

## BeST Case Study

### Glasgow City Centre Surface Water Management Plan

#### Background

The Glasgow City Centre Surface Water Management Plan (SWMP) contains four key phases.

- Phase 1 – Site Appraisal
- Phase 2 – Catchment Assessment
- Phase 3 – Feasibility Study and Schematic Design
- Phase 4 – Economic Impact Assessment

This case study is based on a restricted Economic Impact Assessment (EIA) carried out by MWH for Glasgow City Council in 2013. The EIA includes an assessment of the (capital and operational) costs, flood risk benefits and other, wider benefits from surface water management options, including SuDS. Glasgow City Centre was the location for the SWMP that contains a mix of residential, educational, commercial and retail uses.

#### Approach

The proposed option assessed using BeST was to 'implement SuDS with other surface water management measures'. It included a number of retrofit measures that could form part of the city's redevelopment plan, including green roofs, swales, permeable paving, a pond/wetland and exceedance management measures. The proposed option was compared to a baseline 'do nothing' case.

Based on the screening questions, the following benefit categories were assessed using the tool:

- Amenity
- Carbon sequestration

- Enabling development
- Flood risk
- Health
- Recreation
- Water quality

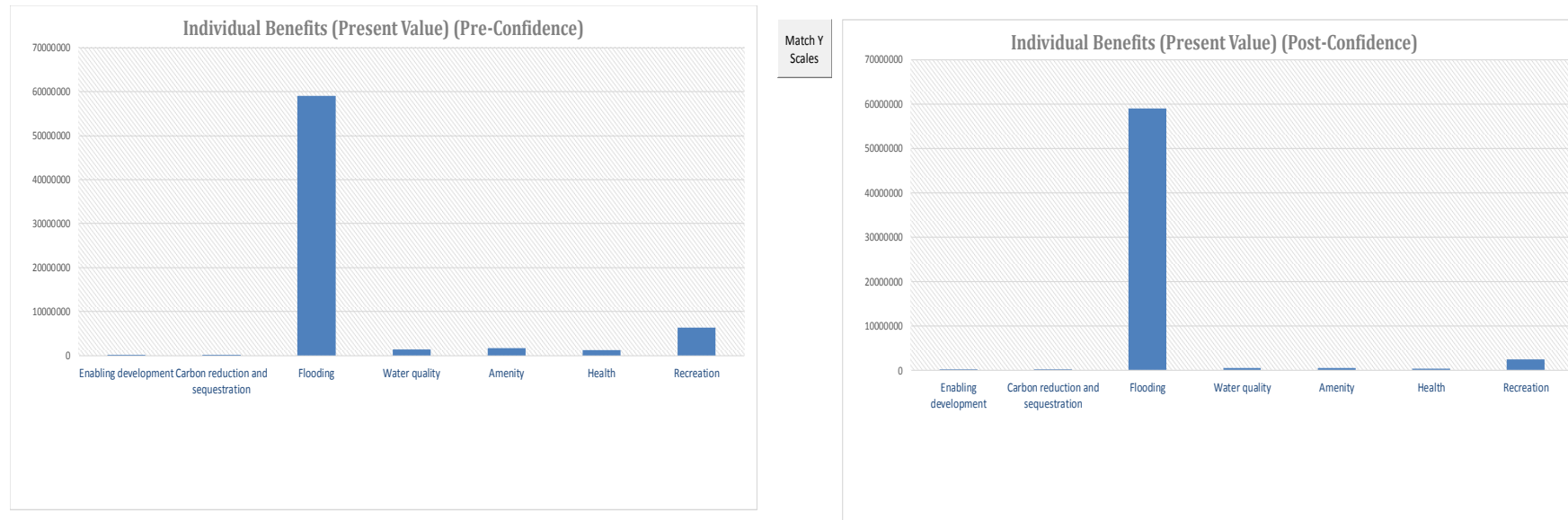
Most of the benefit categories were assessed using information within the tool and guidance. The exceptions to this were 'flood risk', which was assessed using damage cost estimates from the Multi-Coloured Manual, and 'enabling development', which was based on information from the original EIA. The present value costs of the option had already been estimated at £28.3 million.

