

Welcome to Dover District Council's exhibition about the construction work planned for Kingsdown. In this exhibition we explain why the works are needed, what is going to be done, where it will be carried out and when it's likely to happen. It also discloses how the construction work is likely to affect residents, visitors and wildlife and the steps we shall take to mitigate against this disruption.

The start and finish dates we give for the various parts of the work have to be treated with a bit of caution. All construction work, and particularly work on the coast, is subject to events beyond our direct control – storms and bad weather, for instance, will slow things down, good weather will help them along. The dates and times we have given are our best estimate right now and we intend to update them as the job progresses.



East Kent Engineering Partnership's staff have designed the project and they will be supervising its construction on a day-to-day basis.

Wijma Uk Ltd have been awarded the contract to supply the groyne timber.

The main contractor for the sea defence works has not been appointed yet.

The final, but most important, partner in the team is of course you. Residents of Kingsdown, interest groups and Councillors have all been very helpful in progressing the project. There will inevitably be some disruption and disturbance whilst the works are on-going but we will try hard to avoid it as much as possible.

## WHO CAN I CONTACT FOR MORE INFORMATION?

We hope this exhibition answers all your questions but if there is anything else you want to know, or if there's something you want to tell us about the job, then here's how to get in touch.

You can contact:

**Liam Woollorton**

Canterbury City Council

Direct dial 01227 862454

[liam.woollorton@canterbury.gov.uk](mailto:liam.woollorton@canterbury.gov.uk)

or

**Keith Watson**

Dover District Council

Direct dial 01304 872399

[keith.watson@dover.gov.uk](mailto:keith.watson@dover.gov.uk)





The coastal defences in Kingsdown have reached the end of their design life and now are in desperate need of being replaced. The groynes and sea wall are no longer performing efficiently against erosion and are endangering Kingsdown from risk of flooding and erosion. Several emergency works have been carried out in the past fifteen years and although these works repaired parts of the defences, they are not a long term solution.

The Southeast Regional Coastal Monitoring Programme, which records beach levels three times a year has revealed that Kingsdown is losing approximately 4,400m<sup>3</sup> of shingle every year. The existing seawall has been repaired six times over the past fifteen years (1997, 2002, 2010, 2011, 2013 and 2014) with shingle being scoured from underneath the wall, exposing the base of the seawall and the foundation bearing piles. This is evident in the fact that there have been failures in the seawall in 2011, 2013 and 2014 - further erosion has only been prevented due to the emergency works that have been carried out. These emergency works are only of a temporary nature and the seawall is still at risk from undermining for nearly 400m, i.e. two thirds of its length. Any failure would allow the sea to excavate behind the sea wall, rapidly eroding the shingle beach between the seawall and the houses of Kingsdown.

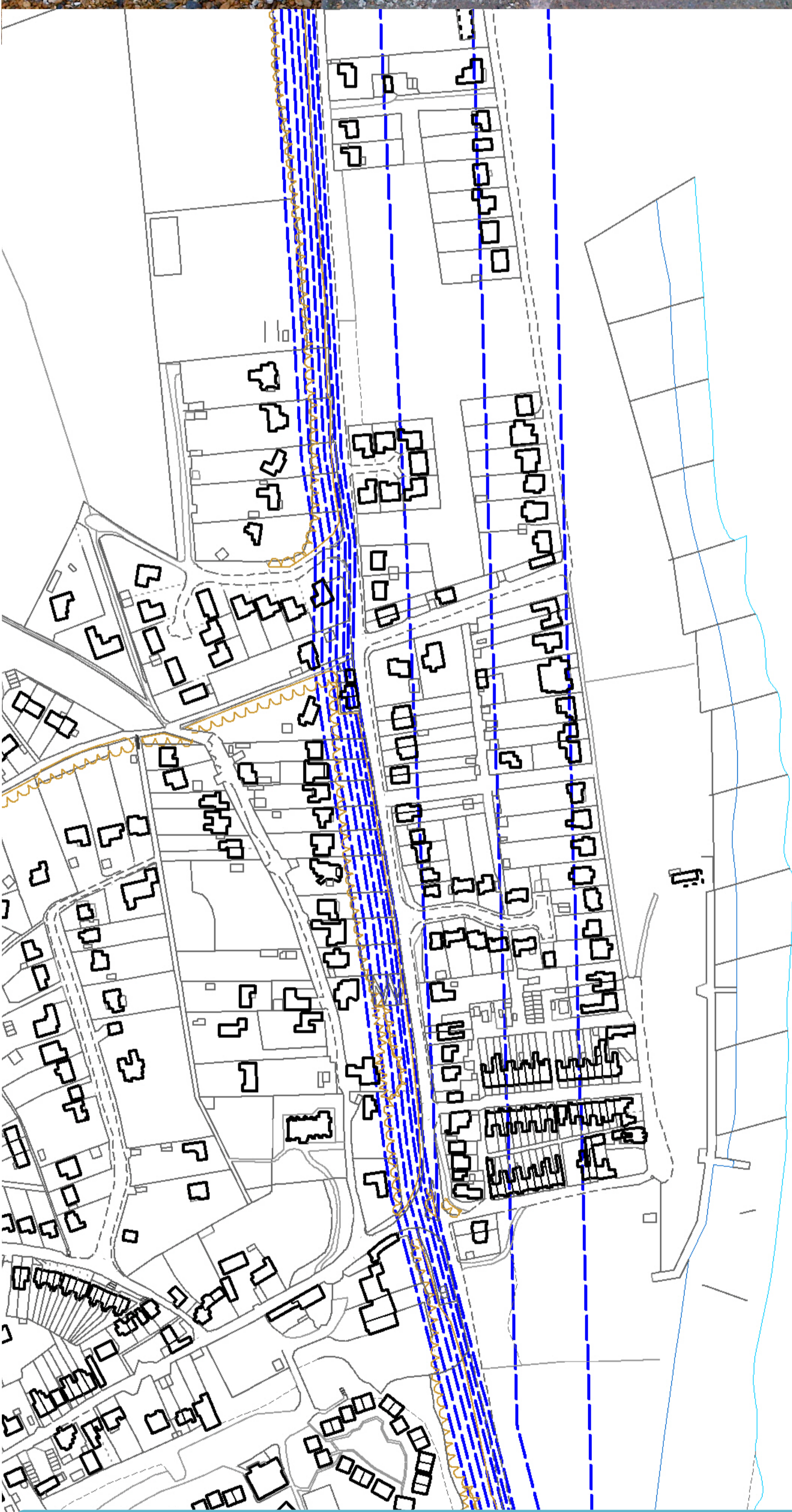
There are currently 14 groynes at Kingsdown, most of which are in a very poor condition; some have almost completely failed. Despite temporary repairs to these groynes, the beach material is able to move freely between the majority of the bays.

Based on the current rate of erosion, if no action was to be taken after a seawall failure:

- The Zetland Arms would be lost to the sea within 5 years.
- The loss of the first property would be within 10 years.
- 173 residential properties and 5 non-residential properties would be lost within 30 years.
- Within 100 years a total of 196 residential and 5 non-residential properties would be lost.

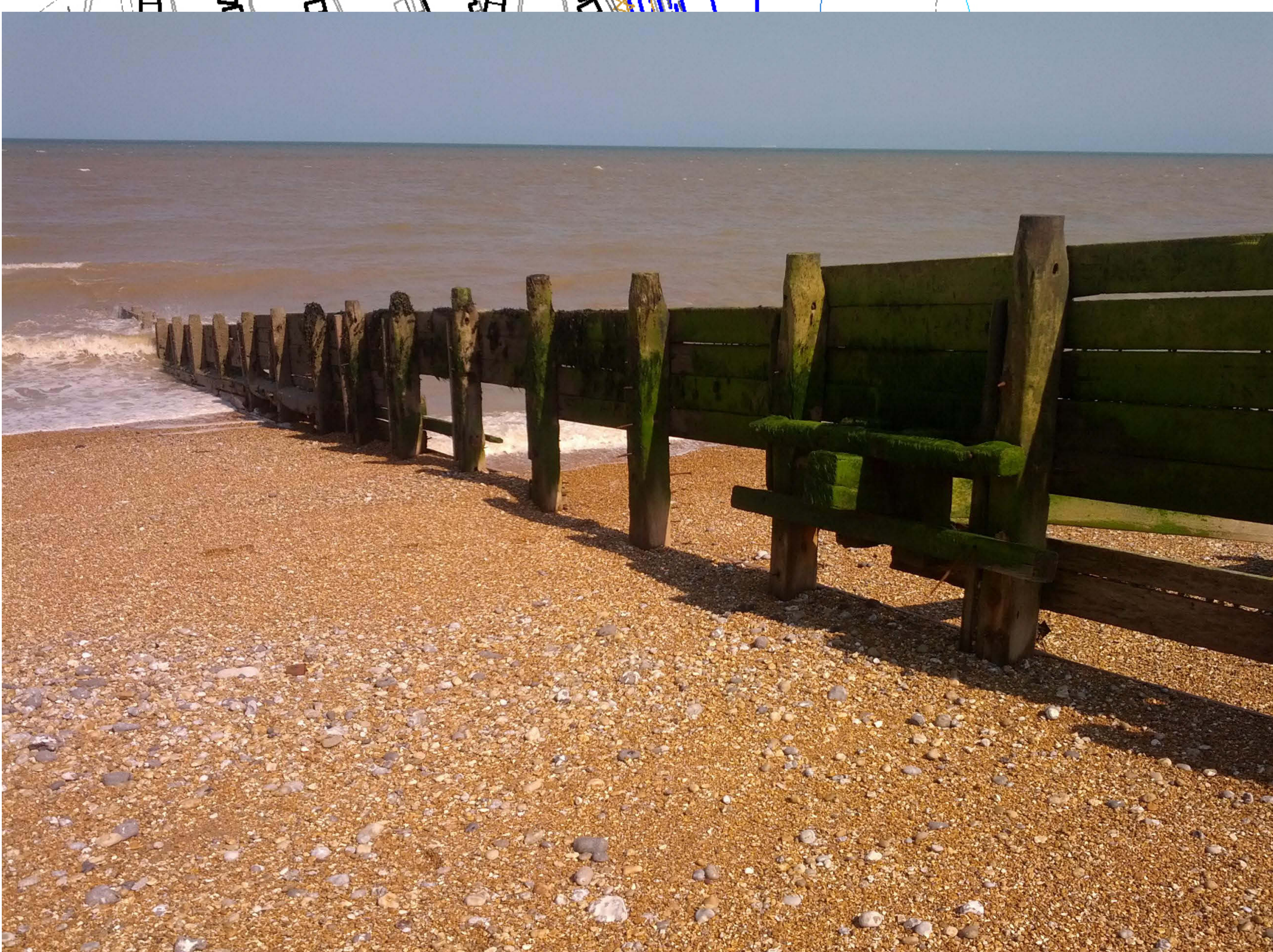
Due to the dilapidated condition of the groynes, the significant erosion of the beach and the ease to which the seawall can fail, the risk of erosion of the land behind is very high. As little as a 1 in 10 year storm could potentially inundate the houses.

The socio-economic impacts of 'doing-nothing' for locals would be severe. As the amenity beach disappears, visitor numbers (currently 145,000 per year) would be expected to decline.



N.B. Each dashed blue contour represents 10 years of erosion.

