# Kirklees Waste Needs Assessment 2025

# Commercial & Industrial Waste Management Requirements in Kirklees to 2043

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# Abbreviations

| Abbreviation | Full Term |
|---|---|
| AD | Anaerobic Digestion |
| C & I | Commercial & Industrial Waste |
| C, D & E / CDEW | Construction, Demolition & Excavation Waste |
| DEFRA | Department for Environment, Food and Rural Affairs |
| EA | Environment Agency |
| EfW | Energy from Waste |
| EWC | European Waste Catalogue |
| HWRCs | Household Waste Recycling Centres |
| LACW | Local Authority Collected Waste |
| MRS | Metal Recycling Site |
| MRF | Material Recycling Facility |
| RDF | Refuse Derived Fuel |
| WCNA | Waste Capacity Needs Assessment |
| WDF | WasteDataFlow |
| WDI | Waste Data Interrogator |
| WPA | Waste Planning Authority |
| WTS | Waste Transfer Station |

# Glossary of Terms

| Term | Definition |
|---|---|
| **Agricultural Waste** | Waste produced on a 'farm' in the course of 'farming'. Agricultural waste takes both 'natural' (or organic) and 'non- natural' forms e.g. plastics and metal. |
| **Anaerobic Digestion** | A process to manage organic matter including green waste and food waste broken down by bacteria in the absence of air, producing a gas (biogas) and nutrient rich solid or liquid (digestate). The biogas can be used to generate energy either in a furnace, gas engine, turbine or to power vehicles, and digestate can be applied to land as a fertiliser. |
| **Bio waste** | Waste that can break down over time due to natural biological action/processes, such as food, garden waste and paper. |
| **Commercial Waste** | Waste from factories or premises used for the purpose of trade or business, sport, recreation or entertainment. |
| **Construction, Demolition & Excavation Waste** | Waste arising from the building process comprising demolition and site clearance waste and builders' waste from the construction/demolition of buildings and infrastructure. Includes masonry, rubble and timber. |
| **Defra** | The UK Government department responsible for developing national waste management policy. |
| **Energy from Waste** | The conversion of the calorific value of waste into energy, normally heat or electricity through applying thermal treatment of some sort. May also include the production of gas that can be used to generate energy. |
| **Environment Agency** | The body responsible for the regulation of waste management activities through issuing permits to control activities that handle or produce waste. It also provides up-to-date information on waste management matters and deals with other matters such as water issues including flood protection. |
| **European Waste Catalogue (EWC)** | Comprehensive listing of wastes divided into 20 chapters, most of which are industry-based, although some are based on materials and processes. Each waste type is assigned a unique six-digit code. Otherwise referred to as List of Waste (LoW). |
| **Exemptions** | Certain activities exempt from the need to obtain an environmental permit. Each exemption has specific limits and conditions that must be complied with to remain valid. Exemptions must be registered with the Environment Agency. Each registration lasts 3 years. |
| **Green waste** | Biodegradable plant waste from gardens and parks such as grass and hedge trimmings, from domestic and commercial sources suitable for composting. |

| Term | Definition |
|---|---|
| **Hazardous Waste Landfill** | Sites where hazardous waste may be disposed by landfill. This can be a dedicated site or a single cell within a non-hazardous landfill, which has been specifically designed and designated for depositing hazardous waste. |
| **Hazardous Waste** | Waste requiring special management under the Hazardous Waste Regulations 2005 due to posing potential risk to public health or the environment (when improperly treated, stored, transported or disposed). This can be due to the quantity, concentration, or characteristics of the waste. |
| **Household Waste** | Waste from households collected through kerbside rounds, bulky items collected from households and waste delivered by householders to household waste recycling centres and "bring recycling sites". along with waste from street sweepings, and public litter bins. |
| **Incineration** | The controlled combustion of waste. Energy may also be recovered in the form of heat (see Energy from Waste). |
| **Industrial Waste** | Waste arising from any factory and from any premises occupied by an industry (excluding mines and quarries). |
| **Landfill (including land raising)** | The permanent disposal of waste to land, by the filling of voids or similar features, or the construction of landforms above ground level (land-raising). |
| **Landfill Directive** | European Union requirements restricting the landfilling of biodegradable municipal waste and requiring pre-treatment of all waste to be landfilled and separate disposal of hazardous, and non hazardous and inert wastes. |
| **Local Authority Collected Waste** | Waste collected by or on behalf of a local authority. Includes household waste and business waste where collected by a local authority and non-municipal fractions such as construction and demolition waste delivered to HWRCs. LACW is the definition used in statistical publications, which previously referred to municipal waste. |
| **Mass Balance** | Method of assessing the quantity of waste that may be converted to recycled aggregate by comparing inputs and outputs for sites reporting through the WDI. |
| **Materials Recycling Facility (MRF)** | A facility for sorting recyclable materials from the incoming waste stream. |
| **Mining Waste** | Waste from extractive operations (i.e. waste from extraction and processing of mineral resources) including materials that must be removed to gain access to mineral resources, such as topsoil, overburden and waste rock, as well as tailings remaining after minerals have been extracted from the ore. Management subject to control through EU Directive 2006/21/EC. |

| Term | Definition |
|---|---|
| **'Next step' Site** | Some waste to intermediate sites may not undergo any processing, thus are reported as leaving the site leave under the same EWC and are accounted for again at the 'next step' site where it is to be managed. |
| **Non-Hazardous Waste Landfill** | A landfill permitted to accept non-inert (biodegradable) wastes e.g. municipal and commercial and industrial waste and other non-hazardous (including inert) wastes. May only accept hazardous waste if a special cell is constructed. |
| **Recovery** | Subjecting waste to processes that recover value including recycling, composting or thermal treatment to recover energy. |
| **Recycling** | The reprocessing of materials extracted from the waste stream either into the same product or a different one. |
| **Refuse Derived Fuel** | A fuel produced to a contract specification by processing the combustible fraction of waste. |
| **Residual Waste** | Waste remaining after materials for re-use, recycling and composting/organic waste treatment e.g. anaerobic digestion have been removed. |
| **The Plan area** | The area subject to the Waste Local Plan to which this study relates. In this case the Kirklees area. |
| **Waste Planning Authority** | The authority responsible for planning for waste within a specific administrative area. In this case Kirklees. |
| **Waste Transfer Station** | A site to which waste is delivered for sorting or baling prior to transfer to another place for recycling, treatment or disposal. |

# Introduction

1.1 Kirklees Council has contracted BPP Consulting to produce the Kirklees Waste Needs Assessment 2025 (WNA 2025). This uses 2023 data, from which, waste arisings to 2043 have been forecast and any resulting management requirements assessed.

1.2 This WNA 2024 covers the following reports:

1. Management Requirements for Local Authority Collected Waste to 2043;
2. Management Requirements for Commercial & Industrial Waste to 2043;
3. Management Requirements for Construction, Demolition & Excavation Waste to 2043;
4. Management Requirements for Hazardous Waste to 2043;
5. Scoping Review of Management Requirements for Other Waste;
6. Review of Strategic Waste Flows.
7. Overview of above.

1.3 This report estimates the quantity of Commercial and Industrial (C&I) waste arising in Kirklees in 2023 and uses this baseline arisings value to forecast C&I waste arisings and assess its projected management requirements through to 2043.

# Estimating Kirklees C&I Waste Baseline Arisings

## Introduction

1.4 This section is concerned with estimating the quantity of Commercial and Industrial (C&I) waste in Kirklees in 2023, the most recent year for which data is available at the time of writing. From this, potential future arisings are forecast. As the baseline value arrived at for a single year may be an anomalous outlier, values for baseline arisings in 2021 and 2022 have also been generated, so that the selected baseline value has been triangulated, and baseline value used for forecasting purposes is shown to be robust.

