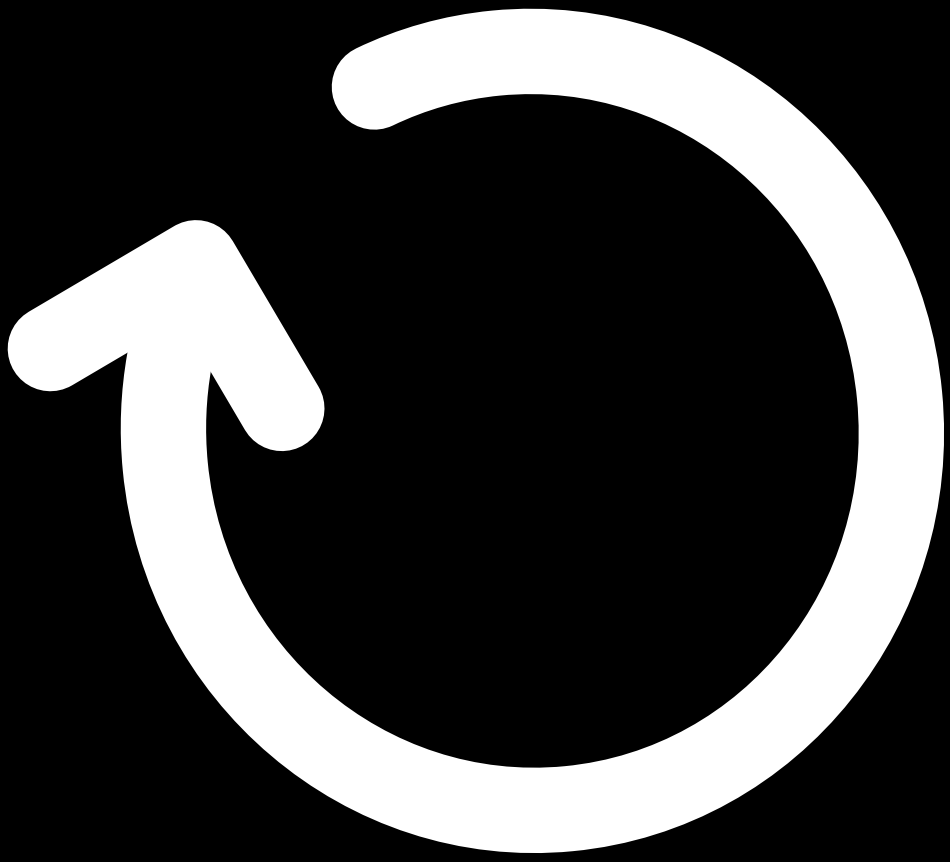
Qflow



The UK Construction Industry

Annual Waste Report 2023

Issue 001

The construction industry generates 62% of the UK's waste and 32% of all waste sent to landfill[1]. Crucially, 13% of construction materials are diverted straight to waste without being used[2].

1 DEFRA Official Statistics (Updated 11 May 2022) - UK statistics on waste
2 BRE (2018) – Sustainable Construction Methods

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MORGAN SINDALL CONSTRUCTION

Main Contractor

The Qflow report on waste correctly identifies that the quality of waste data needs to be improved, and we work closely with our waste management supply chain to tackle this. The report provides good insights into current practice, re-affirming the benefits of segregation of waste at source, and of the proactive management of waste on site. We also share the view that materials that can be reused or recycled should be, and that the goal of having better data is to ultimately reduce waste by design, rather than just to manage it better."

GROSVENOR

Developer & Asset Owner, Qflow User & Investor

Qflow's waste report strikingly details the flaws in the construction waste sector, which have become apparent to us since we began use of their platform. There are so many holes in the chain of custody that it's hard for any developer, no matter how responsible to reliable report on what is happening to 100% of its construction waste. It is of paramount importance that the entire industry takes responsibility and ownership of its waste cycle. Material circularity in the built environment can only be achieved when true accountability is taken for the waste coming from construction sites.

IEMA

Institute of Environmental Management and Assessment (IEMA)

The findings from the report highlight gaps in waste management systems… Improvements to waste data capture of construction, demolition and industrial waste has been long awaited, and it is hoped these improvements will support better use of co-products and second-hand raw materials in this sector.

Executive Summary

Executive Summary

This document is for contractors and developers in the UK seeking to understand the state of waste management in construction. **It provides an analysis of over 90,000 waste transfer notes**, providing data-driven insights on waste compliance, diversion from landfill and the carbon impact of construction waste management. We hope this report will leave you with more questions than answers, but also a clear sense of what to ask, and where you may be able to find the answers.

This analysis highlights the poor state of waste management compliance today, and the lack of consequence felt by the industry from the regulators. As a result, we likely have waste going where it shouldn't, and a regulator that does not have sufficient transparency or capacity to tackle this. Over £23M of possible fines have been unclaimed across these 90,000 waste transfers alone.

One contributor stated "The fact of the matter is, we have no idea what's going on, and the regulator is asleep at the wheel. The 'polluter pays' doesn't work if no one Is watching." Going on to express **"How are we ever going to solve the environmental emergency if we can't even keep track of where stuff goes?"**.

In this report we have provided as much detail and transparency as we can, while still creating an interesting and valuable narrative. If you wish to dive further into the details, please feel free to reach out to the team at Qflow.

Responsibility for managing construction waste rests primarily with the person or company that produces it

Key Findings

This report summarises analyses carried out on over 90,000 waste collection tickets from June 2018 to April 2023 (Appendix) and investigates the strengths within the industry, as well as areas for improvement.

We asked these questions

Industry compliance

- How well does the construction industry comply with the current legal requirements surrounding waste management?
- Which carriers perform best for waste compliance and landfill diversion?
- What are the areas of vulnerability?

Diversion From Landfill

- What is the average Diversion From Landfill rate?
- Is a 100% Diversion From Landfill rate possible?
- Can construction do better (reduce waste generation, increase reuse, reduce its contribution to landfill)?

Carbon

- What is the carbon impact of all this waste?

This report does *not* cover the embodied carbon of the materials wasted, only the waste processing and transport.

The data analysed in this report has been generated using the Qflow system. By procuring Qflow, the construction sites analysed in this report have taken a proactive step to improve their waste management, and hence the picture this data presents may be **more positive** than that across the wider industry.

We found these answers

Industry compliance

- 1 in 3 waste tickets are non-compliant.
- Achieving 100% waste compliance is possible but some assistance is required.
- The most commonly missing fields on waste transfer notes (WTNs) were facility permits/exemptions, European Waste Catalogue (EWC) code and carrier licence.