*Do nothing is not an option!*

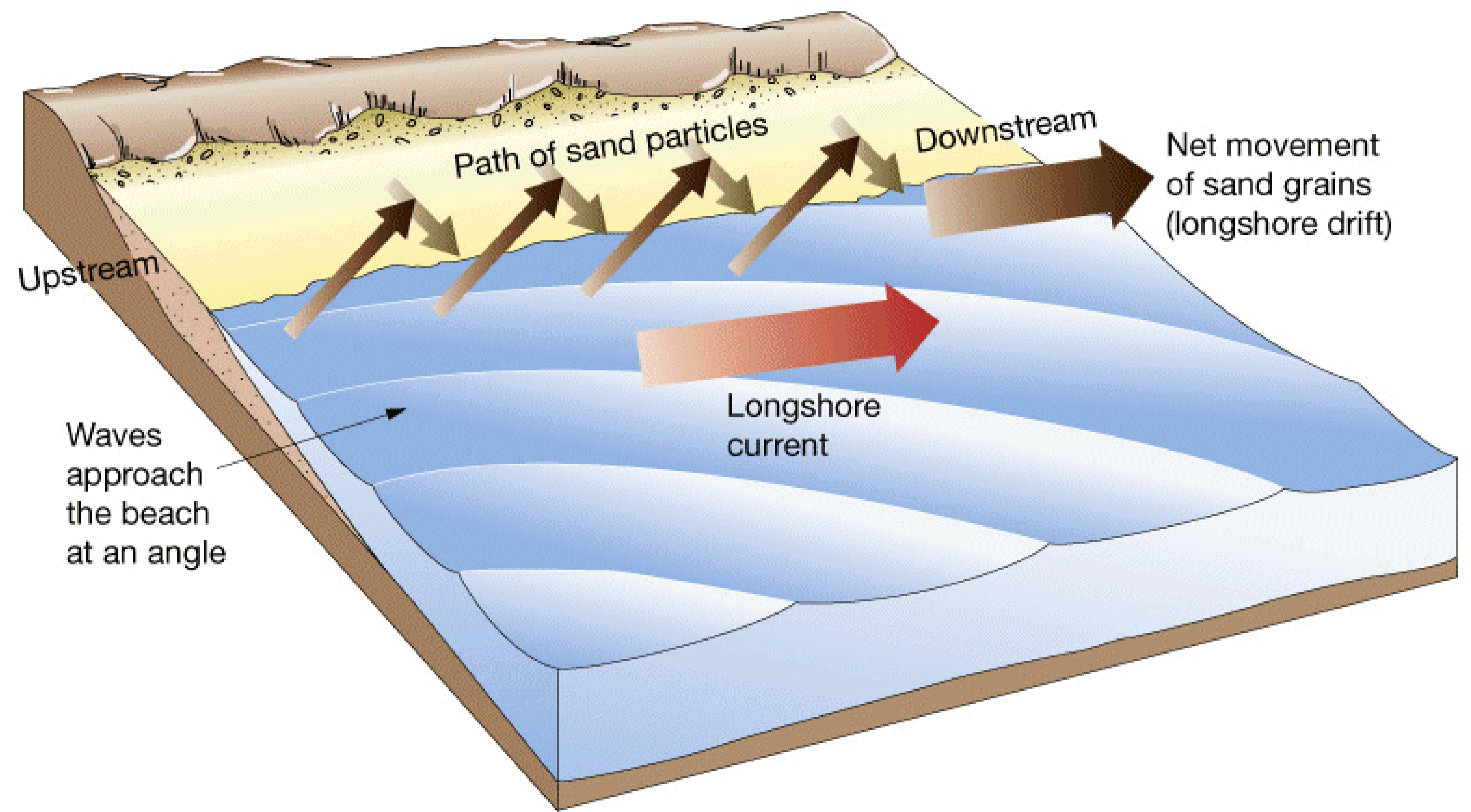


# HOW ARE THESE PROBLEMS GOING TO BE SOLVED?

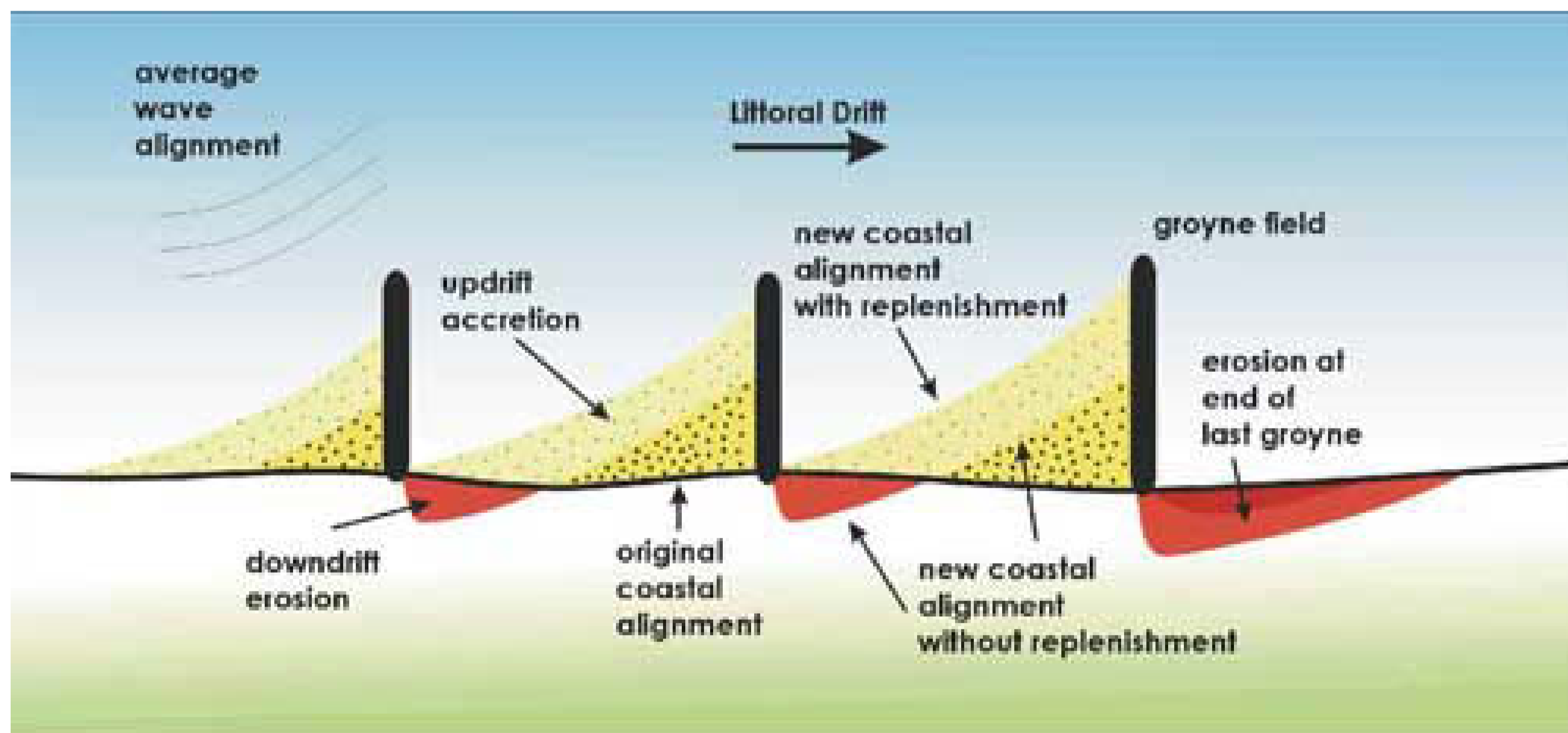
We have looked at a number of ways of improving the sea defences and a scheme based on a **beach with timber groynes** came out as the best of the many alternatives we had studied. A long list of options were examined and included :a new sea-wall in a realigned location, an open plan beach, a much larger beach controlled by groynes involving a significant beach recharge and various rock structures including both revetments and headlands.

Clearly one of the most important considerations is the economics and the large beach and groyne scheme came out on top with the best benefit/cost ratio. Nowadays the possible effects on the environment are also a critical aspect of the decision making process and the scheme we're going ahead with also scored highly in its environmental analysis. Natural England, the Environment Agency and other national and local bodies were closely involved in the analytical process and have confirmed these findings.

Longshore drift, or 'littoral drift' is the movement of material along a coast by waves which approach the shore at an angle and recede directly away from it. We can interrupt this transport of shingle through the use of timber groynes. However by interrupting the flow of shingle, the shape of the coastline is changed: as shingle accumulates on one side of the groyne it is lost on the other as there is now no supply of shingle to this area.

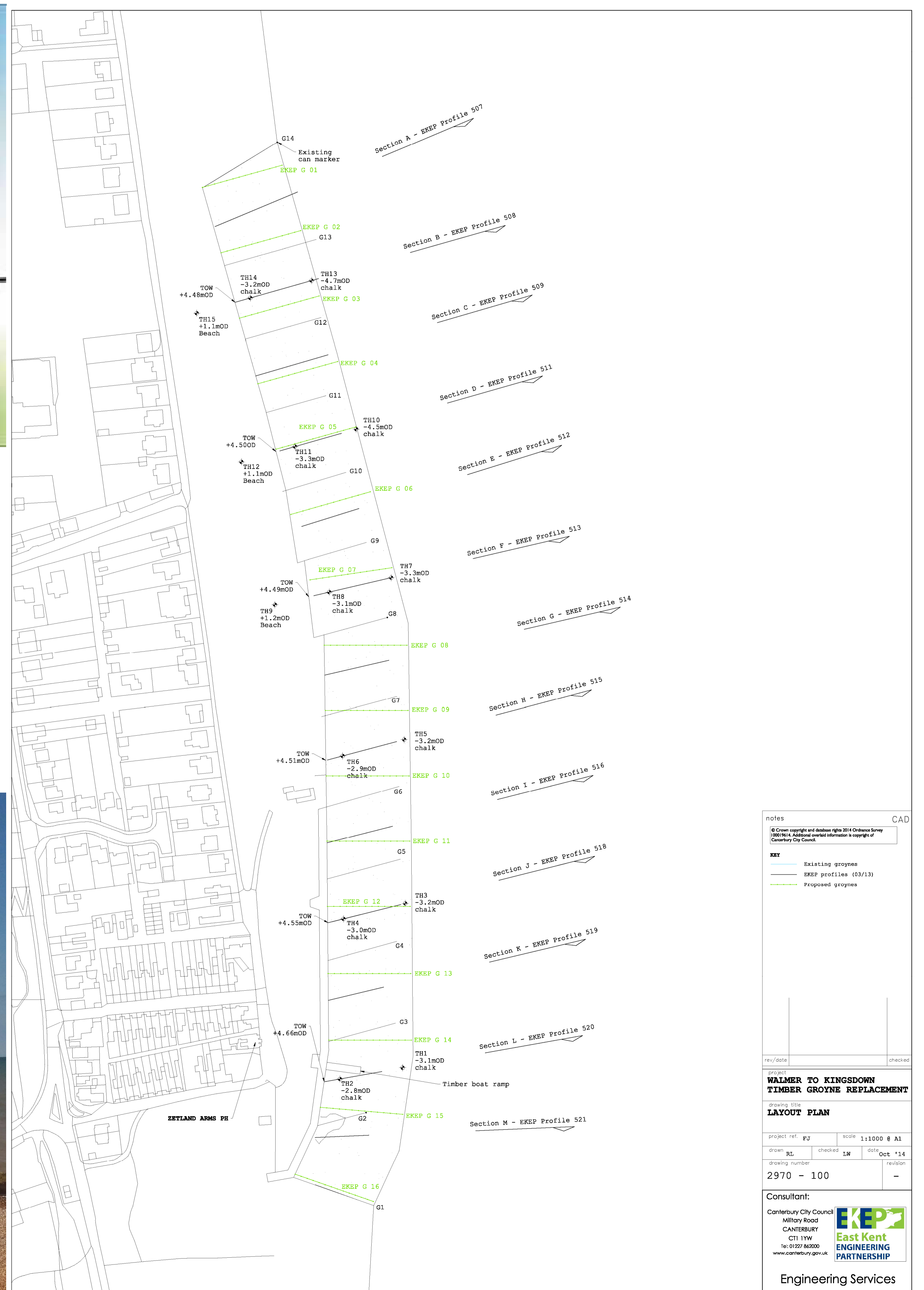


One of the reasons for ineffective defence at Kingsdown is that the current groynes are not aligned perpendicular to the direction of longshore drift. The new groynes are being built in the correct position.



By pairing the groyne works with a supply of recycled shingle to the groyne bays, this problem is overcome.

Using this method of management, the landward advance of the sea can be halted. Beaches provide the best form of protection against wave attack as their porous structure helps dissipate the wave's energy. Therefore by holding onto the beach at Kingsdown, the sea defences can continue to protect us against overtopping, without the fear of undermining.



Proposed works include:

- . Removal of all existing groynes at Kingsdown
- . Construction of 16 new timber groynes
- . Replacement timber boat ramp
- . 24,000m<sup>3</sup> recycling operation of shingle from the Walmer front-age
- . Refurbishment of existing handrails
- . Beach will be built up to the design level of +3.9m OD at the sea wall with an 8m wide berm ; it will be +3.5mOD at the crest with a 1:7 beach slope



*The construction work will be spread along 600m of coastline.*

### Timber Groynes

The existing groynes are in a state of disrepair and are no longer effective at protecting the beach at Kingsdown, which is highly susceptible to erosion. The predominant direction of shingle transport is south to north. During the construction of the existing groynes, their orientation was not fully taken into account and thus the groynes do not trap the shingle effectively. Furthermore, the poor condition of these groynes emphasise their inability to successfully stabilise the beach. To compensate for this, beach recharges must be carried out each year which is a costly and disruptive process.