## Definitions

1.5 The Kirklees Local Plan adopted in 2019, defined C&I waste as follows:

"*Waste arising from premises used wholly or mainly for trade, industry or industrial processes.*"

### Terminology

1.6 While this report is concerned with the management of C&I waste arisings it should be noted that waste similar in nature and composition to household waste arising from businesses is included under the term 'municipal waste' and is normally classified under European Waste Catalogue (EWC) Chapter 20. Most recent estimates for England as a whole found that around 43% of the total C&I waste stream may be waste of a type classed as municipal[1] and 60% of the commercial waste stream may constitute municipal waste. This means that national targets set for municipal waste encompass both Local Authority Collected Waste (LACW) and a significant proportion of the C&I waste stream. LACW and C&I waste may often be managed at the same facilities and hence consideration of management requirements have been assessed together in the subsequent capacity assessment.

[1] National Municipal Waste Composition, England 2017 WRAP January 2020

## Principal Data Sources

1.7 The principal data sources used to generate this WNA are as follows:

### Waste Data Interrogator

1.8 Operators of all sites in England formally permitted to manage waste are required to submit returns on the quantities, types and origin of waste received and, where applicable, destination of waste removed at their sites. These returns are collated by the Environment Agency (EA) annually and are included in a national dataset known as the Waste Data Interrogator (WDI) - waste received and waste removed. This dataset is released approximately nine months after the end of the calendar year to which the data relates. The 2023 WDI (version 1 released Sep 2024) consisting of data for the calendar year 2023 is the most current version available at the time of writing.

### Wastedataflow

1.9 Wastedataflow (WDF) is a web-based data entry portal used by local authorities to report on LACW and household waste management arrangements to central Government on a quarterly basis. The data input is used to report on national recycling and landfill diversion performance as well as local authority league tables on recycling rates etc following independent quality checking. While Councils normally report in financial years, as the EA WDI reports for calendar year the data for Kirklees covering the four quarters of 2023 has been accessed to ensure comparability between datasets.

## Advice on Data

1.10 The principal source of advice with respect to the use of data to inform production of a plan evidence base is the national Planning Practice Guidance (nPPG) available at Guidance Waste . This states that:

"*Assessing waste management needs for Local Plan making is likely to involve:*

- *understanding waste arisings from within the planning authority area, including imports and exports*
- *identifying the waste management capacity gaps in total and by particular waste streams*
- *forecasting the waste arisings both at the end of the period that is being planned for and interim dates*
- *assessing the waste management capacity required to deal with forecast arisings at the interim dates and end of the plan period."*

Paragraph: 022 Reference ID: 28-022-20141016

It includes a section entitled *"Using data to monitor and forecast waste needs*", which articulates the following principles should waste planning authorities adopt when using data to plan for waste management:

- *Make clear assumptions on how data were handled, as well as their impact (including on forecasting)*
- *Provide data to an appropriate level of significance, based on their explicit assumptions. In practice, data quoted to more than 2 or 3 significant figures will not be helpful and spurious accuracy stemming from precise figures should be avoided*
- *Plan for a range of each type of waste rather than a specific single figure."*

Paragraph: 036 Reference ID: 28-036-20141016 Revision date: 16 10 2014

**Data Presentation**

1.11 In order to respect the need to avoid "spurious accuracy", the following approach has been taken:

- Where actual tonnage data has been accessed, this has been used in the computations.
- Where data has been subject to computation, this has been included to 3 sf. Final values discussed in the text are rounded to the nearest 500.
- Where percentages have been used to generate data, the percentages are presented as whole numbers, however the computations actually use the true value. This means that values generated as a result of computations may not always precisely correspond to the values computed if the percentage value presented in this report is applied.
- A threshold of >500 tonnes has been applied to certain computations.

# Methodology

## Context

1.12 Currently there is no requirement on businesses to submit records of waste produced and hence estimating quantities of C&I waste arisings for a specific waste planning area such as Kirklees, with any degree of accuracy, is a challenge. Two different approaches have been used to estimate a baseline as follows:

- **'Point of production'** using data based on the profile of businesses within an Area and applying waste production factors (related to the different business profiles). This method was used in the national survey undertaken in 2009 that informed the previous approach to national estimates[2].
- **'Point of management'** using data related to the management of C&I waste at permitted waste sites. This relies on accurate records of waste delivered to, and removed from, permitted waste facilities. The EA collates this data submitted by operators in its WDI on an annual (calendar year) basis[3]. This data can be supplemented by data for wastes managed at permitted sites that don't report through the WDI, such as the EA's exemption register. This data now forms the basis for the 'Reconcile' method used to estimate C&I waste arisings at national level[4].

1.13 The methodology used to produce the C&I waste baseline in the WNA 2016 was based on the 'point of production' methodology. The methodology used to estimate an updated baseline C&I waste arisings value for 2023 (to be used as a starting point for forecasting C&I waste arisings in Kirklees in this WNA) is based on the national 'Reconcile' methodology, that uses point of management data, adapted to reflect local circumstances[5]. This national methodology considers a number of datasets, in totality, to capture quantities of C&I waste that are managed rather than produced through:

(1) Permitted waste management facilities (reporting through EA WDI);

[2] Commercial and Industrial Waste Survey 2009: Final Report, Defra May 2011, Available: http://archive.defra.gov.uk/evidence/statistics/environment/waste/documents/commercial-industrialwaste101216.pdf

[3] Version 1 of the WDI 2023 was released September 2024 and is the most recent data at the time of writing.

[4] DEFRA 2014, New Methodology to Estimate Waste Generation by the Commercial and Industrial Sector in England as amended by Commercial and Industrial Waste Arisings Methodology Revisions for England October 2018

[5] The methodology has been reviewed by Defra waste statisticians responsible for developing the Reconcile national method.

(2) taking into account the proportion sent directly for export outside the UK.

Deductions are made to eliminate:

(3) Non-relevant waste streams such as Agricultural, Mining, Construction, Demolition & Excavation Waste (C, D & E), wastewater, and hazardous waste included in the datasets; and

(4) Local Authority Collected Waste (LACW) reported through WDF[6].

In summary the methodology applies the following calculation:

*C & I waste arising = (Inputs to permitted facilities + inputs to energy from waste + exports) - (C, D & E waste + mining + agricultural + wastewater + hazardous waste + LACW)*

1.14 For the purposes of estimating the baseline arisings for Kirklees C&I waste, the above method has been adapted to reflect a local approach including computations to avoid double counting of waste inputs to 'intermediate' facilities[7] within Kirklees.

6 Waste Data Flow

7 Intermediate facilities are those at which the waste received does not meet its final fate. That is most waste received leaves for onward management at other facilities elsewhere either having been subjected to some form of treatment or just simply bulked up e.g. transfer stations

**Inputs to permitted facilities**

***Step 1: Waste Data Interrogator quantity of waste from Kirklees with deductions to eliminate non-C&I waste streams.***

1.15 The starting point is to download all data relating to all types of waste identified as coming from Kirklees in the WDI 2023. This is displayed by management route in Table 1 below. This shows that the total quantity of waste identified as coming from Kirklees was just over 0.71 M tonnes.

**Table 1: Waste Arising from Kirklees (tonnes)**

*Source: WDI 2023. Orange cells indicate final fate sites and blue cells indicate intermediate sites*

| Waste Movement | Incineration | Landfill | Recovery to Land | Metal Recycling Sites | Transfer | Treatment | Grand Total |
|---|---|---|---|---|---|---|---|
| **Kirklees to Kirklees** | 130,829 | 42,570 | 0 | 3,652 | 171,693 | 84,959 | **433,703** |
| **Kirklees to elsewhere** | 54,179 | 74,972 | 5,436 | 25,575 | 18,346 | 98,599 | **277,107** |
| **Totals** | **185,008** | **117,542** | **5,436** | **29,227** | **190,038** | **183,558** | **710,810** |

1.16 Waste identified under waste codes considered to represent C, D & E Waste (Chapter 17 plus EWC 19 12 09, 19 13 02 & 20 02 02) and therefore accounted for in the separate estimates of C, D & E waste[8] are deducted from this total. The quantities remaining after this deduction are displayed by management route in Table 2 below. This shows that the quantity of waste identified as arising from Kirklees is reduced by c254,000 tonnes to c457,000 tonnes.

