

CONSTRUCTION CONTRACTORS



connacht-ulster
waste region



eastern - midlands
waste region



southern
waste region


LAPN
Local Authority Prevention Network



Introduction

This series of Circular Economy 'beginners' checklists has been developed by Resource Futures Ltd at the request of the Southern Waste Region using EPA grant funding and with peer review input from the Build360 Group in GMIT led by Dr. Mark Kelly. The aim of the checklists is to raise awareness of the Circular Economy with key actors within the construction sector who all have a role to play in making the sector more circular and provide some early considerations to contemplate.

What is circular construction?

The construction sector is responsible for half of all extracted materials. In 2017, an estimated 4.7Mt of Construction and Demolition (C&D) waste was collected by authorised waste collectors. This represented approximately 31% of Ireland's total waste production making it the largest waste producing sector in the country.

Whilst most of this waste is diverted from landfill into other recovery options, it is recognised that a large proportion of this waste could have been prevented altogether and recovered into higher value products if Circular Economy thinking were embedded at all stages.

The Circular Economy can be summarised into 3 key principles:

1. designing out waste and pollution;
2. keeping products and materials in use; and
3. regenerating natural systems.

Circular Construction seeks to eliminate waste production at all stages of the build process, from procurement and design through construction and into operation and then eventual end of life destinations. Circular Construction also seeks to reduce the demand for virgin materials by keeping products and materials in use for as long as possible and using recovered materials.





What should I do?

To have the maximum impact, the circular economy needs to be considered throughout all phases i.e. from pre-development to end-of-life and involve collaboration across the built environment value chain.

Depending at which stage a contractor becomes involved in a project, and what has already been decided by the client and design team, contractors and certain specialist subcontractors will have a variable degrees of input and influence on the potential circular opportunities on a project.

To date, many construction businesses have focused on the potential to reuse and/or recycle their existing products whilst pioneering companies have begun to consider how we would deconstruct buildings and reconstruct them elsewhere. ARUP in 2016 developed an exemplar circular building which aims to demonstrate the maturity of circular economy thinking in the supply chain and examine what it means for building design.

It is likely that Building Information Modelling (BIM) will play a pivotal role in developing a Circular Economy for the built environment. Not only does it facilitate better design through a digital platform for 'systems thinking' (the collaboration of multiple stakeholders); it will lead to more effective long-term asset management and will ultimately decrease the consumption of natural resources in the built environment. Materials and products lifespans can be managed proactively by highlighting when essential maintenance is required so that they do not deteriorate and then need to be replaced.

To help construction contractors know where to start, here are our recommended first steps to embed circular thinking within your projects:

1. Challenge the value chain

Challenge your subcontractors, manufacturers and suppliers to design out waste, demonstrate circularity, minimise impacts, embrace resource optimisation and employ lifecycle thinking during each stage of the process.

The value chain is fundamental to providing low carbon products and solutions, so early engagement is critical. The traditional construction process means that material suppliers are often the last to be engaged/consulted. The value chain can achieve great things if they are tasked to do so be open to innovative proposals.

Challenge your waste management contractors to support efforts to reuse materials and identify opportunities for waste materials to be converted into higher value circular products rather than simply downcycling material. Waste management contractors should help to identify optimum segregation strategies which enable the above to be achieved within the site constraints.

In order to ensure the value chain is fit for purpose for future circular construction, sustainability and circular economy principles should be embedded into contractor tendering processes and support and signposting should be provided to help raise the bar for everyone in the value chain.

2. Minimise the material choice impact

The embodied carbon of the materials we use in the construction of the built environment are significant and can represent 40-70% of Whole Life Carbon in a new building¹. Therefore, contractors need to consider how they can use less materials, lower embodied carbon materials and produce less waste in the construction process.

Furthermore, circular construction projects recognise and encourage the use of recycled content and secondary materials to reduce the demand for virgin material, reduce embodied carbon and optimise material efficiency. Where feasible, the use reclaimed materials and remanufactured components over new should always be considered.

Beyond considering embodied carbon and the recycled content of the materials, contractors should ensure the responsible sourcing of materials i.e. prioritising bio-based, renewable, local and abundant materials over fossil-fuel dependent, exhaustible, imported and scarce materials.

Contractors should request that the value chain be able to produce Environmental Product Declarations (EPDs) and demonstrate other certifications i.e. Cradle-to-Cradle, Health Product Declarations and NaturePlus for their products. Selecting benign materials with low toxicity that are designed for disassembly and avoiding any materials with 'substances of very high concern' as this will prevent future reuse and recycling and may affect the health of occupants.

¹ Julian Broster - founding director at Civic Engineers <https://www.newcivilengineer.com/opinion/its-time-for-regulations-to-prioritise-lower-embodied-carbon-materials-in-construction-05-11-2020>



3. Be open to solutions

Digital technology is transforming the construction industry. Innovations like those listed below are bringing with them reductions in carbon use, construction time, project costs, material use and construction waste.

- Robotics,
- Drones,
- Augmented and virtual reality,
- Laser scanning,
- Building Information modelling (BIM),
- Sensors,
- Digital twins, and
- Artificial Intelligence (AI).

