

Waste Reduction – CONSTRUCTION

This guide is part of the REBRI series developed to encourage and assist everyone involved in the building industry to reduce waste. The aims of this guide are to:

- assist developers, builders and all other trades and professions involved in construction to consider how and why waste is created during building projects
- provide practical guidance on how to reduce waste to landfill and cleanfill by being efficient with materials during the project and by setting up good systems for recycling and reuse
- foster environmental awareness in the building profession.

The guidelines cover:

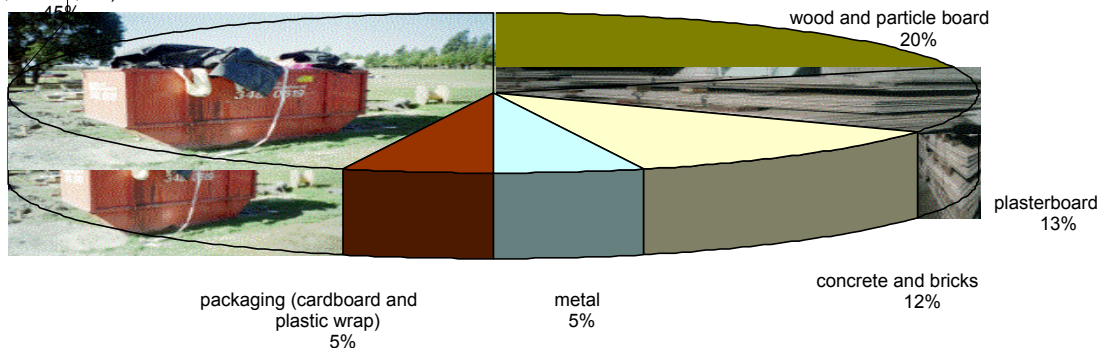
- project planning
- tendering and contracts
- building material and product selection
- reducing waste during demolition/renovation
- setting up a waste storage area
- waste reduction and recycling options
- good site management to avoid waste
- review after construction has been completed
- links, resources and information.

The waste issue

Waste is generated on building sites during each phase of the building life cycle. Evidence suggests that C&D waste may represent up to 50% of all waste to landfills in New Zealand and the majority of waste to cleanfills or C&D dumps. That means that up to 1.7 million tonnes of C&D waste is sent to landfills every year and similar amounts to cleanfills.

Typical construction waste skip, measured by weight

other material types (sweepings, other plastic, soil, green waste, glass, fixtures, etc)



Source: Christchurch City Council Target Zero Construction Waste Reduction Project.

That's a lot of waste to bury in the ground. Not only is this a waste of good resources, it is also filling up valuable landfill and cleanfill space and contributing to serious environmental problems such as air and water pollution.

Increased consumer spending and the relatively low cost of waste disposal means that, unless we take action now, it is a problem that is likely to get bigger.

Products end up as waste during construction through off-cuts, mistakes, temporary works, poor workmanship, inefficient installation or use or because of damage. During demolition, products become waste when they cannot be salvaged efficiently or cannot be recycled or reused.

Product design and materials selection, manufacturing specifications and methods, the way products are packaged and delivered to site and the instructions on product use and installation contribute to the waste on construction and demolition sites.



At least 50% of waste can typically be recycled from a construction site.

10 top tips for waste reduction

1. Plan to reduce waste at the start of a project – set goals, identify waste recycling opportunities and target specific wastes you expect from the project. Use the REBRI Waste Management Plan.
2. All staff and subcontractors need to follow the waste management systems. Include waste reduction instructions or standards in your contracts in your induction material and other communications with staff and subcontractors. Make it a regular item on toolbox and project management meetings.
3. Order just-in-time delivery of products to reduce the storage time on site (and the potential for damage). Have accurate cutting lists and quantity surveys to avoid overordering and product wastage.
4. Talk with suppliers about the latest methods for product installation and uses so that you can reduce off-cuts, mistakes and damage that all create waste during construction.
5. Keep waste materials separate for recycling and reuse. Store them in different skips, bins or piles, and use clear signage so that everyone knows what to do.
6. Set up a single waste storage area – many smaller bins over one site encourages people to use the nearest bin (and mix up the various waste types making it harder to recycle).
7. Different waste types occur at different times in the project so plan your waste separation system around this. Concrete, steel and timber waste occurs during foundations and framing; cladding, plasterboard, electrical cable and insulation waste occurs during the next phase; cardboard, plastic wrap, paint tins and other packaging waste occurs during fit-out.
8. Encourage reuse of off-cuts, scraps and so on. Keep them in a handy place until the end of the project.
9. Keep a current list of recycling operators in the site office for easy reference. Use the REBRI Waste Management Plan to list the specific recycling operator's details for the project.
10. Have incentives such as morning tea shouts if waste reduction is achieved on the project.