**Table 2: Waste Arising from Kirklees minus C, D & E Waste (tonnes).**

*Source: WDI 2023. Orange cells indicate final fate sites and blue cells indicate intermediate sites*

| Waste Movement | Incineration | Landfill | Metal Recycling Sites | Transfer | Treatment | Grand Total |
|---|---|---|---|---|---|---|
| **Kirklees to Kirklees** | 130,829 | 0 | 3,641 | 134,581 | 20,054 | 289,105 |
| **Kirklees to elsewhere** | 54,179 | 4,010 | 22,599 | 12,063 | 75,037 | 167,887 |
| **Totals** | **185,008** | **4,010** | **26,240** | **146,644** | **95,091** | **456,992** |

[8] *Kirklees WNA 2025 CDEW Management Requirements to 2043* BPP Consulting July 2025.

1.17 Waste identified under waste codes considered to represent Agricultural Waste (Chapter 02 01), mining (Chapter 01) and hazardous waste[9] (All codes with *) are accounted for separately and so are also deducted. The quantities remaining after this deduction are displayed by management route in Table 3 which shows that the total quantity of waste identified as arising from Kirklees is reduced by c25,000 tonnes to c432,000 tonnes.

**Table 3: Waste Arising from Kirklees minus C, D & E Waste, agricultural, mining & hazardous waste.**

*Source: WDI 2023. Orange cells indicate final fate sites and blue cells indicate intermediate sites*

| Waste Movement | Incineration | Landfill | Metal Recycling Sites | Transfer | Treatment | Grand Total |
|---|---|---|---|---|---|---|
| **Kirklees to Kirklees** | 130,829 | 0 | 3,566 | 134,538 | 19,836 | 288,769 |
| **Kirklees to elsewhere** | 52,233 | 3,931 | 22,063 | 10,616 | 54,473 | 143,316 |
| **Totals** | **183,062** | **3,931** | **25,629** | **145,154** | **74,308** | **432,084** |

***Step 2: Deduct specific wastes accounted for separately (rather than complete streams)***

1.18 Landfill leachate (EWC 19 07 03) and sludges from wastewater treatment plants (EWC 19 08 05) are expressly excluded from the national Reconcile reporting method, as Defra considers counting wastes generated by waste management facilities from processes handling wastes generated elsewhere in the economy to be double counting under this overall waste stream. However, the WDI 2023 reports no inputs of these waste types was reported as arising from Kirklees itself in 2023.

1.19 Septic tank sludge (EWC 20 03 04) is also included in the deduction process at this stage as given that septic tank sludge originates from households, it is considered appropriate to deduct it on the basis that it will be managed through wastewater treatment facilities rather than conventional waste management facilities. However, again, no inputs of this waste type were reported as arising from Kirklees in 2023.

[9] Excluding hazardous C, D & E waste as excluded in Table 2.

***Step 3: Accounting for Local Authority Collected Waste***

1.20 While LACW is not distinguishable from C&I by reference to EWC Codes, all being reported under Chapter 20 Municipal Waste, by cross referencing data from the WDF, it is possible to ascertain the quantities of LACW managed through specific facilities reporting through the WDI. Cross checking between the sites identified and the category assigned where listed in the WDI enables attribution to specific routes, as follows:

**Table 4: LACW Received at Facilities included in WDI Count for Waste Arising from Kirklees**

*Source: WDF 2023 Cross checked with WDI 2023*

| Waste Movement | Incineration | Transfer | Treatment | Grand Total |
|---|---|---|---|---|
| **Kirklees to Kirklees** | 119,897 | 127,518[10] | 16,025 | **263,440** |
| **Kirklees to Elsewhere** | 0 | 0 | 36,920 | **36,920** |
| **Totals** | **119,897** | **127,518** | **52,945** | **300,360** |

When the values displayed in Table 4 are deducted from the values in Table 3 the remaining value is c131,500 tonnes as shown in total Table 5. This may be referred to as the 'gross C&I waste arising' value.

**Table 5: Gross C&I Waste Arising from Kirklees**

*Source: Table 3 minus Table 4.*

| Waste Movement | Incineration | Landfill | Metal Recycling Sites | Transfer | Treatment | Grand Total |
|---|---|---|---|---|---|---|
| **Kirklees to Kirklees** | 10,932 | 0 | 3,566 | 7,021 | 3,811 | **25,328** |
| **Kirklees to elsewhere** | 52,233 | 3,931 | 22,063 | 10,616 | 17,553 | **106,396** |
| ***Totals*** | **63,165** | **3,931** | **25,629** | **17,636** | **21,363** | **131,724** |

[10] Includes inputs to Kirklees 4 HWRCs and Emerald Street Household Waste Site & Composting Facility.

***Step 4: Account for any double counting subtracting value for intermediate sites (inc. waste transfer stations).***

1.21 Adjustments may be needed to address recording waste at intermediate sites to account for:

- Double counting - the same waste being recorded once as an input from Kirklees to an intermediate facility in Kirklees, and then again as an input from Kirklees to a 'next step' facility if it goes onward for further management; and
- Loss of some waste - as a consequence of residues from the processing of waste arising at intermediate sites like MRFs where some outputs may be recoded from the original source of inputs i.e., the original source identity gets lost under EWC Chapter 19 (Wastes from Waste Management Facilities).

***4a Deduct movements of waste arising in Kirklees to intermediate sites within Kirklees***

1.22 The national 'Reconcile' method discounts inputs to all types of transfer facilities recorded in the WDI on the basis that if the waste is only being transferred there is no processing of the waste hence there is in theory no loss of waste in the movement of waste into and out of the site and a risk of double counting the same tonnage of waste managed through the site at the 'next step' site. This is illustrated in Figure 1.

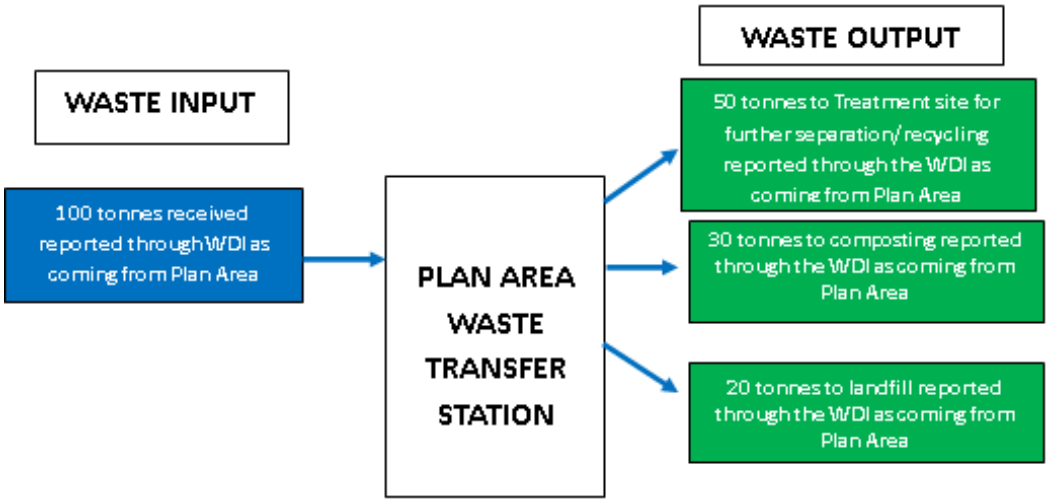



**Figure 1: Schematic of Flows for Waste Transfer Stations Showing Double Counting of Wastes in WDI**

1.23 In reality outputs of any type of intermediate site might be managed through routes that do not report through the WDI once they have left the site, e.g. exported to steel works abroad or delivered directly to reprocessing sites in England (that do not report through WDI) or to sites outside England. While the national method includes estimates for exports and movements to reprocessors, it is not possible to disaggregate this data down to Plan area level. Therefore, the outputs from intermediate sites within Kirklees that received waste from Kirklees in 2023 have been further analysed to determine whether outputs do in fact go to destinations reporting through the WDI i.e. a 'next step' site. This is illustrated in Figure 2 below.

