Designing out Waste Tool for Civil Engineering

Quick Start Guide, Version 1.0

The Designing out Waste Tool for Civil Engineering (DoWT-CE) is a freely accessible online resource that will help you to:

- generate indicative forecasts of the quantities of materials and wastes that will be used in the project. These can be used to identify and prioritise materials reuse and waste prevention options to input to your Site Waste Management Plan;
- identify the civil engineering elements that are likely to produce the most waste;
- identify opportunities to design out waste and calculate the combined impact of selected design solutions; and
- assess the impact of your chosen design solutions on the value of waste, waste to landfill, disposal cost and CO_2 from materials extraction.

The Tool is available at http://dowtce.wrap.org.uk/, and should be used in conjunction with WRAP's Designing out Waste Guide: a Design Team Guide for Civil Engineering, available at www.wrap.org.uk/designingoutwaste.

The Tool can be used iteratively during outline design, as different options will become relevant as the design is developed. An indicative waste forecast requires only outline project data, further more refinement of project elements can take place as the project becomes more detailed. Once the project has been set up in the tool a 'performance report' can be generated that identified opportunities to reduce materials consumption and wastage by following WRAP's designing out waste principles. The time and effort expended in investigating waste reduction opportunities can result in significant financial savings and environmental benefits.

Users:	▪ Design team – civil engineer
When:	▪ Option preparation and design development stages
Inputs:	▪ Project elements and approximate dimensions ▪ Design team thinking on options to design out waste
Outputs:	▪ Tabulated reports on the impact of design solutions on project costs, materials requirement, wastage and embodied carbon
Cost:	▪ A short amount of time is needed to complete analysis (depending on project complexity) ▪ The Tool is free to use
Benefits:	▪ Helps to identify opportunities to reduce the need for imported materials, minimise wastage and achieve cost savings ▪ Can be used for options appraisal by comparing different project scenarios ▪ Provides input for the project Site Waste Management Plan ▪ Users can include potential savings in tender specification so that tender prices can take account of design decisions ▪ Results can be used to demonstrate Corporate Responsibility

1. Getting started

Create an account
You can use your existing Net Waste Tool login details if you have an account. Otherwise, complete the basic registration form on the Login screen at http://dowtce.wrap.org.uk/. You will receive an auto-generated email welcoming you to the Tool. You can begin using the Tool immediately after registering.

Create a new project
After logging in, you will arrive at your 'My Projects' page. From here you can create a new project:
- To set up a new project from scratch, click on 'Add new project' (top left)
- To use one of your existing projects as a template for a new project, click on 'Use as template'. You will be prompted to re-name the project, which will then appear as a new project under your 'My Projects' tab. Click on the project name to enter the project.
- To use a saved WRAP project as a template for your new project, go to the 'Example projects' tab, click on 'Use as template' and proceed as above.

Enter basic project details
The Tool will now take you to the 'Project Details' screen. Enter your project data, or edit the existing project data if you are using an existing project. Help text will display for some data fields when you put your cursor in the field. You can switch off the auto-help text at the top right of your screen (display auto help). Enter project data as best you can. Remember you are aiming to create an indicative rather than a detailed waste forecast. You can refine the project data as the design progresses.

Project builder
The Tool will now take you to the 'project builder' screen. Within the project builder you can select the different elements that comprise your project (e.g. pavements, embankments, drainage, foundations, etc). For each selected element you are required to provide some high level information on the quantities involved (e.g. the length of the selected drainage), other project information is set using editable default assumptions. Using the palette of elements in the project builder you can create simple or complex projects that reflect the nature of the proposals and the level of available information.

2. Analysing your project

Solutions & impacts
After checking your project's specification, the Tool will take you to the 'Solutions and impacts' screen. The aim of this screen is to help design teams focus their effort on the elements that consume or waste the most material and then to specify specific actions which will have an impact on the amount of material used or the level of wastage.

Information is presented for the selected project elements and the different components used in their construction. You can also print out a report that highlights the key opportunities to reuse materials and reduce waste on the project.

WRAP suggests you use this report to inform your Design Review Workshop. This workshop is described in detail in the design team guide.

If you decide to select solutions to reduce material consumption and/or waste in the design, you record these solutions and their impacts on project costs and waste to landfill. The 'Solutions & impacts' screen provides the following functions:

- **Project log –** the table at the top of the screen lists the building elements, and shows their estimated material consumption and wastage. The table also provides a record of the number of design solutions and impacts that have been recorded for each element.
- **Performance –** the left-hand section of the screen shows the material consumption and wastage estimates by material type.
- **Solutions –** this section can be used to record design solutions. You should choose the correct element and design principle that relate to your solution. All of the solutions for the selected element will be recorded in the table below.
- **Impacts** – after recording each design solution, you can enter the impacts as prompted by the Tool. The impacts you record will be different for each design principle; for example, solutions recorded under Design for Reuse and Recovery will require you to enter your proposed quantity of reclaimed material to be for that element.