The three Rs: reduce, reuse, recycle

Applying the three Rs of waste minimisation to your practices will lower the volume of waste going to landfill, reduce demand for new materials and conserve precious materials for use by future generations. The three Rs work in a hierarchy:

1. Reduce

Preventing waste from being created in the first place is the best way to reduce waste. The way products are designed, used or installed can prevent wastage in adhesives, packaging, off-cuts, extra finishes or cleaning products.

2. Reuse

Reusing materials as much as possible is the next best way to reduce waste. For building products, this could mean having reusable packaging or creating products that can be reinstalled or used for another purpose after their original use.

3. Recycle

Resources that have reached the end of their useful life and off-cuts of materials should be recycled where possible. Where products cannot be reused, the components or materials should be designed to be recycled at the end of their original use. Of course, recycling materials is not enough. You need to help create a market for recycled resources by designing products or promoting the use of products with high recycled content.

How your business benefits

Reducing waste is not just good for the environment. Other benefits are:

- reducing waste disposal costs
- a high level of client satisfaction could enhance your company's image and encourage repeat business
- winning contracts for projects that specify waste reduction procedures
- innovation and challenges can help to attract and retain employees.



Avoca Construction, Takapuna.

Project planning

Diverting waste from the landfill or cleanfill requires planning for each building project. Each project is different and will require a different approach. You will need to establish goals and objectives, estimate the expected waste stream and develop a waste management plan.

Establish goals and objectives

A commitment at this early stage to waste minimisation is more likely to endure throughout the project. Consider setting broad goals and objectives related to the following:

- Eliminate waste as a priority.
- Use construction methods that allow for deconstruction.
- Use products and materials that reduce waste.
- Use salvaged/second-hand materials.
- Use of prefabricated materials and materials prepared off site.
- Recycling and reusing waste that is created on the job.

Estimate the expected waste stream

- Forecast the types and volumes of waste that will be produced.
- Consider the opportunities for reducing waste.
- Identify the possibilities for reuse and recycling waste that is created.
- Calculate the cost/benefit of diverting waste from landfill.

Develop a waste management plan

A waste management plan is a written record of what must be done to achieve the goals and targets that have been set. It will identify the waste minimisation measures that all site personnel should be following. A new plan will need to be prepared for each job/site, as materials and job specifications will differ. In most cases, subcontractors would operate to the main contractor's plan, as the main contractor is most likely to be responsible for waste management on site. Where subcontractors have sole responsibility for their waste, they should complete their own waste management plan.

The plan should summarise the approach to waste reduction using many of the tips in this guide:

- Define responsibilities for waste management.
- Identify waste reduction measures.
- Identify wastes and destinations, including what materials are being segregated on site for reuse or recycling.
- Identify where and how to store new and waste materials.
- Identify a system for the collection of waste and recycling data.

REBRI has developed the Waste Management Plan template to keep things simple.

Tendering and contracts

Tendering process

- Include your waste management plan in your tender response. Adapt as necessary to meet the requirements of the tender.
- Where tenders include the main contractor's waste management plan, subcontractors should review and adapt their response as necessary to fit in with the main contractor's waste reduction requirements.

Contract documentation

- Agree the waste management plan with the principal, main contractor or client and with subcontractors. The waste management plan will form the basis for targets, on-site methods, responsibilities and so on.
- Identify a point of responsibility. This will ensure that a waste management plan is followed. It is important that the individuals responsible know who they are!
- Agree which party or parties receive any financial benefits of recycling.
- Agree on any economic incentives for recycling – this will help keep workers motivated.
- Consider the inclusion of waste minimisation and recycling performance clauses in the contract.

