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1.0 Introduction

The analysis within this annual report aims to provide an overview of beach performance and wave and tidal measurements for North Kent (Isle of Grain to North Foreland), from the strategic regional coastal monitoring project, utilising data collected during the last recording year. Topographic surveys are conducted at all viable sites using land based RTK GPS in the spring 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 2012) and the comparable data from Spring 2011.

All profile data was imported into SANDS® for analysis. This enables cross sectional areas (CSA) to be calculated providing a representative beach between a landward point, master profile and beach toe location (Figure 1.1). Where available, seawalls are located spatially using a combination of design schematics and a sea defence survey conducted in 2003. Master profiles are set at 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 in 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 management 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 management 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 (2012).

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 1.2: Management Unit Overview
2.0 Condition of Management Units

To provide an overview of the annual change in each management 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 (m$^2$) and are presented in Table 2.1.

<table>
<thead>
<tr>
<th>Management Unit</th>
<th>No. of Profiles</th>
<th>Average Change (%)</th>
<th>Average Change (m$^2$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A - Allhallows West</td>
<td>7</td>
<td>10.38</td>
<td>1.25</td>
</tr>
<tr>
<td>1A - Allhallows</td>
<td>9</td>
<td>-8.18</td>
<td>-0.36</td>
</tr>
<tr>
<td>1B - Grain Village</td>
<td>4</td>
<td>-0.75</td>
<td>-0.5</td>
</tr>
<tr>
<td>1C - Grain Power Station</td>
<td>5</td>
<td>-6.8</td>
<td>-0.6</td>
</tr>
<tr>
<td>2A - Sheerness Docks</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2B - Sheerness</td>
<td>12</td>
<td>1.08</td>
<td>1.75</td>
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<tr>
<td>2C - Minster Cliffs</td>
<td>2</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>3A - Warden Bay</td>
<td>12</td>
<td>-3.75</td>
<td>-0.83</td>
</tr>
<tr>
<td>3B - Shellness Point</td>
<td>7</td>
<td>1.71</td>
<td>-0.57</td>
</tr>
<tr>
<td>3C - Harty Ferry</td>
<td>4</td>
<td>-2.5</td>
<td>-0.75</td>
</tr>
<tr>
<td>4A - Seasalter</td>
<td>18</td>
<td>-0.68</td>
<td>-0.15</td>
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<td>4B - Whitstable</td>
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<td>1.23</td>
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<td>5A - Tankerton</td>
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<td>0.42</td>
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<tr>
<td>5B - Swalecliffe</td>
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<td>1.11</td>
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<tr>
<td>5C - Herne Bay</td>
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<td>5.82</td>
<td>0.53</td>
</tr>
<tr>
<td>5D - Bishopstone</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>5E - Northern Sea Wall</td>
<td>23</td>
<td>-2.65</td>
<td>-3.09</td>
</tr>
<tr>
<td>6A - Minnis Bay</td>
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<td>-3.67</td>
<td>-4.00</td>
</tr>
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<td>6B - Margate</td>
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<td>6C - Cliftonville</td>
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<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

These results are also illustrated as coloured thematic maps in Figures 2.1 & 2.2. As with the detailed profile maps, the colour scheme illustrates erosion (red), accretion (blue) and no significant change (grey).

The results also reflect a short-term trend through just a snapshot in time, these figures can be viewed as a starting point, but individual profiles should be examined 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 project in 2003, or even further back where reliable historic data exists.
Figure 2.1: Profile Summary
Figure 2.2: Profile Summary
3.0 Profile Change Summary

Changes along individual profiles within each management unit are summarised in a series of thematic maps on the following pages. The maps show the location of each beach profile, superimposed on an aerial photograph (note the lines have been extended for clarity). Where possible the annual change in cross-sectional area (CSA) has been calculated from Spring 2011 to Spring 2012.

