Essex County Council & Southend on Sea Council

Waste Needs Assessment Update

Updated Baseline for Commercial & Industrial Waste Generated in Essex & Southend on Sea

Report: Final Issue

Version 1.2

Issued: 04 May 2018

BPP Consulting Document Control

Project: Essex & SoS Waste Needs Assessment Update 2016

Report: Baseline for Commercial & Industrial Waste Generated in Essex & SoS

Version Description: Final Issue

Version No: 1.2

Date: 04.05.18

Version No.	Version Description	Author	Date	Reviewed	Date
0.1	Draft for Internal review	Alan Potter (BPP Partner)	12.03.18	Matt Todd (Peer Reviewer)	09.04.18
1.0	Draft for Client review	Alan Potter (BPP Partner)	09.04.18	Claire Tomalin (Client Contact)	11.04.18
1.1	Final Issue for Client sign off	Alan Potter (BPP Partner)	02.05.18	Claire Tomalin (Client Contact)	04.05.18
1.2	Final Issue	Alan Potter (BPP Partner)	04.05.18		

Table of Contents

Table of Tables

Abbreviations and Glossary

Abbreviations

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
WDF	WasteDataFlow
WDI	Waste Data Interrogator
WTS	Waste Transfer Station

Glossary of Terms

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.
Biodegradable waste	Waste that can break down over time due to natural biological action/processes, such as food, garden waste and paper.
Commercial Waste	Waste arising from premises which are used wholly or mainly for trade, business, sport, recreation or entertainment, excluding municipal and industrial waste.
Controlled Waste	Waste subject to controls emanating from the EU Waste Framework Directive.
Construction, Demolition & Excavation Waste	Waste arising from the construction and demolition activities, including excavation during construction, maintenance and repair activities. It mainly consists of inert materials such as soils and hardcore with some non inert materials.
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 advice.
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.
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.
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.
Leachate (associated with landfill)	Effluent arising from the breaking down of degradable waste in landfill when liquid (normally rainwater) is introduced. Normally carries pollutants from decomposing waste requiring special collection and treatment.
Local Authority Collected Waste	All waste collected by 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. LACW is the definition used in statistical publications, which previously referred to municipal waste.
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 largely extracted from the ore. Management subject to control through the EU Directive 2006/21/EC.
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.
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.

1 Estimating C&I Waste Baseline Arisings

1.1 Introduction

This section of the report supports is concerned with estimating current arisings for Commercial and Industrial (C&I) Waste in Essex and Southend on Sea (hereafter referred to as "the Plan Area"). From this the contribution that this source of waste may make to future arisings of both Non-Organic Non-Hazardous waste (aka residual waste) arisings and Organic Non-Hazardous waste arisings can be assessed and any forecast capacity gap updated as necessary.

National Planning Practice Guidance chapter on waste states that: "Planned provision of new capacity and its spatial distribution should be based on robust analysis of best available data." (emphasis added) (Para 035). Therefore, this exercise involves a robust analysis to utilise what is considered to be the "best available data" relating to C&I waste.

1.2 Context

The replacement Waste Local Plan (rWLP) adopted in July 2017 defines C&I waste as follows:

"Waste from shops, industrial and business premises; this covers a wide range of waste types from waste food to waste packaging... (para 4.8)"

Two different approaches can be taken to estimate a baseline for C&I waste as follows:

- 'Point of production' using data based on the profile of businesses within an area and the application of waste production factors (related to the different business profiles). This method was used in the Defra national survey undertaken in 2009 that informed the previous approach to national estimates.[1]
- Point of management' using data related to C&I waste managed. This relies on records of waste delivered to, and removed from, permitted waste facilities. The Environment Agency (EA) collates this data submitted by operators in its 'Waste Data Interrogator' (WDI) on an annual (calendar year) basis. This data is supplemented by data for wastes managed at permitted sites that do not report through the WDI. This approach is now used to estimate C&I waste arisings at national level and is referred to as the 'Reconcile' method.[2]

The Waste Needs Assessment[3] that supported the formulation of the adopted Plan applied a value extrapolated by a previous version of the Capacity Gap analysis based on the 'point of production' method. This generated a total baseline estimate value of around 1.153m tonnes of C&I waste arising in the Plan Area for 2013 and forecast to increase to 1.21mt at 2016. However, now that local baseline estimates applying the Reconcile method have been subject to examination and preferred over the point of production approach[4], this update has adopted the 'point of management' method.

[1] Commercial and Industrial Waste Survey 2009: Final Report, Defra May 2011.

[2] DEFRA 2014, New Methodology to Estimate Waste Generation by the Commercial and Industrial Sector in England

[3] Topic Paper 1 Waste Capacity Gap Update Version 1.1. December 2015 BPP Consulting

[4] See Oxfordshire Minerals & Waste Core Strategy adopted September 2017

1.3 Methodology

The methodology used to generate this updated baseline C&I waste arisings value (to be used as a starting point for forecasting C&I waste arisings) is based on the national 'Reconcile' methodology, adapted to reflect local circumstances[5]. This methodology considers a number of datasets, in totality, to capture quantities of commercial and industrial waste that are managed rather than produced, through:

(1) Permitted waste management facilities (reporting through Environment Agency Waste Data Interrogator & where relevant data available for waste sent to Energy from Waste plants[6]);

(2) exempt facilities (extrapolating from the register of facilities exempt from the need for an Environmental Permit); and,

(3) taking into account the quantity sent directly for export, in this case outside the Plan area.