#### Results

A summary of the results exported from BeST is shown in Table 1. The estimated benefits of the option are always greater than the costs. The central estimate after confidence is applied gives a benefit cost ratio of 2.3. This is 1.3 under low sensitivity and 3.7 under high sensitivity. The breakdown of benefits (before and after confidence applied) is shown in Figures 1, 2 and 3. The majority of benefits are associated with flood risk reduction. Other potentially important benefits are recreation, water quality and amenity. Figure 4 shows the total benefits present values for different conditions and net present values.

**Table 1: Summary of results**

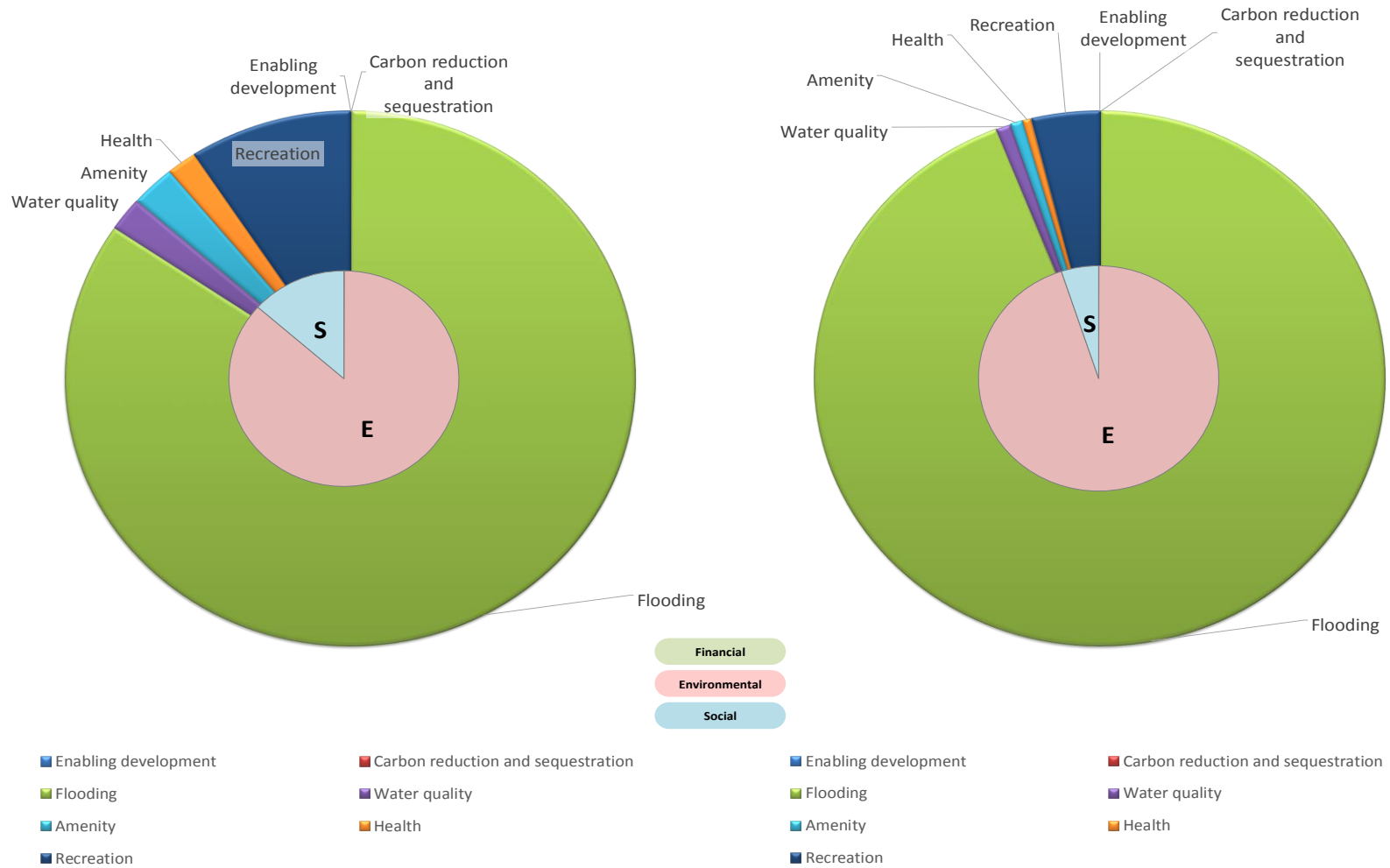
Present Value Assessment Stage	Total Benefits PV	Total PV Costs	Net Value Present	Benefit Ratio Cost
Present Value before confidence applied	£69,858,591	£26,833,659	£43,024,932	2.6
Present Value after confidence applied	£62,707,500	£26,833,659	£35,873,841	2.3
Present Value sensitivity - low	£34,363,669	£26,833,659	£7,530,010	1.3
Present Value sensitivity - high	£99,782,635	£26,833,659	£72,948,976	3.7