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 (2012). These help to establish if recent changes in beach morphology are consistent with medium-term trends or an anomaly that has occurred in the past year.
4.0 Hydrodynamic Data

Herne Bay Step Gauge

Location
OS: 616895E 169377N
WGS84: Latitude: 51° 22.919' N Longitude: 01° 06.934' E

Water Depth
N/A

Instrument Type
Etrometa Step Gauge

Data Quality

<table>
<thead>
<tr>
<th>Recovery rate (%)</th>
<th>Sample interval</th>
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<tbody>
<tr>
<td>89</td>
<td>20 minutes (2011); 30 minutes (2012)</td>
</tr>
</tbody>
</table>

Monthly Statistics – 2011/12

<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>0.20</td>
<td>3.0</td>
<td>2.8</td>
<td>-</td>
<td>-</td>
<td>29</td>
</tr>
<tr>
<td>May</td>
<td>0.20</td>
<td>2.8</td>
<td>2.7</td>
<td>-</td>
<td>-</td>
<td>31</td>
</tr>
<tr>
<td>June</td>
<td>0.19</td>
<td>2.7</td>
<td>2.7</td>
<td>-</td>
<td>-</td>
<td>29</td>
</tr>
<tr>
<td>July</td>
<td>0.19</td>
<td>2.9</td>
<td>2.7</td>
<td>-</td>
<td>-</td>
<td>30</td>
</tr>
<tr>
<td>August</td>
<td>0.16</td>
<td>2.8</td>
<td>2.6</td>
<td>-</td>
<td>-</td>
<td>29</td>
</tr>
<tr>
<td>September</td>
<td>0.13</td>
<td>2.7</td>
<td>2.6</td>
<td>-</td>
<td>-</td>
<td>30</td>
</tr>
<tr>
<td>October</td>
<td>0.18</td>
<td>3.1</td>
<td>2.8</td>
<td>-</td>
<td>-</td>
<td>31</td>
</tr>
<tr>
<td>November</td>
<td>0.16</td>
<td>3.2</td>
<td>2.7</td>
<td>-</td>
<td>-</td>
<td>30</td>
</tr>
<tr>
<td>December</td>
<td>0.22</td>
<td>2.9</td>
<td>2.7</td>
<td>-</td>
<td>-</td>
<td>31</td>
</tr>
<tr>
<td>January</td>
<td>0.11</td>
<td>3.1</td>
<td>2.8</td>
<td>-</td>
<td>-</td>
<td>27</td>
</tr>
<tr>
<td>February</td>
<td>0.09</td>
<td>3.3</td>
<td>2.9</td>
<td>-</td>
<td>-</td>
<td>28</td>
</tr>
<tr>
<td>March</td>
<td>0.06</td>
<td>3.2</td>
<td>2.9</td>
<td>-</td>
<td>-</td>
<td>29</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>02-May-2011 23:20</td>
<td>1.32</td>
<td>4.3</td>
<td>3.8</td>
<td>-</td>
<td>2.17</td>
<td>HW -1</td>
<td>3.8</td>
<td>0.02</td>
<td>0.15</td>
</tr>
<tr>
<td>05-Jun-2011 01:00</td>
<td>1.29</td>
<td>3.7</td>
<td>3.6</td>
<td>-</td>
<td>2.07</td>
<td>HW -1</td>
<td>4.3</td>
<td>0.28</td>
<td>0.33</td>
</tr>
</tbody>
</table>

* Tidal information is obtained from the nearest recording tide gauge (the step gauge also provides tidal data). 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.
Profile Change Summary for Spring 2011 to Spring 2012 - 1 of 2

Annual Change in Cross-Sectional Area (m²) (Spring 2011 - Spring 2012)

- **Accretion**
  - > 30%
  - 15 - 30%
  - 5 - 15%

- **No Change**
  - Less Than 5%

- **Erosion**
  - 5 - 15%
  - 15 - 30%
  - > 30%
Profile Change Summary for Spring 2004 to Spring 2012 - 1 of 1

MU3C - Harty Ferry
Distribution plots

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

- Percentage of occurrence of $H_s$, $T_p$ and $T_z$ from April 2011 to March 2012
- Monthly time series of $H_s$ (red line is 1.6 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

Summary

This was a quiet reporting year with no storms recorded during the period.

General

The Step Gauge was first deployed on 19 March 1996.