Diversion From Landfill

- The current industry average rate for Diversion From Landfill is 87% (this is in conflict with the commonly referred to statistic of 99% diversion from landfill which we find is often reported)
- There are carriers operating at a 100% Diversion From Landfill rate and/or 100% compliance rate.
- Non-hazardous waste types that can be reused, recycled or recovered are disposed to landfill in numerous cases. Examples include soil and stone, mixed construction and demolition and concrete wastes.

Carbon

- Average emissions associated with waste transport per project are over 9t CO_2e; equating to more than 6,000 miles of waste movements.
- The current average carbon emissions associated with waste management during construction is 190,000kg CO_2e per £1,000,000 project CapEx.

Waste regulation in the UK

Waste generation and disposal is highly regulated in the UK, with legislation in place for both producers and managers of waste.

UK construction waste is regulated by the *Environmental Protection Act 1990*, the *Waste (England and Wales) Regulations 2011*, and the *Environment Act 2021*. According to these regulations, the legal responsibility for managing construction waste rests primarily with the person or company that produces it, known as the "producer of waste." This could include the contractor, or property owner/developer who is responsible for the construction project.

The producer of waste must ensure that the waste is properly handled, stored, transported, and disposed of in accordance with the relevant regulations. They must also take steps to minimise the amount of waste produced and to promote recycling and reuse of materials.

The producer of waste must keep records of the waste type, quantity, management and disposal method. **Waste Transfer Notes** (WTN) and **Hazardous Waste Consignment Notes** (HWCN) are legally required documents which must be completed for **all** transfers of non-hazardous and hazardous waste, both are referred to as a WTN in this report. WTNs can be requested for audit up to **two years** after the removal date so information must be retained by the site teams[1].

Failure to comply with these regulations can result in legal action, including fines and even imprisonment in severe cases. The legislation surrounding waste is largely the same across the UK requiring the following items on each WTN:

- A description of the waste
- Listed waste processes (if any)
- The container for the waste
- Quantity of waste (weight for England/Wales)
- Date of waste movement
- Site address of waste collection and carrier address
- Carrier licence
- Facility permit or waste exemption relating to waste destination
- **European Waste Catalogue** (EWC) code and the **Standard Industry Code** (SIC)
- For England and Wales, a statement that the waste hierarchy (also referred to as management route) is acknowledged and adhered to.

New regulation

The Environment Act 2021 received Royal Assent in November 2021[2]. Currently, this provides relevant national authorities with the ability to make regulations relating to: Waste enforcement and regulation, charges for single-use items, and restrictions on shipments and exports of different waste types.

It is up to those authorities to determine how and when to exercise these new powers. As such, there is no certainty around what the changes will be and when they will come into effect.

What is certain however, is that the new *Office for Environmental Protection,* and other environmental regulators subject to its oversight, will come under increasing pressure to make use of their wide-ranging enforcement powers which aim to **eliminate avoidable waste by 2050.**

This report focuses purely on waste management during construction and does not look upstream to efficiencies introduced during design.

1 Newground CIC (2023) - Waste Transfer Notes and how to complete them (Scotland & NI)
1 The Compliance People (2023) - Waste Transfer Notes (England and Wales)
2 Environment Act 2021 - Section 50 - Producer responsibility obligations

The format of a WTN must conform to the requirements laid out in Part 9 of *The Waste (England and Wales) Regulations 2011*. However, the quality and legibility of WTNs used in construction varies dramatically, making data collection and analysis difficult and time-consuming. The images on this page represent a fragment of the range of Waste Transfer Notes analysed.

Waste management workflow

The construction industry, like most, aims to follow the waste hierarchy and target waste prevention and reuse, over recycling and disposal, see *Figure 1*.

In practice, the management of waste during construction follows the high-level workflow described in *Figure 2*, with some tailoring to meet individual project needs (for example the use of barge or rail for waste transport, or permitted transfers between construction sites for reuse of materials). Each waste collection is transported by carrier from the project site address to a waste facility. From here, the waste can be transported, stored, recycled or disposed.

According to the UK government's guidance on construction waste management, "The producer of the waste remains responsible for ensuring that it is managed properly throughout its life cycle, including during transport and disposal."[2]

The undertaking of **waste prevention** during construction lies primarily with developers and /or contractors, for example identifying opportunities to re-use materials and reduce their waste generation. It is also their responsibility to contract with carriers and facilities that are not only compliant, but can also meet project and corporate sustainability objectives, such as high Diversion From Landfill rates.

Each carrier is required to register for a carrier's licence certifying them to transport waste to permitted facilities. The waste management facility must hold an appropriate facility permit (or exemption where applicable) that specifies what types and volumes of waste it can process.

The waste producer is ultimately responsible for the compliant handling of waste.

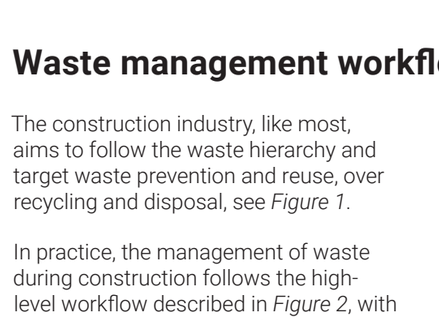


Figure 1 **Waste Hierarchy** [1]