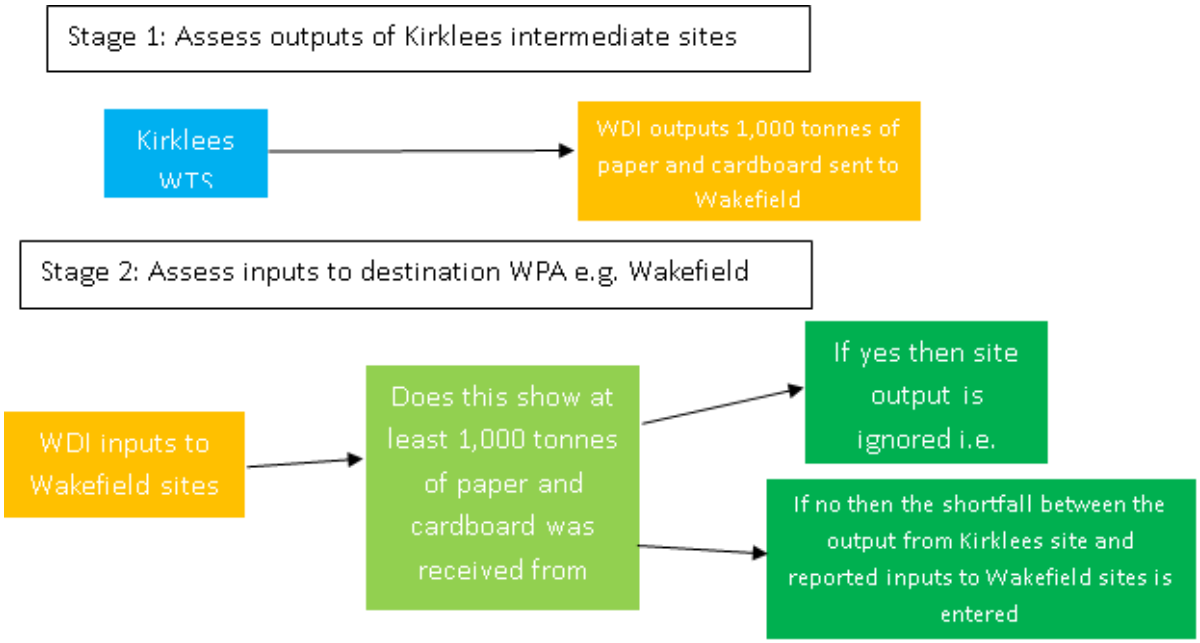



**Figure 2: Schematic of checks conducted for shortfalls in outputs from Kirklees Intermediate sites (confirming if double counting of Kirklees outputs has in fact occurred)**

1.24 This step has been applied to all intermediate sites reporting through the WDI located in Kirklees.

1.25 Firstly, the values for Kirklees C&I waste managed at Kirklees intermediate sites are set to zero in the gross C&I waste value table. Then the following steps are undertaken to identify any 'lost' tonnage:

i) Intermediate sites within Kirklees (classed as WTS[11], MRS and treatment) receiving significant tonnages (>500 tonnes) of C&I waste were identified[12].
ii) Then the principal outputs (>500 tonnes) of these sites were analysed by EWC code, fate and destination WPA.
iii) For each tonnage of output waste, the input data listed in the WDI by receiving WPA, EWC code and fate was cross checked to confirm if a comparable or greater tonnage of that waste type from Kirklees was reported as being received at the same facility type/management route in the destination WPA area specified.
iv) Where a greater or comparable tonnage did not appear as an input to a specific WPA area and facility type/ management route, the difference between any input value and the Kirklees site output value was recorded, on the basis that a shortfall in the WDI entry means the tonnage needs to be counted at the source site e.g. Kirklees WTS, otherwise it will be lost as a false deduction.
v) Where a greater or comparable tonnage did appear as an input, the intermediate Kirklees site input was taken as having been accounted at the 'next step' site and therefore is not counted in this computation, to avoid double counting of this tonnage of waste.

1.26 Where the receiving location has not been coded below regional level a review of entries for destination WPAs within the specified region has been conducted to identify a possible destination. If no WPA within the region is named then it is assumed that none of the waste has been counted as an input to a site within that region, and the tonnage has been added back to the gross C&I waste value table. For waste identified as going 'Outside the UK' it is assumed that this travelled directly from Kirklees and hence wasn't counted at a 'next step' site and therefore, the whole value has been added back. The same applies for waste that travelled to

[11] All the principal waste codes under transfer were reported as arising from Yorks & Humber (uncodeable). Therefore, they were not considered further as this is accounted for in Step 5.
[12] Excluding LACW sites.

Wales because the WDI only relates to England. For waste identified as going to sites located within Kirklees it has not been counted as it would add the risk of double counting. Table 6 presents the outcome of the analysis for each principal waste type (by EWC code) by fate and named destination (WPA). This shows a shortfall of 3,332 tonnes at Kirklees MRSs and 1,570 tonnes at Kirklees waste treatment sites.

**Table 6: Destinations & Fates of Principal Outputs (500t or more) from Kirklees MRS and Treatment sites taking C&I waste. As a result of Step 4a**

| Site Category | EWC code + description | Waste description | Named destination (WPA) | WDI Crosscheck shortfall |
|---|---|---|---|---|
| **MRS** | 06 13 99 | Wastes not otherwise specified | West Yorkshire | 2,548 |
| **MRS** | 19 12 02 | Ferrous metal | Kingston Upon Hull City | 82 |
| | 19 12 02 | Ferrous metal | Nottingham City | 702 |
| | | | **MRS Total** | **3,332** |
| **Treatment** | 19 10 01 | Iron and steel waste | Oldham | 1,032 |
| **Treatment** | 19 12 04 | Plastic and rubber | Lancashire | 538 |
| | | | **Treatment Total** | **1,570** |

1.27 The above exercise indicates that some of the output waste from Kirklees permitted waste management sites do not appear to be accounted for in 'next step' site returns. Therefore, instead of completely disregarding the inputs to these sites by zeroing the values displayed (on the basis that the tonnages are managed through 'next step' facilities reporting through WDI as per the national method), the shortfall tonnages derived from the above computation exercise have been substituted for the original values shown for waste managed at the corresponding type of Kirklees site. This gives a revised gross C&I waste headline value of c122,000 tonnes as shown in Table 7.

**Table 7: Adjusted C&I Waste Arising from Kirklees**

*Source: Table 5 adjusted for step 4a values - italicised entry adjusted*

| Waste Movement | Incineration | Landfill | Metal Recycling Sites | Transfer | Treatment | Grand Total |
|---|---|---|---|---|---|---|
| **Kirklees to Kirklees** | 10,932 | 0 | 3,332 | 0[13] | 1,570 | **15,835** |
| **Kirklees to elsewhere** | 52,233 | 3,931 | 22,063 | 10,616 | 17,553 | **106,396** |
| **Totals** | **63,165** | **3,931** | **25,395** | **10,616** | **19,123** | **122,230** |

***4b Deduct waste from intermediate facilities coded under 19 12 12 and 19 12 10***

1.28 Outputs from facilities that treat waste prior to its final fate such as Material Recovery Facilities (MRF) and Mechanical Biological Treatment[14] (MBT) plants, for example, was deducted from the national estimates. These outputs are likely to be coded under EWC Chapter 19 (Wastes from Waste Management Facilities). For the purposes of applying this method to Kirklees, it is deducted for intermediate sites.

1.29 The principal stream of concern is wastes coded as refuse derived fuel (RDF) under EWC code 19 12 10 and that resulting from mechanical treatment of waste (coded under EWC 19 12 12). Analysis of the waste removals data in the WDI for intermediate sites within Kirklees indicates that the net output of these waste types in 2023 was 66,908 tonnes. Given that these wastes may arise from the processing of C, D & E waste or C&I waste, the % inputs of C, D & E waste accepted at Kirklees intermediate sites producing these waste types in significant quantities (>500t) has been applied to the net output of 19 12 10 and 19 12 12, with the remainder being taken to have arisen from C&I waste. As these waste types might arise at Kirklees sites from waste originating outside Kirklees, a further step is applied to identify the tonnage that may have only arisen from the incoming Kirklees C&I waste. Hence the tonnage arrived at was allocated by the proportion of inputs accepted at intermediate sites within Kirklees that arose from Kirklees. The computation process is illustrated by Figure 3 and the results are shown in Table 8:

[13] Deductions result in inputs from Kirklees going to Kirklees transfer sites being zero.

[14] No MBT facilities in Kirklees as of Feb 2025.