Building material and product selection

Building materials are often selected based on lowest cost, aesthetics and short-term needs. However, to identify the most effective materials to use in order to reduce waste, it is important to use a broader set of criteria when choosing materials such as:

- recyclability – whether the product or material can be easily reprocessed back into a useful product or material
- resource efficiency – less materials have been used to produce the same product
- salvage and reuse – second-hand building parts and ensuring a useful life for the product/material following its original use

- durability – how quickly a product or material will need to be replaced – the more durable, the less wasteful.

Product suppliers can tell you this sort of information, or check the information on product labels.

Product and material selection should still be done within the context of New Zealand building standards and regulations.

Specify materials that achieve waste reduction

- Materials and components that are reusable or can be recycled after their useful life in the building.
- Materials with known recycled content – this reduces the use of raw materials and helps boost the market for recyclables.
- Second-hand or salvaged materials – using materials where durability is consistent with the building's anticipated life will reduce the frequency of replacement.
- Materials that don't need finishes (natural timber ceilings, bricks and tiles, pigmented concrete or plaster or roofing steel with a colour baked on at the mill) – reduces waste associated with finishing products.
- Avoid overspecifying (for example, specifying 9 mm plasterboard when 6mm is appropriate) – this reduces the amount of materials going into a building.
- Prefabricated materials supplied to the specifications of your project – means no resizing on site.
- Materials that have recyclable or reusable packaging.



Prefabricated framing saves timber off-cuts on site.

Finding recycled or second-hand materials

Use local waste-recycling directories (www.branz.co.nz/REBRI_Recycling_Directory), Yellow Pages (www.yellowpages.co.nz), the Waste Exchange (www.nothrow.nz) and buy recycled directories (www.zerowaste.org.nz) to know what materials have markets for reuse or recycling. These change often, so it pays to keep checking.

Suggestions for recycled product use

The availability of recycled products will change around New Zealand. Suggested recycled products are:

- waste plasterboard gypsum as a soil conditioner in landscaping
- waste wood mulch in landscaping
- recycled concrete aggregate as base course in driveways, foundation slabs and other civil works
- insulation with recycled content (batts with recycled glass or recycled textiles)
- claddings, interior linings and floor coverings with recycled content.



Using crushed concrete as aggregate is an easy way to specify recycled products.

Consider supplier practices

Your choice of suppliers can influence the amount of waste generated during manufacture and retailing of the product as well as during construction. Develop a preference for materials from suppliers that have investigated how their product characteristics, manufacturing processes and product packaging can reduce waste. Some of the more obvious things you may like to look for include suppliers that:

- have waste minimisation/environmental plans or credentials
- provide recyclable packaging and/or collect packaging for recycling
- take back or buy back substandard, rejected or incorrect orders
- deliver supplies in sturdy, returnable pallets and containers and back-haul the empty containers when delivering goods
- reduce packaging waste, for example, by using minimal types and amounts of materials and avoiding unnecessary packaging

For more information on what you can expect from manufacturers and retailers who reduce waste, see the REBRI Waste Reduction – Building Products guide.

Develop and maintain product information

- Keep up to date with product information and changes in materials standards. This can be achieved by keeping your libraries of manufacturers' product literature and specifications current and attending trade information sessions presented by manufacturers and industry associations. Read building trades publications promoting resource-efficient building.
- Develop a preferred specification list that includes materials and components.

Tighten up on estimating and purchasing

- Plan for 1% wastage or less! By doing this, you reduce your product orders and will give staff an incentive to use resources more efficiently, since there is not a plentiful amount of supplies available.
- Avoid overspecifying.
- Make sure the correct amount of material is brought to site, and immediately return oversupply to reduce the potential for product damage and wastage.
- Develop a procurement/purchasing policy so that manufacturers and suppliers are aware of your exact requirements. In particular, this can assist in avoiding overpackaging goods or unnecessary packaging.
- Consider whether lower standards or performance specifications may be appropriate if waste can be reduced as a result.
- Order to fit – when ordering materials, double check they are consistent with the dimensions required for the job.
- Minimise time between delivery and installation – excess materials can be damaged on site, increasing the amount of potential wastage.