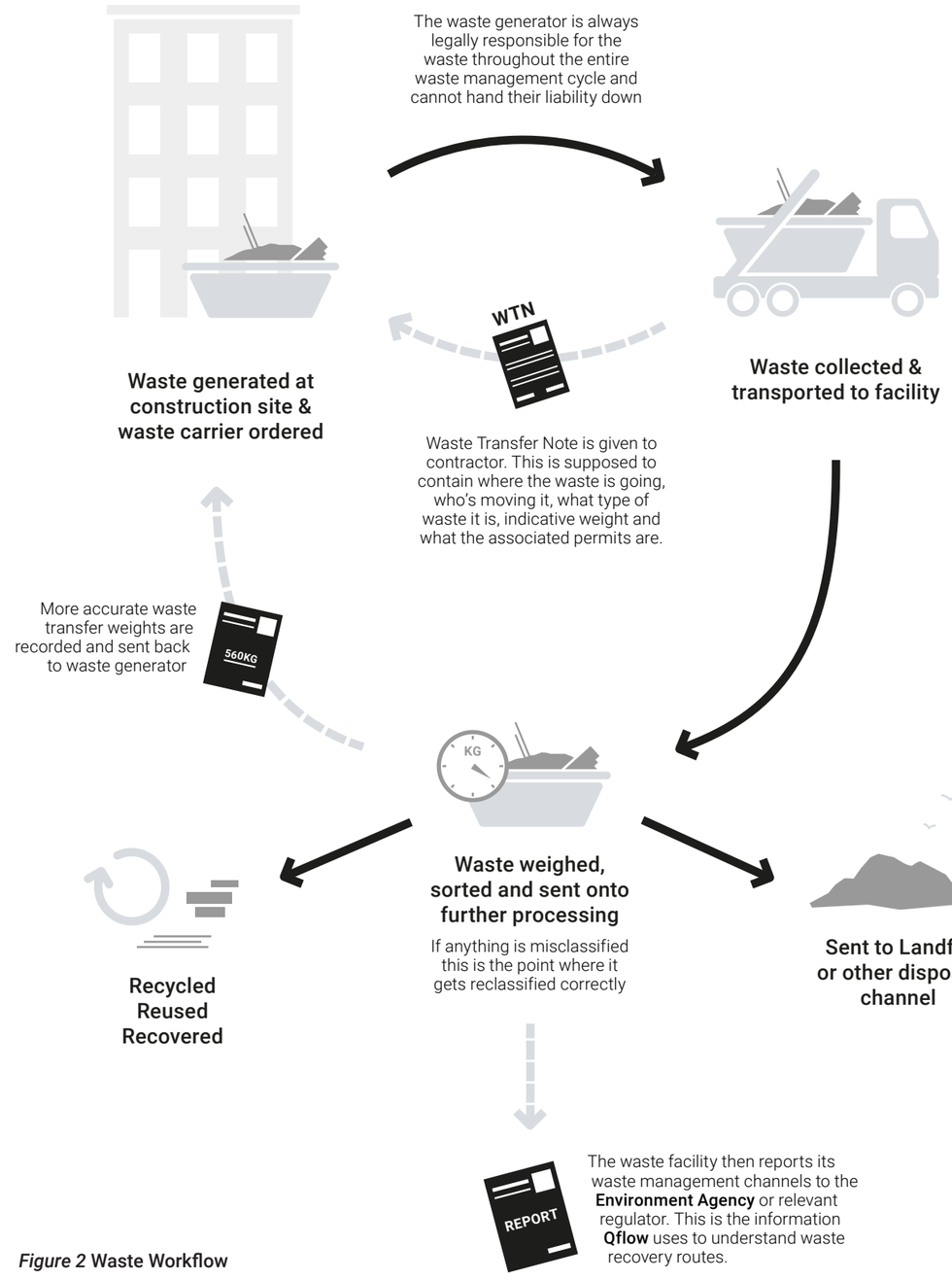


Figure 2 **Waste Workflow**

1 European Environment Agency (2016) - Waste hierarchy European Environment Agency
2 UK Government Nov 2018 – Waste Duty of Care Code of Practice

Current Compliance

The average waste compliance across all projects analysed within this report is 64% at the time of transfer (where no corrective actions have been taken). If taken as representative of how the industry is currently performing, this means that **legally required fields are absent for more than 1 in 3 WTNs**. The data distribution is visualised in *Figure 4*.

Figure 4 shows that 35% of projects analysed hold a compliance rate above 90%. Within this group more than half have 100% compliant WTNs, showing that it is possible to run a fully-compliant project.

However, the average waste compliance across all projects, when calculated using the mean, was just 64%. Of the 110 projects analysed, eight projects recorded 0% compliance across all waste collections. For these 8 projects, every WTN analysed was missing at least one of the following: facility permit, carrier licence and EWC code.

You cannot manage what you cannot measure. For us to improve waste management in construction, we must also improve the detail and diligence with which we report on it, making targeted improvements possible.

Why care?

This poor compliance with waste regulation means two things:

1 The industry is at risk of being complicit in unscrupulous actors disposing of waste in environmentally harmful ways.

2 The industry has an incomplete picture of:

- How waste is being handled
- Where it is sent to
- What type of waste it is
- How much is being reused, recycled or disposed of.

As such it is impossible to properly quantify the level of financial and physical waste involved in the process and the resulting impact on our planet.

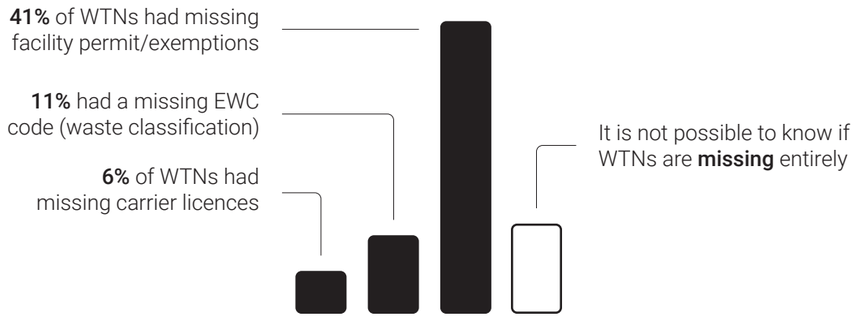


Figure 3 **Non-compliance across all WTNs**

Legally required fields are absent for more than 1 in 3 WTNs

Figure 4 **Waste Compliance by Project**

The missing information risk

Missing information is an administrative problem and a significant risk to the project and people. Items most commonly missing from a WTN are:

No facility permit or exemption (41% of all waste collections)

This poses a significant compliance risk. Facilities not equipped to handle particular waste types can incur costly and time-consuming audits, and at worst, expensive penalties and even loss of licences. An Environment Agency report from 2016[1] highlights how a waste carrier was fined over £1.2M for illegally handling waste.

No EWC code (11% of all collections)

The EWC code determines the waste type and is vital for ensuring correct waste management routes and disposal channels. The common use of 'muck away' is insufficient, covering more than one EWC code and possibly leading to misshandling of waste.

This vague classification can cause issues down the line, particularly if the waste is found to be hazardous and is taken to a facility not capable of accepting these waste classes. **This causes serious issues as the facility may not have appropriate Personal Protective Equipment (PPE) or safety procedures in place.** If the facility reports this back in the waste returns, this can also introduce commercial disputes, as contaminated waste is more expensive to dispose of than non-hazardous or inert. As such, including the correct EWC is important, not just for compliance, but also for effective cost management during construction.

No carrier licence (6% of all collections)

Similar to facility permit absence, a missing carrier licence is associated with a high risk. Unlicensed carriers present a much higher risk of fly-tipping and illegal waste disposal, both of which have serious consequences for the waste producer. The correct carrier's licence helps projects have confidence that their waste is managed lawfully.