**Figure 3: Schematic of Intermediate site outputs**

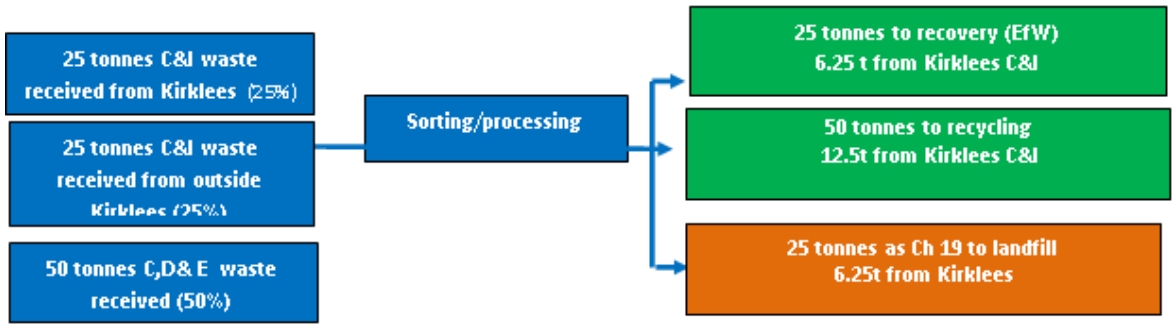



**Table 8: Net output of 19 12 12 + 19 12 10 attributed to Kirklees C&I waste to deduct[15]**

| Site Category | Net output of 19 12 10 and 19 12 12 | % CDE inputs | 19 12 10 + 19 12 12 attributed to CDE | 19 12 10 + 19 12 12 attributed to C&I | % inputs from Kirklees | Kirklees C&I 19 12 10 + 19 12 12 |
|---|---|---|---|---|---|---|
| Transfer | 60,892[16] | <1% | 300 | 60,592 | 0[17] | 60,595 |
| Treatment | 6,016 | 33% | 1,980 | 4,036 | 36% | 1,471 |
| **Total** | - | - | - | - | - | **62,062** |

1.30 The result of this calculation is 62,062 tonnes of 19 12 12 and 19 12 10 output attributed to Kirklees as C&I waste. As this waste goes on for further management at a next step site as Kirklees waste, this value would be deducted from the Kirklees to Kirklees dataline in Table 7 split across transfer and treatment. However, because the transfer value is already zero, only the amount attributed to treatment sites in Kirklees has actually been deducted, bringing the total running baseline arising value to c121,000 tonnes as shown in Table 9.

[15] Final values computed may not precisely correspond to the values computed using percentages in the Table (due to rounding). Refer to paragraph 2.8.

[16] RDF from Dewsbury Transfer Station. As advised by Kirklees Council, inputs into this site may reduce due to the recently permitted Veolia site in Birstall.

[17] All inputs to the transfer site were not attributed below the source region, in this case 'uncodeable below Yorkshire and Humber Region'. All of the outputs of 19 12 10 and 19 12 12 attributed to C&I waste inputs have been attributed to Kirklees on a precautionary basis.

**Table 9: Adjusted C&I Waste Arising from Kirklees**

*Source: Table 7 minus 4b values - italicised entry adjusted*

| Waste Movement | Incineration | Landfill | Metal Recycling Sites | Transfer | Treatment | Grand Total |
|---|---|---|---|---|---|---|
| **Kirklees to Kirklees** | 10,932 | 0 | 3,332 | *0*[18] | *100* | **14,364** |
| **Kirklees to elsewhere** | 52,233 | 3,931 | 22,063 | 10,616 | 17,553 | **106,396** |
| **Totals** | **63,165** | **3,931** | **25,395** | **10,616** | **17,653** | **120,760** |

**Additions**

***Step 5: Accounting for waste recorded to Yorkshire and Humber only***

1.31 Data quality of the WDI relies on operators of permitted sites reporting inputs down to origin WPA level. A number of permitted sites in Kirklees do not report inputs to that level, preferring to report at regional level only e.g. 'Yorkshire and Humber uncodeable'. This means that a significant tonnage of waste is not attributed to a specific WPA which may include Kirklees.

**Table 10: Kirklees sites receiving 500 tonnes or more of C&I Type Waste not attributed below region**

| Site Category | Site | Operator | Total Unattributed | % input reported as coming from Kirklees | % unattributed represents of total input |
|---|---|---|---|---|---|
| **Incineration** | Kirklees EfW | Suez Recycling & Recovery Kirklees Ltd | 1,629 | 96% | 1,572 |
| **Transfer** | West End Mills | C & J Blackburn | 14,995 | 0[19] | 14,995 |
| **Transfer** | Dewsbury Transfer Station | Biffa GS (M & B) Ltd | 65,663 | 0[20] | 65,663 |
| | | | | **Grand Total** | **82,230** |

[18] See Footnote 13.

[19] All inputs to transfer sites not attributed below origin region, i.e. 'uncodeable below Yorkshire and Humber Region'.

[20] See footnote 19.

1.32 The WDI 2023 indicates 3 permitted sites in Kirklees received >500 tonnes of Yorkshire and Humber uncodeable waste.

1.33 The percentage inputs reported from Kirklees itself have been applied to the unattributed waste as shown in Table 10 below. This is on the basis that if some waste from Kirklees is shown to travel to the site, then more waste from Kirklees may travel there, and has simply not been correctly attributed down to WPA level. For two of the three sites, no inputs are attributed below regional level and in the absence of any further evidence the total (uncoded) input to both has been attributed to Kirklees, on a precautionary basis.

1.34 This results in c82,000 tonnes of uncodeable C&I waste being attributed to Kirklees, which is added back to the 'Kirklees to Kirklees' dataline by the facility type, incineration or transfer as shown in Table 11.

**Table 11: Adjusted C&I Waste Arising from Kirklees**

*Source: Table 9 plus uncodeable waste*

| Waste Movement | Incineration | Landfill | Metal Recycling Sites | Transfer | Treatment | Grand Total |
|---|---|---|---|---|---|---|
| **Kirklees to Kirklees** | 12,504 | 0 | 3,332 | 80,658 | 100 | **96,594** |
| **Kirklees to elsewhere** | 52,233 | 3,931 | 22,063 | 10,616 | 17,553 | **106,396** |
| **Totals** | **64,737** | **3,931** | **25,395** | **91,274** | **17,653** | **202,989** |

1.35 This results in a final Kirklees C&I waste baseline arising estimate in 2023 of c203,000 tonnes.

## Triangulating baseline arisings estimates

1.36 To ensure that the baseline value for Kirklees C&I waste arising arrived at for 2023 was not anomalous, baseline values for 2021 and 2022 were also generated replicating the methodology set out above. The resulting values are shown in Table 12 below.

**Table 12: Kirklees C&I Waste arisings 2021, 2022 & 2023 from WDI**

| Year | 2021 | 2022 | 2023 |
|---|---|---|---|
| **C&I waste arisings** | 236,235[21] | 213,301[22] | 202,989 |

1.37 Table 12 indicates that C&I waste arisings in Kirklees have decreased over the 3-year period but that all values are within 10% difference. To ensure the baseline value used is robust, a mean value has been taken across three years, upon which the forecasts in the next section have been based. This amounts to c217,500 tonnes.

## Comparison with previous baseline arisings estimates

1.38 The C&I waste baseline arising value of c217,500 tonnes compares with the WNA 2016 value of c362,500 tonnes in 2014. However, these values are not directly comparable given the different methods applied to generate them. The value generated for 2023 through the method above is considered more robust.

[21] Includes inputs to sites that report all inputs as uncodeable below Yorks and Humber region: c17,500 tonnes at West End Mills, c68,500 tonnes at Dewsbury Transfer Station and c24,500 at Arthur Brook.

[22] Includes inputs to sites that report all inputs as uncodeable below Yorks and Humber region: c14,000 tonnes at West End Mills and c70,500 tonnes at Dewsbury Transfer Station.