Acknowledgements

TASK2000 tidal prediction software was kindly provided by the Permanent Service for Mean Sea Level, Proudman Oceanographic Laboratory.
Figure 4.1: Percentage of occurrence of Hs, Tp, Tz & Direction (April 2011 - March 2012)
Figure 4.2: Hs at Herne Bay April 2011 to March 2012
Figure 4.3: Storms at Herne Bay from April 2011 to March 2012

Storms at Herne Bay from Apr 2011 to Mar 2012

Storm threshold is Hs ≥ 1.8m

Missing data

Storms at Herne Bay - all years

Hs (m)

Date

Jul97 Jan00 Jul02 Jan05 Jul07 Jan10
5.0 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.

5.1 Isle of Grain

5.1.1 MU1A - Allhallows West (Profiles Te09468 – Te09500)

This section has been monitored since spring 2008; therefore a long term analysis is unavailable. The short term trend has shown erosive tendencies; although this reporting year appears to reverse the previous trend with gains shown on all profiles. Profile Te209479 shows a 30% increase which appears to be very significant, however this equates to only a 3m² gain in beach material. Most of the beaches on the Isle of Grain are very small so the CSA value is easily skewed to suggest a large change. The profile extends 50m onto the deep mud foreshore, this again, can skew the CSA values; which must be kept in mind when analysing Isle of Grain CSA values.
5.1.2 MU1A – Allhallows (Profiles 4a00001 – 4a00057)

The beach at All Hallows is predominantly undefended and so volumetric change reflects natural movements due to wave action. Typically the net change is very small which is reflected in the 2011/2012 monitoring data. Within the last year, only two profiles show significant percentage changes however these typically reflect <2m$^2$ loss indicating a very small availability of sediment.

The longer term analysis studies fewer profiles as not all the profiles were surveyed until 2008. However, the overall long term trend is one of minor erosion, despite significant percentage changes. 4a00036 shows a typical cross section through a profile in this section with losses shown below MHWS and the beach crest translating up the beach face. The average change per profile within this unit is -8.18% (-0.36m$^2$)

Figure 5.1: Profile 4a00036 Allhallows
5.1.3 MU1B – Grain Village (Profiles 4a00058 – 4a00099)

MU1B showed gains in material in the south of the section, while the north eroded; overall the net change per profile was -0.75% (-0.6m$^2$). Profile 4a00086, just south of the change in coastline orientation, showed the largest gain of 18% (6m$^2$). This is likely due to the predominance of northerly winds over the winter period, bringing material from northerly profiles. Profile 4a00073, located in front of Grain Village car park, shows a loss of 8m$^2$ (22%). This is due to this profile falling on an extraction site for a beach replenishment undertaken in March 2012. The large beach crest extending above MHWS has been removed (figure 5.2) to replenish groyne bays just south of this profile. This profile has historically shown a large accretion with the beach toe translating 5m seawards and the development of a large beach crest (removed this year). The terminal groyne just north of this profile traps a relatively large amount of the sediment moving northwards contributing to this build up; making it a suitable extraction site.

The net long-term change shows a small volumetric gain across all profiles. Having said this, profile 4a00073 shows a 57% (10m$^2$) gain since 2004. This is despite the 8m$^2$ extraction loss this year.

5.1.4 MU1C – Grain Power Station (Profiles 4a00100 – 4a00141)

Over the latest reporting period the profiles at Grain power station all show losses of material. The northern section seems to have lost more material with losses of 12 and 20%. However, these losses, again, only equate to very small actual volumetric changes of less than 2m$^2$. This highlights the small nature of the beaches on the Grain frontage.

This minor change has been shown for the previous two monitoring years with a switch between negligible erosion and accretion. This trend is further reflected in the longer timescale, with all profiles showing beach changes of <2m$^2$ losses. The sediment starved nature of these beaches explains the low volumetric change on this frontage.
5.2 Isle of Sheppey

5.2.1 MU2A – Sheerness Docks (n/a)
Sheerness Docks is the main feature within this management unit and as a result no topographic beach surveys are undertaken in this unit.

5.2.2 MU2B – Sheerness (Profiles 4a00142 – 4a00281) & MU2C – Minster Cliffs (Profiles 4a00282 – 4a00295)
Most profiles along this frontage are typified by relatively low beach levels, with crest heights in the region of 1-3m ODN. In the last year, all significant change recorded has been accretive, with the exception of Profile 4a00193 which lost 15% (37m$^2$) since 2011.