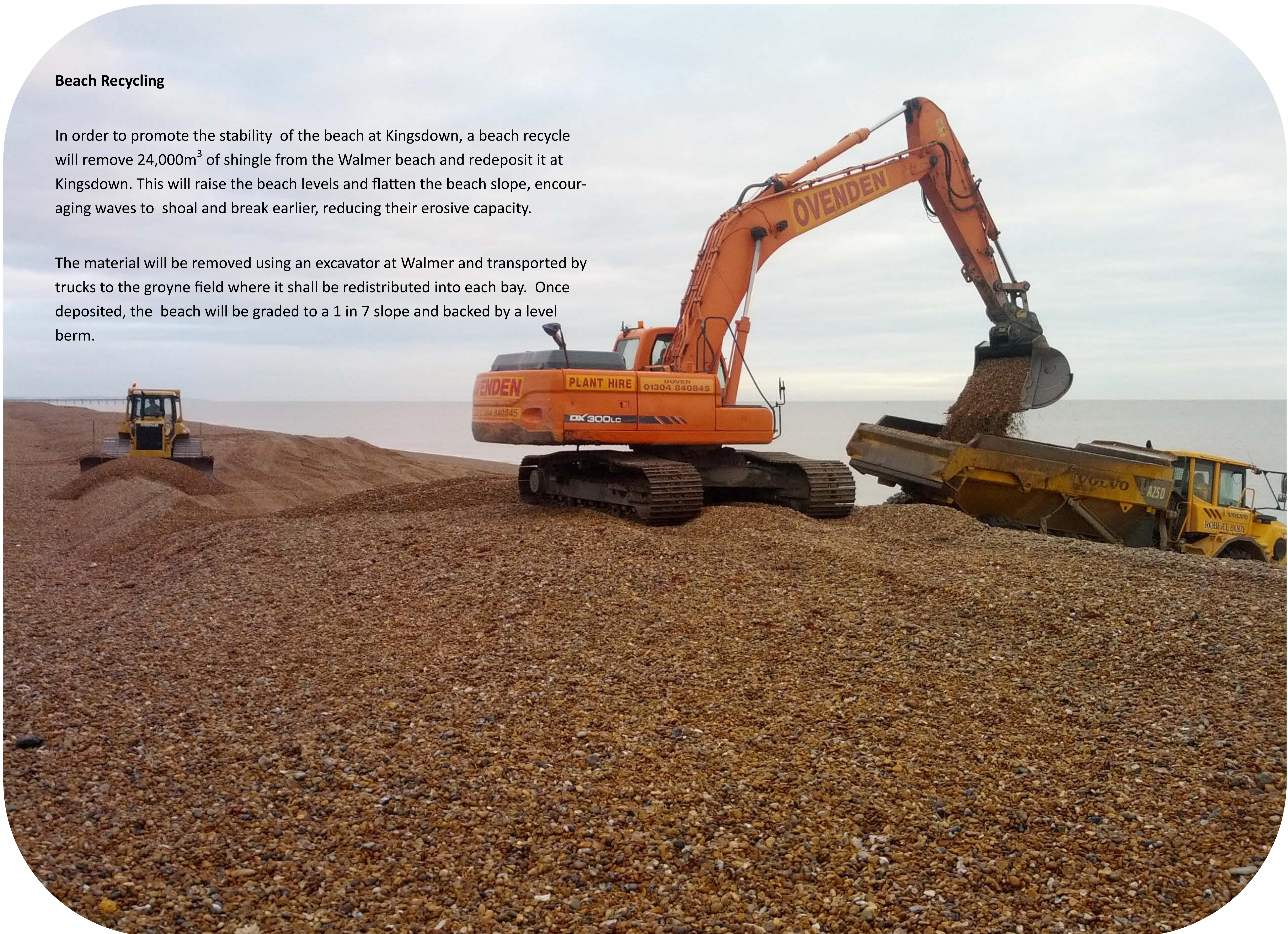
The proposed groynes will be built close to the existing groynes. To minimise any loss of shingle during the works, the existing groynes will be removed in stages. Post construction, the requirement for beach material supply will become less frequent and beach levels will become more stable.

The design life for timber groynes is around 60 years. After this period the groynes will have an increased maintenance requirement; this is included within the budget.

### Beach Recycling

In order to promote the stability of the beach at Kingsdown, a beach recycle will remove 24,000m<sup>3</sup> of shingle from the Walmer beach and redeposit it at Kingsdown. This will raise the beach levels and flatten the beach slope, encouraging waves to shoal and break earlier, reducing their erosive capacity.

The material will be removed using an excavator at Walmer and transported by trucks to the groyne field where it shall be redistributed into each bay. Once deposited, the beach will be graded to a 1 in 7 slope and backed by a level berm.



# HOW MUCH IS IT COSTING AND WHO'S DOING THE WORK?

The total cost of the project is £1.8million.

It's a lot of money but sea defences are very expensive to construct and maintain. DEFRA, the governmental department for environment, food and rural affairs, has awarded the majority of the funds with an additional contribution from Dover District Council.

## Project Appraisal Report

The Project Appraisal Report (PAR) was submitted to the Environment Agency on the 10th November 2014 by the Dover District Council staff. The report illustrates the need for the works and considers the options available for Kingsdown. Over 160 pages long, the document and its appendices document the technical aspects of the works including full design drawings and hydrodynamic reports, as well as cost/benefit analysis, an economical appraisal and an environmental report. The project programme, procurement strategy and costs breakdown are also included.

## Construction

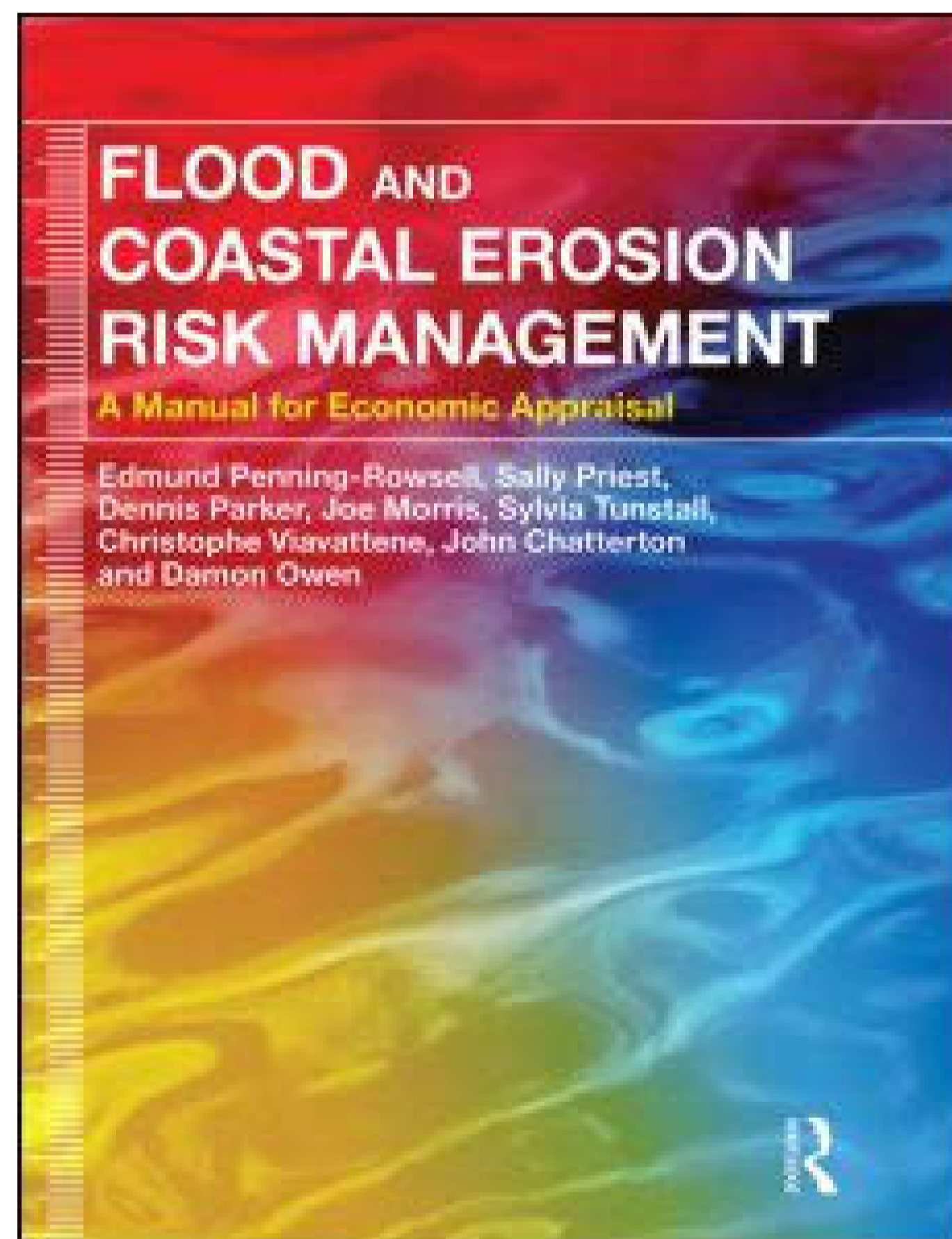
As well as carrying out the initial study, engineers from the East Kent Engineering Partnership undertook all the design for the project and will be supervising the work. Over the years we have built up a team experienced in coastal and structural work managing recent major projects in Herne Bay, Margate and Greatstone. We consider that as well as being less expensive than external consultants, we can bring to the project our local expertise and knowledge.

## Site Supervision

The contract to construct the new timber groynes is currently being tendered. Once the contract has been awarded and programme details are finalised a newsletter confirming these details will be sent to residents.

## Materials

To meet the Council's strict environmental policy, only timber from a sustainable source shall be used for the groynes. The wood we have chosen, Ekki (also known as Azobé), is sourced from Cameroon. A separate contract worth £505k has been awarded to Wijma UK Ltd for the timber supply. The timber will be delivered to a site compound at Walmer in July/August 2015.



## Contribution

Dover District Council will also make a contribution in Year 1 (2015/16) of £200k, towards the cost of the works. In later years Dover District Council will also fund the biannual maintenance recycling aspects of the project. Dover District Council has a formally adopted policy with respect to flood and coastal defence. The policy states that the "Council will provide an adequate, economically, technically and environmentally sound approach to providing the flood and coastal defence service and will ensure that appropriate maintenance regimes are in place for flood and coastal defence for which the Council takes responsibility."



## Cost Benefit Analysis (CBA)

As part of the PAR report, a cost benefit analysis is undertaken. This forms part of the decision making process when choosing which option is the most suitable and best value for money. The cost benefit ratio is the ratio between the cost of the proposed project against the approximate value of damages if the do nothing approach is taken, i.e. the amount of property protected by the scheme.

The multi-coloured manual for flood and erosion risk management provides the CBA methods and data which can be used for the practical assessment of schemes. Geographic Information Systems are used to analyse the area looking at flood contours, erosion predictions and which properties and assets they affect.

This scheme earns a cost benefit ratio of 1 to 18.5. So for every pound we spend, we are saving eighteen pounds and fifty pence.

*Is this good value for money?*

The Environment Agency require a cost benefit ratio of at least 1 in 5 but normally 1 in 8. This shows that we are committed to getting the most out of public money.

## Not Costing the Earth...

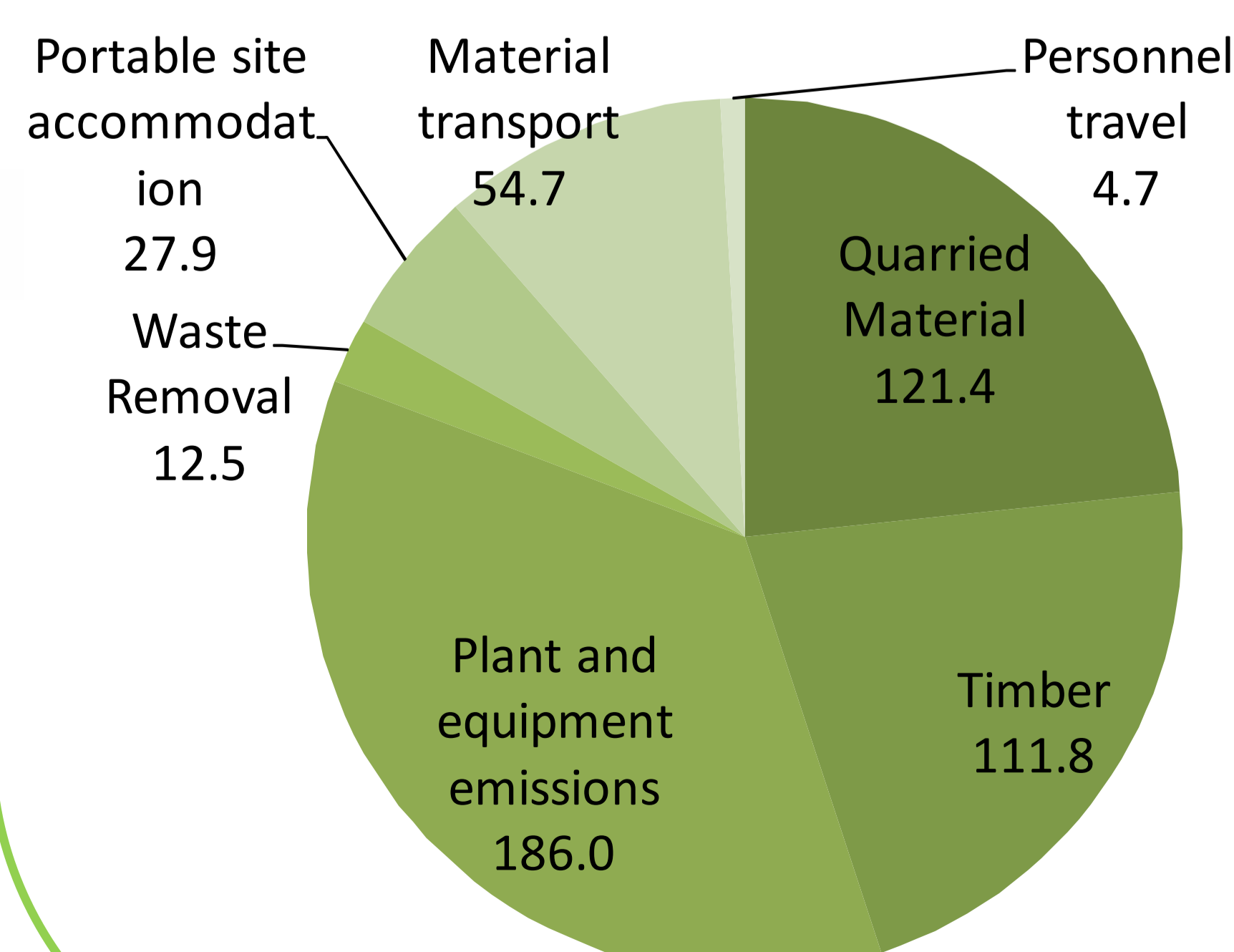
### ...Carbon Calculator



All major projects must undergo a carbon assessment using the Environment Agency's carbon calculator tool. This calculator estimates the amount of carbon dioxide (CO<sub>2</sub>) in tonnes for all aspects of the project. The total output for the entire project is 516 tonnes.