# Forecasting Future C&I Waste Growth

## Context

1.39 The nPPG states when looking to forecast C&I waste:

*"Waste planning authorities can prepare growth profiles, similar to municipal waste, to forecast future commercial and industrial waste arisings. In doing so, however, they should;*

*i) set out clear assumptions on which they make their forecast, and if necessary, forecast on the basis of different assumptions to provide a range of waste to be managed;*

*ii) be clear on rate of growth in arisings being assumed. Waste planning authorities should assume a certain level of growth in waste arisings unless there is clear evidence to demonstrate otherwise."*

*Paragraph: 032 Reference ID: 28-032-20141016 Revision date: 16 10 2014*

Hence the nPPG anticipates the application of a positive growth rate.

1.40 The WNA 2016 applied 3 scenarios using the following growth factors to 2031:

- No growth.
- +0.55% per annum based on economic growth projections.
- +0.87% per annum based on economic growth projections.

## Updating the Plan Forecast

1.41 Comparison of the Kirklees C&I waste arising values obtained for 2021, 2022 and 2023 suggests the growth rates in Table 13 below.

1.42 Table 13 indicates that C&I waste arisings in Kirklees decreased over the 3-year period by an average of minus 7.27% per annum. This suggests a negative growth rate might be appropriate. However, this would be contrary to the nPPG advice cited previously. Hence other sources have also been considered below.

**Table 13: Comparison of Kirklees C&I Waste arisings 2021, 2022 & 2023 and growth rates**

| Year | 2021 | 2022 | 2023 |
|---|---|---|---|
| **C&I waste arisings** | 236,235 | 213,301 | 202,989 |
| **Implied Growth rate p.a.** | | -9.71% | -4.83% |
| **Average growth rate p.a** | | | **-7.27%** |

## DEFRA Analysis of Future C&I Waste Growth

1.43 Defra commissioned a Future Waste Arisings report in 2020[23] published in 2021. This includes the most current national growth forecast for the C&I waste stream in England. The method used to produce a forecasting model for C&I waste included development of a time-series forecast for gross value added (GVA) for the commercial sector and separately for the industrial sector, which was then used to generate C&I waste arisings forecasts. The forecasts also incorporate the impact of growth in the number of businesses nationally on C&I waste arisings by combining data on waste generated per business size and sector and adjusting the GVA to waste ratios using the growth in the number of businesses in each sector by size respectively. Two forecasts were modelled for England from 2019 to 2050: one for commercial waste arisings (refer to Figure 4) and the other for industrial waste arisings (refer to Figure 5). The resultant graphs are reproduced as Figures 4 and 5 respectively.

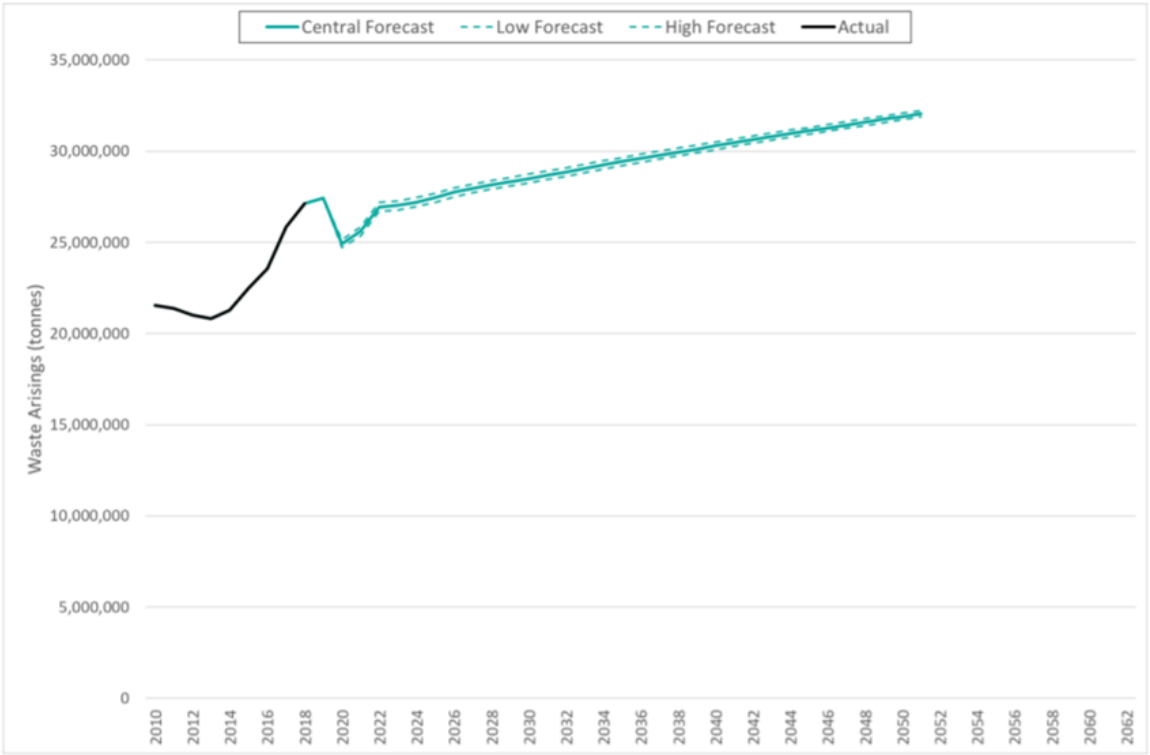



**Figure 4: Commercial Waste Arisings Forecasts for England (2019-2050)**

*Source: Future Waste Arisings, produced for DEFRA (2021)*

[23] '*Future Waste Arisings* DEFRA, April 2021.

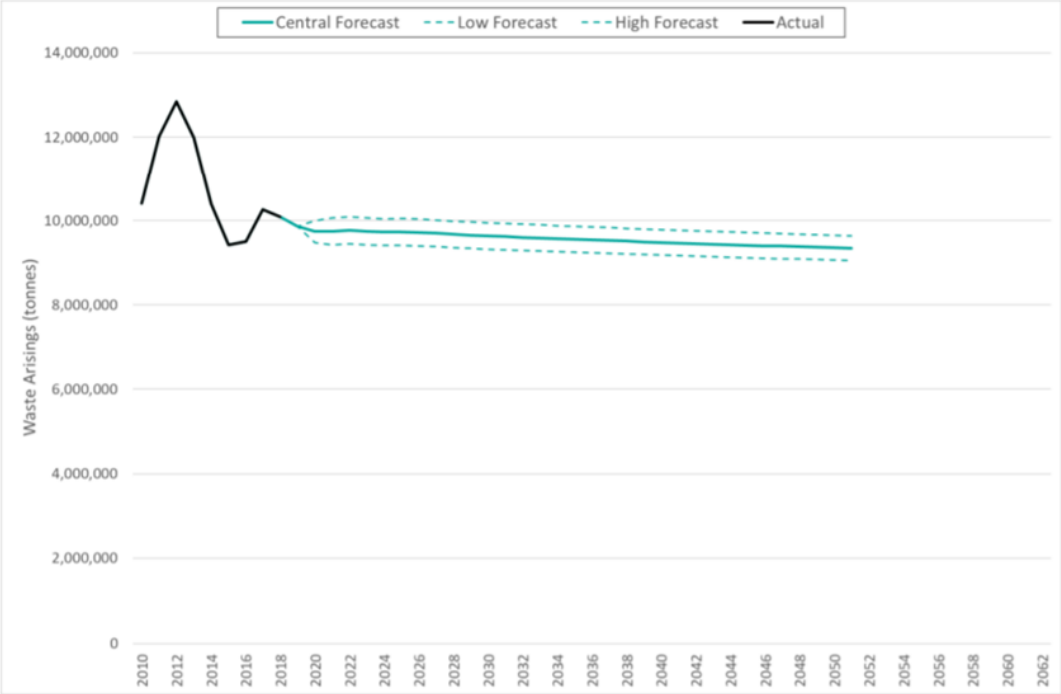



**Figure 5: Industrial Waste Arisings Forecasts for England (2019-2050)**

*Source: Future Waste Arisings, produced for DEFRA (2021)*

1.44 Figures 4 and 5 present central, low and high forecast waste arisings for the commercial and industrial sectors respectively albeit within a narrow range. Commercial waste arisings are projected to increase steadily from 2022 to 2050, whilst industrial waste arisings are projected to progressively fall from 2022 to 2050.