The western end of MU2B is characterised by groyne bays, explaining the trend of greater accretion in the west over both the past year and since 2004. The profile with the highest accretion over the longer timescale is Profile 4a00153 (48%, 44m$^2$), which is located in the west of the management unit. Profile 4a00193, near Barton’s Point, has previously shown a large amount of accretion in line with other western profiles on this frontage. However, during 2011 – 2012 the profile lost 37m$^2$ (15%) leading to a loss of 23m$^2$ (10%) since monitoring began. This large-scale loss is due to extracted material used to recycle beaches further east of this location. It can be seen from Figure 5.3, that the main beach crest has been removed, which had previously been accreting. The volume removed is vastly greater than the volume that had built up over the previous 7 years, so recovery is expected to be slow. The main beach crest now resides 1.5m above MHWS which could present a problem during storm conditions. Consequently this profile should be carefully monitored.

Figure 5.3: Profile 4a00153 Sheerness

Most of MU2C is composed of soft cliff, and is not part of the topographic survey programme. However, two profiles are surveyed within this unit, both of which have
experienced no significant change over the past year. In the longer term MU2C is characterised by minor accretion.

5.2.3 MU3A – Warden Bay (Profiles 4a00333 – 4a00431)
Along this section of coast a number of management structures are currently in place. The cliffed section of the Warden village has a toe defence structure, which limits but does not prevent erosion. The low-lying section of Warden is currently defended by a concrete seawall. At ‘The Bay’ there is a secondary defence (clay bund), whilst at Leysdown-on-Sea there is a concrete seawall and 25m spaced timber groynes. Leysdown beach is characterised by a shallow gradient, sand beach.

Over the past year, there has been no apparent pattern of significant change along the management unit. The greatest loss was experienced at Profile 4a00345 (25%); however the actual CSA loss associated with this profile is only 6m², highlighting the small availability of sediment. The largest percentage gain is at Profile 4a00395 (12%/4m²). The remaining profiles in the unit displayed no significant change over the past monitoring year, with CSA gains and losses varying between 0-2m².

The long term changes (2004-2012) have indicated a more varied trend; the majority of the larger volume changes are located towards the northeast, particularly at Profile 4a00345 and 4a00357. Having said this, Profile 4a00415 has gained 33% (6m²). The smaller CSA changes in the southeast can be explained by the presence of groynes, whereas a lack of influential defence towards the north-east along the long open stretches of beach enables a greater movement of material.

5.2.4 MU3B – Shellness Point (Profiles 4a00433 – 4a00491)
This management unit is fairly heavily groyned along its frontage, possibly accounting for the observations of slight volumetric change of less than +/-5m². The most significant change is located at Profile 4a00436 which gained 22% (3m²) during the most recent recording year.

The long term trends demonstrate greater values which are predominantly erosive. Profiles 4a00454 and 4a00470 have lost 44% (25m²) and 35% (42m²) respectively, since monitoring began. Profile 4a00470 has been included in Figure 5.4. The substantial loss over the whole beach face is clearly evident with a retreat by as much as 11m in places. The most recent annual loss of 6% (2m²) is also provided, displaying a 1m landward retreat since the previous monitoring period. Profiles that should be closely watched in the future are 4a00454 and 4a00470 as the beach crest now exists just 1m above MHWS.
5.2.5 MU3C – Harty Ferry (Profiles 4a00493 – 4a00515)
MU3C is located on the end of the spit at Shellness, and as such is more dynamic than the previous management units. The net volumetric change during 2011 to 2012 is erosive with only the two northern profiles showing minor accretion. The main loss is represented by Profile 4a00505 with a 16% loss (8m$^2$). This continues the long term trend, having previously shown a significant loss.

The mean long term trend for this section is accretive, a trend dominated by one profile with a large gain; Profile 4a00514 has gained 82% (35m$^2$) since 2004. It would appear that beach material is moving northeast to southwest resulting in sediment build up along this profile, which corresponds with predicted spit development. It is believed that part of this gain is due to the significant loss at Profile 4a00505.

