Guidance for client project managers

Actions to reduce waste in construction projects and minor works
Our vision is a world without waste, where resources are used sustainably. We work with businesses and individuals to help them reap the benefits of reducing waste, develop sustainable products and use resources in an efficient way. Find out more at www.wrap.org.uk
Why take action?

Secure the benefits sought by sector leaders.

- **Reduce construction costs** – waste disposal costs will escalate with annual increases in Landfill Tax to 2013, and the cost of wasted materials is typically even higher. Cost-benefit analyses indicate you can save up to 2% of the construction cost by achieving good practice wastage rates on the 5-10 most wasted components on each project – and more through design changes and materials reuse. These savings are net of implementation costs (see www.wrap.org.uk/constructioncba).

- **Ensure regulatory compliance** – in England, as a client you are legally responsible with your main contractor for satisfying the Site Waste Management Plans Regulations [2008] on all projects over £300k, plus the Duty of Care regulations. Moreover, sites with low waste are often safer and better managed.

- **Maintain corporate reputation** – by measuring performance and setting improvement targets, you can demonstrate Corporate Responsibility, keeping your customers, investors, staff, planning authorities and other stakeholders happy.

- **Demonstrate leadership** – you can evidence your contribution in reducing landfill and the carbon impacts of waste, and show that you are delivering efficiency savings. Over 300 organisations across the sector have signed the Halving Waste to Landfill Commitment (www.wrap.org.uk/halvingwastetolandfill), and public sector funding programmes are asking for improved performance – make sure you aren’t seen to lag behind your peers.

### What do you need to do?

Construction clients signed up to the Commitment agree to:

- set a target for reducing waste to landfill;
- embed the target within corporate policy and processes;
- set corresponding requirements in project procurement and engage with our supply chain;
- measure performance at a project level relative to a corporate baseline; and
- report annually on overall corporate performance.”

If you only want to take action on a specific project, then start by setting performance requirements in tenders and contracts (see below).

### How can you achieve this?

This document sets out:

- actions at each project stage, and the roles of different supply chain members;
- what data your projects need to forecast, measure and report for waste, and how the data should be collected and reported; project and corporate levels;
- key wording to include in tender and contract documents; and
- how the approach will differ for minor works.
Project stages

Action is needed at the following stages:
1. project inception and initial design;
2. detailed design;
3. tender;
4. project kick-off and pre-construction;
5. construction; and
6. post-construction reporting.

Base your measurement and reporting requirements around the following metrics and KPIs agreed by major contractors:

<table>
<thead>
<tr>
<th>Get this project-by-project information...</th>
<th>...to calculate the baseline values of these corporate KPIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>■ Tonnes of waste sent to landfill.</td>
<td>■ Waste to landfill: tonnes of waste to landfill per £100k of construction cost.</td>
</tr>
<tr>
<td>■ Tonnes of waste generated.</td>
<td>■ Waste generation: tonnes of waste per £100k of construction cost.</td>
</tr>
<tr>
<td>■ Construction cost (i.e. tender price, excluding VAT).</td>
<td>■ Waste recovery: % of waste diverted from landfill during the last year.</td>
</tr>
<tr>
<td>■ Recycled content [% materials by value] – optional, £300k+ projects only.</td>
<td>■ Recycled content %: % recycled content by value – optional.</td>
</tr>
</tbody>
</table>

Actions at stage 1: project inception and initial design
Set out your requirements in the Project Brief (see Appendix 1 for wording). It is essential that the major opportunities to reduce, reuse and recover waste are identified and communicated from an early design stage, so that the cost-saving potential can be factored into tender prices. The basic elements are:

■ your corporate objective for reducing waste and landfill over time;
■ minimum and stretch outcomes for waste reduction, recovery and reuse on each project; and
■ requirements for waste measurement and reporting.

On all projects above £300k in value, use the kick-off meeting to instruct the design team to:

■ develop a Site Waste Management Plan (SWMP) at the design stage;
■ set a project-specific target for waste reduction in addition to the targets for waste recovery and recycled content defined in the Project Brief;
■ report on waste reduction actions at design review meetings; and
■ identify the selected actions and associated cost savings in the tender invitation issued to potential contractors.