This is roughly the same as the annual output of 24 UK households (University of Stockholm, 2007).

Because of the harsh, saline environment it was not possible to change the materials we are using, however it did help us to consider the amount of carbon we were producing and how we could reduce this.



We will reduce the number of journeys made by the dumpers and excavators. This helps protect local air quality.

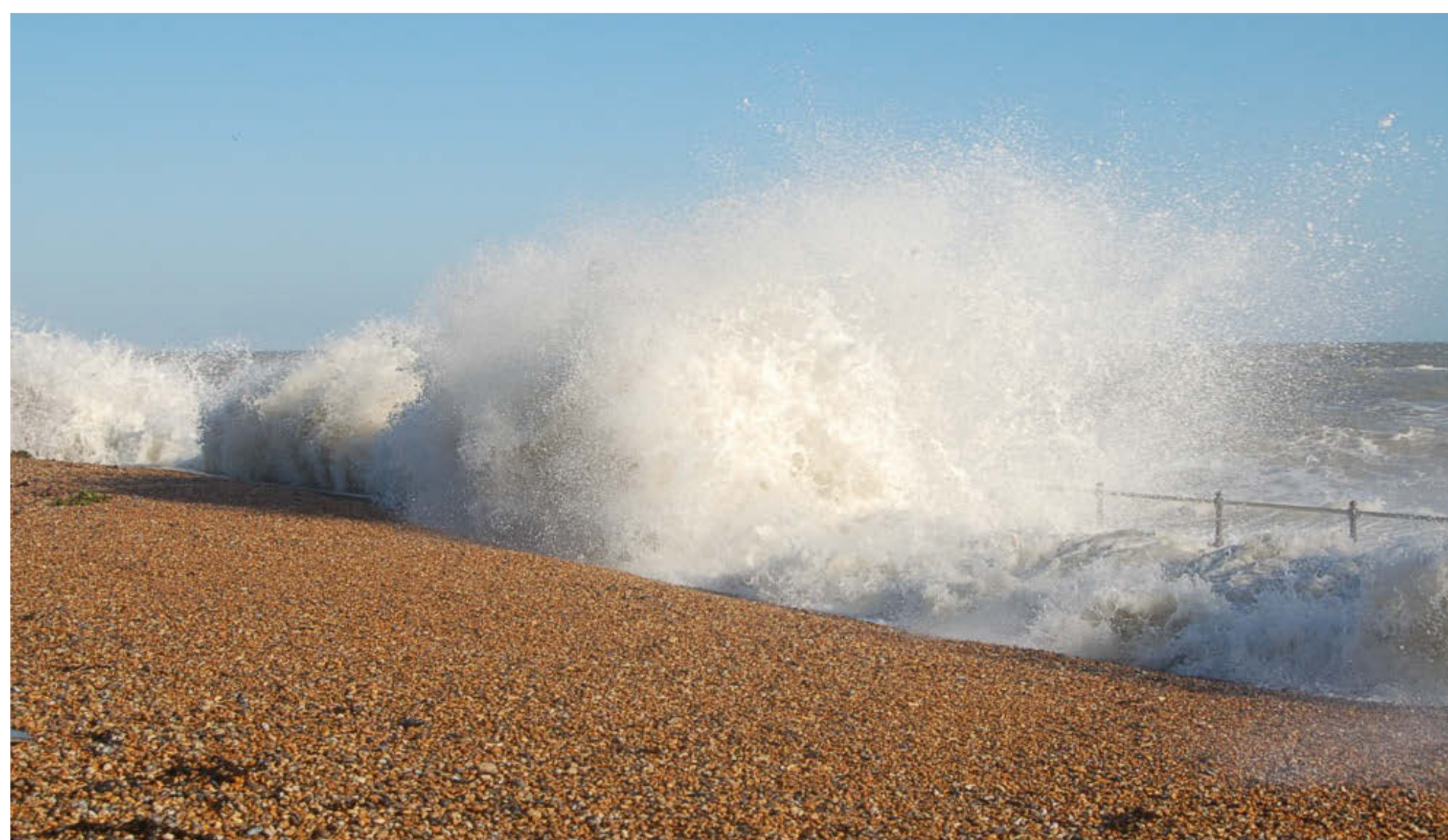
We have also decided to reuse some of the existing timber onsite which means that we can save both money and CO<sub>2</sub> by not having to import as much new timber.



# WHAT'S THE PLAN AND HOW LONG WILL IT TAKE?



- . FSC approved timber has already been ordered from Wijma UK Ltd.
  - . The timber will be delivered to the site from May 2015.
- . Timber will be stored in a compound on the beach at Walmer where the timber piles will be prepared.
  - . The main contract works are currently being tendered and will be awarded shortly.
- . The main contract works will hopefully commence in September with a contract duration of approximately 30 weeks.
  - . The contractor will mobilise to site and set up a site compound on the beach in Kingsdown.
  - . The works will commence at the southern end of Kingsdown and progress northwards.
  - . Timber will be transferred to Kingsdown from the timber compound at Walmer as and when required.
- . Once the timber groynes have been planked the shingle will be transported from the Walmer frontage to Kingsdown.



All construction jobs are affected by bad weather but this one is more sensitive than most due to the low level of the foreshore and the limited working window. As well as the usual difficulties of trying to work in the wet and the cold, storms could delay piling and planking and there may well be days when no work at all can take place.

The contractor will do his very best, but please be patient if things don't always go as they are planned. We will update information on the programme as work progresses, particularly if there are major changes.



It would be great if we could assure you that you won't even notice the contractors and workers on the beach but unfortunately we can't do that. All construction work causes inconvenience and even when we know these works are being carried out for our own future good, this does not make the work any less noisy or annoying. What we are aiming to do is reduce the impact that large scale construction creates. Here are some of the ways we are going about it:



**Vibration:** 16 new groynes are going to be built which means a lot of pile-driving; 384 of them in total but remember this is spread over half a kilometre of seafront. Based on similar sea defence jobs we've done in the past, we are confident that this will not cause high vibrations. However, we will be carefully monitoring the situation on a seismograph to ensure that everything stays within the acceptable limits as defined in European standards. The seismograph (see left) will be set up outside the house nearest the piling.

**Noise:** The groynes have 24 piles each. Based on progress on similar jobs it should take about 2/3 days to complete the piling for a single groyne. This is obviously dependent on weather, tides and actual working hours as described below. The shorter piles do not take long to drive as they do not penetrate too far. The noise from piling will not be continuous as between driving each pile there will be a short break whilst the piling rig is moved and set up ready to drive the next pile.

Nothing can be done to disguise the fact that pile-driving is noisy. What can be done is to limit the contractor's working hours - as explained further on. Excavators and site trucks are noisy too but the contractor will ensure they all have adequate silencers on their exhaust systems and that they are kept well maintained. To avoid the annoying noise of reversing beepers the dump trucks moving the shingle will have them turned off and but will have radar systems fitted instead so that site safety is not compromised. This work would also be subject to restrictions with respect to maximum noise levels (75 decibels for continuous, 85 decibels at peak).

**Traffic:** Any construction project means an increase in traffic. Materials have to be delivered, workers arrive at the start of each day and leave at the end of their shift and heavy machinery is needed.

**Parking:** all machinery will be stored at the site compound compound which will prevent any added pressure on parking.

**Working Hours:** Coming up with a set of contractor's working hours is a difficult balancing act between residents who want to get a night's sleep undisturbed by construction work and the contractor who needs to get on with a job which is *restricted by the tides*.

Construction work generally will run Monday to Friday from 7am to 7pm. In order to make use of early morning low tides the contractor will be allowed to get ready for piling before 7am but the hammer must not start until then. The contractor can ask to extend these working hours if they are getting behind schedule. If there are extra-high or extra-low tides which will materially help them they may also be permitted to extend the standard hours. If weekend work is requested, standard start and finish times would apply on Saturday but the earliest start on Sundays would be 8am.

**Dust:** Based on our experience of similar sea defence contracts we don't think that dust will be a problem. A lot of sawdust will be created when the piles are trimmed before having their metal points and driving rings fitted but this all takes place in a separate timber compound. Running vehicles over the beach might create some dust, especially during long hot summer periods, but in the past we have found that limiting vehicle speeds keeps the problem within bounds. Spreading it has not caused any dust problems on previous jobs.

**Access:**

**...to the Beach Huts.** The access to the beach huts should never be fully blocked, however during the construction works it may be unpleasant to use the beach huts. Although this is an inconvenience for frequent beach users, please bear in mind that by undertaking these works that the beach huts will benefit from a more stable beach.

**...to the Boat Ramp**—as part of the scheme a new boat ramp is being constructed. This will vastly improve the current access to the beach for boat users.

*Your right of way is not affected.*



**Natural Environment:** Natural England describes Kingsdown Beach as 'a broad shingle plateau with a succession of plant communities that are influenced in their extent and composition by increasing shingle stability'. The vegetated shingle community consists of a range of interesting plants, such as sea pea, sea kale, the nationally rare rose garlic and important colonies of spider orchid and prostate oak. The special vegetated shingle is registered as a Site of Nature Conservation Interest as it is the only place in the UK to support the Bright Wave Moth (above).



To ensure no damage occurs to this delicate habitat, construction vehicles will be limited to manoeuvre on a designated route. This will prevent any disturbance to the vegetation.



**Protection of the Foreshore:** the design of the proposed groynes should avoid any potential damage to the foreshore during construction and typically they do not extend down below the toe of the beach. Foreshore damage is mainly associated with beach replenishments by barge, which in this case will not be required, and the use of tracked vehicles. Some excavation and the use of a piling rig will be needed for groyne construction and for the removal of existing groynes within the beach. The impact on the foreshore will be minimal as the areas affected will be very localised and the foreshore will be able to recover quickly. Re-profiling the beach will not disturb the foreshore as trucks will access the beach from a set route along the beach.



It is widely accepted that sea levels are set to rise from the melting of the polar ice caps, thermal expansion of the ocean and, in Britain, isostatic rebound. This has a considerable impact on the level of protection provided by existing defences. Under the government's policy, the design of new sea defences must take into account the expected rise in sea level so that they are effective now and in 100 years time. The new defences in Kingsdown are no exception; the text below explains how we've considered future sea level rise in our design.

How bad a storm is depends on the height of the sea, known as the **still water level**, and how big the **waves** are. Because tidal conditions are different all round the coast we don't describe storms by their height but by how often that water level occurs. So on average there will be a 10-year storm every ten years, a 50-year storm every fifty years and so on. The words "on average" are important. If you flip a coin often enough you will, *on average*, get the same number of heads and tails but just because it came up heads last time does not mean that the next time will be tails. Similarly if there's a 100-year storm this year it doesn't mean that the next one won't turn up until 2015. For instance the worst storm along the east coast in living memory was that in 1953, which was about a 1 in 150 year storm.

