Direct and Indirect Water Use at Heathrow Terminal 2B

This case study details the development of water footprinting tools and their trialling at Heathrow Terminal 2 satellite pier T2B. It demonstrates that water used during construction is only a small part of the water used and that consideration also needs to be given to the embodied water in materials and products.

Project introduction
The T2B project is part of the £4.5 billion major capital investment programme by BAA at Heathrow Airport. The project involves construction of Satellite Pier T2B (formally Midfield Pier) which will complement the new Terminal 2.

The new satellite pier’s facilities will be of equivalent standard to the Terminal 5 piers, and when operational, in 2014, T2B will comprise:

- 16 aircraft stands;
- Retail provision of approximately 1,275m$^2$;
- 3 lounges with 3,600m$^2$ floor area; and
- 4,000m$^2$ of airline operations accommodation.

Organisations involved
- BAA (Client)
- Balfour Beatty (Contractor)
- Parsons Brinckerhoff (Consultant)

Focus on water footprinting
Balfour Beatty’s Sustainability Road Map$^1$ requires the company to undertake assessments of its indirect water footprint across its supply chain to indentify the most significant areas of water embodied in products and materials. The Sustainability Team at Parsons Brinckerhoff, a Balfour Beatty company, developed a robust methodology and toolset to support Balfour Beatty’s ambitions.

Working collaboratively with Balfour Beatty, and one of its main suppliers, Marshalls, Parsons Brinckerhoff transposed an industry methodology, developed by the Water Footprint Network$^2$, into a suite of five user-friendly water footprinting tools to enable:

- designers and construction contractors to estimate the volume of direct and indirect water used in construction projects; and
- material suppliers to calculate the volume of direct and indirect water used in construction products.

The toolset considers direct and indirect (‘embodied’) water use as well as local water stress to estimate a water impact index. The water impact index is based on the fact that some areas of the UK are water stressed, and others are not. Unlike carbon (which has the same effect wherever it is emitted), the impact of using water depends on the degree of water scarcity in the area it is extracted.

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$^2$ www.waterfootprint.org
Trialling the toolset at Terminal 2B

The toolset developed by Parsons Brinckerhoff was trialled by Balfour Beatty at Heathrow T2B; a £507m design and build project for BAA.

The initial findings of the trial assessment, as outlined below, indicate that the embodied water associated with procured materials and products greatly exceeds, by an order of magnitude in this case, that used directly on-site:

- Direct water footprint: 18,596m$^3$ per year
- Indirect Water footprint: 652,236m$^3$ per year

The analysis shows that although metals have the highest water footprint it is flooring that has the greatest impact when the water impact index is considered.

These tools are now being used by Balfour Beatty on other construction projects to enable a greater understanding of the typical water impacts across a range of its different projects and to prioritise where to focus effort to target water use reductions within the supply chain and during construction.

Key learning for future projects

This case study promotes an industry leading approach to assess direct and indirect water use that can be used by designers and contractors to estimate the water footprint. This information can help target water use reductions within the supply chain. The toolset also allows suppliers to calculate the water footprint and impact of individual construction materials and products; and environment and facility managers to understand the water footprint and impact of the water used in their offices and site accommodation.

The key learning from the development of the water footprinting tools and their trialling at Heathrow Terminal 2B are:

- Initial analysis suggests that the indirect water associated with procured materials greatly exceeds that used directly on construction sites.
- It is important to consider the water impact index alongside the water footprint for a more complete understanding of the water impact.
- To maximise resource efficiency embodied water must be considered alongside that of embodied carbon (in materials and products) and drivers such as cost and other sustainability criteria (which may include durability, safety and suppliers environmental performance).
- Currently there is no generally accepted methodology for water footprinting. The Water Footprint Network methodology provides an approach which can aid our understanding of water impacts on construction projects.
- Unlike carbon, there is currently very limited embodied water factor data (‘cradle-to-gate’) for typical UK construction materials.
- Data on water stress across the globe was limited.

![Output Screenshot from Indirect Footprinting Tool](image-url)