1For example, using the template freely available at www.wrap.org.uk/swmp
On minor works less than £300k in value, use a simple reporting template to replace the SWMP – see the example in Appendix 2.

Brief your commercial team that they should include requirements corresponding to the Project Brief in the Pre Qualification Questionnaire (PQQ), tender and appointment/contract documents for both the design team and contractor on each individual project. Model wording is available at www.wrap.org.uk/procurement_requirements

Brief the design team to use resources freely available to them from WRAP (Waste & Resources Action Programme), including:

- **Designing out Waste guides for Buildings and Civil Engineering** – which explain how to build waste assessment into design development and value engineering processes, and include information on low-waste solutions;

- **Designing out Waste Tools for Buildings and Civil Engineering** – which enable a quick and low-effort way of forecasting waste at an early design stage and homing in on a set of priority actions; and

- **Net Waste Tool** – this helps the design team to calculate a more accurate waste forecast at the detailed design stage (e.g. RIBA Stages C to E), using cost plan data as input. The tool identifies where to focus effort in reducing wastage rates/allowances and in looking for alternative products with higher recycled content.

At the options appraisal stage, consider how waste can be avoided, e.g. by refurbishing instead of demolishing or stripping out; using existing facilities more efficiently (such as hot-desking); or choosing to recondition (instead of replacing) elements of a project.

**Actions at stage 2: detailed design**

At design review meetings, check that the design team has:

- developed a forecast for waste;
- identified and quantified the most effective actions to reduce waste and the costs of waste (including reuse and recovery);
- included these details in a SWMP (for projects over £300k in value);
- and
- included these details in documents for contractor tendering and appointment.

Ask for evidence that the design stage SWMP is legally compliant with the SWMP Regulations in England [since, as a client, you are legally responsible with the contractor for compliance].

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2 www.wrap.org.uk/designingoutwaste
4 www.wrap.org.uk/nwtool
As a check-list, see whether the design team has considered the following options (where relevant):

- off site construction or selecting prefabricated components;
- reuse of construction, demolition and excavation materials on site;
- changes in the design specification which reduce waste and materials use;
- optimisation of the design, such as matching building and product dimensions;
- reducing wastage allowances in expectation of SWMP actions achieving lower wastage rates on high volume/value components;
- selecting durable components with low waste over their life-time; and
- providing facilities for segregating operational waste once the facility is in use.

Ask about early contractor involvement in design discussions (where appropriate), which may increase the savings.

**Setting a project-specific target for waste reduction**

The design team can:

- identify **some specific design changes** (off site construction, materials reuse etc), quantify their effect on waste (e.g. using WRAP’s tools for Designing out Waste), and specify these changes in the SWMP; or
- **forecast the waste for the whole project** before and after changes in design specification and wastage rates (e.g. using WRAP’s Designing out Waste tools and Net Waste Tool), and specify a target level of waste generation per £100k of construction spend in the SWMP and tender documents; or
- **review industry average data** on waste generation per £100k for different types of construction; and select a rate to set as a threshold; or
- **review data from your completed projects** on waste generation per £100k, and select a level that represents good practice for the type of project (e.g. office refurbishment). For example, ask each new project to emulate your best-performing project to date.

The first two methods are based on design information specific to the project, and therefore are likely to be more accurate but require more analysis.

**Actions at stage 3: tender**

Ensure that performance standards and requirements for waste measurement and reporting are included in the PQQs, tender documents and contracts for principal contractors. These should reflect the wording in the Project Brief – see Appendix 1 and the wording available at [www.wrap.org.uk/procurement_requirements](http://www.wrap.org.uk/procurement_requirements)

Where the design team selected particular actions to secure waste and cost savings, these must be clearly communicated during contractor tendering and appointment using the Invitation to Tender (ITT) and SWMP. In turn, the principal contractor will be prompted to set requirements on their specialist/trade contractors and waste contractors.