This does not apply to just the large corporates, even the public are subject to these rules. Devon Live reports on a case[2], that is repeated across the country, of a man who paid £80 for waste removal only to be fined £354 after it was dumped in a lane. As the waste producer, he was ultimately responsible, even though he had paid someone to take the waste away. You can find more examples of this here.

"Waste crime costs the economy in England an estimated £1 billion per year."[1]

The EA is increasing its efforts to manage waste crime. Between 2017 and 2020, the EA stopped illegal waste activity at 2,700 sites and initiated 191 prosecutions for illegal waste sites, with 39 prison sentences handed down.

Failure to produce complete documentation including waste transfer notes on demand can result in a fixed penalty notice of £300 or prosecution where the maximum fine is £5000. If all the non-compliant WTNs analysed incurred a fixed penalty charge of £300, the resulting fines would total **£13.2M.**

On top of this, if just 1% of the non-compliant WTNs analysed resulted in illegal waste handling, the resulting fine paid to the EA would exceed **£15M**. Resulting in over **£28M** of possible fines across these analysed projects alone. If scaled up across the whole UK construction industry, there could be £250M - £1BN of unrealised fines available to the regulator.

1 Environment Agency (2016) - Waste firm ordered to pay more than £1.2m for waste offences
2 Devon Live (2022) - Man who paid £80 for waste removal fined

£1bn of fines available to the waste regulator

Is real-time recording of waste movements possible?

One project analysed saw up to **155** waste collections per day – each movement tracked with an individual WTN. It is understandable that data goes missing and quality assurance is a serious challenge for project administration with this volume of data to process.

Through Qflow's simple data capture, using a photograph on a smartphone or tablet, it is not only possible, but highly efficient to capture WTNs in real-time. One project boasted an 80% time saving using Qflow's smart capture system. On top of this, Qflow supports the auditing of waste transfer notes and flagging missing information including expired permits.

Which carriers perform best for waste compliance and landfill diversion?

Of the 153 carriers recorded with ten or more waste transfers, only 14 achieved a 100% compliance rate. The top four carriers with 100% waste compliance across at least 150 collections were:

- C & M Plant Hire
- Ron Smith Recycling Ltd
- TC Haulage Ltd
- Simpson Environmental Services

What is the average Diversion From Landfill rate, and is a 100% Diversion From Landfill rate possible?

Diversion From Landfill is a metric that companies are often interested in tracking and improving as this is one metric for quantifying their environmental impact. Some waste types require disposal to landfill, for example asbestos, but for most other waste types, Diversion From Landfill is possible.

To explore the effectiveness of Diversion From Landfill, it is also important to understand the different types of waste being produced by a project.

Non-compliant WTNs can be as a result of missing or incorrect information supplied by the carrier on the WTN (e.g. facility permit or carrier's licence), or incorrect information added by site team (e.g. the EWC code)

Waste Breakdown by Project Type

Data was segmented into four core project sectors: Fit Out, Commercial, Infrastructure and Residential.

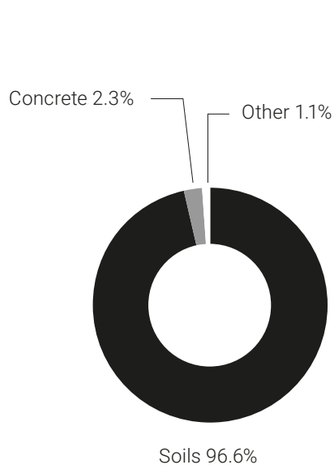
***Figure 5* shows that there is significant variation in the waste mix produced depending on the project sector.**

The differing proportions of waste types across the sectors are not surprising, but become helpful when targeting waste reduction efforts, and waste management routes (shown in *Figure 6*)

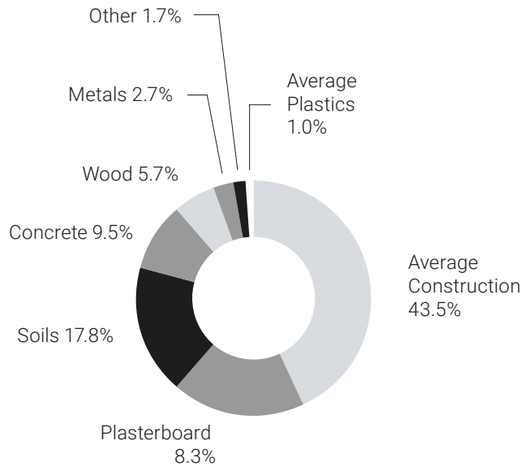
Infrastructure and Residential construction waste is dominated by various classes of 'soils'. This would include, for example, EWC code: 170503 (soils and stones containing dangerous substances). A full list of EWC codes can be found here[1]

Fit Out generates the greatest proportion of "average construction" waste. This category is predominately comprised of mixed construction and demolition waste codes.

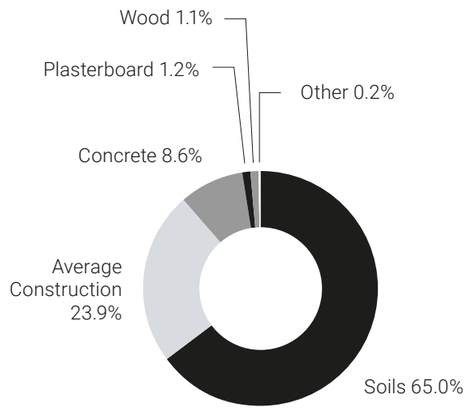
Concrete waste is a common output of both Commercial and Residential projects, with Commercial accomplishing a greater segregation rate on average: less Mixed Waste and more segregated concrete proportionally.



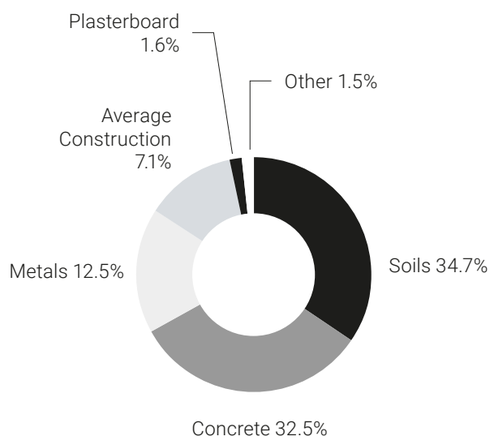
Infrastructure



Fit Out



Residential



Commercial

***Figure 5* Waste weight by Project Sector**

1 Gov.UK - Classify different types of waste

Waste Disposal Channels

According to the waste hierarchy (*Figure 1*), waste is either reported as Disposed Of, Recycled, Reused or Recovered. To determine a project's Diversion From Landfill rate these categories are further sub-divided, for example 'Disposal through incineration (without energy recovery)'.