Product delivery, LUNEY'S Construction, Christchurch.

Reducing waste during demolition/renovation

Many construction projects also include renovations or demolition – refer to the REBRI Waste Reduction – Demolition guide for detailed waste reduction guidelines.

Top tips

- Visit the site and identify components from the old building for reuse in the new building. The client and/or the design team may also want to be part of the walkthrough. Compile a detailed list to pass to relevant contractors.
- Reduce garden and soil waste by protecting trees (or have them removed for replanting) and minimising earthworks.
- Dismantle rather than demolish. Use deconstruction techniques to remove building components piece by piece rather than damaging building parts by destructive methods.
- Engage specialist deconstruction contractors rather than using labourers to remove building parts to maximise the quantity and quality of salvaged materials.
- Protect materials for salvage – store under cover and away from waste.
- Recycle waste from the demolition process that cannot be salvaged for reuse.



Salvaging floor boards (Ward Demolition).

Setting up a waste storage area

Before construction begins, sort out a system for sorting, storage and handling waste.

On-site or off-site waste management?

- On site involves one waste storage area with several skips, bins and piles to keep waste types separate. Several organisations may be involved in collecting the different waste types.
- Off site is the traditional waste management method of having one skip of mixed waste collected by a waste contractor. Recyclable materials are then sorted out of the skip at a designated facility.

Decide which system to set up. You could even have a combination of the two. Key determining factors are:

- the available space for several bins or piles (where space is limited, off-site sorting is usually best)
- costs – compare recycling service charges and labour for sorting with a waste contractor's off-site service
- availability of recycling services locally (and their ability to pick up materials)
- availability, training and commitment of the labour force on site.

On-site separation and storage of waste

- This system requires space, planning and commitment from everyone on site.
- This system often requires more than one contractor collecting waste from the site – usually a mix of waste collectors and resource recovery firms.

- You can better measure and manage your waste stream and understand where waste has come from and where reduction efforts should occur.
- You can reduce disposal costs and take advantage of any cost savings through recycling and reuse.
- Have one designated waste storage area on site. In general, contractors and staff will use the most convenient skip or bin, regardless of whether it is for recycling or disposal. Only having one waste storage area avoids this 'convenience' problem, and also helps to keep the site orderly and tidy.
- Each waste type needs a separate bin, skip or pile at the designated waste storage area.
- Determine arrangements with the various firms for removing waste and recyclables from site.
- Negotiate recycling paybacks with resource recovery firms.
- You may be penalised for contaminating waste streams by not sorting correctly on site, so this system requires good training of staff and contractors.

Using contractors for off-site sorting and recycling

- Skips are filled in the same way as traditional waste management.
- Filling mixed-waste skips is more convenient where space for on-site sorting is restricted.
- The charges for recycling services may be different to waste disposal only (could be more or less expensive depending on the contractor).
- Seek verification of the company's sorting facility – look for third-party accreditation by EnviroMark® NZ or similar. Otherwise, you may never know whether recycling is being done or not.
- This system makes it more difficult for you to measure your waste, determine where your waste is being created and how waste can be reduced.
- This system reduces the reliance on staff or subcontractors to adequately sort materials.

Confirm the destination of all waste

- Use the REBRI Waste Transfer Form to confirm the destination of recyclables, reusable materials and waste for disposal.
- Dispose of residual waste responsibly. Only use landfills and cleanfills that are consented by the regional council or have met the permitted activity status in regional plans. These records should be available from your regional council or the contractor.



Sorting waste, Hawkins Construction, Christchurch. From left to right: Timber pile, blue landfill skip, cardboard pile for recycling, yellow hazardous waste bags (landfill), soft plastic for recycling.



At South City Library, Mainzeal chose a contractor who sorted recyclables off site. One skip was for landfill waste and the other for all recyclable waste.