1.45 To assess how the national forecasts may be taken into account when forecasting Kirklees C&I waste arisings, data points have been extracted for the 2023-2043 period as that is the period which this WNA covers. For the purpose of this exercise, the national central forecast values were used. See Appendix 1 for how the growth rates were ascertained using national central forecast values.

1.46 The average annual growth rate generated in the period 2023 to 2042 was +0.70% per annum for commercial waste and -0.18% per annum for industrial waste respectively. These can now be weighted according to the percentage contribution waste from commercial sources and that from industrial sources make to the overall baseline arising value for Kirklees.

1.47 In the Kirklees WNA 2016 the C&I waste 2014 arisings value was split, with commercial waste and industrial waste each taken to account for virtually half of

total C&I waste arisings.[24] In the absence of any more recent data, this split has been applied to the national growth factors to generate a combined C&I waste growth rate as follows:

Commercial waste represents 49.9% of C&I waste arisings: 49.9% of +0.70% = +0.35%
Industrial waste represents 50.1% of C&I waste arisings: 50.1% of -0.18% = -0.07%

**0.70% + -0.07% = +0.26%**

## Generating a Forecast for C&I Waste

1.48 The method set out in the nPPG to generate WPA area C&I waste forecasts proposes that a growth profile be based on different assumptions to produce a range of values. Therefore, as per the discussion above, the following set of growth factors

[24] Table 6: Management Routes for Commercial and Industrial Waste Kirklees *WNA 2016*

have been applied to the mean 2021-2023 baseline arisings value of c217,500 tonnes extrapolated to 2043 to create a cone of possibilities plotted in Figure 6 below:

(1) Previous WNA growth factors based on projected economic growth of +0.55% per annum and +0.87%;
(2) Recent C&I waste arisings growth factor of minus 7.27% per annum; and
(3) Combined DEFRA National Forecast of +0.26% per annum.

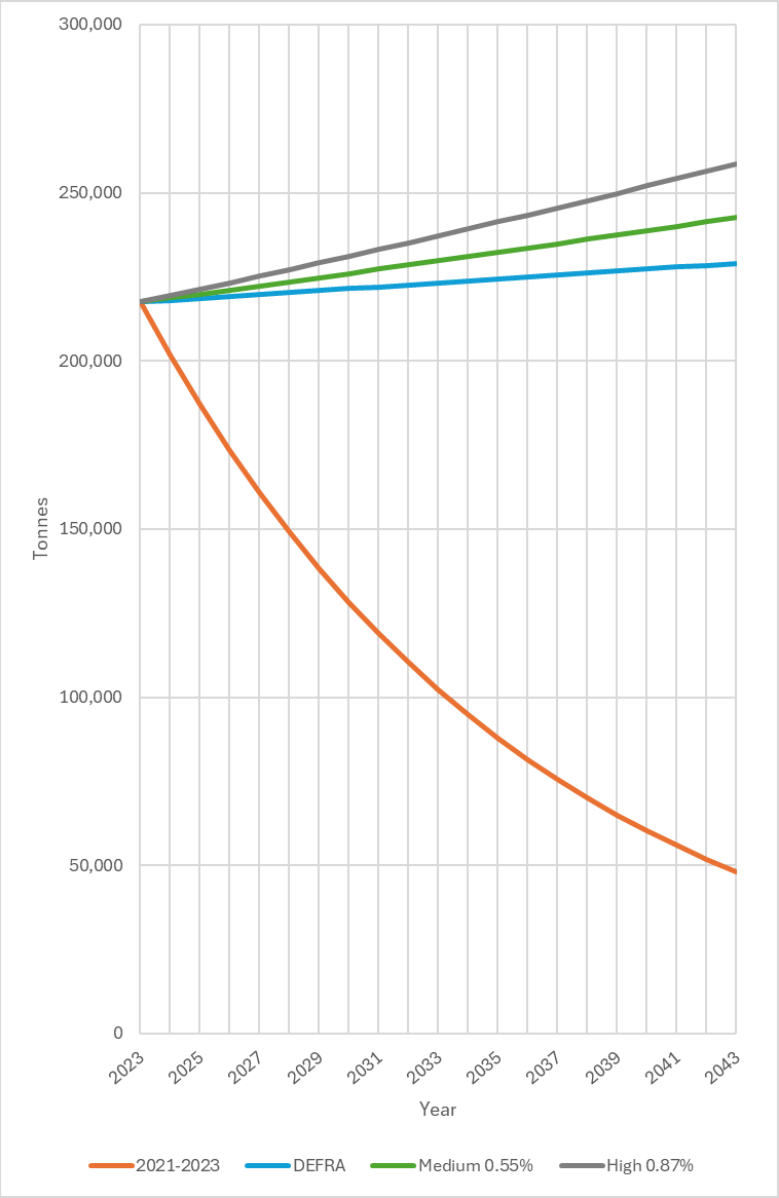



**Figure 8: Kirklees C&I Waste Arisings Forecast Scenarios**

1.49 It is clear from Figure 6 that the recent decline seen between 2021 and 2023 is an outlier compared to the other growth forecasts. On this basis it is recommended that the previous WNA forecast of 0.55% (green line) that falls between the DEFRA and

previous WNA +0.87% forecast be taken forward for planning purposes as it allows for modest growth as per nPPG advice and confers flexibility in the Plan.

1.50 The forecast C&I waste arisings by Plan milestone are shown in Table 14 below.

**Table 14: C&I waste forecast for Kirklees applying growth factor of +0.55% p.a. to mean baseline**

| Year | *2023* | 2028 | 2033 | 2038 | 2043 |
|---|---|---|---|---|---|
| **Tonnes** | *217,509* | 223,556 | 229,772 | 236,161 | 242,727 |

1.51 Table 14 shows that C&I waste arisings would increase by c25,000 tonnes or c11.6%% to c242,500 tonnes over the Plan period.

## Forecast Conclusion

1.52 It is suggested that the previous WNA 2016 forecast for C&I waste arisings in Kirklees using the lower scenario remains a robust forecast. Applying the previous WNA waste growth rate of +0.55% to the updated baseline arising mean value projects Kirklees C&I waste arisings in 2043 to be c242,500 tonnes.

# Projected Management Requirements

1.53 Determination of how C&I waste produced in Kirklees might be managed requires assessment of how this waste is currently managed and then projecting how any future Plan intends the waste to be managed through exerting influence on the types of management capacity developed during the Plan period.

## Baseline Profile

1.54 The management profile presented in Table 15 below is based on the management data available through the WDI 2023. Since the WDI does not have an exclusive 'recycling' category it is not possible to establish how much of the waste managed goes on for recycling. The principal management methods are those that would represent a final fate reported in the WDI as follows:

(1) Composting and AD
(2) Landfill
(3) EfW and Recovery to Land (together combined as 'other' recovery)

### Composting and AD

1.55 No C&I waste from Kirklees was reported as being sent to composting and only 155 tonnes was sent to AD (at Clayton Hall) in 2023.

### Landfill

1.56 As shown in Table 15, in 2023, it was estimated that c4,000 tonnes of C&I waste arising in Kirklees was sent to landfill[25].

### 'Other' Recovery

1.57 As shown in Table 15, in 2023, it was estimated that c65,000 tonnes of C&I waste arising in Kirklees was recovered.

### Recycling

1.58 The difference between the sum of the tonnages for the above categories and the baseline value has been taken to represent the tonnage that went on for recycling via permitted facilities. In 2023 this amounted to c134,500 tonnes as shown in Table 15 below.

[25] Potentially wastes being diverted from EfW plant during times when it is closed plus 681 tonnes of trommel fines.

**Table 15: Computed Kirklees C&I Waste Management Profile 2023**

| Route | Tonnes | % |
|---|---|---|
| Total Arisings | 202,989 | |
| Landfill | 3,931 | 2% |
| 'Other' Recovery | 64,737 | 32% |
| Composting | 155 | 66% |
| *Recycling & Reuse (remainder)* | 134,167 | |

# Management Targets for Future C&I Waste Arisings

## Targets in the adopted Kirklees Local Plan

1.59 Policy LP43 *Waste management hierarchy* does not set out any specific management targets but instead includes reference to "*working towards achieving the objectives and targets for recycling/recovery for waste as set out in the Waste Framework Directive;*". The supporting WNA 2016 cited as evidence includes a number of scenarios including a maximised recycling and recovery scenario. The targets from which are shown in Table 16.