Figure 5.5 demonstrates the extent of the accretion visible at Profile 4a00514. The main beach slope has closely maintained its gradient, however advancing by up to 15m since 2004. Within the last year the slope has advanced by as much as 4m in places. The foreshore has changed considerably over the long term however not so significantly in the short term.
5.3 Canterbury District

5.3.1 MU4A – Seasalter (Profiles 4a00539 – 4a00677)
The area fronting Seasalter tends to have a very low abundance of beach grade sediment. This is shown in the very low annual changes in beach volume due to a lack of available sediment to be transported, a result of the highly protected Whitstable beach. Consequently beach changes are typically less than 5% over the latest monitoring period and indicate a trend of stability.

Profile 4a00562 shows the only significant change across the management unit with a net loss of 17% or 3m$^2$. Although the actual volume loss is small, it is deemed significant in relation to the very small volumes of material along these profiles. This loss is likely to be due to a change in orientation of the coastline sheltering the coastline immediately west of the bend. This causes sediment to bypass this profile, into Profiles 4a00554 and 4a00546. Profile 4a00670 shows a gain of 10% (3m$^2$) which is seen across the whole beach face. This is likely to be a result of the material moving from the sailing club, replenished in 2010, in a westerly direction.

Although there have only been relatively minor CSA changes within MU4A during the past year, there has been much more significant change overall in the eight years since monitoring began. An area of significant activity can be seen on the beach fronting the Sportsman’s pub. Profile 4a00593 has lost 34% of its CSA (22m$^2$), as it is slightly more exposed than adjacent profiles. The profile experiences significant cliffing (Figure 5.6) which explains the high rate of erosion. Immediately east of this location, Profile 4a00602 is one of the more accretive profiles (62%, 17m$^2$). This groyne is of a much
better standard than surrounding groynes which could explain the large accretion since monitoring began. This highlights the importance of permeability in efficient groyne design.

The replenishment undertaken in 2010 is skewing the CSA changes for the eastern end of the management unit, which prior to 2010 showed significant losses. Castle Coote Spit is a sediment sink for the North Kent coastline at the western extent of MU4A and has historically accreted material, as demonstrated by the two profiles to the east of the spit which both accreted between 2011 and 2012 (4a00546 and 4a00554). Both of these profiles have also seen significant increases in beach CSA since the onset of the project in 2003.

5.3.2 MU4B – Whitstable (Profiles 4a00676 - 4a00801)

Whitstable beach underwent a capital scheme in 2006 to reduce loss of beach material through littoral drift, and decrease the likelihood of flooding through greater beach levels. This justifies the chosen baseline year of 2007 as prior to the groyne scheme, beach volumes were vastly different. The short term trend indicates the continued success of the groyne field, with the majority of profiles experiencing less than 2% change during the 2011/2012 monitoring period.

There were three significant changes in beach volume over the reporting period, all found in front of the Whitstable Golf Course. Profile 4a00739 lost 7% of beach material (9m$^2$) while profiles 4a00742 and 4a00743 gained a large amount of material (25%/12m$^2$ and 72%/25m$^2$ respectively). These losses are due to beach recycling undertaken in October 2011 where 1,444m$^3$ of beach material was extracted from a build up west of...
Profile 4a00739 and deposited to the east of the groyne bay to greatly increase the crest width in front of the beach huts. This can be seen in Figure 5.7. This area was previously losing material at a rate of c.5%/year, due to a 300m break in the groynes at this location.

The long term trends further shows the success of the beach management scheme, with minor beach volume changes (<5%) shown across the management unit. In the middle of the unit, fronting the golf course, CSA volume changes can be seen to have reduced by as much as 12%, consistent with the short term analysis. This can be seen in Figure 5.8 by a recession of 12m over 4 years. The break in the groyne field had allowed material to travel in the predominant direction from east to west, building up in the down drift groyne bays; subsequently these bays were also full and material was being transported towards Seasalter.

![Figure 5.7: Profile 4a00743 Whitstable](image)

5.3.3 MU5A – Tankerton (Profiles 4a00802 – 4a00904)

There have been two sets of capital work carried out in MU5A since monitoring began in 2003. The third phase of the Tankerton coastal defence works, stretching from the sailing club to the mouth of Swalecliffe brook, was completed in the summer of 2004. In addition, as part of the 2006 Whitstable scheme, new groynes, a ramp and a small amount of recharge were carried out east of Whitstable harbour. Profile 4a00811A was subsequently introduced to replace 4a00811; and as a result uses data from 2006 onwards. It currently displays 0% loss and 0m$^2$. Similarly, profiles 4a00869 to 4a00884 were affected by the 2004 coastal works; leading the profiles to also display 0% change and 0m$^2$ change so have been removed from the longer time period trends.