For a full list of waste hierarchy sub-categories see the EU Waste Framework Directive 2008/98[1]). To understand the subdivision further, see information on Recovery & Disposal (R&D) codes[2] and this R&D flow chart[3], and this Guide to EA Waste Facility Type Codes (compiled by 360 environmental[4]).

***Figure 6* displays waste tonnage proportions for the four outlined project sectors by waste management route.**

Waste reuse is low across all project sectors, only Residential shows any significant reuse (9.2%). It is not clear why this is, but further investigation may enable us to improve reuse rates across the industry.

One reason for the 'Unknown' section viewed in Figure 6 is an absence of necessary information on the WTN. An 'Unknown' classification can also be triggered by a non-English waste facility location (Environment Agency data on waste management routes covers England only), or waste exemption facilities (where data is less accessible than those with permits).

Conclusions

1 Recycling rates across the four sectors averages over 1/3 with Fit Out the highest at 51%.

2 Recovery & reuse rates are highest in Residential (44%) and lowest on Commercial (16%)

3 Disposal to Landfill accounts for 6-14% across all sectors except Fit Out. The presumption that mixed construction waste would lead to higher landfill disposal would appear to be unfounded.

4 Infrastructure waste disposed of to landfill is commonly recorded as non-hazardous soil & stone (170504) and non-hazardous mixed concrete and demolition wastes (170904). Yet, disposal in this manner is not expected for these codes. It is possible that this is a misclassification[3] or a permitted transfer that is being documented as landfill.

5 Following Infrastructure, Residential projects recorded the second greatest contribution to landfill at 10%.

6 Infrastructure projects also record the highest proportion of disposal methods outside of landfill, including Disposal After Treatment, and Disposal After Storing. In total, almost one third of waste from Infrastructure projects is disposed of (as opposed to reused, recovered or recycled).

If the worst offending Infrastructure project is removed from the analysis, Disposal To Landfill reduces to 8%.

1 European Parliament Waste Framework Directive 2008/98/ECL
2 Waste Support Recovery and Disposal Codes
3 360 Enviromental D&R Code Flowchart
4 360 Environmental - Guide to EA data waste facility type codes

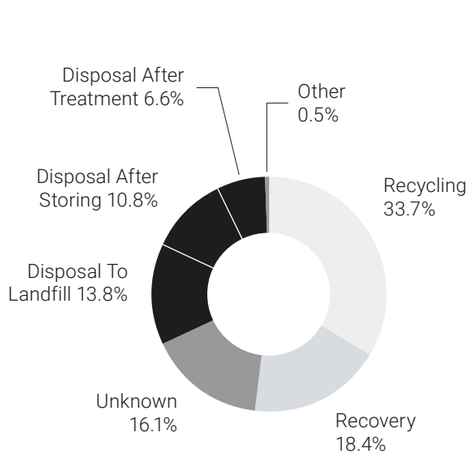


***Figure 6* Waste Management Route breakdown by sector**

Almost one third of waste from Infrastructure projects is disposed of

7 Projects have shown that, by working with the right carriers and facilities, it is possible to achieve a 100% Diversion From Landfill rate on a project.

8 The significant element of 'Unknown' across all four sectors (14-36%) results in an incomplete picture

Which non-hazardous EWC codes are being disposed at landfill?

More than 175,000 tonnes of waste were recorded as Disposed to Landfill across 110 projects. *Figure* 7 describes the proportions of key materials that were disposed to landfill.

Top Performing Waste Carriers based on Diversion From Landfill Rate

We recorded an average Diversion From Landfill of 87% across all projects. 66% of carriers achieved a 100% Diversion From Landfill rate.

The following carriers achieved this rate across more than 250 waste collections:

- ACE Grab Hire & Haulage Ltd
- Economic Skips Ltd
- Ellgia Ltd
- ETM Recycling Ltd
- Shorts Group

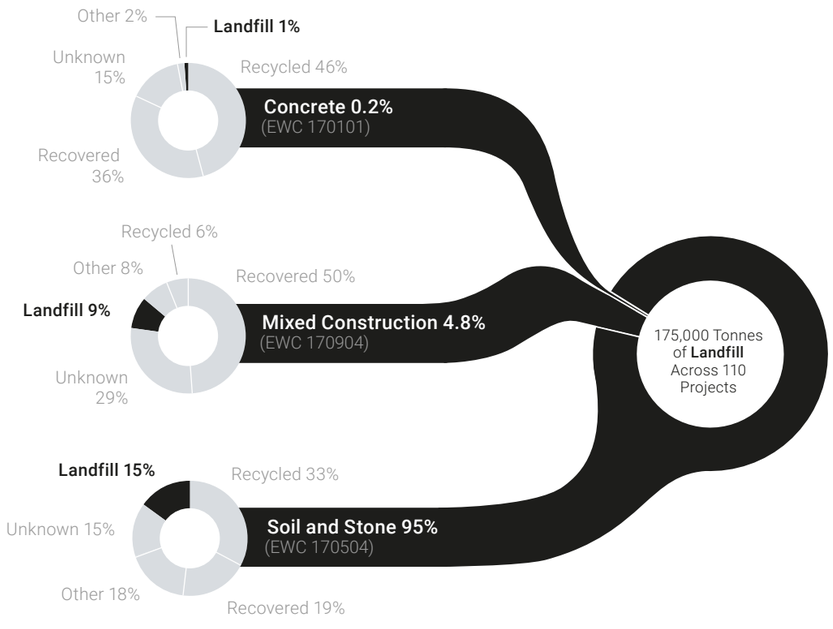


Figure 7 **Breakdown of waste streams to landfill**

Does choice of facility matter?

Yes, it is evident that some facilities are better at diverting waste from landfill than others. Further examination of EWC code: 170504 (Soil and Stone) showed that this waste type was distributed to 196 facilities over 62,500 movements. 166,000 tonnes (15%) of soil and stone was diverted to landfill. Of this, 31% was the output of a single facility.

The Soils Task Force highlights that the construction industry sends nearly 30 million tonnes of soil to landfill each year, worth nearly £3 billion![3]

For one facility analysed, 31% of Soil and Stone was sent to landfill; of which 98% came from a single project.

The supply chain transparency made available by this data has highlighted this discrepancy and made it possible for the project team to investigate the reason for this high landfill rate.

Soil and Stone is often sent to Landfill to be used as capping. However, preservation of good quality soils is a new priority area for the EA and DEFRA. Better classification and segregation of soils will enable high quality soils to be diverted from disposal in favour of other methods, while poor quality soils can still be used for landfill management.