**Table 16: Kirklees Commercial and Industrial Waste Targets in 2031**

*Source: Kirklees WNA 2016*

| Waste Type | Commercial | Industrial |
|---|---|---|
| **Recycled and/or composted** | 80% | 85% |
| **EfW** | 6% | - |
| **Other treatment** | 4% | - |
| **Landfill** | 10% | 12% |
| **Land recovery** | - | 3% |

## Key Policy Targets for Waste Management

1.60 There are no national policy targets addressing the management of C&I waste in totality alone. However, a number of policy targets concerning the management, and prevention, of waste have been adopted by Government, which are relevant when considering future need for management capacity for C&I waste. These are summarised below:

i) A stated intention to achieve the virtual elimination of biodegradable waste going to landfill from 2028 (regardless of origin);
ii) adoption of municipal waste recycling targets for 2025, 2030 and 2035;
iii) adoption of a residual waste reduction target such that it does not exceed 287 kg per capita per year [from 2019 levels] by 31 December 2042;

supported by the following interim targets to be achieved by 31 January 2028:

iv) Reduce residual waste produced per person by 24%.
v) Reduce residual waste in total tonnes by 21%.
vi) Reduce municipal residual waste produced per person by 29%.

plus adoption of a long-term target for the virtual elimination of avoidable waste by 2050.

1.61 The residual waste reduction targets are expected to be achieved through a combination of increased recycling rates and waste prevention measures. Government modelling has shown recycling rates may need to reach 75% by 2042. This is expected to be achieved by the introduction of Extended Producer Responsibility initiatives including a deposit return scheme relating to packaging waste, and the adoption of a more consistent approach to recycling involving the statutory requirement for the separate collection of at least five materials: glass; metals; plastics; paper; and, food waste, from all households and business premises by 31 March 2025 for businesses (other than micro) and material type.

## National Municipal Waste Management Targets

1.62 As explained previously (paragraph 2.3) municipal waste is LACW plus waste of a similar nature and it has been estimated that up to 60% of commercial waste could

fall within that definition[26]. As commercial waste is estimated to contribute c50% of Kirklees total C&I waste arisings, applying 60% to 50% of the total C&I waste arisings gives a value for non-household municipal waste arising in Kirklees of c73,000 tonnes.

1.63 As set out above the UK government has committed[27] to meet the following targets for the management of municipal waste in England:

i) 55% recycling floor by 2025; and
ii) 60% recycling floor by 2030; and
iii) 65% recycling floor by 2035; plus
iv) 10% ceiling limit on landfilling by 2035.

1.64 The Kirklees C&I waste management profile arrived at for 2023 set out in Table 14 indicates that 66% of total C&I waste was recycled, which is greater than the 65% recycling target for municipal waste by 2035.

1.65 Furthermore, given the Environment Act target for a reduction of residual waste of 50% per head by 2042, going beyond the current recycling target may be necessary. Based on this, the targets for C&I waste in Table 17 below are proposed.

**Table 17: Proposed Targets for C&I Waste Management in Kirklees**

| Targets | *Actual* | Target | Target | Target | Target |
|---|---|---|---|---|---|
| **Year** | ***2023*** | **2028** | **2033** | **2038** | **2043** |
| **Recycling/composting** | *66%* | 70% | 75% | 80% | 80% |
| **Landfill diversion** | *2%* | 2% | 1% | 1% | 1% |
| **Remainder to Other Recovery inc Recovery to Land** | *32%* | 28% | 24% | 19% | 19% |

## Projected Management Requirement for Kirklees C&I Waste

1.66 Applying the proposed target values in Table 17 to the C&I waste forecast shown in Table 14 gives the management requirements displayed in Table 18 below.

[26] See footnote 1.

[27] Circular Economy Package Policy Statement

**Table 18: C&I Waste Management Requirements**

| Year | 2028 | 2033 | 2038 | 2043 | Plan Period Peak/Cumulative Capacity Requirement |
|---|---|---|---|---|---|
| **Recycling** Target (Floor) | 156,489 | 172,329 | 188,929 | 194,182 | 194,182 (peak) |
| **Landfill Diversion** Target (Ceiling) | 4,471 | 2,298 | 2,362 | 2,427 | 56,757 (cumulative) |
| **Remainder to Other Recovery inc Recovery to Land** | 62,596 | 55,145 | 44,871 | 46,118 | 62,596 (peak) |

1.67 Table 18 shows Kirklees recycling capacity for C&I waste will need to be capable of managing c194,000 tonnes per annum of waste by the end of the Plan period for the proposed target/floor to be met if applied across the board (not just limited to the fraction of C&I waste classed as municipal waste).

1.68 The application of the proposed targets is forecast to result in a declining need for non-inert landfill with a cumulative non-inert landfill requirement of c57,000 tonnes over the Plan period as shown in Table 19 below.

**Table 19: Projected Residual C&I Waste Non Haz Landfill Requirement (tonnes)**

| Year | Tpa | Tonnes Cumulative |
|---|---|---|
| 2025 | 4,147 | 4,147 |
| 2026 | 4,255 | 8,402 |
| 2027 | 4,363 | 12,765 |
| 2028 | 4,471 | 17,236 |
| 2029 | 4,036 | 21,272 |
| 2030 | 3,602 | 24,874 |
| 2031 | 3,167 | 28,041 |
| 2032 | 2,732 | 30,774 |
| 2033 | 2,298 | 33,071 |
| 2034 | 2,310 | 35,382 |
| 2035 | 2,323 | 37,705 |
| 2036 | 2,336 | 40,041 |
| 2037 | 2,349 | 42,390 |
| 2038 | 2,362 | 44,752 |
| 2039 | 2,375 | 47,126 |
| 2040 | 2,388 | 49,514 |
| 2041 | 2,401 | 51,915 |
| 2042 | 2,414 | 54,329 |
| 2043 | 2,427 | **56,757** |

# Appendix 1: Data from National forecast and annual growth rates

| Year | Commercial | Growth rate | Industrial | Growth rate |
|---|---|---|---|---|
| **2023** | 26,958,247 | | 9,839,286 | |
| **2024** | 27,031,316 | 0.27% | 9,821,429 | -0.18% |
| **2025** | 27,333,535 | 1.12% | 9785714.5 | -0.36% |
| **2026** | 27,635,753 | 1.11% | 9,750,000 | -0.36% |
| **2027** | 27,836,276 | 0.73% | 9,732,143 | -0.18% |
| **2028** | 28,036,798 | 0.72% | 9,714,286 | -0.18% |
| **2029** | 28,237,181 | 0.71% | 9,678,572 | -0.37% |
| **2030** | 28,437,563 | 0.71% | 9,642,857 | -0.37% |
| **2031** | 28,612,329 | 0.61% | 9,625,000 | -0.19% |
| **2032** | 28,787,095 | 0.61% | 9,607,143 | -0.19% |
| **2033** | 28,987,338 | 0.70% | 9,589,286 | -0.19% |
| **2034** | 29,187,580 | 0.69% | 9,571,429 | -0.19% |
| **2035** | 29,388,032 | 0.69% | 9,553,572 | -0.19% |
| **2036** | 29,588,484 | 0.68% | 9,535,714 | -0.19% |
| **2037** | 29,772,503 | 0.62% | 9,517,857 | -0.19% |
| **2038** | 29,956,522 | 0.62% | 9,500,000 | -0.19% |
| **2039** | 30,167,392 | 0.70% | 9,482,143 | -0.19% |
| **2040** | 30,378,261 | 0.70% | 9,464,286 | -0.19% |
| **2041** | 30,583,958 | 0.68% | 9,455,768 | -0.18% |
| **2042** | 30,789,655 | 0.67% | 9,447,250 | -0.18% |
| **2043** | 30,996,735 | 0.67% | 9,430,245 | -0.18% |
| **Average growth rate p.a.** | | **+0.70%** | | **-0.18%** |