Waste reduction and recycling options

Concrete

- Reuse crushed concrete instead of new aggregate for sub-base, base course and landscaping materials. See the Aggregate and Quarry Association of New Zealand's Best Practice New Zealand Guideline for the Supply of Recycled Concrete Materials for Use in Pavements and other Civil Works (www.aqa.org.nz/documents/Recycled%20Best%20Practice%202010.pdf).
- Use reinforcement made from recycled steel.
- Form up accurately and fine-tune estimating. Up to 10% is often wasted.
- Return surplus cement to the plant for recycling.
- Buy from plants that wash out cement to allow recycling of sand and aggregate.
- Break remnants into small pieces before final set to allow later use as backfill or recycling (see photo).
- Always form up a small area of path or low grade slab ready to accept remnants.
- Store waste concrete separately from other waste for crushing/recycling. Use ½ skips (4.5 m³) if concrete is going to be taken off site for recycling, otherwise store in a pile for on-site crushing.
- Reuse wooden boxing, and use timber scraps to make up boxing.



Recycled concrete aggregate



Brick and tile work

- Use second-hand bricks and tiles.
- Return oversupply to the supplier, use on the next job, on-sell or donate to charity.
- Use appropriate mortar strength for bricks. Softer mortar saves cement and helps in recycling.
- Recycle broken bricks and tiles with waste concrete.
- Keep tile pieces separate for reuse and make the left-overs available for art and craft work. Recycled concrete aggregate.

Timber

- Order pre-made framing and joinery to avoid off-cuts on site.
- Prepare accurate cutting lists before ordering.
- Ensure that staff or contractors have a complete cutting list to allow efficient timber use.
- Have a single timber cutting area to keep all off-cuts in one designated bin or pile. Staff and contractors can help themselves to off-cuts during the project.
- Use joinery profiles that can be easily and invisibly joined to reduce off-cuts.



- Use off-cuts wherever possible before cutting new lengths.
- Keep treated and untreated waste timber separate at all times. Clearly label each bin or area.
- Provide untreated timber for firewood to staff, the public or charities. Provide a dedicated bin or pile.
- All other untreated timber can be recycled – check with recycling operators whether this includes MDF and other engineered products.
- Treated timber waste must go into the landfill skip.

Steel

- Order pre-made framing to avoid off-cuts on site.
- Prepare accurate cutting lists before ordering.
- Ask your supplier for recycled steel (most construction steel is recycled in New Zealand) – or use second-hand steel members.
- Ensure that staff or contractors have a complete cutting list to allow efficient steel use.
- Use off-cuts wherever possible before cutting new lengths.
- Store steel waste with other metal waste for recycling. Depending on the volume of metal and the recycling operator's preference, store waste in a tidy pile or use a skip.



Collecting metal stored in piles (Avoca Construction, Takapuna).

Electrical

- Use sub-boards and plan wiring to reduce wiring distances, quantities, waste and cost.
- Minimise the 'extra' amount allowed for at sockets, switches and so on.
- Recycle off-cuts with other construction metal. Strip insulation from wire prior to recycling.
- Recycle cable drums and reels or return to the supplier for reuse.
- Check the quality of existing wire in a renovation project for reuse rather than assuming the building should be rewired.

Plastering

- Prepare accurate quantity and cutting lists before ordering. Detailed planning can reduce the amount of plasterboard required and the amount of unused off-cuts.
- Have a single plasterboard cutting area to keep all off-cuts in one designated pile. Keep off-cuts clean and dry. Staff can help themselves to off-cuts during the job.
- Install plasterboard with screws and nails rather than glues to assist deconstruction and recyclability at the end of the building's life.
- Installing plasterboard horizontally can be more efficient (i.e. use less board and have fewer off-cuts) than installing it vertically.
- Off-cuts of half a board or larger may have resale value, or keep for the next job.
- Return oversupply to the supplier, keep for use on the next job, on-sell or donate to charities.
- Store clean construction plasterboard waste separately on site for recycling.



- Keep demolition plasterboard separate, as demolition plasterboard is more difficult to recycle and may contaminate the waste.
- Recycle plastic buckets or donate for reuse. Scrape out plaster first into the landfill skip.

Glazing

- Pre-order glass sizes and pre-made windows and doors from the supplier to avoid producing off-cut waste on site.
- Order just-in-time delivery and store carefully to reduce the risk of damage.
- Separate construction glass from all other glass such as drink bottles and recycle. Store glass waste in a skip or bin.
- Return oversupply to the supplier, keep for use on the next job, on-sell or donate to charities.
- Recycle timber and aluminium framing separately.