Reporting
Having selected actions and defined their impact on your project, you can generate a report details project performance in comparison to baseline or good practice benchmarks.
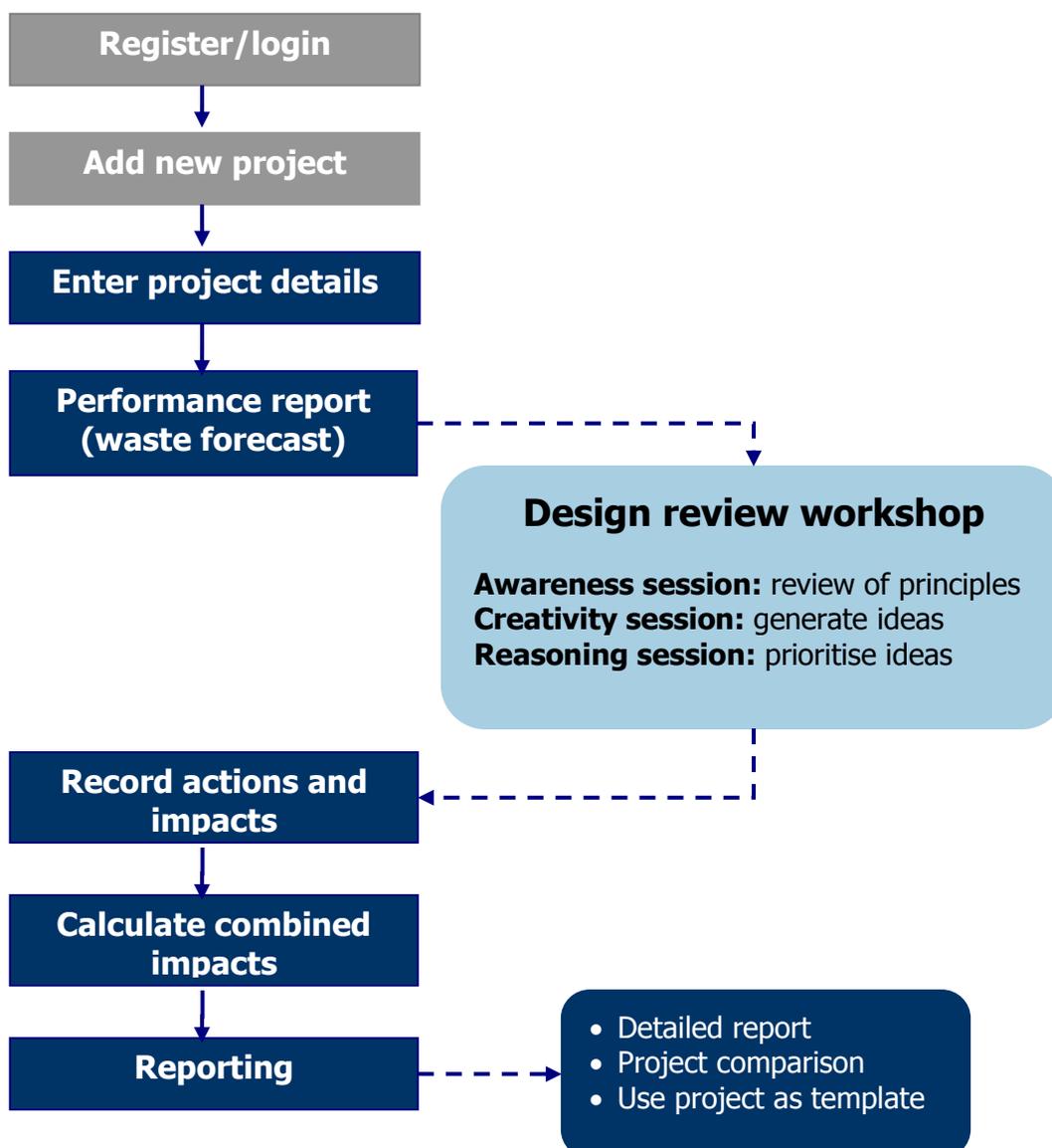
If you would like to compare the performance of different designs or specifications, you can generate a Project Comparison report. To do this, you first need to create different projects that you can compare. You may choose to do this by creating new projects from scratch, or (more likely) by creating alternative versions of an existing project using the 'Use as Template' function on the My Projects screen. You can then select the projects you want to compare and click on 'Compare Projects Report'.

3. Relationship with other WRAP tools

The DoWT-CE, DoWT-B (for buildings) and the Net Waste Tool have a common landing page and utilise the same registration details. Information in the DoWT-CE cannot be transferred to either the DoWT-B or Net Waste Tool, however, the DoWT-CE can incorporate information on demolition arising or wastage from projects created in the DoWT-B. In this way users can identify opportunities for reusing demolition, excavation or construction wastes from building projects in associated civil engineering activity (eg site roads, car parks, etc).

The outputs from the DoWT-CE can be used to complete the waste forecast and list of waste prevention or reduction actions within WRAP's Site Waste Management Plan Template.

4. User journey

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┌─────────────────────┐
│    Register/login   │
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          │
          ▼
┌─────────────────────┐
│   Add new project   │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│ Enter project details│
└─────────────────────┘
          │
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┌─────────────────────┐
│ Performance report  │┄┄┄┄┄┄┄┄┄┄┄┄┄┐
│  (waste forecast)   │              ▼
└─────────────────────┘   ┌───────────────────────────────┐
                          │    Design review workshop     │
                          │                               │
                          │ Awareness session: review of  │
                          │   principles                  │
                          │ Creativity session: generate  │
                          │   ideas                       │
                          │ Reasoning session: prioritise │
                          │   ideas                       │
                          └───────────────────────────────┘
┌─────────────────────┐              ┊
│  Record actions and │◄┄┄┄┄┄┄┄┄┄┄┄┄┘
│       impacts       │
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┌─────────────────────┐
│ Calculate combined  │
│       impacts       │
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┌─────────────────────┐      ┌──────────────────────────┐
│      Reporting      │┄┄┄┄►│ • Detailed report        │
└─────────────────────┘      │ • Project comparison     │
                             │ • Use project as template│
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If you would like more detailed guidance on using the Tool, you can download the DoWT-CE Full User Guide from the 'Download options' menu in the Tool.