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# LINCSHORE '97



## AN ENVIRONMENTAL STATEMENT



**NRA**

*National Rivers Authority  
Anglian Region*

## INTRODUCTION

The beaches and sea defences between Mablethorpe and Skegness on the Lincolnshire coast provide flood protection to a large area of low lying coastal plain with residential, commercial, industrial and agricultural interests. The beaches, which are used extensively, are an important recreational and amenity resource. Many of the coastal towns are popular holiday resorts. The coastline also includes sites of special nature conservation value such as Gibraltar Point National Nature Reserve and areas of archaeological interest.

This part of the coast has a long history of flooding. The most notable event, in 1953, resulted in multiple breaching of the defences, 41 deaths, the total evacuation of Mablethorpe and Sutton and the flooding of 8,000 hectares of land.

Since 1953 there has been a continuing programme of sea defence works. More recent storms in 1976, 1978 and 1983 demonstrated the continuing risk to lives and property when damage occurred along much of the coast and a number of defences came near to breaching.

Recognising the need to plan ahead, to provide sound and secure defences on the 24 kms stretch of coast between Mablethorpe and Skegness and to ensure protection of lives and property a detailed investigation was carried out into a long term strategic approach to the future of the area's defences.

As part of the investigation, an environmental review of the potential impact of the preferred solution of beach nourishment was carried out by consultants for the Anglian Region of the National Rivers Authority. This leaflet summarises the main points in the 84 page report.

## THE STUDY AREA

The shoreline comprises extensive sand and shingle beaches crossed by numerous timber groynes. The beach is backed by extensive lengths of seawalls of varying designs interspersed with dune revetted systems.

The coast is of regional importance as a holiday destination for many people living in the East Midlands and South Yorkshire. Its attractive beaches and the proximity of flat land suitable for holiday development have been important factors in the substantial and rapid increase of caravan, chalet and holiday complexes.

The existing sea defences provide protection against flooding for over 20,000 hectares including more than 15,500 residential properties as well as commercial and industrial developments. Recent capital investment in leisure developments in the area has been considerable. The economic justification for providing defences is illustrated by the extent of the potential damage to homes - in excess of £950 million - a figure which does not include indirect, intangible or social costs.



## EXISTING SEA DEFENCES

The existing defences consist of lengths of revetment and concrete slab or stepwork structures complete with wave and splash walls. The defences also incorporate many groynes, a significant number of which are in poor repair.

Since 1953 work has been in progress to rebuild and, where necessary, improve the defences. Reconstruction has generally consisted of new facing works and extending the toe of the concrete structures. Some current and planned schemes include the use of rock armour or "seabee" concrete armour units placed at the toe of the defence to break up and hence reduce wave energy. All recent new schemes have also involved the replacement or refurbishment of existing groynes.

Other improvements have involved the building of splash walls, embankments and decking, together with the provision of gated walls across pullovers (wide points of access from the road to the defences).

## THE BEST SOLUTION

In considering strategies for the future two basic approaches could be adopted:

- **Seawalls.** Continued reliance on seawalls alone would do little to stem the long term fall in beach levels. Design refinements (wave throwback walls, steps and rock toes) could improve the resistance to overtopping and, to some extent, help reduce the rate of beach lowering. But as time went by the beaches would continue to fall and new walls would need to be bigger and stronger.
- **Beach nourishment.** Beach nourishment reduces or eliminates the lowering of beaches by providing a much larger beach in front of the existing seawalls. The protective layer of sand, which would be several metres thick, would reduce any tendency for lowering of the foreshore. These 'new' beaches cause waves to break before reaching the wall so reducing the potential for wave overtopping or damage.

However, the defence must be secure in the long term and this might require new beach control structures (groynes or breakwaters) and/or periodic renourishment.

Such an approach is used with great success along much of the Dutch and Danish coasts. In the Anglian Region beach recharge has been used at Hunstanton and Heacham on the Wash and at Clacton in Essex.

Beach nourishment is the strategy which has been adopted for this stretch of the Lincolnshire coast.

## BEACH NOURISHMENT

Beach nourishment involves dredging sand from an offshore source, transporting it by dredger to the site and pumping it ashore.

The sand would be taken from the offshore source using a trailer suction dredger and transported to a discharge point located approximately 1 km offshore. The discharge point would comprise a buoyed and anchored floating pipeline connected to a sinker line, laid on the sea bed. The sinker line would run to the existing sea defences where it would be fitted with a "T" to connect distribution pipes in both directions.