Between 2011 and 2012, there has been very little significant change in CSA in MU5A. This suggests that the groyne field, which covers much of this section of coastline, is keeping beach material in place. Furthermore, within the whole management unit the
losses and gains average just $-1\text{m}^2$ change, indicating the beach behaviour is primarily confined to the sub cell; a result of the harbour wall to the west and the protruding headland at the east.

Similarly the long-term trend is fairly stable, demonstrating only minor overall beach change since monitoring began. The largest losses reach 9% and 10% (Profiles 4a00808 and 4a00822), located towards the western end. This is due to the predominant drift direction transporting material from east to west. The only profile displaying a significant change is Profile 4a00891 which increased by 48% or $23\text{m}^2$. This profile is located next to the mouth of Swale Brook and has displayed significant sediment deposition as a result of the development of the spit. Although this profile is showing a large long and short term gain, this is heavily skewed by the recent deposition of material in October 2011. The groyne bay of Profile 4a00891 and neighbouring bays (east) gained $1,835\text{m}^3$ which has directly impacted the CSA value.

Figure 5.8: Profile 4a00891 Tankerton
5.3.4 MU5B – Swalecliffe (Profiles 4a00905 – 4a00967)
This section runs between Hampton Pier and Long Rock, backed by a sea wall and dense groyne field. The dominant sediment flow is east to west; however, the presence of Hampton Pier hinders this movement.

As with previous management units, there has been little significant change in the majority of profile CSA, with most profiles showing less than 5% change since spring 2011. However, the east of the section shows two accreting and one eroding profile lines. Profile 4a00959 experienced the greatest beach change, gaining 17% (9m$^2$) of material, while Profile 4a00954 shows a significant loss of 13% or 9m$^2$. It is possible that this is a reversal of the dominant longshore drift direction or due to a build up of fine sediment. This section often experiences variability due to the terminal structure of Hampton Pier.

Over a longer timescale the profiles within this section display a varied trend, the general pattern however appears to be of minor accretion along the central section of the unit, with erosion at either ends. The largest total net gain over the past 7 years is 29%/12m$^2$, recorded at Profile 4a00937. The greatest loss over the same time frame is located at Profile 4a00959 (12%/9m$^2$), although this is skewed slightly by the large accretion in the latest reporting year.

5.3.5 MU5C – Herne Bay (Profiles 4a00970 – 4a01148)
Extending from Hampton Pier to Bishopstone Cliffs, most of this unit encompasses the Herne Bay frontage. Regular recycling is conducted along this coastline, predominantly within the breakwater arm, with most material being placed by the pier and westwards of this point. The works also incorporate some recognition of the beach for aesthetic and recreational purposes; as a result this work is typically carried out in the spring prior to the summer season.

In comparison to previous years, 2011-2012 has been a fairly active year in terms of beach change. The levels of erosion and accretion vary considerably across the frontage. Table 2.1 indicates an average gain of 5.82% and 0.53m$^2$, however this value is skewed by a significant gain at profile 4a00991 with an increase of 66% or 14m$^2$. Figure 5.9 shows the CSA change for this profile showing a gain across the whole beach face restoring the profile to a near baseline condition. This gain is mirrored by a loss at Profile 4a00970, losing 10% or 14m$^2$. These two profiles have historically shown reversed trends to those recorded here, shown in the long term changes. This could imply a switch in the dominant drift direction under the current monitoring year, potentially due to the presence of a large amount of North-Easterly winds.
This observation is further backed up when looking at the profile with the greatest loss, Profile 4a01036 (-9%/-13m$^2$), shown in Figure 5.10. This profile has shown an increase of 646m$^2$ (48%) over the longer timescale, showing that it is a significant sediment sink due to its proximity to Neptune’s arm, acting as a terminal structure. The fact that the two terminal structures of Hampton Pier and Neptune’s arm have shown erosion over the last year give strength to the theory of a reversal in the predominate drift direction.
The overall long-term trend is one of considerable accretion across the whole frontage. As stated previously, profiles situated to the east of terminal structures and on the east of effective groyne bays show the most significant gains of upwards of 50%. The profiles within Neptune’s arm show little change indicating stability. However, these profiles are subject to significant recycling which is not evident from the long term change diagrams.