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4Data are collected by BRE, Constructing Excellence and WRAP. Signatories to the Waste to Landfill Commitment will be able to benchmark their performance against their peer group average using the Waste to Landfill Reporting Portal at [www.wrap.org.uk/reportingportal](http://www.wrap.org.uk/reportingportal)
Actions at stage 4: project kick-off and pre-construction

Post-appointment, ensure that the contractor:

- develops the SWMP in more detail\(^5\), checks and refines the waste forecast, and takes forward the actions for waste reduction defined at the design stage;
- includes plans for reducing wastage on site (lower wastage allowances on trade packages etc); for materials logistics (delivery and site storage); for waste recovery (site segregation etc); and for reuse on site (mobile processing plant etc);
- takes ownership for delivering the performance requirements (recovery rates etc);
- records and reports on waste using the agreed metrics; and
- engages with their own supply chain, including trades and waste services contractors, to make sure everyone understands the project requirements (which should be defined in subcontractor appointments).

Your principal contractor needs to negotiate lower wastage allowances with their specialist/trade contractors before prices are agreed if you, as a client, are to share in the potential cost savings.

Prior to work starting on site, ask to see the contractor’s version of the SWMP, and check it against the requirements in the project brief. The contractor should also confirm:

- the quantity of each different waste type expected to be produced; and
- the waste management action proposed for each waste type, including re-using, recycling, recovery and disposal.

Ask for evidence that the construction stage SWMP is legally compliant with the SWMP Regulations in England\(^6\), and that Duty of Care for waste will be implemented by the principal contractor and their supply chain on all projects. Ask whether any specialist/trade contractors will be removing waste from site, and how this will be measured and reported.

Experience suggests that success in achieving your targets for waste recovery rates will be strongly influenced by:

- the contractor’s choice of waste management contractor; and
- the ability to get materials sorted and segregated on site.

Actions at stage 5: construction

During the construction stage, your contractor should record in the SWMP (for projects over £300k in value):

- details of waste carriers and waste facility destinations;
- actual waste types and quantities produced; and
- whether waste was reused, recycled, recovered or sent for disposal.

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\(^5\) The contractor may have their own SWMP template.

\(^6\) WRAP’s SWMP Template is available at [www.wrap.org.uk/swmp](http://www.wrap.org.uk/swmp), and includes a list of the legal requirements your SWMP will need to meet in England. The wording of the Regulation is available at [www.opsi.gov.uk/si/si2008/uksi_20080314_en_1.htm](http://www.opsi.gov.uk/si/si2008/uksi_20080314_en_1.htm)
Ask for a quarterly summary of tonnes of waste generated, tonnes of waste sent to landfill and corresponding construction value, and:
- email the data to your Corporate Responsibility/Sustainability/Environmental Manager; and/or
- (if your organisation is a signatory to the Waste to Landfill Commitment) get the contractor to enter the data into your organisation’s account at WRAP’s Halving Waste to Landfill Reporting Portal.

For smaller projects, ensure the contractor is using the agreed reporting template.

You should minimise design and specification changes once the construction process has started, since late design changes often have a disruptive effect in increasing wastage.

**Actions at stage 6: post-construction reporting**

Ensure you receive the completed SWMP (or waste data reporting template in the case of minor works) from your principal contractor.

On projects requiring a SWMP, ensure your contractor has:
- collected all actual waste data (separated by whether this is construction, demolition or excavation waste):
  - tonnes of waste generated; and
  - tonnes of waste sent to landfill;
- completed the SWMP and ensured it is legally compliant; and
- evaluated performance against the standards that were set at the start of the project:
  - recovering a minimum of (70% – or whatever target you set) of construction materials;
  - recovering a minimum of (60%) of strip-out materials and (80%) of demolition and excavation materials (where applicable); and
  - ensuring that at least (15%) of total material value derives from reused and recycled content.

Report the totals for waste generated, waste sent to landfill and corresponding construction value to your Corporate Responsibility/Sustainability/Environmental Manager on completion of each project. This will help your organisation to determine their baseline performance, set a corporate target for improvement, and subsequently assess and report progress (for the corporate portfolio as a whole) using the defined KPIs.

On £300k+ projects, project managers should also report the level of recycled content (by value) achieved on completion.
Waste reduction for minor works

For single projects less than £300k in value within a programme of minor works, developing a full SWMP may not be cost-effective (although a SWMP may be useful where it can be used as a template for multiple similar projects). You should simply ask the project team to:
- identify the top options to avoid, reduce, reuse and recover waste and use more reused/recycled content in construction – see Appendix 1 for the wording of the Project Brief; typically this will involve looking at the most significant materials in terms of quantity, value or expected wastage (up to five in number) and the main waste streams; and
- use a simple reporting template to record actions taken and the waste generated; see the example in Appendix 2.