**"Global warming will mean that the frequency and intensity of storms will increase."**

Intergovernmental Panel on Climate Change, 2013

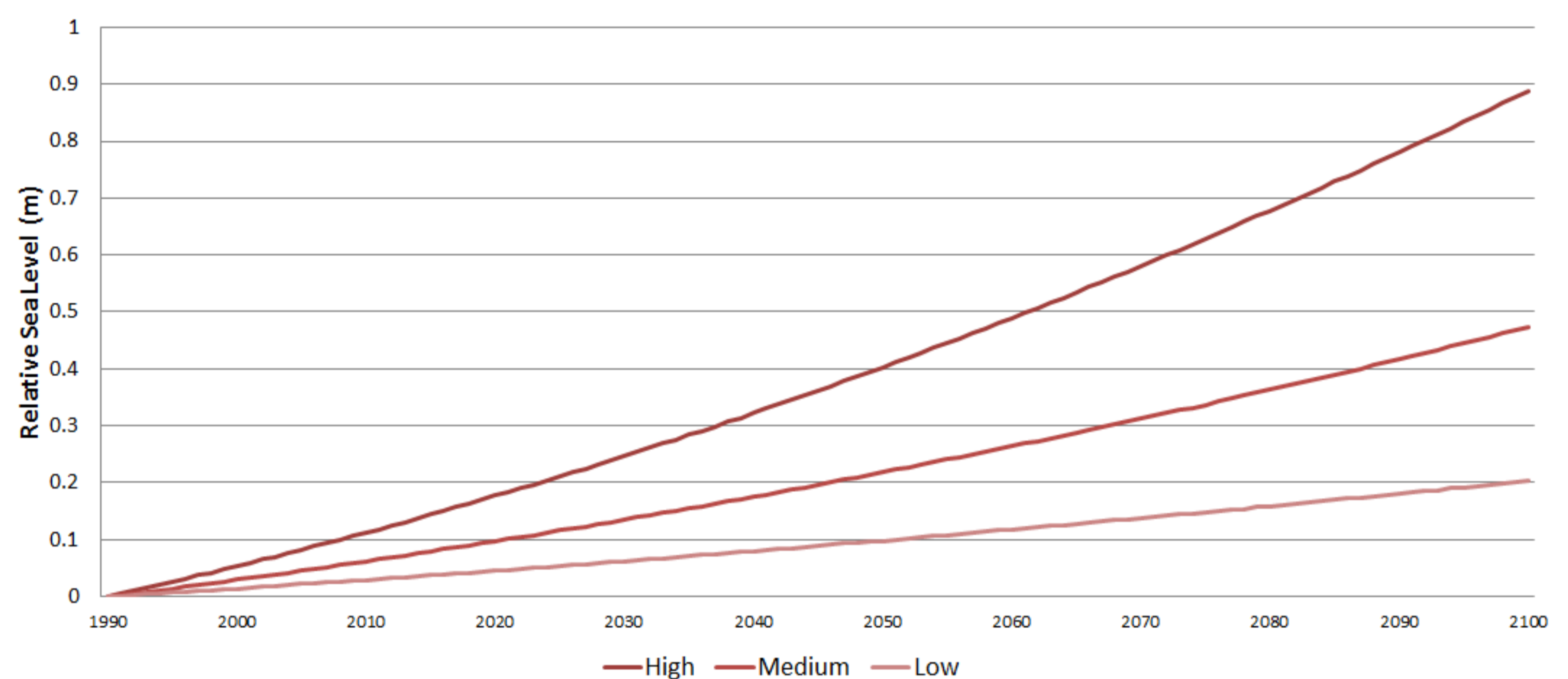
The level of protection we can afford changes along the coastline as a result of what is being protected and is therefore very much dependent upon economic considerations. If there were only open fields behind the seawall with no risk to life or property then the standard of protection would be against a 1 in 50 year storm or possibly even less. At Kingsdown we have designed the project such that no significant amount of water should come over the seawall for up to a 1 in 200 year storm and that the seawall itself should be able to withstand, without breaching, up to a 1 in 1000 year storm. The seawalls themselves are adequate but in places the protecting beach is becoming seriously eroded.



The before and after photographs show where Oldstairs Bay was completely stripped last winter as a result of the Christmas Eve 1 in 30 year storm. Post-storm surveying revealed that approximately 21,000 m<sup>3</sup> of shingle was lost.



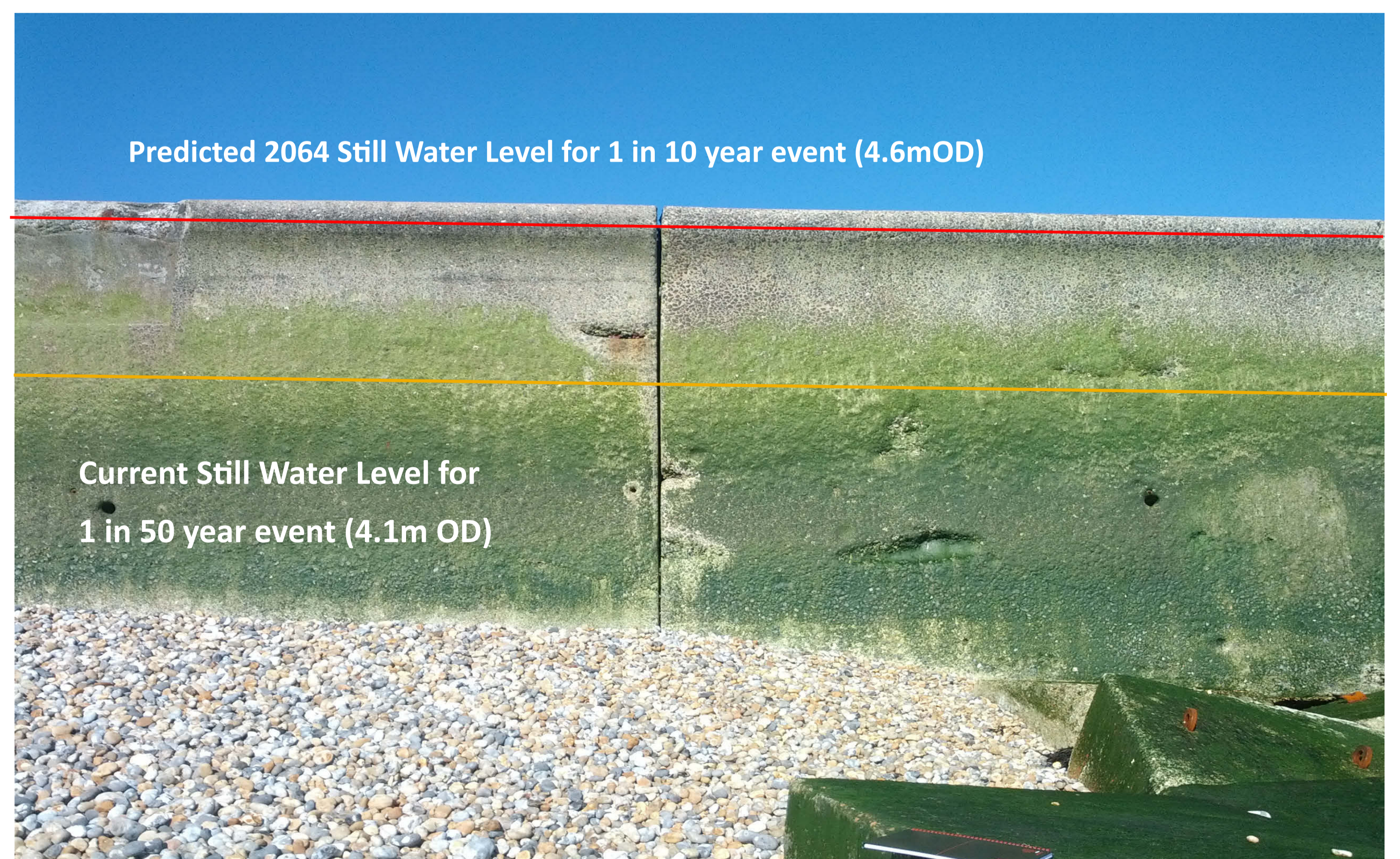
Future rises in sea level are dependant on the amount of global carbon emissions. We do not know how human activities will change in the future, so three predictions are given, based on high, medium and low emissions. The graph below shows Defra's accepted predictions for sea level rise. Uncertainty increases with time, which is why the difference between the three predictions increase further into the future.



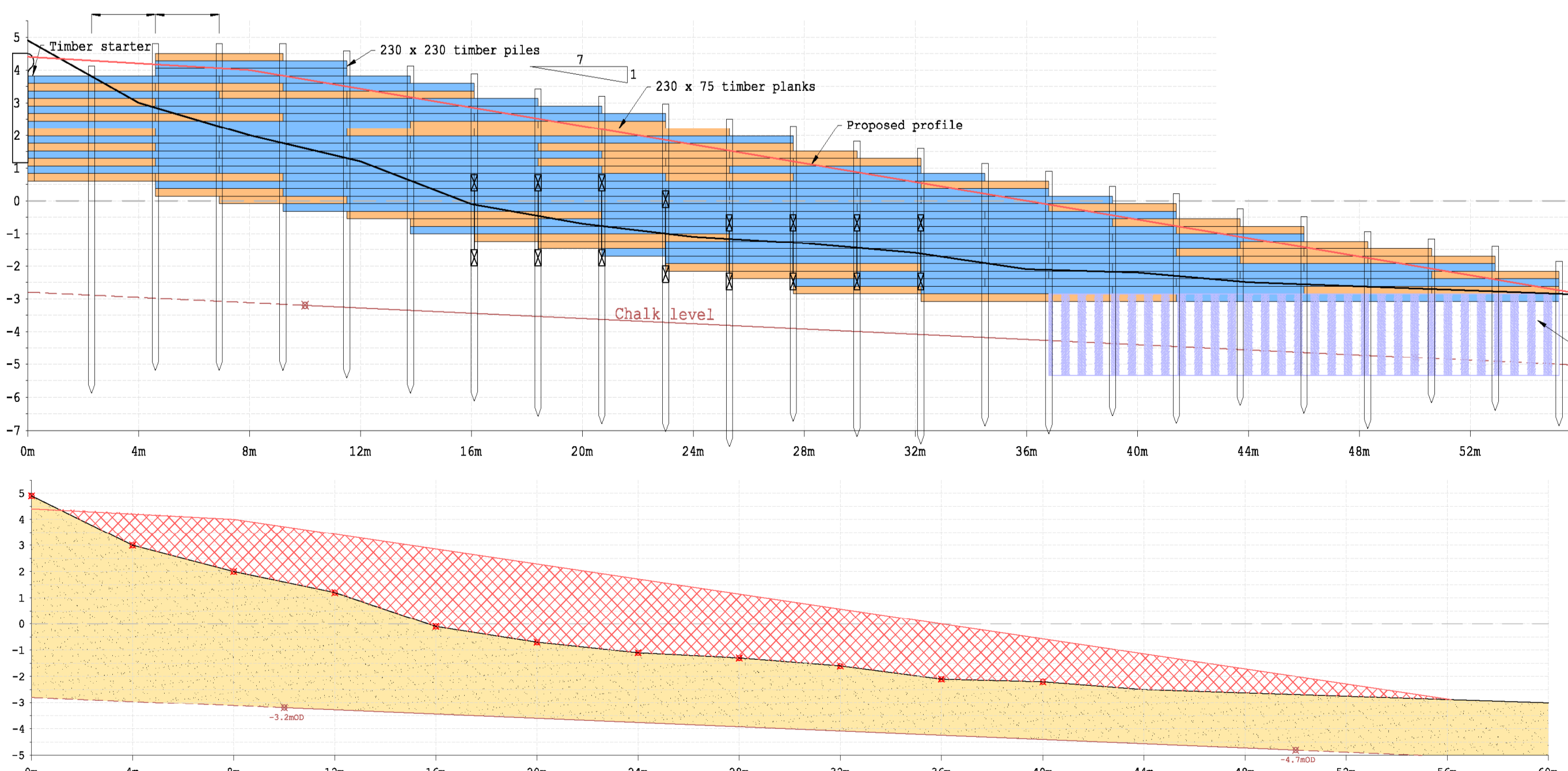
The graph below shows the extreme still water levels and how they will change with sea level rise. Currently a 1 in 10 year storm has a still water level of 4.1m OD—in 50 years time a 1 in 10 year storm will have a still water level of just under 4.6 m OD. That is equivalent to a 1 in 200 year storm today. This means that, in fifty years time, we can expect, on average, *storms with greater intensity more frequently*. We use these water levels to ensure that the new beach will protect Kingsdown for the next 60 years.

Greater water levels mean that larger (and more destructive) waves can reach the beach. Big waves can scour away the beach material and expose the sea wall to undermining, overtopping and wave impact.

A large and stable beach can provide protection to the sea wall by dissipating the wave's energy. The beach needs to be maintained at a specific level to provide adequate protection against storm events. Overtopping calculations have been used to determine what beach level can protect against overtopping to an *acceptable* level.



DEFRA's advice is that at present we should allow for sea levels to rise at 6mm a year or 300mm (one foot) over 50 years. This is allowed for in the design and if sea levels continue to rise at that rate then it will be 50 years or more before we have to do any further major work. However there is growing concern that this rate of sea level rise might increase and also that winters will become increasingly stormy, so that in 50 years time what is a 1 in 100 year storm today could become a 10 year storm and happen on average once in ten years. Sea levels could then be so high that the protection of bigger beaches will not be enough and the most practical options would either be to increase the height of the sea wall or accept a lower standard of protection. In 20 to 30 years time, when we should have much more accurate information about real sea level rise, we will have to give this serious consideration.