Plumbing, HVAC (heating, ventilation and air conditioning) and drainage

- Plan plumbing, HVAC and drainage to minimise pipe lengths where possible – group wet areas, use direct lines etc.
- Select pipe and duct lengths and fittings that fit the purpose but also minimise off-cuts during installation.
- Choose plastic products that can be recycled. Check the plastic type with local recycling operators.
- All metal, concrete and tile components can be recycled.
- Store off-cuts separately and reuse during the project. Keep off-cuts for use on other projects.
- Return oversupply to the supplier, keep for use on the next job, on-sell or donate to charities.
- Recycle metal, plastic and concrete pipes and fittings. Store waste separately by material type.
- Prepare drain channels using recycled aggregate or broken bricks, tiles and concrete, rather than natural aggregate.

Roofing, cladding and insulation

- Select products that can be recycled. Metal, brick, tile, concrete and timber products can be recycled depending on the finishing products.
- Pre-order lengths from the supplier to avoid off-cuts from preparation on site.
- Store off-cuts separately and reuse during the project. Keep off-cuts for use on other projects.
- Return oversupply to the supplier, keep for use on the next job, on-sell or donate to charities.
- Look to reduce the need for extra finishing and fixing products that create more waste. For example, have the roofing steel coloured by the supplier to avoid the need to paint.
- Store timber, tile, brick, concrete and metal waste separately for recycling. Keep treated timber separate from other timber types and dispose to the landfill bin.



Paint and other finishing products

- Order paint and other finishing products in bulk to reduce the amount of packaging required. For example, order one 10-litre can instead of five 2-litre cans.
- Keep left-over paint for reuse where possible during the project or for use on other projects. Donate left over paint to charities.
- Return oversupply to the supplier, keep for use on the next job, on-sell or donate to charities.
- Clean out cans and buckets for recycling – make sure the paint has set hard in the container, scrape out and put the hardened paint in the landfill skip. Recycle metal cans with other metal types. Recycle plastic buckets or donate them for reuse.
- Do not tip paint, varnishes, adhesives etc. down the drain, on the ground or into waterways.



Flatten cardboard to keep tidy and allow easy pick up (Hawkins Construction).

Good site management to avoid waste

If a building site is well managed and tidy, materials are less likely to get damaged and workers can be more efficient with materials. This leads to savings in both wastes and costs.

- Maintain a tidy site – a tidy site means that materials are less likely to be damaged or lost.
- Train staff and contractors during induction and team meetings.
- Have designated cutting or preparation areas for timber, joinery, cladding, tiling etc. and store the off-cuts in a single location for easy access and reuse. Staff and contractors are more likely to reuse off-cuts if they are easily found and are stored separately from other wastes. Provide signage that the waste is for reuse not disposal.
- Protect new materials from damage, weather etc.
- Have a single waste storage area with clear signage on how to sort and store recyclables.



Site entry sign at Luney's, Christchurch.

Training and communications

- Waste should form part of the usual site communications and training such as during the site induction and during tool box meetings.
- Develop an induction sheet to explain the waste management system or create a waste section in your regular induction information.
- Let people know who to approach if they have a problem, idea or other suggestion about waste.
- Waste reduction could be a regular agenda item at tool box meetings and project management meetings with the client and design team.

- Use clear signage around the site to explain the waste management system. Some examples are:
 - using the hazard identification board
 - staff notice board
 - signage on bins and at the waste storage area
 - signs on site entrances.
- Shout morning tea or drinks at the end of the project or provide other incentives to meet waste reduction targets.

New materials storage and handling

- Have a designated area for unloading and storing new materials.
- Materials should be stored under cover to guard against damage from weather.
- Make sure materials are stored away from vehicles and driveways.
- Put signage up if it helps.
- Order delivery of materials as needed to reduce the time they are stored on site and minimise the chances of wastage from damage and unnecessary handling. Have fragile fixtures delivered and installed as close as possible to completion date.
- Check that packaging adequately protects the goods (keeps them dry and dust free during storage).
- Check quantity, condition and quality on delivery. Report any discrepancies immediately and send unwanted products back to the supplier.
- Reject inferior goods if their quality will result in additional waste. Send them back to the supplier.
- Report careless delivery staff to the supplier.