Contractors are encouraged to embrace digital tools to support the designing out waste process, carry out pre-demolition/refurbishment audits and create digital building and materials passports. These Building Passports will interpret buildings as material banks and assess opportunities for recovery, reuse and recycling within various value and utility propositions.

Using digital tools contractors are able to achieve the following potential benefits:

- Material reduction through standardisation of components or modules,
- Better visualisation of design principles at an early stage,
- More accurate existing building or site models,
- Assessing material waste during design,
- Reducing material/ component replacements,
- Assessing whole life costs,
- Improved quality of co-ordinated modular and off-site construction,
- Savings in time and resources during construction and operation,
- Integrating sensors for real-time energy monitoring and analysis, and
- Itemised components for deconstruction and material re-use.



4. Consider Offsite Construction techniques

The greater the project has been designed to incorporate repeatable, standardised components and assemblies, the easier it is for contractors to consider offsite construction techniques. Offsite construction enables less material being used, especially with structural elements for high-rise construction and precision in factory manufacturing.

Offsite construction often generates higher and more consistent quality, more reliable performance through repeat production and therefore greater predictability of performance and outcomes. It also results in easier quantification of repeat standardised elements and better representation in BIM models.

The offsite construction methodology which typically includes pre-delivery inspections, factory-controlled installation conditions, enhanced traceability of components for maintenance or later modification, and properly planned interfaces, reduces the likelihood of defects in the final building resulting in less waste being generated.

5. Tackle the packaging issue

An important aspect of preventing waste at source is managing the high levels of packaging that arrive on site. The effective management of this should form part of the SWMP agreed with all project team members, but it is of specific relevance to contractors as they will have the responsibility for delivery of this part of the plan.

In some cases, the packaging is necessary to protect certain vulnerable items from damage, contamination, moisture and weather. However, with suitable storage and transportation arrangements on site, it is usually possible to remove the need for the majority of packaging.

Negotiating with suppliers and delivery companies can be helpful in reducing the amount of packaging used. The best circular construction option is to stipulate the use of re-usable packaging that can be returned for continued use (that is, plastic or timber crates rather than cardboard or shrink wrap). If that is not possible then many items, such as cardboard, can be harmlessly recycled or even composted on site provided they are segregated and managed effectively.

Why should I seek to make my projects more circular?

Reducing waste can help contractors save money through more efficient use of raw materials, packaging and technology, and allow you to cut your waste disposal costs. Using a more detailed waste forecast can help mitigate against the commercial risk resulting from misjudging waste tender allowances.

Another business case for sustainability is that it will help boost your brand's reputation among customers, suppliers, potential employees and insurers, who may want to be sure that you take your environmental responsibilities seriously, as well as boosting morale of existing staff. Corporate Social Responsibility not only helps boost your company's image, but has been proven to boost media coverage and employee engagement.

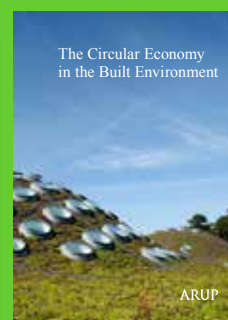
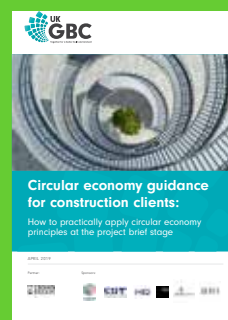
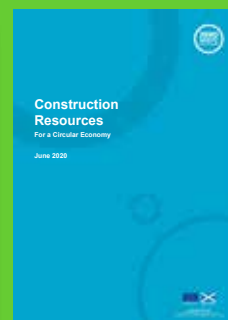
Moreover, environmentally conscious, circular economy companies are more likely to attract and retain investors. Investors are more likely to be attracted to and continue to support companies that demonstrate a commitment not only to employees and customers, but also to causes and organizations that impact the lives of others.



Key resources

The following recommended resources will help you to continue your circular journey and embed the above mentioned tips within your projects:

- Irish Green Building Council (IGBC)
[Towards a circular economy in construction: Assessing low carbon, healthy, responsible products for the construction sector](#)
- UK Green Building Council (UKGBC)
[Circular economy guidance for construction clients: How to practically apply circular economy principles at the project brief stage](#)
[Circular Economy Implementation Packs for Products as a Service and Reuse](#)
- Zero Waste Scotland
[Construction Resources For a Circular Economy](#)
[Procuring resource efficient construction projects](#)
[Design out waste in construction Guide](#)
[Maximising re-use in construction](#)
[Create a SWMP](#)
[Improving waste management on construction sites](#)
- ARUP
[Circular Economy in the Built Environment](#)



Support available

Should you wish to learn more or have a pilot or demonstration project which you would like support with to explore circular construction approaches then please get in touch with:

Southern Region Waste Management Office,
Lissanalta House,
Dooradoyle Road,
Limerick
Phone: 061 556596
E-mail: info@srwmo.ie
Twitter: [@preventwaste](https://twitter.com/preventwaste)