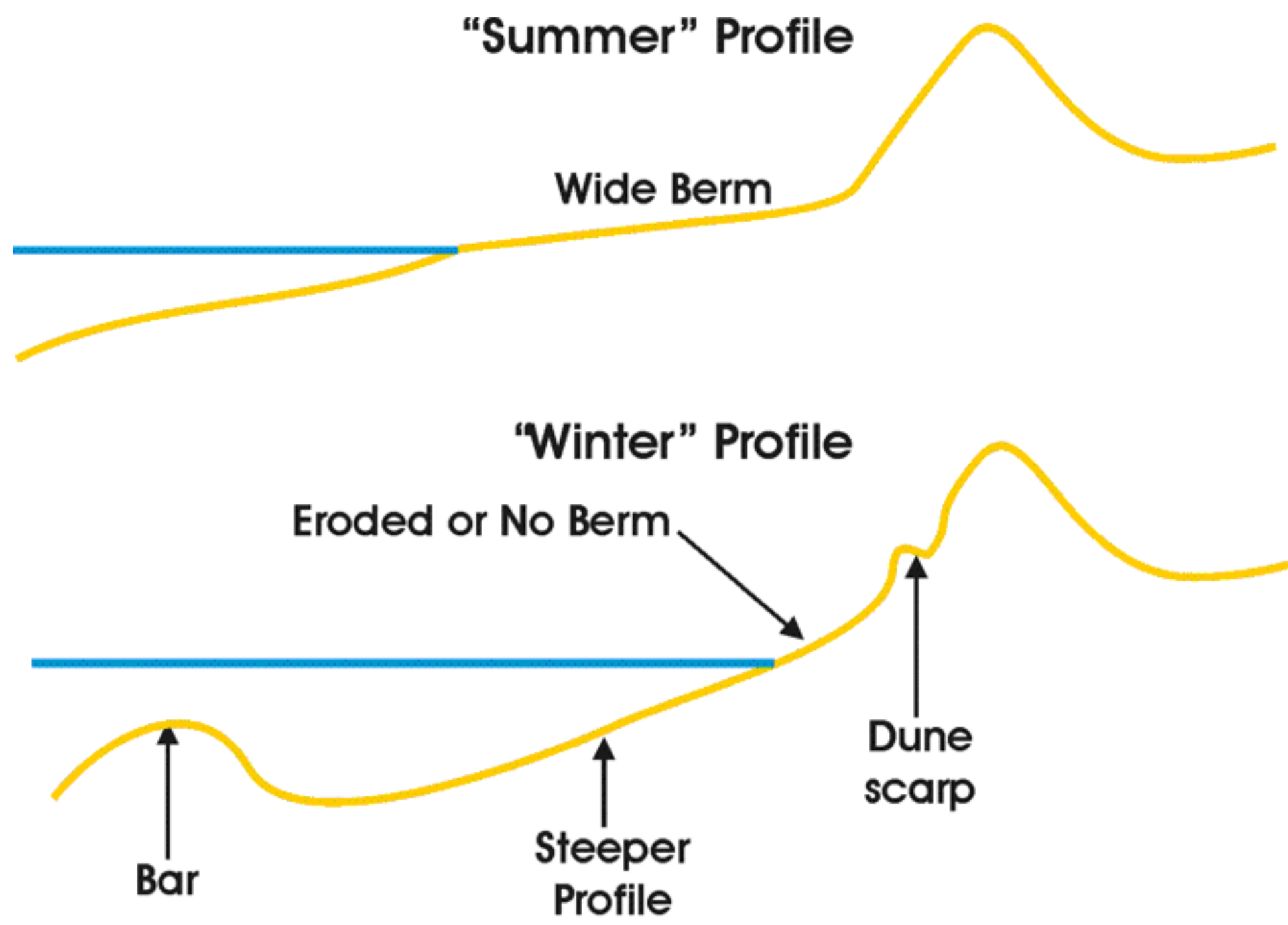


**The Design:**

The beach levels are to be raised to 3.9m OD at the sea wall and the new groynes will hold the beach material at that level.



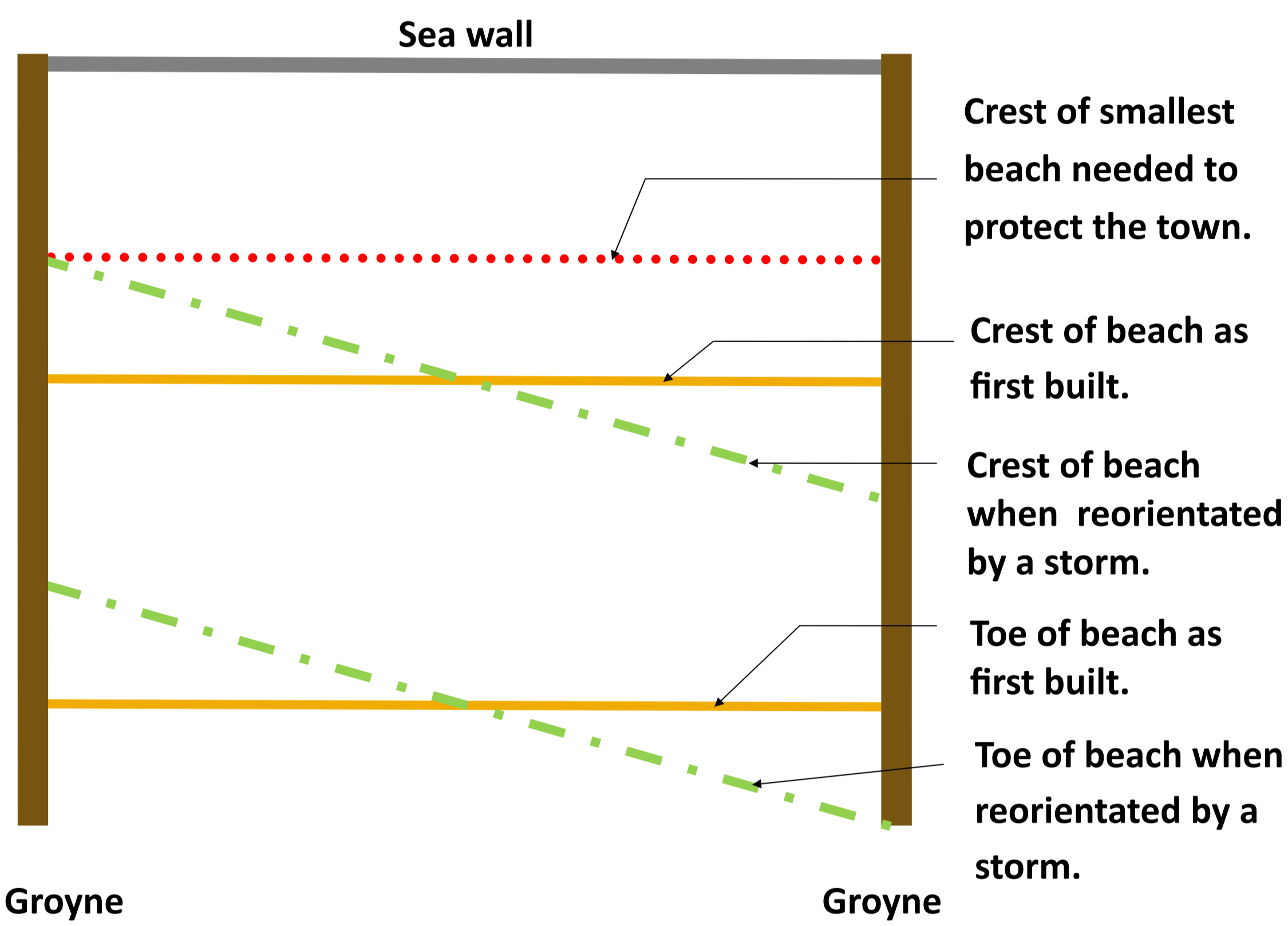
The beach is, arguably, the most essential part of the works and its maintenance will be a long term operation. We want the scheme to be as sustainable, i.e. *meeting this generations needs without compromising the needs of future generations*, as possible and that means thinking about where we source our beach material. In the past, material dredged from limited offshore deposits was solely used for replenishment. A different approach, championed by Canterbury City Council along the North Kent coast, is being adopted.



### Beach Mechanics

The beach provides the first line of defence against the sea at Kingsdown. The angle of the slope and the dissipating effect of the shingle reduce the destructive power of the waves. During storms, when waves are at their greatest, the beach shape changes as shingle is moved seawards and the berm of the beach is eroded. This "winter" profile is clearly visible on most shingle beaches between November to February; as summer arrives smaller waves help build up the beach again, creating a "summer" profile. Because the beach has groynes, lateral reorientation also occurs during storms. This can greatly reduce the effectiveness of the beach at dissipating the wave's energy.

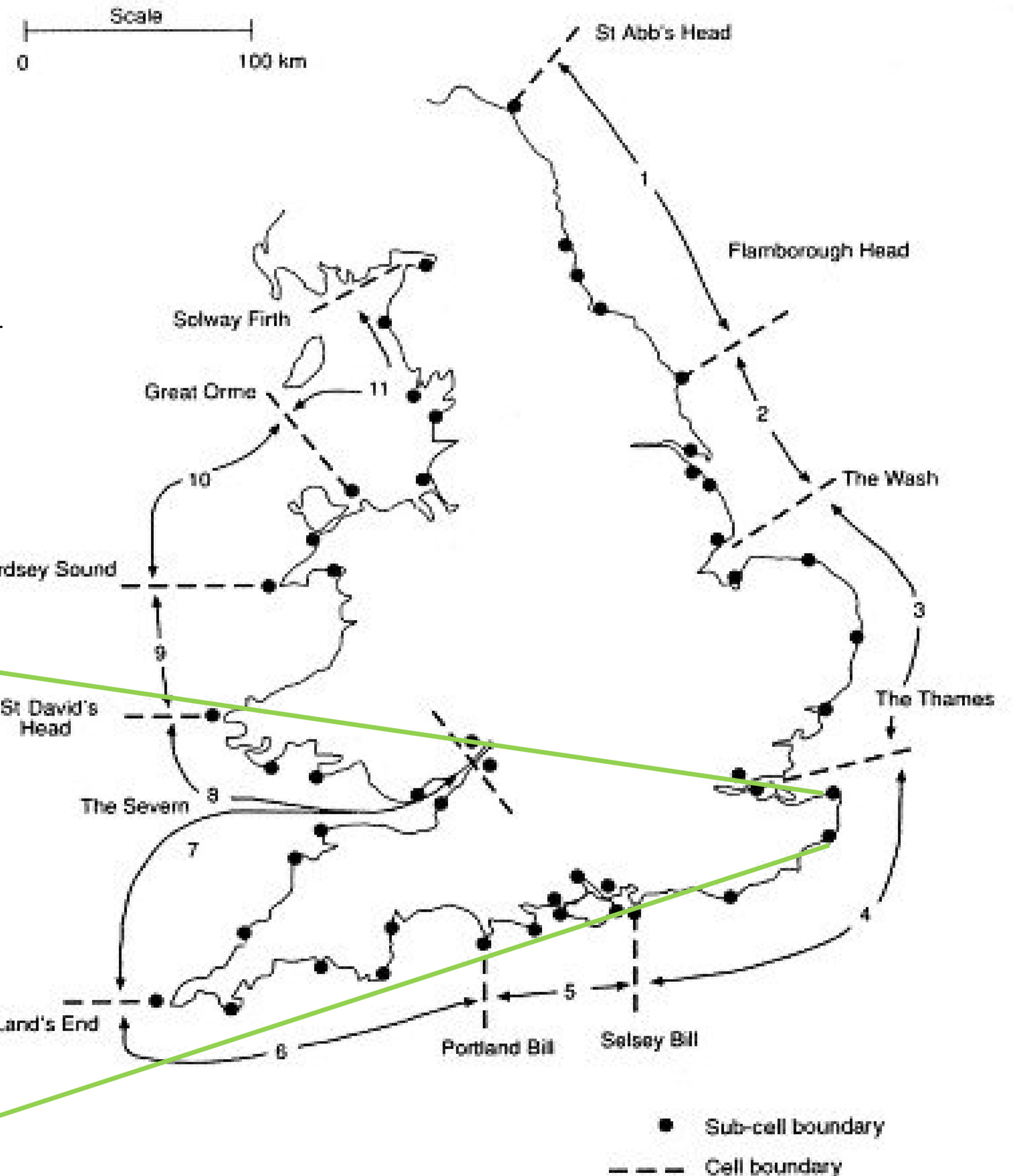
To protect the town, the beach has to be made **bigger** than is absolutely necessary because we want to make sure there is still enough beach left in place when it undergoes reorientation during storms. The new groynes need to be big enough to contain the beach after reorientation. The closer together groynes are, the more effective they are at retaining the beach.



To calculate how much shingle we need to put on the beach we look at both the **long term average shingle loss** together with some **extreme rates of erosion** which have taken place. The strategic monitoring team's beach level data provides us with this information. They have over 12 years of beach level data from which we can pick out the worst case scenarios.

