

Designing out Waste on a primary school project

Southwark Primary School, Nottingham



Image courtesy Capita Architecture Ltd

The best opportunities to reduce materials use and waste in construction occur at the design stage. This case study describes how the design team used the Designing out Waste process developed by WRAP (Waste & Resources Action Programme) to identify and prioritise waste saving opportunities on a primary school project in Nottingham.

Top waste saving opportunities

- Use of carpet tiles instead of carpet on rolls.
- Use of open ceilings where possible instead of suspended ceilings.

Implementing these opportunities would:

- reduce total project costs by £25,150;
- reduce waste by 14 tonnes; and
- reduce embodied carbon by 260 tonnes.

Project details

Capita Architecture is designing Southwark Primary School in Nottingham – an ‘exemplar’ primary school for 720 pupils as part of the Nottingham Building Schools for the Future (BSF) programme. The design aim is to achieve BREEAM ‘excellent’ rating.

Designing out Waste process

The project team and client worked together to apply the key principles and identify design opportunities that could be implemented in the project.

They used WRAP’s three-step Designing out Waste process by undertaking:

1. a facilitated workshop where all possible design changes to reduce waste were explored and prioritised in terms of their likely impact on waste reduction and ease of implementation;
2. detailed analysis of the cost, waste and carbon savings of a shortlist of preferred design changes; and
3. selection of design changes to implement in the project.

The analysis in Step 2 involved comparing the suggested design changes against the existing design to quantify savings in:

- construction cost;
- quantity of site waste;
- cost of waste disposal;
- value of materials wasted; and
- embodied carbon.

Designing out Waste principles

WRAP’s design guide, *Designing out Waste: a design team guide for buildings*, sets out five key principles that design teams can apply at the project level to reduce waste:

- Design for Reuse and Recovery;
- Design for Off Site Construction;
- Design for Material Optimisation;
- Design for Waste Efficient Procurement; and
- Design for Deconstruction and Flexibility.

Application of these principles at the design stage of a construction project can result in significant savings in cost, waste and carbon.

Opportunities to reduce waste

Many of the ideas from the workshop had already been incorporated into the design. Four design changes were shortlisted as having a high impact on waste reduction and easy to implement. One was rejected because of its higher cost and another because it was difficult to make accurate estimates of the costs. The other two were analysed in further detail. The Net Waste Tool provided wastage rates and bulking factors.

Carpet tiles

Laying 500 × 500 mm carpet tiles uniformly over rubber-studded tiles rather than using rolls of broadloom carpet over a rubber underlay (both laid over a cement and sand base) would achieve significant cost savings because of the much lower wastage rate for carpet tiles (5%) than for sheet carpet (20%). As well as reducing the total project cost by over £17,000, the use of carpet tiles would reduce waste by 13 tonnes and reduce embodied carbon by almost 240 tonnes.

Use of 'random design' tiles rather than 'standard' tiles would reduce the number of tiles needed and further reduce waste as they can be installed in any direction. But the higher purchase cost of the 'random design' tiles was not acceptable to the design team.

Open ceiling design

Leaving the ceiling structure open where possible rather than having suspended ceilings throughout the building would reduce both materials use (fewer ceiling tiles would be needed) and waste. Despite the need to use acoustically absorptive panels in the open ceiling design, this design change would reduce the total project cost by £7,420. There would also be a reduction in waste of one tonne and a reduction in embodied carbon of over 20 tonnes.

Want to know more?

Full details of the Southwark School project including the results of the quantitative analysis are available in a separate technical report.

For more information on Designing out Waste and the design review process see *Designing out Waste: a design team guide for buildings*.

Both are available from the WRAP website www.wrap.org.uk/designingoutwaste WRAP's Net Waste Tool is available online at www.wrap.org.uk/nwtool

Potential savings from alternative designs for the Southwark School project

Design solution	Total project cost	Waste (tonnes)	Embodied carbon (tonnes) *	Waste disposal cost	Value of materials wasted
Carpet tiles	£17,090	12.9	239	£182	£8,348
Open ceiling design	£7,420	0.9	21	£232	£812
Total	£24,510	13.8	260	£414	£9,160

* Resulting from reduced materials used and/or reduced waste created. Does not include carbon contributions from transport of materials and waste.

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