



# Greater insight into shoreline management

## Shoreline and near-shore data system

Halcrow's unique shoreline and near-shore data system (SANDS) offers sophisticated coastal data capture, monitoring and analysis.

SANDS is unique because it brings together the greatest number of shoreline analysis and presentation tools in one place, enabling the most comprehensive comparisons of data for a given location.

Used by shoreline managers, coastal engineers, asset managers and environmental scientists worldwide, SANDS helps to detect trends in the coastal environment and provides valuable support for development decisions.

It is regularly used in regional management planning, flood risk management, budgeting for flood alleviation measures and asset management, as well as specific projects on the shoreline. A version of SANDS specifically developed for ports (PORTAL) has also been developed.

Clients include local authorities, government departments and government agencies like the UK's Environment Agency. It is also used in research projects and as an educational tool in universities.



### Our approach

SANDS is an independent product, developed by Halcrow. Users do not need specialist software skills and it can be customised to meet specific needs.

For example, SANDS can accept information from inspection forms, provide additional analysis functions and deliver special reporting formats.

The system takes in geospatial and temporal data on climate, weather, environment and shore condition, as well as a wide range of asset data, survey reports and records. This is analysed, interpreted and compared to detect means and trends.

SANDS databases can be set up and configured for many purposes, such as monitoring the movement of material on a shoreline, analysing the causes for that movement and identifying seasonal trends. This in turn helps the user understand when, where and how to apply any remedial measures.

Information is stored centrally and referenced to a mapping system. Sets of data are easily retrieved and can be viewed and compared simultaneously.

### Key features

- readily available, shared data with user-friendly access
- accepts information from asset inspection reports and monitoring activities
- creation of graphs, charts and plots to enable analysis
- erosion and accretion analysis

- area and volumetric analysis
- tidal analysis and prediction
- wind and wave extremes analysis
- sediment transport analysis
- probability analysis
- wave transformation analysis

### Mapping

Data in SANDS are associated with distinct location markers or areas, shown on maps or aerial photographs. Users select a marker to display the full list of data associated with that location, and then choose analysis and graph options to create visual interpretations of the data.

### Diarised inspections

SANDS provides a mechanism for capturing monitored information in a consistent manner over time, storing it, and building an ever-more valuable database. A range of inventory forms are provided for this purpose, accessed via the SANDS diary. These forms are the basis for monitoring or site surveys, such as structural inspections, ecological surveys, water-quality assessments and marine and ecosystem health records. Variants of these forms or new ones which fulfil particular client needs can be produced by Halcrow's software development team if required.

### Time-series analysis

SANDS contains analysis routines for numerous scenarios, including tidal predictions, tidal harmonics, weather extremes, wave energy and drift rates, as well as the probability of multiple events. It is also able to apply an offshore deepwater data set to a model of inshore locations, providing data on these locations and thereby removing the need to collect physical data at multiple locations over a long period.

The graphs, scatter plots and rose plots SANDS can create can be used to check and edit time-series data before analysis.

Time-series analysis results can be shown in relation to other data within SANDS and used to assess their relationship over time. For example, a user might compare wave energy and the movement of material in order to assess the susceptibility to flooding of an area behind the shoreline and then identify the most efficient mitigation measures.

### Profile analysis

The profiles derived from survey data can be related to a known reference point, such as a rock bed or dredged level. SANDS can then create cross-sections of particular areas, showing the survey information in

relation to these reference points, and plot trends over time.

SANDS can also group surveys from different locations and perform volumetric analyses. Its statistical routines can analyse both climatic and profile data. This enables analysis of changes in the shape of a beach over time in relation to the prevailing conditions, including annual and seasonal accretion or erosion trends.

## Delivering value – case studies

### ■ South-east England regional monitoring programme

The software and technical advice provided by Halcrow enables local authorities, the coastal groups of south-east England and the Environment Agency to share shoreline information across the region and cut out duplication of work for survey monitoring and data acquisition.

By adopting standardised analysis techniques and terminology, direct comparison can be made between geographical areas.

Data from this project is shared publically on the Channel Coastal Observatory website.

### ■ Broomhill Sands, East Sussex, UK

All the data collected as part of Halcrow's recent study of beach evolution and the predicted effects of adding beach-control structures and recharge material to the Broomhill Sands area is held within SANDS.

As a result, the Environment Agency and the project team are able to use SANDS as a live tool to help it analyse the area's beaches, adding new information as it is captured to ensure it always has an up-to-date understanding of beach movements along this part of the south coast.

### Contact us

- **Michael Stickley – UK**  
tel +44 (0)1793 812479  
email [stickleymc@halcrow.com](mailto:stickleymc@halcrow.com)

For your nearest Halcrow office, visit [halcrow.com](http://halcrow.com)