Where certain activities (e.g. refurbishment of office space) are repeated between projects, the team may find it efficient to define model solutions for minimising and managing waste in these activities, and to monitor wastage for one or two major materials (e.g. plasterboard). For example, they might adopt a ‘racking’ system for unused materials and offcuts on refurbishment schemes, enabling them to store and transport materials to the next project for reuse.

Cost-effective design options on a small project may include:
- choosing to refurbish instead of replacing structures or components;
- avoiding unnecessary excavation and strip-out;
- reusing construction, demolition and excavation materials available on site;
- selecting pre-fabricated components;
- reducing wastage allowances on major materials (e.g. by improving materials storage, agreeing just-in-time delivery and adjusting floor-to-ceiling heights to reduce the expected wastage rate of plasterboard from say 20% to 10%); and
- looking for higher recycled content options for as few as one or two major materials.
Summary of roles

Client project managers
1. Ensure you include requirements and performance standards for waste outcomes (e.g. minimum waste recovery rate) in the Project Brief and tender/contract documents for your design team as well as your contractor. (See Appendix 1 and www.wrap.org.uk/procurement_requirements).
2. Consider using a procurement route which facilitates early contractor involvement in Designing out Waste, quantification of cost savings before tender prices are agreed, and a win-win sharing of savings.
3. Get your design team (and contractor if applicable) to identify the top opportunities to reduce and reuse waste from an early design stage, and to include corresponding outcome requirements in the design stage SWMP and contractor ITT.
4. Review waste forecasts and planned savings at design stage sign-offs (e.g. RIBA Stages C, D and E for buildings), and require to see the contractor’s detailed SWMP before work starts on site.
5. Agree contractual responsibilities for waste data reporting (which your main contractor should then cascade to trade and waste contractors).
6. Review the SWMP on project completion, compare forecast and actual performance, benchmark against other projects, and use the learning to inform future projects.
7. Report the headline metrics for waste, waste to landfill and construction value quarterly and on project completion.
8. On programmes of minor works, get the project team to focus on the top five products and waste streams, and identify just a few key actions to reduce, reuse and recover more waste and use higher recycled content (especially actions which are common across multiple projects). Agree a simple data reporting template (e.g. see Appendix 2), and obtain and report the headline metrics on completion.
Design team

1. At the options appraisal stage, consider with the client the opportunities to refurbish an existing asset (instead of redeveloping), to use existing space more efficiently, and to design new works to be flexible to future changes in needs.

2. At an early design stage, forecast waste and identify the top opportunities for waste reduction and reuse on which to focus attention. In particular, consider use of in-situ materials (e.g. through remediation and stabilisation), reprocessing of materials for reuse on site (e.g. demolition and excavation arisings; cut and fill balance), alternative design solutions, and off site construction.

3. At a later design stage, focus attention on reducing wastage rates to good practice levels for the 5-10 most wasted products/components in the waste forecast – for example by matching product and design dimensions, and standardising the choice of components across a project. Select materials and components with high durability.

4. Seek early contractor involvement in identifying and vetting low waste solutions (where appropriate).

5. Quantify the forecast waste and costs of waste, estimate the achievable cost savings from specific actions, and capture these in a SWMP, starting from the early design stage (e.g. RIBA Stage C for building projects).

6. Include the waste/cost estimates and actions in the contractor tendering process, so that tender prices take account of design decisions and potential savings.

Main contractor

1. At the pre-construction stage, develop the SWMP in more detail and refine the waste forecasts. Include plans for reducing wastage (lower wastage allowances on trade packages etc); for materials logistics (delivery and site storage); for waste recovery (site segregation etc); and for reuse on site (mobile processing plant etc).

2. Discuss practical implementation with the design team, specialist/trade contractors and waste contractors to maximise savings before tender prices are agreed.

3. Include responsibilities (e.g. for waste reduction, reuse and segregation, and for data reporting) in subcontractor appointments.