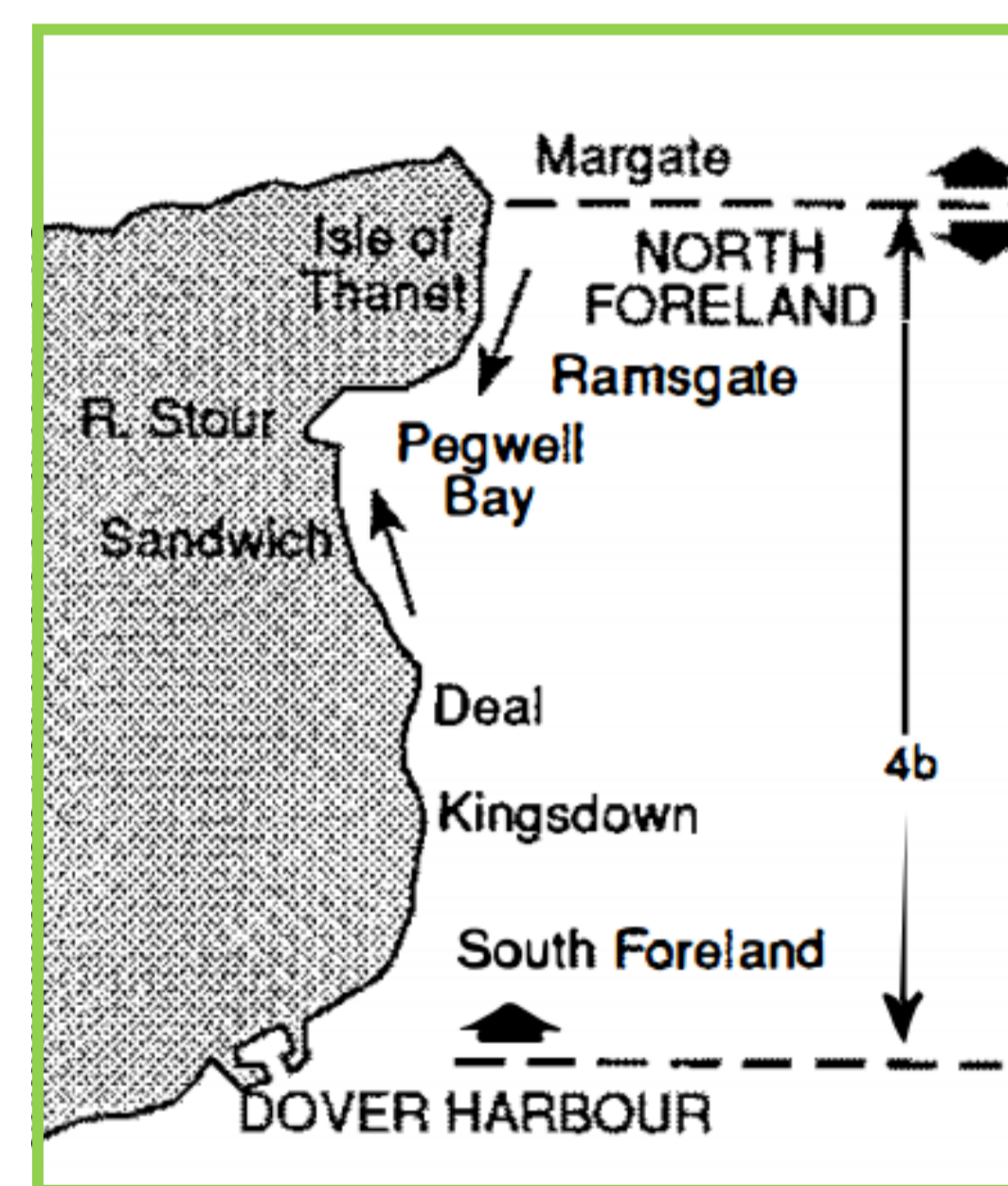
The coastline is a dynamic environment, yet studies have shown that the movement of shingle around our coasts is limited to what we call "sediment cells" these huge areas mark the boundaries where what goes on in one cell would not affect its neighbour. Boundaries occur in two forms: sediment sinks or divergent, where a sharp change in the direction of the coast causes beach material to move away in both directions.

For a successful beach recharge, it is necessary to match the new shingle to that which was there originally.

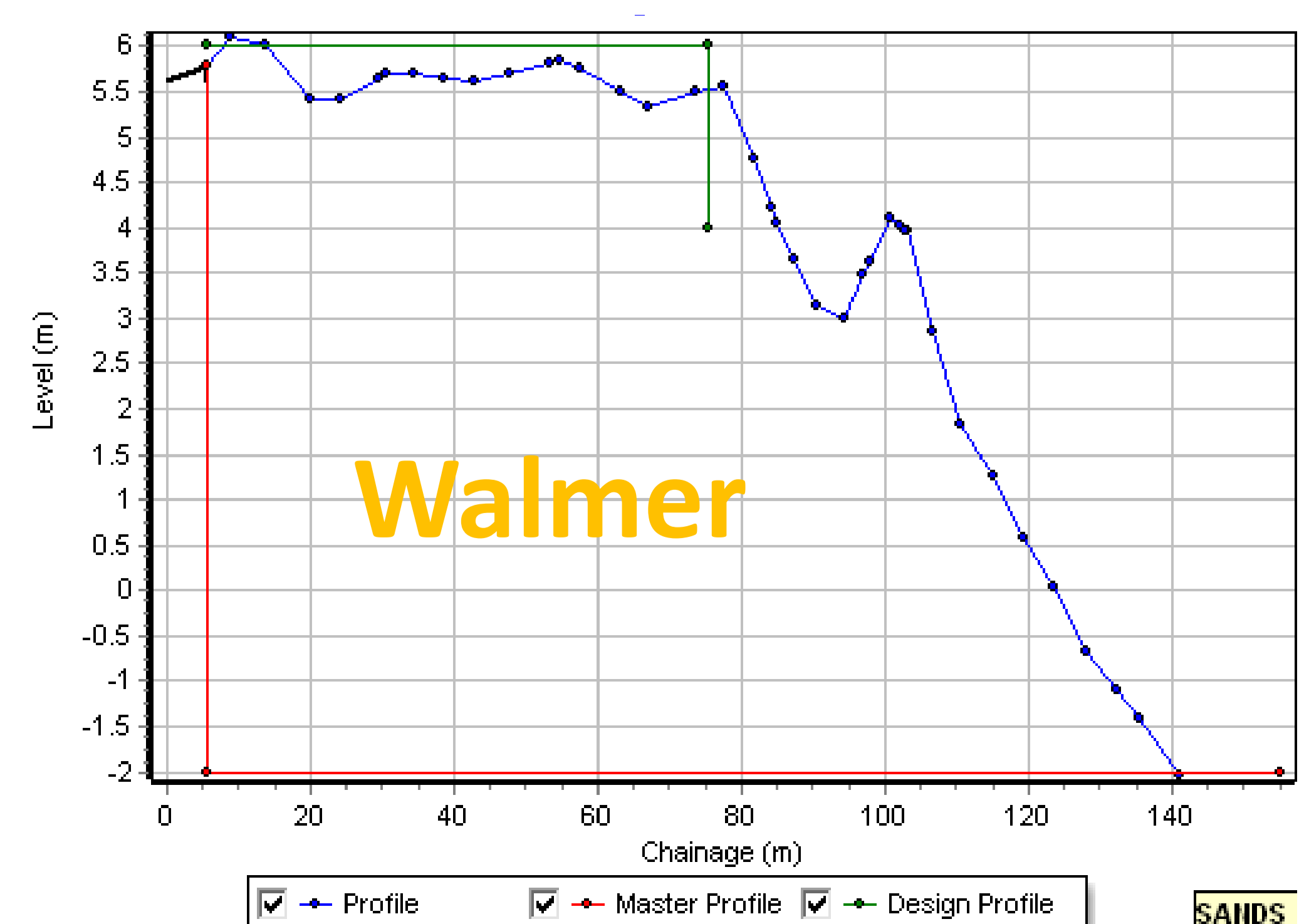
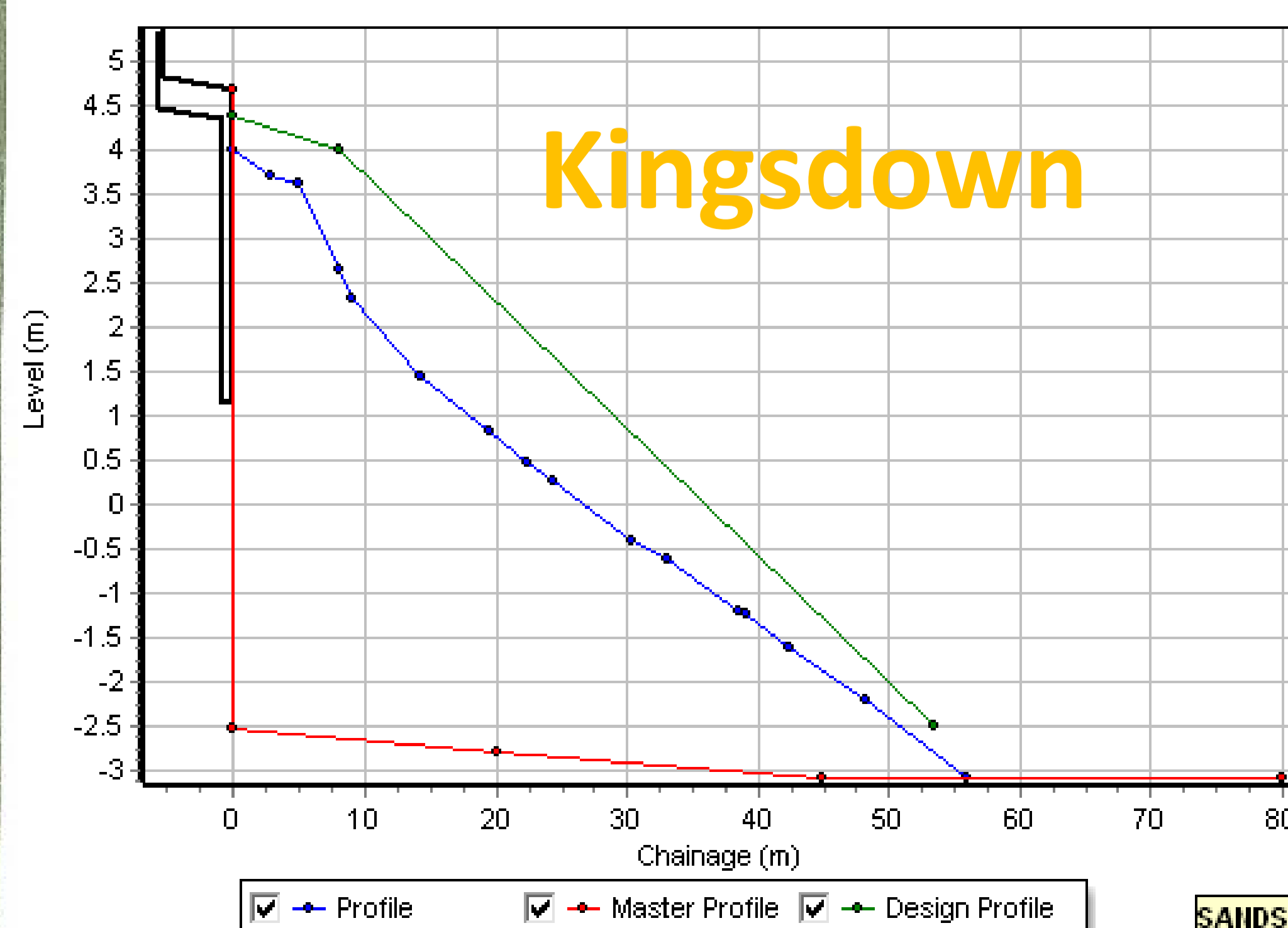


At Kingsdown, the predominant drift direction is south to north. In 1847 the natural shingle cell was interrupted by the construction of the massive outer harbour wall at Dover. This created a new sub boundary. Since then Kingsdown has been starved of shingle as its natural supply had been cut off.

Because we know that the shingle lost from Kingsdown is moving northwards and is not being lost offshore, it is possible to reclaim that material and put it back on Kingsdown beach. The Strategic Monitoring Programme measures beach profiles around the whole of the coast so we can see where it accumulates. We have chosen to undertake annual recycling of shingle from Walmer Castle to Kingsdown. Because the material is originally from Kingsdown, it is the perfect size for feeding the beach with.



The beach at Kingsdown is visibly smaller than near Walmer Castle from Aerial Photography. The beach profiles really show us how much they differ: a profile at Kingsdown has a cross sectional area 166 m<sup>2</sup> in comparison to Walmer at 790 m<sup>2</sup>.



The use of tropical hardwood will inevitably cause concern to those of you who are worried about global warming and its effects – and quite rightly so.

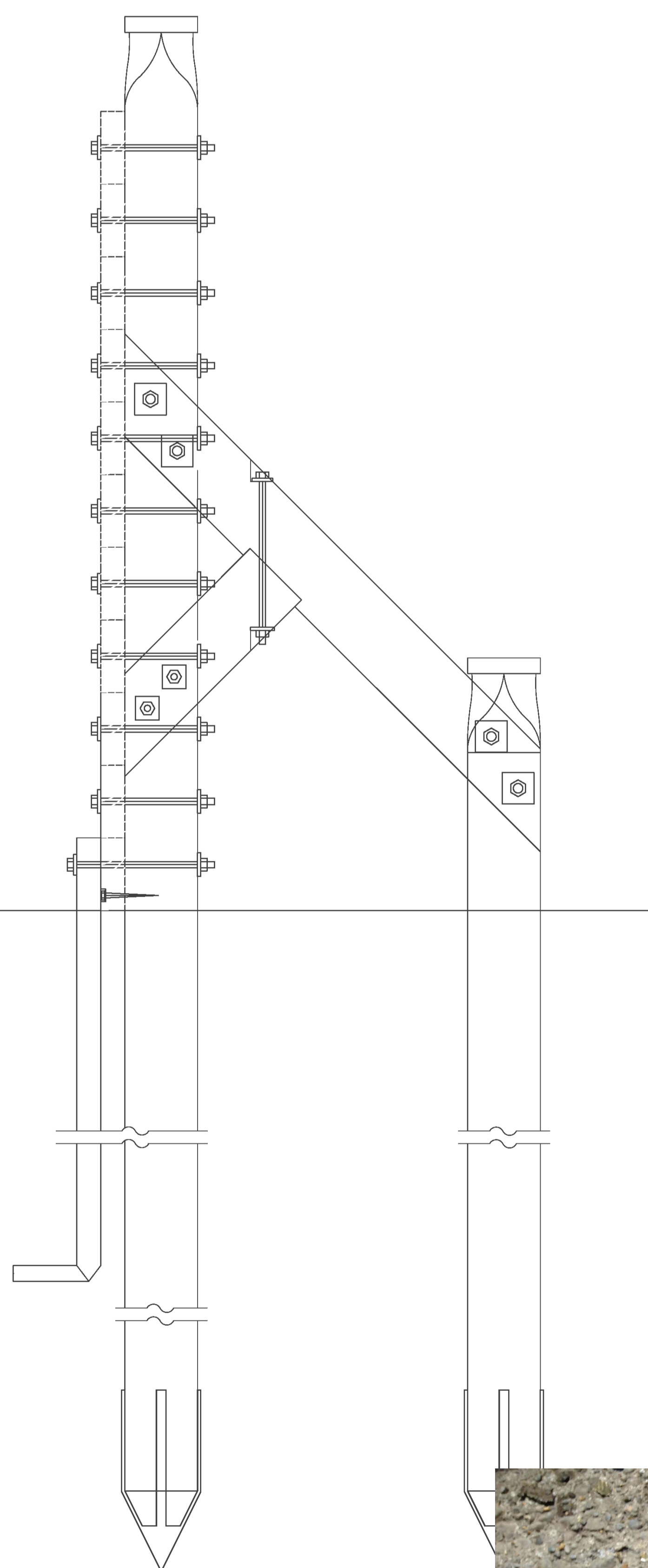
515 cubic metres of Ekki for the groyne piles and planks are coming from Cameroon, along the Gulf of Guinea, Central-West Africa.