The distribution pipe would be extended as the beach feed progressed with a total of 2 km of beach feed being potentially achievable from a single sinker line position. It is anticipated that two sinkers would be deployed at any one time, possibly with a third being located in readiness.

Large volumes of seawater are used to flush the sand out of the transporting vessel and pump it ashore. The mixture of sand and water (over 95% water) from the discharge pipe would be used to distribute the material to a natural profile with only minimal mechanical reworking.

The planning and phasing of the operation would be likely to be:



- **Sinker line assembly.** A suitable coastal site would be required for the assembly of the sinker line. This can normally be performed on a drying beach area with the pipe rolled out at high water in 250m lengths. The pipe is then jointed whilst afloat to form a 1km line for tow-out and sinking.
- **Offshore Discharge Point.** The offshore discharge point from the dredger into the sinker line would be subject to a Notice to Mariners and marked with appropriate navigation aids.
- **Phasing.** The beach nourishment would be phased over five years, starting in the south at Skegness and progressing northwards along the coast.
- **Rate of progress.** The typical rate of advance of the pipeline along the beach would be 24 metres a day.
- **Sinker line.** Each sinker line is likely to be in position for a period of 12 weeks. Fishing operators would be notified of the position of the sinker line.
- **Placement line.** Up to a maximum of 2 kms of shore parallel pipe (0.75m diameter) would be laid along the toe of the existing defences. The line would be laid on previously placed material to ensure that it remains above the tide and wave action level. Access points across the pipeline would be provided at appropriate locations.
- **Discharge Point.** During discharge operations it would be necessary to prohibit all public access within 200 metres of the discharge point.
- **Fines Washing Out.** The quantity of excessively fine sediment (silt) should be small, but would require monitoring.
- **Working.** The dredging and pumping operation would be performed on a 24 hour, 7 day week basis. The operation of any mechanical plant on the foreshore would be restricted to daylight hours.



The beach nourishment solution will still involve some maintenance works to the existing seawalls and, in due course, the replacement of some of them.

However, since foreshore levels will have been increased significantly by the beach nourishment, the scale of works will be less than those currently required and much reduced from those which would be necessary if seawalls alone were used.

A key feature of nourishment is the need to compensate for any loss of beach material by periodically feeding new material on to the beach. Monitoring of beach levels and recharge will be needed to maintain beaches at or around their design levels to ensure their effectiveness. This monitoring will be integrated with regional monitoring programmes and beach management plans. On average it is expected recharge will be required about every 10 years.

## IMPACT OF BEACH NOURISHMENT

In summary the effects of the nourishment scheme will be:

- **Land Use, Improved Flood Protection, Nature Conservation, Local Community.** Improved flood protection.
- **Recreation.** Raised beach levels; improved beach quality.
- **Landscape.** Aesthetically more pleasing than seawall approach: covering of exposed clays.
- **Fisheries.** Should not generally interfere with fisheries activities provided fishermen are kept fully informed. Possible turbidity unlikely to affect shellfish, but monitoring will be required.
- **Nature Conservation.** Possible deposition of beach nourishment materials at Gibraltar Point is unlikely to be significant, but will be monitored.

Possible change in calcium carbonate content of dune building materials will be minimised by the selection of appropriate materials.

- **Geology.** Protection of features of geological interest by covering with sand.
- **Archaeology.** Protection of features of archaeological interest by covering with sand. Possible damage to features will be minimised by liaison with County Archaeologist.
- **Traffic.** Possible congestion and/or disturbance due to heavy vehicle movements. Careful programming and routing of vehicle movements will minimise impact.
- **Tourism.** Possible disturbance due to works on beaches during summer months will be kept to a minimum.
- **Recreation, local community.** Possible dangers to public due to proximity of major civil engineering works. Stringent safety measures will be applied.

## CONCLUSION

Beach nourishment is the solution which has the greatest number of significant benefits and, in the majority of instances where there is any environmental impact, the level is assessed as being either minor or short lived for the duration of the beach building operation.

The scheme will make a significant contribution to reducing the risk of flooding along the coast. The tourist trade will benefit from the maintenance or improvement of beach quality and increased beach levels will improve general access and open up larger sections of beach previously underused because of exposed clay.