4. Communicate waste actions to the contractor’s team and supply chain, providing training where needed.

5. Collect data on waste arisings into the SWMP, following the method for measurement and reporting agreed by members of the UK Contractors Group and Civil Engineering Contractors Association.

Note:

WRAP believes the content of this guidance to be correct as at the date of writing (March 2010). However, factors such as procurement policy, procurement practice and regulatory requirements are subject to change and users of the report should check with their advisers to confirm the current situation. The views and recommendations within this report are based upon normal contracting conditions and consideration must be given to the relevance of this guidance to each project type. Particular care should be taken in using the model wording provided as it is based upon numerous project-specific assumptions (such as scale, location, tender context, etc.). While steps have been taken to ensure accuracy, WRAP cannot accept responsibility or be held liable to any person for any loss or damage arising out of or in connection with this information being inaccurate, incomplete or misleading. It is the responsibility of the potential user of a service, material or product to consult with the supplier or manufacturer and ascertain whether a particular product will satisfy their specific requirements.

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*Download at www.wrap.org.uk/reportingportal
Appendix 1: Wording to use when appointing the design team and contractor

Include the following wording within the Project Brief and discuss it with both designers and contractors at kick-off meetings:

Box 1: Wording for project brief for projects above £300k in value

“By [2012], [name of organisation] aims to [halve/reduce by X% – state target] the rate at which its projects send construction, demolition and excavation waste to landfill (i.e. quantity of waste per unit of construction), relative to a baseline year of 2008 (or alternative date), and will report progress annually.

Our design and construction teams will be required to:

- implement Site Waste Management Plans throughout the design and construction period that comply with regulatory requirements (where applicable) and include in such Plans project-specific targets for waste recovery and reused and recycled content (below) and for waste reduction;
- measure and report progress quarterly against the corporate KPIs for the quantity of waste produced and the quantity of waste sent to landfill (measured in tonnes per £100k construction value)\(^8\) (using the WRAP Reporting Portal\(^8\))
- recover a minimum of (70% – state target) of construction materials, and aim to exceed (80%);
- recover a minimum of (60%) of strip-out materials and (80%) of demolition and excavation materials (where applicable), and aim to exceed (90%); and
- ensure that at least (15%) of total material value derives from reused and recycled content in new construction, select the top opportunities to exceed this figure without increasing the cost of materials, and report actual performance.

The design team shall forecast waste quantities and reused and recycled content and set targets for waste reduction from an early design stage (for instance by using WRAP's Designing out Waste Tools and Net Waste Tool\(^9\)).

Before starting on site, the Contractor shall submit a copy of the Site Waste Management Plan, identifying the actions to be taken to reduce waste, increase the level of recovery and increase reused and recycled content, and quantifying the resulting changes.

On completion of the Works, the Contractor shall submit a copy of the completed Site Waste Management Plan, reporting the forecast and actual performance for waste quantities, disposal routes, and reused and recycled content used in construction.”

\(^8\) Construction value is the price in the accepted tender or, if there is no tender, the cost of labour, plant and materials, overheads and profit.
\(^9\) These tools are freely accessible at www.wrap.org.uk/nwtool. The Outline Tools are used at an early design stage (for buildings and civil engineering projects.) The more detailed Net Waste Tool is used at a later stage of design.
For the appointment of design teams and contractors: see the model wording for Pre-Qualification Questions (PQQs), tender invitations and contract documents at www.wrap.org.uk/procurement_requirements, and modify as appropriate to include your specific requirements as defined in your project brief.

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**Box 2: Wording for project brief for minor works (projects less than £300k)**

“By [2012], [name of organisation] aims to [halve/reduce by X% – state target] the rate at which its projects send construction, demolition and excavation waste to landfill (i.e. quantity of waste per unit of construction), relative to a baseline year of 2008 [or alternative date], and will report progress annually.

Across our programme of minor works, we seek to:

- recover a minimum of [70% – state target] of construction materials, and aim to exceed (80%);
- recover a minimum of (60%) of strip-out materials and (80%) of demolition and excavation materials (where applicable), and aim to exceed (90%);
- measure and report progress quarterly against our corporate KPIs for the quantity of waste produced and the quantity of waste sent to landfill (measured in tonnes per £100k construction value\(^1\)); and
- after measuring our baseline for waste generation, set and pursue a target for reducing the quantity of waste produced (measured in tonnes per £100k construction value) each year.