Alternatively, it is possible that this waste was misclassified at site, and reclassified as hazardous by the waste facility.

In discussions with the EA, better waste classification on site was highlighted as a key area of focus in order to support better waste management and to protect human health.

The cost of Landfill Disposal

Disposal of waste by landfill has significant financial implications in the form of a Landfill tax (included in the standard carrier fees ~£250/skip). The average cost associated with sending construction Waste To Landfill is **£102.10/tonne.**[1]

We have recorded over 175,000 tonnes of waste heading to landfill across 110 projects. On average, this equates to 1,591 tonnes and more than £162,000 per project, just paying for landfill.

More than £162,000 per project, just paying for landfill

1 GO Contaminated Land Solutions (2023) - Spring Budget 2023
2 Ecofficiency (2017) - Misclassification of Waste – How to Avoid It
3 Soils Task Force (2022) - Building on soil sustainability: Principles for soils in planning and construction

The carbon impact of waste

Waste does not only pose a financial, logistical and environmental challenge, it is also responsible for significant carbon emissions, both in its transport and in its processing and disposal.

The current average carbon emissions associated with waste management during construction is 190,000kg CO2e per £1,000,000 project CapEx.

Transport Emissions

The average waste disposal journey was recorded at 9.62 miles; the maximum journey distance was 290 miles. This maximum distance was logged for transporting Soil and Stone (EWC 170504) from London to Cornwall. This project in particular has sent the same waste type (soil and stones) to facilities within 1 mile of the site, indicating that more local disposal is possible. There may be good reasons for moving 'waste' over such distances; for example, this may be used as fill for another site.

With this data readily available, the contractor managing the project can investigate this further and identify if this is an appropriate disposal method. Overall, the data highlights a preference for local facilities. On average, a project will issue 682 waste collections covering approximately 6000 miles, with each trip emitting ~13.26kg CO2e. The average waste related transport emissions per project are over 9t CO2e.

Waste management

The various methods of waste processing and disposal all result in different carbon emissions. The waste categories with the greatest carbon impact (as a result of both their volume and disposal method) are as follows:

1 The greatest contributor to carbon emissions across the 92,834 collections analysed was Soil and Stone (EWC: 170504) accounting for 86% of total carbon emissions. This is expected, as soil and stone represents 83% of all tonnage recorded (as explored on page 16).

2 The second highest contributor was Wood (EWC: 170201) accounting for 7.4% of total emissions across 0.2% of total tonnage.

- Wood is primarily disposed of through recycling. 60% of all wood waste is recycled, generating 12% total emissions.
- 8% of wood waste was disposed of through methods of combining (such as blending or mixing), resulting in 61% of total carbon emissions.
- Wood to landfill, despite accounting for just 0.3% of total wood waste, accounted for over 2% of total emissions. The associated carbon factor for wood to landfill is 828kg CO2e/t. (significantly higher than other methods generating just 1.23-21kg CO2e/t).
- Recovery Through Incineration with Energy Recovery accounted for 2% of carbon emissions for this EWC code and other waste management routes accounted for 23%.

3 Thirdly, Gypsum-Based construction materials (EWC: 170802) were responsible for almost 4% of recorded carbon emissions. This is a higher proportion than this EWC code's waste tonnage rate at 0.5% of total tonnage. This means that the management of its waste is likely driving up higher carbon emissions, with Disposal After Treatment representing the majority (almost half) of carbon emissions for this EWC code. It is possible to avoid disposal for this waste type, with data recorded showing that although 49% of EWC: 170802 was disposed of, 14% was recovered and 19% recycled. The data also showed marginal reuse (less than 1%) and 18% undetermined.

4 EWC code: 170904 (Mixed Construction and Demolition) accounts for 1% of total carbon emissions across 7% of total waste tonnage. The majority, 63%, of this waste type's emissions were associated with Recovery. The mixing of waste may reduce opportunities to reuse and recycle, as further explored on page 20.

95% of total *Waste To Landfill* was classed as soil and stone

How can you reduce carbon emissions from waste transport?

Visualising your waste supply chain can help identify opportunities for change. *Figure 8* shows the location of waste facilities being used by a specific project. The larger the circle, the more waste tonnage sent to the facility. There are other factors (beyond location) that affect whether a waste facility suits a project's needs. To reduce carbon emissions associated with waste transport you can:

1 Reduce the tonnage of waste leaving site by identifying reuse opportunities.

2 Seek facilities that are close to your project

3 Identify alternative lower emission waste transport methods e.g. rail

Maps such as the one below can show project waste destination and tonnage, and be used by project teams to identify possible opportunities for reductions in transport distance.

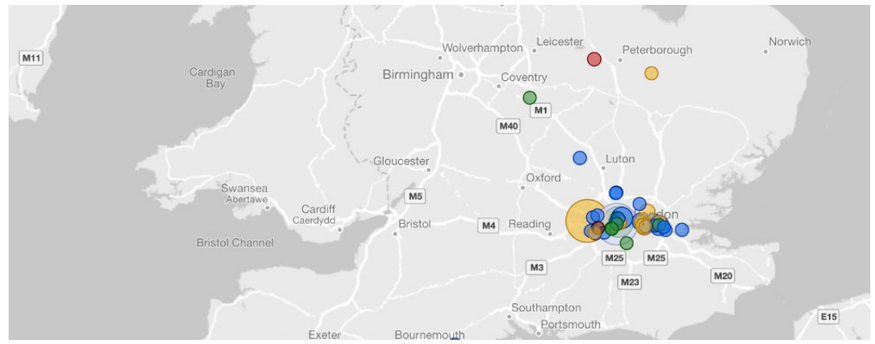


Figure 8 **Map of waste disposal locations for an example project in the Qflow portal. The size of the bubbles indicates proportionate tonnage of waste sent to various facilities.**

The industry does not currently account for unused material that is sent to waste as this is typically added to an existing skip on site. Through greater waste segregation and material management we hope to reduce the volume of material being sent to waste and dramatically increase material reuse. This in turn would reduce construction waste management costs and carbon emissions.

The carbon factors used are sourced from the Department for Business, Energy and Industrial Strategy 1 BEIS (2022) - Government conversion factors for company reporting of greenhouse gas emissions

Improving data quality, transparency and compliance

Data capture & real-time auditing, such as that provided by **Qflow**, can improve compliance, notify developers and contractors about risks, and enable swift action to correct them.

