

Case Study Reference: IEM/2012/003

*these case studies highlight actions we are taking to reduce our carbon footprint within the Environment Agency, including benefits and lessons learnt*

### Swinefleet Carbon Reduction Case Study

#### Background

The **Swinefleet** project was an £11.9m project where we raised and strengthened 1.1 km of embankment along the Humber Estuary. The flood defence was a steel sheet pile wall clad with European oak, rather than brick. Most of the work was undertaken from the river using barges and pontoons as shown in the photo.



#### Increase in the Carbon Footprint

The outline design had a carbon footprint of 3,565 tonnes CO<sub>2</sub> (tCO<sub>2</sub>). However, the carbon footprint increased by 1,350 tCO<sub>2</sub> to 4,915 tCO<sub>2</sub> due to the lack of availability of recycled products within the market and design changes reacting to unforeseen circumstances.

#### Steel sheet piling

Sheet piling was intended to be made from imported recycled metal to reduce the CO<sub>2</sub> impact. However, due to defective units being delivered, replacements (with high recycled content) could not be sourced in time. This resulted in an increase of 1,536 tCO<sub>2</sub>.

Between the project planning stage and detailed design it was identified that changes were required to the line of the sheet piles to suit local conditions. Heavy use piling was reduced by 1,300 m<sup>2</sup>, but medium use piling increased by 3,100 m<sup>2</sup>. This led to a net embodied CO<sub>2</sub> increase of 150 tCO<sub>2</sub>. At the same time an extra 10% of length was added to the project (i.e. increase in scope). The net increase between these two stages was 149 tonnes of CO<sub>2</sub>.

#### Recycled Aggregates

At the outline design stage it was planned to use recycled aggregates on the project. However, at the construction stage recycled material was not available in sufficient quantities locally. This increased the carbon footprint by 89 tonnes of CO<sub>2</sub>.

#### The lessons to take away

Constraints during construction can result in significant design changes. Design changes can increase the carbon footprint on projects. Wherever possible any design changes should have their CO<sub>2</sub> assessed to assist decision making.

When specifying recycled materials the availability of these within the market should be taken into account.

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