We require each individual project to:

- measure and report construction, demolition and excavation waste amounts separately, and identify the destinations (landfill, materials recovery facility etc) to which these amounts are sent and their recovery rates;
- identify the five most significant construction materials/products (by quantity, cost and wastage) and the most significant waste streams (in terms of disposal cost);
- propose and implement the most cost-effective methods of reducing, reusing and recovering more of these waste materials;
- identify, for at least one of these five product/material categories, options with higher recycled content available on the market at a competitive cost\(^1\) and use these products in construction; and
- provide a record of waste data and waste reduction/reuse/recovery/recycled content actions from each individual project using an agreed template.”

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\(^1\)Construction value is the price in the accepted tender (excluding VAT) or, if there is no tender, the cost of labour, plant and materials, overheads and profit.

\(^1\)Identify product options by talking to suppliers and using WRAP’s Recycled Content Product Guide, freely accessible at www.wrap.org.uk/rcproducts.
# Appendix 2: Waste data reporting form for small projects

## 1. Project details

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal contractor name</td>
<td></td>
</tr>
<tr>
<td>Project name</td>
<td></td>
</tr>
<tr>
<td>Description of works:</td>
<td></td>
</tr>
<tr>
<td>New construction</td>
<td></td>
</tr>
<tr>
<td>Refurbishment</td>
<td></td>
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<tr>
<td>Client</td>
<td></td>
</tr>
<tr>
<td>Construction value (£)</td>
<td></td>
</tr>
<tr>
<td>Region (England, Scotland, Wales, Northern Ireland)</td>
<td></td>
</tr>
<tr>
<td>Postcode</td>
<td></td>
</tr>
<tr>
<td>Project start date</td>
<td></td>
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<tr>
<td>Expected finish date</td>
<td></td>
</tr>
<tr>
<td>Person responsible for waste management on site</td>
<td></td>
</tr>
</tbody>
</table>
2. Planned actions to improve performance

Reducing waste streams

*Identify the most significant sources of waste on the project (2-5) and propose off site methods of reducing them*

<table>
<thead>
<tr>
<th>Material/product type or waste stream</th>
<th>Method proposed to reduce waste</th>
<th>Forecast quantity of waste and saving (if known) – in tonnes, % wastage rate, materials value etc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: plasterboard</td>
<td>Dry storage cabin; 2.4m floor to ceiling height matched to board size</td>
<td>10% wastage of £10k worth of materials, reduced from 20% (saving £1000)</td>
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<td></td>
<td></td>
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<td>1.</td>
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<td>3.</td>
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<tr>
<td>4.</td>
<td></td>
<td></td>
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<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reusing waste streams

*Identify the most significant opportunities to reuse materials on the project (if any)*

<table>
<thead>
<tr>
<th>Material/product type or waste stream</th>
<th>Method proposed to reuse materials</th>
<th>Forecast saving (if known) – in tonnes, materials value etc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: ceiling tiles</td>
<td>Spray paint and reinstall, instead of stripping out and replacing with new tiles</td>
<td>Avoid 200m² of tile waste and save £1000 on materials purchasing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
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<tr>
<td>2.</td>
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<td>3.</td>
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<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Recovering/recycling waste streams

*Identify the most significant waste streams on the project (2-5), and propose methods of recovering them (including off site recycling, reclamation and supplier takeback)*

<table>
<thead>
<tr>
<th>Material/product type or waste stream</th>
<th>Method proposed to increase recovery and avoid landfill</th>
<th>Forecast saving (if known) – in tonnes, waste disposal cost etc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: plasterboard</td>
<td>Manufacturer’s takeback scheme for clean offcuts</td>
<td>Avoid 5 tonnes of landfill and save £500 on skip costs</td>
</tr>
</tbody>
</table>

1.  
2.  
3.  
4.  
5.  