- In some cases, repeated non-compliance is caused by poorly designed WTNs, e.g. a missing field. Qflow's real-time auditing flags missing information, making it simple to locate and amend issues.
- Our bird's-eye view of waste management across your projects makes spotting trends easy. Dramatic improvements in compliance, Diversion From Landfill and carbon emissions are achievable through focused, data-led conversation with suppliers.

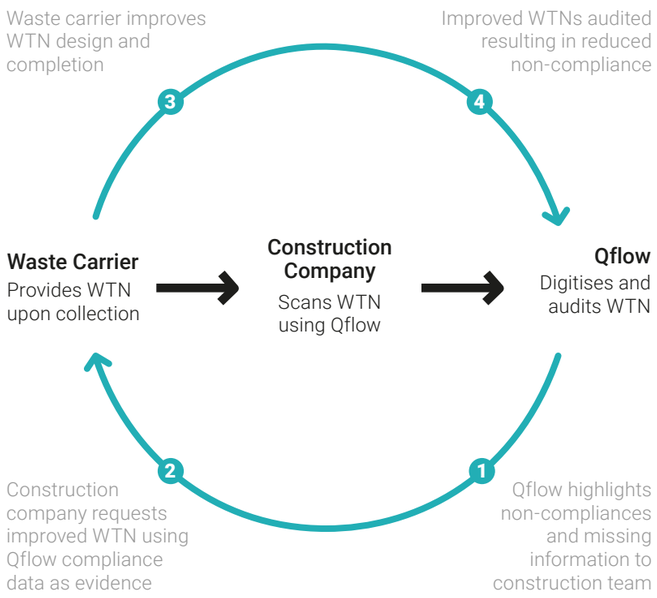


Figure 9 **Waste Workflow**

Figure 10 **Scanning a Waste Transfer Note on site**

Here is a great example of transforming an underperforming project into one that has achieved 100% compliance:

After receiving notifications from Qflow and using the Waste Dashboard to identify underperforming carriers, over a one-year period, a client's compliance rate improved from **57% to 100%**.

Qflow helped identify missing fields, providing the clarity needed to communicate effectively with their carriers. Qflow also provided direct links to the record so that gaps could be completed post-publishing, reducing the burden on the site team.

Another project has improved their compliance rate by an impressive rate over 6 months from **10% to 99.6%**.

Both these success stories show that with the right support the industry can achieve 100% compliance.

The industry *can* achieve 100% compliance

Can construction do better?

Material reuse can and must improve

This analysis showed that on average only 2% was reused following distribution to a waste facility. This report considers how waste facilities are handling materials; as such, reused materials that are never recorded as "waste" are not included in this report. Some work has already been done by the industry to repurpose or donate reusable materials. However, this is not captured in this analysis.

The most reused waste type was Soil and Stone (EWC 170504), which is reassuring following the landfill insights above. Other high reuse waste types include Concrete (EWC 170101) and Concrete, Brick and Tile mixtures (EWC 170107).

Is there an advantage to segregating waste?

Reuse may increase if segregation was prioritised. Mixed Waste (EWC code: 170904) is the result of amalgamated waste types and is the second most common waste type, accounting for 41% of construction waste.

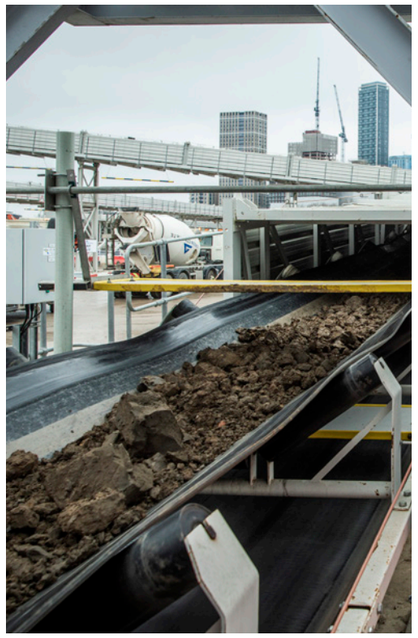
Only 6% of Mixed Waste is currently recycled

Currently Mixed Waste results in 0% reuse compared to an average of 2% across all waste types. Only 6% of Mixed Waste is currently recycled, compared to 33% for other waste codes.

If waste currently classified as Mixed Waste was segregated, the recycling and reuse rate would be expected to increase.

Higher reuse rates are possible on mainstream projects

One project analysed achieved an impressive reuse rate of 23% across their projects.



What are the regulators & industry bodies doing?

The Environment Agency (EA) recognises poor compliance with Waste Duty of Care and has run several campaigns aimed at tackling inaccurate descriptions of waste. A recent survey carried out by the EA in 2020 and 2021 found that 18% of all waste in England may be illegally managed[1].

The UK Government is developing a mandatory *Digital Waste Tracking Service*, that is expected to be launched in 2024. They anticipate this will deliver a step change in waste data and reporting by waste facilities enabling the EA to identify discrepancies in waste going into and out of management facilities, and enable them to respond more quickly where discrepancies are identified.

However, if the EA isn't provided with additional resources to enforce this, it is unclear how this will result in improved waste management across the UK. Currently, fines from EA prosecutions are returned to the *Treasury*. A Government press release[2] from November 2022 indicated that fines from water pollution would be channelled back into environmental improvements. Channelling waste-related fines *back* into the EA could help improve waste management across the UK. **This report** highlights that there are significant funds available through capturing fines, but only if the EA is properly resourced and incentivised to do so.

The Construction Leadership Council are working towards "zero avoidable waste (ZAW) in the construction sector by 2050", and identified actions needing to be taken across the construction sector, and by the government, in their 2021 routemap[3]. There are a number of other targets included within the Routemap:

- By 2030 costs are reduced by 10% through designing out waste and material optimisation.
- By 2040 eliminate all but hazardous C&D waste entering landfill.
- By 2040 reduce soil to landfill by 75% based on a 2020 level, and by 2050 this should be zero, unless required for landfill operation purposes.

IEMA shared their thoughts with us: *"The introduction of the Environment Agency's Digital Waste Tracking system in 2024 is designed to improve traceability and overcome these issues. It is essential that the construction sector embeds circular strategies into the industry. The sector must design for longevity, flexibility, adaptability, assembly, disassembly, and recoverability – using low impact, safe and sustainable materials, and avoiding waste in the first place."*

The UK Green Building Council is also pushing for the transformation to a circular economy through their forum[4].

Qflow comments that *"there is clearly an awareness of the problem and an appetite for change, however without a combination of 'carrot and stick' it is likely this change will be reluctant and slow. The initiatives outlined above have worked hard to layout the benefit case for better waste management; reduced cost, reduced health risks, and improved environmental impact. However the friction felt in delivering these improvements still appears to be too great, and the consequence of not changing, too small.*

Tools such as Qflow can do a lot to relieve the friction and enhance the benefits, but there is still is significant need for enforcement of legislation and targets, not just at the facility level, but all the way up the waste chain, to really drive change in behaviour and accelerate the circular economy."