Forestland covers almost half of the country's total land area, some 51.8 million acres (21 million hectares). Cameroon's forests represent the northern limit of the Congo Basin's forests, the second largest contiguous rainforest in the world, after the Amazon. The map shows the vegetation of Cameroon and all of it is forest except for those parts coloured blue, pink, orange and beige. Our timber is coming from Wijma UK Ltd which has a full FSC certified chain of custody.

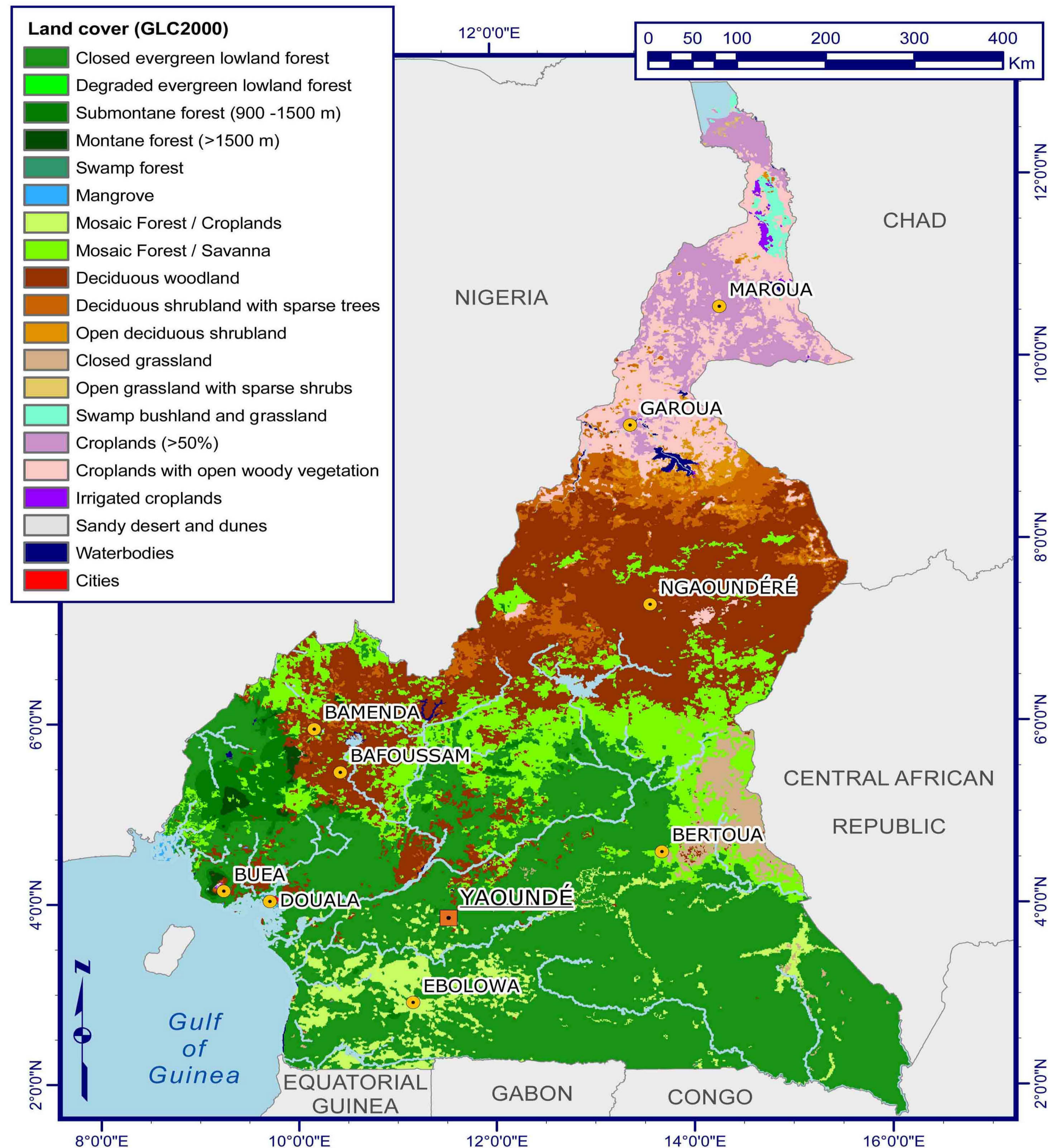
**“Cameroon’s forests forms part of the second largest contiguous rainforest in the world, after the Amazon.” Rainforest Alliance, 2014**

Ekki is a tropical hardwood, also known as ‘ironwood’ that is particularly tough and has been used in marine construction for over a hundred years. It is far stronger than Oak. The design of the groynes, as explained below, means that tropical hardwood has to be used and it is essential to ensure that the timber comes from a well-managed and legal source. By controlling the purchase at the Council, as we have done in letting a separate contract with Wijma UK Ltd, we can do our utmost to ensure the timber meets sustainability and environmental requirements as well as being of high quality.

The structural design of the groynes means that as well as high strength the timber must have the following properties.



Data sources:  
- Vegetation cover: GLC2000 (EU Joint Research Centre, 2003)  
- Cameroon administrative boundaries, hydrology, settlements, and coastline: Interactive Forestry Atlas of Cameroon, (Cameroon Ministry of Forestry and Wildlife / World Resources Institute, 2007).



**Durability:** The timber needs to be very durable to withstand the severe marine environment of daily tidal wetting/drying, long exposure to sun, salt water, marine life and occasional impact.

**Abrasion:** Very high resistance to abrasion is needed as the groyne will be subject to the action of continual movement of shingle against it. During storms the abrasion will be severe.

**Marine borers:** It is known that both *Teredo* (shipworm) and *Limneria* (gribble) are present in our waters. These marine borers can eat their way through all but the hardest of timbers doing considerable damage within five years and limiting the life of groynes to under twenty years. Timber resistant to marine borers is essential.

For coastal defence structures, tropical hardwoods are the only type of timber meeting the three criteria above as well as having suitable strength. *There are no other viable alternatives.*

The East Kent Engineering Partnership has carried out tests using non-tropical hardwood in groynes. Douglas Fir lasted about five years in the lower part of the groyne before the timber became riddled with borings and virtually fell apart. Oak lasted about ten years in upper planking in Whitstable before fungal decay turned much of the timber to powder as can be seen in the central photograph below. On the contrary, we have tropical hardwood groynes more than fifty years old on our seafront which are still serviceable.

The Council has a policy of extensive beach monitoring coupled with a programme of regular beach recycling. This allows us to be very economical with our groyne design because we know the beach will be maintained at a safe level. However it also means that the relatively thin timber members must possess high strength in order to ensure the groyne does not fail.

The type of tropical hardwoods used in groynes (Greenheart, Ekki) has strengths twice that of European hardwoods such as Oak. Lower strength timber can be used but you need bigger pieces to meet the design stresses. This inevitably means you need a bigger quantity of timber and pay more for it.





## Forestry Stewardship Council (FSC) Principles

### 1. Compliance with laws and FSC Principles

Forest Management shall respect all applicable laws of the country in which they occur, and international treaties and agreements to which the country is a signatory, and comply with all FSC Principles and Criteria.

### 2. Tenure and use rights and responsibilities

Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.

### 3. Indigenous peoples' rights

The legal and customary rights of indigenous peoples to own, use and manage their lands, territories and resources shall be recognised and respected.

### 4. Community relations and worker's rights

Forest management operations shall maintain or enhance the long-term social and economic well-being of forest workers and local communities.

### 5. Benefits from the forest

Forest management operations shall encourage the efficient use of multiple products and services to ensure economic viability and a wide range of environmental and social benefits.

### 6. Environmental impact

Forest management shall conserve biological diversity and its associated values, water resources, soils and fragile ecosystems and landscapes, and, by so doing, maintain the ecological functions and the integrity of the forest.

### 7. Management Plan

A management plan, appropriate to the scale and intensity of the operations, shall be written, implemented, and kept up to date. The long-term objectives of management, and the means of achieving them, shall be clearly stated.

### 8. Monitoring and assessment

Monitoring shall be conducted, appropriate to the scale and intensity of forest management, to assess the condition of the forest, yields of forest products, chain of custody, management activities and their social and environmental impacts.

### 9. Maintenance of natural forests

Primary forests, well developed secondary forests and site of major environmental, social or cultural significance shall be conserved. Such areas shall not be replaced by tree plantations or other land uses.

### 10. Plantations

Plantations shall complement, not replace, natural forests. Plantations should reduce the pressures on natural forests.

When you see 515m<sup>3</sup> of timber stacked up in the Kingsdown compound it does look to be a vast quantity, but please remember that all timber supply is FSC approved. Our contract specifies that all timber shall be legally sourced and there is chain of custody certification for each piece of timber supplied. FSC (Forest Stewardship Council) is an international, non-governmental organisation to promote management of the world's forests and certification is based on 10 principles (see right).

It is widely accepted that tropical deforestation is damaging to the global environment. However, there is a strong case for using timber from a sustainable and well managed source:

- Timber is renewable and is an environmentally responsible option with relatively low energy required for its production;
- When harvested periodically, the forest will be maintained for future generations and there is an economic reason for doing so;
- If not harvested there is the likelihood that the forest will be converted to agriculture, open cast mining or plantation use, which are all damaging to the environment;
- Harvesting gives employment to the local people. Without adequate job security these people will have to seek alternative means to make a living, which usually means "slash and burn" harvesting of the forest which is incredibly damaging to the local environment
- All timber is also milled to finished dimensions in the country of origin. This gives further occupation for the local people and added value to their local economy;
- Managed timber extraction reduces the amount of illegal logging as the market for the illegal timber is reduced;



## The Legal Stuff

The EU Timber Regulation (EUTR) came into force on 3rd March 2013, making it illegal to place illegally harvested timber and timber products on the EU market. The legislation affects all those that first place timber on the EU market as well as traders further down the supply chain. After 3rd March 2013, it has become a crime to place illegal timber on EU markets and all organisations affected by the regulation have to adopt practices to assure that the timber or timber products they trade and supply are legal, as a minimum.

In response to this the UK government brought into law the Timber Procurement Policy. Timber suppliers must have documentary evidence to show the timber supplied is, at a minimum, from legal and sustainable sources. This evidence should include full chain of custody from the forest source(s) to the end user. Acceptable forest certification schemes provide this evidence of legal and/or sustainable timber. Suppliers and buyers must check evidence to verify its validity.

Before we awarded the contract to Wijma UK Ltd we needed to be certain that the timber came from a sustainability forest source. The first stage was to validate the chain of custody.

Wijma UK Ltd are part of the international company Koninklijke Wijma who are globally recognised for their commitment to the social and environmental involvement. The company are fully FSC and PEFC (Programme for the Endorsement of Forest Certification) certified. We have checked this by taking their certification codes and checking them with FSC and PEFC records. Wijma are also certified by the Rainforest Alliance. The Rainforest Alliance (RA) is an international non-profit organisation with the mission to conserve biodiversity and ensure sustainable livelihoods by transforming land-use practices, business practices and consumer behaviour.



Our new groynes are designed on the basis that we can re-use the good quality timber we salvage from the old ones. Old piles will be used as struts to help support the new piles.

Any timber we can't reuse from the old groynes will be made available to the public or to businesses. We found in the past, where a lot was given away, that some people were taking large amounts and then reselling it themselves. This time, apart from for public projects, we are considering making a small charge for the timber. Any money made would go to charity. If you do want any timber please remember that:

- The contractor and their workers are here to build sea defences so they might not always have the time to help you straight away
- You will have to organise your own transport to take the stuff away.
- The timber could well have bits of old metal-work sticking out of it.
- And finally, groyne timber is heavier and harder to work than you think.