### Improving recycled content

*Identify the most significant materials/products (up to 5), in terms of value/quantity to be used on the project, and propose cost-competitive substitutions with higher recycled content*

<table>
<thead>
<tr>
<th>Material/product type</th>
<th>Product option with higher recycled content</th>
<th>Increase in recycled content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: dense block</td>
<td>Brand X</td>
<td>50% instead of 0% (£500 of materials)</td>
</tr>
</tbody>
</table>

1.  
2.  
3.  
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### 3. Quantities of actual waste arising

<table>
<thead>
<tr>
<th>Waste type</th>
<th>Reused on site</th>
<th>Recycled/recovered for use off site</th>
<th>Sent to landfill site</th>
<th>Recovery rate (%)</th>
<th>Date</th>
<th>Amount of waste (t or m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C – construction</td>
<td>✓</td>
<td>[Tick only one column]</td>
<td></td>
<td>80%</td>
<td>01/10/09</td>
<td>8</td>
</tr>
<tr>
<td>D – demolition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E – excavation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Totals:**

<table>
<thead>
<tr>
<th>Waste type</th>
<th>Reused on site (t)</th>
<th>Recycled/recovered (t)</th>
<th>Landfilled (t)</th>
<th>Disposal cost (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demolition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excavation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. Reference data

Waste recovery rates
If you are unable to obtain reliable recovery rates for the destinations to which you send your waste, use the default recovery rates given in the table below:

<table>
<thead>
<tr>
<th>Waste destinations and default % recovery rates</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Landfill</td>
<td>0%</td>
</tr>
<tr>
<td>Landfill – inert soil and stones (LoW 17 05 04)</td>
<td>50%</td>
</tr>
<tr>
<td>Mixed waste sent to a Materials Recovery Facility (MRF) or Transfer Station</td>
<td>50%</td>
</tr>
<tr>
<td>Segregated recyclable waste sent to a Recycling Centre, Materials Recovery Facility (MRF) or Transfer Station</td>
<td>80%</td>
</tr>
<tr>
<td>Contaminated land remediated within an Environment Agency Cluster project</td>
<td>80%</td>
</tr>
<tr>
<td>Landfill license exempt site</td>
<td>100%</td>
</tr>
<tr>
<td>Reuse on site (non-waste materials)</td>
<td>100%</td>
</tr>
</tbody>
</table>

Waste conversion rates
If you collect waste data in m³, convert to tonnes using the following factors [e.g. 1m³ of construction waste weighs 0.87 tonnes]. List of Waste (LoW) codes are shown in brackets.

<table>
<thead>
<tr>
<th>Waste types and volume to mass conversion rates</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>For construction activities:</strong></td>
<td></td>
</tr>
<tr>
<td>Construction (17 09 04)</td>
<td>0.87</td>
</tr>
<tr>
<td>Demolition (17 09 04)</td>
<td>0.87</td>
</tr>
<tr>
<td>Excavation (17 05 04)</td>
<td>1.25</td>
</tr>
<tr>
<td><strong>For individual waste streams:</strong></td>
<td></td>
</tr>
<tr>
<td>Inert – soil and stones (17 05 04)</td>
<td>1.25</td>
</tr>
<tr>
<td>Hazardous – soil and stones (17 05 03)</td>
<td>1.25</td>
</tr>
<tr>
<td>Non-hazardous (non-inert) – dredgings (17 05 06)</td>
<td>0.51</td>
</tr>
<tr>
<td>Gypsum (17 08 02)</td>
<td>0.33</td>
</tr>
<tr>
<td>Metals (17 04 07)</td>
<td>0.42</td>
</tr>
<tr>
<td>Wood (17 02 01)</td>
<td>0.34</td>
</tr>
<tr>
<td>Packaging (15 01 06)</td>
<td>0.21</td>
</tr>
<tr>
<td>Inert – mixture of concrete, bricks, tiles etc (17 01 07)</td>
<td>1.24</td>
</tr>
<tr>
<td>Inert – glass (17 02 02)</td>
<td>0.61</td>
</tr>
<tr>
<td>Mixed hazardous – C&amp;D waste (17 09 03)</td>
<td>0.87</td>
</tr>
<tr>
<td>Mixed C&amp;D waste (17 09 04)</td>
<td>0.87</td>
</tr>
</tbody>
</table>