5.3.6 MU5D – Bishopstone (Profiles 4a01149 – 4a01175)
This management unit is surveyed at the beginning of every phase; once in 2003 and 2007. A short term and long term analysis are unavailable. The next survey within this management unit will be the Summer of 2012.

5.3.7 MU5E – Northern Sea Wall (Profiles 4a01180 – 4a01298)
Stretching from the Reculver Towers to Minnis Bay, this section of coastline was heavily recharged in 1997, with the addition of a several large rock groynes at 200m intervals. Regular beach monitoring has been conducted since the scheme completion.

During 2011-2012 the most erosive profile was Profile 4a01180 (-27%/-9m$^2$), the most westerly profile. The largest gain was measured at Profile 4a01195 (14%/14m$^2$) to the east of the unit. The remaining profiles in MU5E generally experienced no significant CSA changes over the past year, with about half the profiles showing minor erosion.

The western extent of this unit is particularly prone to cliffting. Year on year, erosion is shown in the majority of these profiles particularly focussed around the high water mark leading to the cliffed profiles shown below. This is likely to be due to the shingle/sand composition of beach material providing higher internal friction angles, allowing for a steeper beach profile than in a solely sand or shingle beach make-up.
Over a longer timescale (2004-2011), the trends are fairly similar to that of the past monitoring year. In general, the western half of MU5E is characterised by erosion, while accretion dominates the east. Profile 4a01180 shows a total loss of 40% (16m$^2$) showing the repeated annual loss displayed in the most recent monitoring year. However, no significant accretion was registered on Profiles 4a01265 and 4a01269 during 2011-2012. This is not displayed over the longer timescale, with the profiles showing gains of 45%/33m$^2$ and 36%/41m$^2$. These profiles accrete due to the transportation of material from the western eroding profiles, down to the eastern end of this management unit. Other profiles further east of this location do not show such significant build up due to the extraction of material for beach recycling.

5.4 North Thanet

5.4.1 MU6A – Minnis Bay (Profiles 4a01299 – 4a01338)
Comprising Minnis Bay, and marking the Thanet district boundary, this management unit forms a transition to predominantly sand beaches. As a result, beach gradients are typically a lot shallower. Therefore, beach recycling is not necessary within this management unit due to the pocket beach characteristics; however regular regrading of the beach face occurs through the use of heavy plant.

Between 2011 and 2012 there was a trend of erosion noted throughout all profiles except for the most eastern profile, Profile 4a01335, which gained 4m$^2$ (25%). All other profiles showed losses of less than 10%, typically equating to less than 6m$^2$ of the CSA. These changes are likely to be due to the annual regrading and recycling of material within this pocket beach.

The long term trend mirrors the short term records, with erosion to the west and minimal change in the centre of the bay. The greatest loss and greatest overall change for this management unit since 2004 is 18% (-22m$^2$) at Profile 4a01304, mirroring the short term trend despite the fact that this profile has been accreting over the previous two monitoring years.

5.4.2 MU6B – Margate (Profiles 4a01359 – 4a01441)
The two pocket beaches at Westgate-on-Sea, in the west of the unit, have relatively low beach levels with the beach crest at the seawall typically below 2m ODN. Beach recycling is not necessary within this management unit due to the pocket beach characteristics; however regular regrading of the beach face occurs through the use of heavy plant.

In the past year (2011-2012), there has been no obvious trend in accretion or erosion, with very little significant activity. The eastern pocket beach shows the most significant movements with Profile 4a01412 showing a gain of 19% (614m$^2$) and Profile 4a01421 showing a loss of 9% (85m$^2$).

These patterns are mirrored over the longer timescale. Small changes are noted on the majority of profiles, with the exception of profile 4a01412 and 4a01421 which show accretion and erosion respectively. However, one significant change is noted on the western pocket beach on profile 4a01366, showing a 77% increase or 1,777m$^2$ gain in sediment.

5.4.3 MU6C – Cliftonville (n/a)
No topographic beach surveys are conducted in this unit.