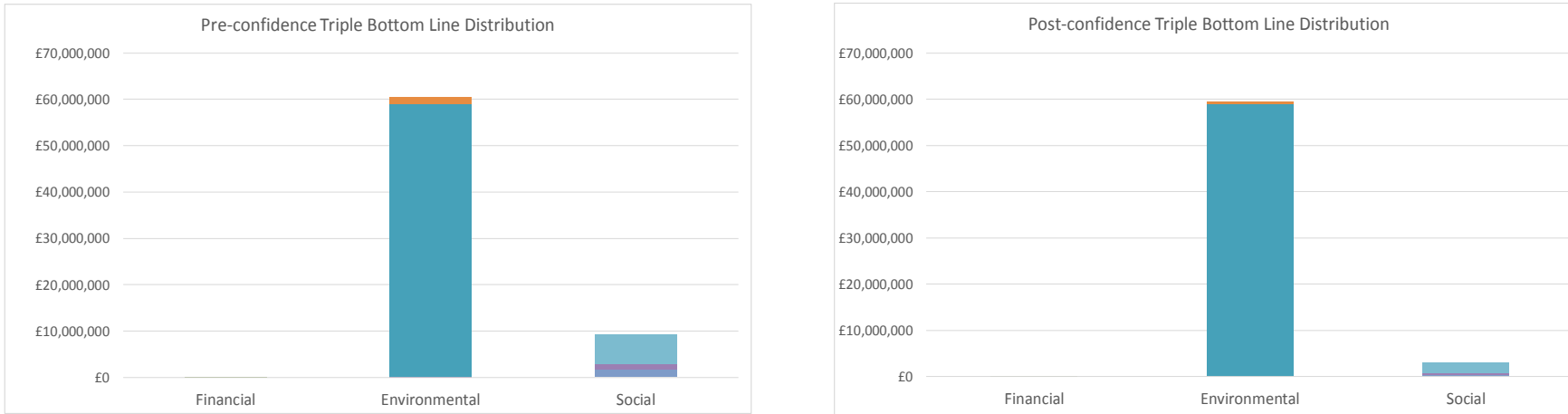
**Figure 1: Breakdown of benefits per category pre (left) and post (right) confidence**

Individual Benefits (Present Value) (Pre-Confidence)

Individual Benefits (Present Value) (Post-Confidence)



**Figure 2: Distribution of benefits pre (left) and post (right) confidence**



**Figure 3: Breakdown of benefits under triple bottom line categories pre (left) and post (right) confidence**



**Figure 4: Comparison of benefits present value (left) and net present value (right) for pre and post confidence and sensitivity testing.**