As the Digital Waste Tracking system is developed Qflow will look to integrate directly with the portal, helping companies make the transition from paper to digital documentation, and ensure they capture all the relevant duty of care items.

1 Environment Agency National waste crime survey 2023
2 Gov.UK Press Release Water company fines to be channelled into environmental improvements
3 Construction Leadership Council The Routemap for Zero Avoidable Waste in Construction
4 UK Green Building Council (UKGBC) Circular Economy

Conclusion

The case studies discussed in this report demonstrate that **it is possible** to deliver high-reuse, low-landfill projects that comply with Environment Agency regulation, but the analysis of over 110 projects shows that the industry still struggles to achieve this.

Compliance with waste regulation is low

- The average waste compliance rate across all analysed projects is 64%, meaning 1 in 3 WTNs do not meet the minimum legal requirement.
- The most commonly missing information from WTNs were carrier licences, facility permit or exemptions and EWC codes.
- A compliance rate of 90% or above was only achieved by 32% of all projects analysed.

These statistics provide a **baseline**, and we hope to track improvements in waste performance over the coming years. Compliance improvements are possible; some projects achieved over 80% improvement with support from Qflow.

Diversion From Landfill is a key metric by which the industry is judged. The average Diversion From Landfill is 87%, with over half of carriers in our study operating at a 100% Diversion From Landfill rate. Analysis of waste types still being disposed of to landfill suggests that a greater Diversion From Landfill rate is achievable.

Reuse of waste is concerningly low at just 2%. Case studies suggest it is possible to increase this to higher levels, with one project achieving a reuse rate of over 23%. Further investigation is required to establish the points of leverage that will improve reuse across the industry.

This analysis shows:

- The Infrastructure sector is the most likely to contribute to disposal of Waste To Landfill.
- Fit Out projects are less likely to segregate their waste than other sectors. However, recycling rates for this sector are high, recycling over 50%.
- 95% of the total waste sent to landfill, accounting for more than 5,000 tonnes of carbon emissions, was Soil and Stone (EWC code: 170504). Meaning, waste classes that are commonly recycled or recovered are still being diverted to landfill with dramatic carbon impacts.

Diversion From Landfill is not the only metric we use to assess successful waste management. To truly decarbonise construction and reduce its environmental impact we must reduce our waste production all together, and focus on **keeping materials within the built environment indefinitely.**

In future reports we hope to see a reduction in waste tonnage generated per £ spent on construction, an increase in reuse and recycling rates, and a reduction in the percentage of waste going to landfill or other disposal.

Reducing waste sits with every part of the industry: Planners & designers must consider low waste alternative approaches, including no-build and low-build scenarios. Developer & Contractors must procure the right supplier and effectively separate waste. Waste Facilities should find alternative ways of managing waste.

What next?

Ultimately, the legal responsibility for **waste compliance** sits with the waste producer. However, the responsibility for **reducing waste** sits with every part of the industry.

This report has highlighted some key points of leverage that this industry can focus on in order to improve waste management today. The key opportunity that can be acted upon immediately is to take a data driven approach to the selection of carriers and disposal facilities. This can deliver:

- Improved waste compliance
- Reduce carbon emissions associated with waste transport and disposal
- Greater recycling and reuse, and reduced Waste To Landfill

There are areas that require more data and further investigation to better understand the potential opportunities, in particular the opportunity presented by the circular economy and improved waste segregation to enable greater reuse, recycling and Diversion From Landfill.

Planners and designers must consider low waste alternative approaches, including no-build and low-build scenarios. Only then should they specify materials and construction methods that balance other project needs with environmental impact. Developers and contractors must procure the right supplier, both for material and waste management services, to reduce material wastage and waste generation. Waste generated must be effectively separated, transported and processed to minimise contamination and carbon emissions, and to optimise reuse and recycling.

Waste facilities should find alternative ways of managing waste, before condemning it to disposal, which is low value, high cost and high carbon.

Not sure where to start?

The first step is to understand what data you have today, and in what format. Then, you can use this to spot any trends and opportunities across your supply chain.

Q Finding your data is incomplete, or in a format that you can't analyse? Not able to dig into and spot trends? Or found that you don't have the data at all?

A Consider a more automated approach to construction waste management, alleviating the pressure on your team and supply chain, and improving the quality and value of your data in one simple and direct action.

Q Not sure what that could look like?

A Speak to the team and Qflow and we will help direct you to solutions that might suit your needs.

This analysis will be revisited in May 2024 with the aim of assessing any changes in industry performance against the key areas discussed, and to begin to explore the opportunity presented by the circular economy.

Appendix

Over 90,000 waste collections to over 400 facilities across the UK were analysed:

Data referenced throughout this report encompasses:

- 110 projects throughout England, Wales and Scotland.
- 92,834 waste collections (England, Scotland and Wales)
- 499 waste facilities throughout the UK
- 153 waste carriers with 10 or more waste collections
- Dates 31/5/2018 – 27/4/2023
- Project value ranged from £54,000 to £1 billion, with an average (mean) project value of £92 million per project. This breaks down to the following averages, split by sector:

- £7.5 million for Fit Out
- £80 million for Commercial
- £247.9 million for Infrastructure
- £96.8 million for Residential

The Commercial category consists of shops, entertainment, health, offices and education.

The Infrastructure category consists of water, roads, railways and gas, communications & air.

List of Abbreviations

EWC	European Waste Catalogue
SIC	Standard Industry Code
Qflow	Qualis Flow
WTN	Waste Transfer Note
EA	Environment Agency
PPE	Personal Protective Equipment
CapEx	Capital Expenditure

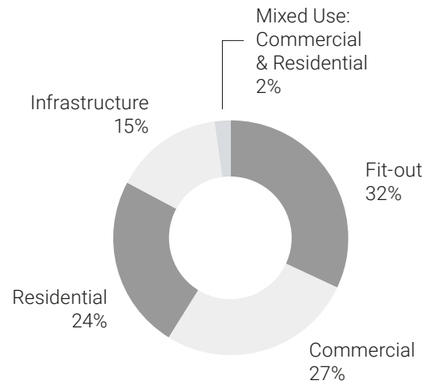


Figure 11 **Spread of project types analysed by project count**

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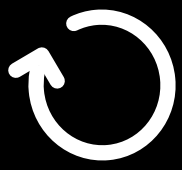

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