Waste storage and handling

- Keep a current list of recycling operators in the site office for easy reference. Use the REBRI Waste Management Plan to list the specific recycling operator's details for the project. The template is downloadable from www.rebri.org.nz.
- Designate one person to be responsible for managing waste on site.
- Clearly label each bin at the waste storage area so people know how the sorting system works.
 - Use the RONZ symbols (downloadable from www.wasteminz.org.nz/pubs/ronz-symbols) or some other type of clear signage on containers.
 - Signs should be easy to take on and off bins – magnetic signs or signs with hooks work well.
 - Whiteboard signs allow you to change the signage depending on the waste types.
- Avoid using lots of wheelie bins, drums and other small bins around the site – it makes waste disposal too easy and waste sorting too difficult. It is OK to use smaller bins for one waste type only, but label them clearly to avoid mixing waste types (for example, “Untreated timber only” or “Waste to landfill”).
- Have a staff member or contractor check the waste storage area periodically (perhaps at the end of each day or during site clean-ups) and sort any contamination.
- Lock recycling bins at night and weekends to prevent rubbish dumping and contamination.



Mainzeal used magnetic whiteboard signs on bins at South City Library, Christchurch.

Timing of wastes during a construction project

Different wastes will come on stream at different stages of the building project, so you won't need all the waste bins on site for the whole project. Plan waste separation around the stages:

- Foundations and earthworks – timber, concrete, soil, vegetation.
- Framing – metal, timber, concrete.
- Cladding – metal, brick, concrete, timber.
- Insulation, HVAC, wall linings, electrical, plumbing – plasterboard, insulation, metal, plastic, polystyrene, cardboard, tile, sweepings.
- Fit-out – cardboard, timber, plastic, polystyrene, metal, tiles, hazardous materials, sweepings.



Soft plastic waste is common at fit-out stage (Hawkins Construction).

Storage ideas

Check with your waste contractor or recycling operator for storage requirements:

- Cardboard – cage from a recycling operator or flatten and pile on a pallet for pick up (keep dry if possible).
- Concrete, brick etc – ½ skips (4.5 m³) as concrete is too heavy for the 9 m³ skips. For large volumes or for on-site processing, store in piles.
- Metal – pile, skip or trailer, depending on the recycling operator and the volumes.
- Plasterboard – covered skip or front-loading bin with lid or stacked on a pallet for reuse. Should be kept clean and dry.
- Polystyrene – large plastic bags that can be securely tied so that pieces don't blow around the site.
- Plastic (hard) – bin with lid so it doesn't blow around the site.
- Plastic wrap and film – trailer or front-loading bin with a lid so that it doesn't blow around the site (see photo bottom).
- Soil – stockpile on site or load straight onto a truck for removal.
- Treated timber – keep separate from other timber in a pile or bin, as long as there is easy access by staff for reuse.
- Untreated timber – bin, skip or pile, as long as there is easy access by staff for reuse.
- Vegetation – stockpile on site or load straight onto a truck for removal.
- Residual waste – skip or front-loading bin.



Trailers are easy for moving around and off the site (Hawkins Construction).

Review after construction has been completed

Reviewing your waste reduction efforts at the end of the project will help you to learn from your experience and give you a better start for your next project. Consider involving staff, contractors, designers and the client in discussing and finding solutions to any problems that were encountered. Questions to ask include:

- Did you meet the goals and waste percentage targets set at the beginning of the project? How much money did you save by reducing waste? Was it all worth it? Establish what worked well and what didn't. Where intended targets were met, consider setting more ambitious targets for the next project.
- Did you encounter any problems?
 - Irregular or inconsistent record keeping.
 - Bin contamination.
 - Inadequate storage facilities.
 - Estimating waste quantities.
- Was your staff training adequate?
- Were your separation storage bins well placed for protection and convenience?
- What sorts of materials were incorrectly placed in the bins?
- What sort of materials were wasted and why?

Links, resources and information

- ConsumerBuild – information about building and renovating homes in New Zealand www.consumerbuild.org.nz
- Enviro-Mark[®]NZ www.enviro-mark.co.nz
- New Zealand Waste Strategy www.mfe.govt.nz/publications/waste/waste-strategy
- Resource Efficiency in the Building and Related Industries (REBRI) www.rebri.org.nz
- Site Safe. www.sitesafe.org.nz
- Sustainable Business Network www.sustainable.org.nz
- The Waste Exchange www.nothrow.co.nz
- Waste Management Institute of New Zealand – WasteMINZ www.wasteminz.org.nz
- Yellow Pages www.yellowpages.co.nz
- Zero Waste Buy It Back Guide www.zerowaste.co.nz/resources-education/buy-it-back-guide

REBRI guidelines and tools

- Waste Reduction – Design and Planning
- Waste Reduction – Construction
- Waste Reduction – Demolition
- Waste Reduction – Building Products
- Waste Reduction – Home Renovation
- Easy Guide to Waste Reduction – Construction
- Easy Guide to Waste Reduction – Building Products
- Contract Specifications for Waste Management
- Waste Management Plan
- Waste Transfer Form

Glossary

- **C&D:** Construction and demolition – refers to the process of building or demolishing domestic or commercial buildings, excluding infrastructure.
- **Cleanfill:** Area for disposal of inert material that does not require the high containment standards of an engineered landfill. Also used to refer to such material. The material deposited in a cleanfill will typically be from construction and demolition activities and will generally comprise soil, rock, concrete, bricks and similar inert material so does not include compostable materials, hazardous or toxic materials.
- **Construction and demolition (C&D) waste:** Solid waste typically including building materials, packaging, metal, plasterboard, timber, concrete and rubble resulting from construction, renovation and demolition of buildings.
- **Demolition:** Rapid destruction of a building with little removal of salvageable items.
- **Deconstruction:** The process of taking a building apart, storing and handling materials in a manner that achieves maximum salvage and recycling of materials and safe removal and disposal of hazardous materials.
- **Dismantling:** Taking a building or building components apart in a manner that achieves maximum salvage and recycling of materials
- **Engineered wood products (EWP):** Timber products that have been manufactured from wood pulp, fibre or veneer, for example, fibreboard or plywood.
- **Hazardous:** Explosive, corrosive, toxic or reactive.
- **HVAC:** Heating, ventilation and air-conditioning.
- **Landfill:** A site for the disposal of waste materials by burial. Historically, landfills have been the most common methods of organised waste disposal and remain so in many places around the world.
- **Non-hazardous:** Exhibiting none of the characteristics of hazardous substances.
- **PPE:** Personal protective equipment.
- **Renovation:** Changes made to a building including structural alterations, additions and redecorating.
- **Reuse:** Repeated use of a product in the same form but not necessarily for the same purpose.
- **Recycle:** Any process by which waste and recyclable materials are transformed or collected for the purpose of being transferred into new products.
- **Salvage:** Removal of structural and non-structural building materials from residential, industrial, commercial and institutional buildings deconstruction projects for the purpose of reuse or recycling.
- **Source separation:** The act of keeping different types of waste materials separate from other wastes from the moment they become waste,
- **Triple bottom line:** An assessment method that incorporates financial, environmental and social factors rather than just economic factors to make a decision.
- **Waste:** Any product or material resulting from the construction or demolition process that is surplus to or not included in the finished building

What is REBRI?

The REBRI waste reduction guidelines have been developed to encourage and assist everyone involved in the construction and demolition industry to reduce waste. REBRI stands for Resource Efficiency in the Building and Related Industries and started in 1995 as a collaborative effort between Auckland councils and BRANZ to undertake research and raise awareness of the issues of waste and the efficient use of resources in C&D projects. A consortium of councils, BRANZ, Recycling Operators of New Zealand and the Ministry for the Environment, with assistance from Winstone Wallboards Limited and industry representatives, extended the initiative in 2003 to undertake more research and develop national waste reduction guidelines.

Our thanks goes to the numerous individuals and organisations in the building and resource recovery industry, research organisations and in local and central government that have helped to develop these guides through participation at workshops, review of drafts and otherwise providing advice and time to the project.