Deductions are made to eliminate:

(4) Waste streams covered elsewhere in the WNA such as Agricultural, Mining, Construction, Demolition & Excavation Waste (C, D & E), wastewater and hazardous waste included in the datasets; and

(5) Local authority collected waste managed through WDI reporting facilities (as reported through WasteDataFlow[7]).

(6) Waste managed through HWRCs.

Computations are also carried out to avoid double counting of waste inputs to 'intermediate' facilities[8] within the Plan area.

The Reconcile method has been subject to amendment recently with the omission of exempt site count on the basis that materials managed through these sites will emerge at a permitted site at some point in the management chain. Therefore this category of sites has been omitted from the updated methodology applied.

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

6 Provided on request from the Environment Agency

7 http://www.wastedataflow.org/

8 Intermediate facilities at which waste received does not meet its ultimate (or final) fate. That is, 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

1.3.1 Inputs to permitted facilities

Step 1: Make deductions in waste recorded in the Waste Data Interrogator as arising from the Plan Area to eliminate non C&I waste streams.

The starting point is to download all data relating to waste arising from the Plan area in the Environment Agency Waste Data Interrogator. This is displayed by management route in Table 1 below. This shows that the total quantity of waste arising from the Plan area managed through permitted sites reporting through the WDI for 2016 stood at 6.66 million tonnes.

Table 1: Waste Arising from the Plan Area (tonnes)
Source WDI 2016

	Landfill	Metal Recycling Sites	Transfer	Treatment	Recovery to Land	Grand Total
Plan area arisings managed at Plan area sites	1,417,723	193,987	1,192,053	1,373,082	157,158	**4,334,003**
Plan area arisings managed at sites outside Plan area	317,389	137,621	550,420	1,252,668	70,844	**2,328,942**
Totals	**1,735,112**	**331,608**	**1,742,473**	**2,625,750**	**228,002**	**6,662,945**

Waste identified under waste codes considered to represent C, D & E Waste (EWC Chapter 17 plus EWC 19 12 09 & 20 02 02) and therefore accounted for in the separate estimates of C, D & E waste need to be deducted from the totals in Table 1. The quantities remaining after this deduction are displayed by management route in Table 2 below and this shows that the quantity of waste arising is reduced to just over 3.55 million tonnes. The reduction is 3.1 million tonnes.

Table 2: Waste Arising from the Plan Area minus C, D & E Waste inc haz (tonnes).
Source: Table 1 and WDI 2016

	Landfill	Metal Recycling Sites	Transfer	Treatment	Recovery to Land	Grand Total
Plan area arisings managed at Plan area sites	280,565	91,132	774,929	856,177	0	**2,002,803**
Plan area arisings managed at sites outside Plan area	112,793	109,350	388,162	940,657	2,351	**1,553,313**
Totals	**393,358**	**200,482**	**1,163,091**	**1,796,834**	**2,351**	**3,556,116**

Waste identified under waste codes considered to represent Agricultural Waste (EWC Chapter 02 01), mining (EWC Chapter 01) and hazardous waste from sources other than CDEW (All codes with *) are accounted for separately and so are also deducted. The tonnages remaining after this deduction are displayed by management route in Table 3 which shows that the quantity of waste arising is reduced to just under 3.5 million tonnes.

Table 3: Waste Arising from the Plan area minus C, D & E Waste, agricultural, mining & hazardous waste (tonnes).

Source: Table 2 and WDI 2016.

	Landfill	Metal Recycling Sites	Transfer	Treatment	Recovery to Land	Grand Total
Plan area arisings managed at Plan area sites	280,081	82,190	763,555	829,611	0	**1,955,437**
Plan area arisings managed at sites outside Plan area	105,708	99,103	379,442	918,051	2,351	**1,504,655**
Totals	**385,789**	**181,293**	**1,142,997**	**1,747,662**	**2,351**	**3,460,092**

Step 2: Make deduction for specific wastes accounted for separately (rather than complete streams)

Step 2i Remove Landfill Leachate

Landfill leachate was neither counted in the 2009 national C&I Point of Production survey data and is expressly excluded from the national reporting method[9]. Based on this, the value for landfill leachate (all waste classed under EWC Code 19 07 03***)*** from the Plan Area managed at permitted facilities has also been deducted. This is reported as being 51,271 tonnes in total. Of this, 24,731 was received and managed at landfill sites outside the Plan Area and the remainder was managed at treatment sites predominantly within the Plan Area (19,158t).

Step 2ii: Remove the Wastewater component

Since waste water is planned for and managed as a separate waste stream, values for the component classed as sludges from urban waste water (Ch 19 08 05) received at sites in and outside the Plan Area were deducted from the Treatment category: This means subtracting 548,639 tonnes of which 242,792 tonnes were managed at facilities within the Plan Area.

Table 4 shows that deducting these values gives a revised headline value of 2.86m tonnes.

Table 4: Waste Arising from the Plan Area minus C, D & E Waste, agricultural, mining & hazardous waste, leachate and wastewater (tonnes).

Source: Table 3 minus Step 2 values

	Landfill	Metal Recycling Sites	Transfer	Treatment	Recovery to Land	Grand Total
Plan area arisings managed at Plan area sites	280,081	82,190	763,555	567,661	0	1,702,205
Plan area arisings managed at sites outside Plan area	80,977	99,103	379,442	604,822	2,351	1,158,099
Totals	**361,058**	**181,293**	**1,142,997**	1,172,483	**2,351**	2,860,182

[9] See footnote 1 of DEFRA Waste Data Overview May 2011.

1.3.2 Deduct Local Authority Collected Waste

Local Authority Collected Waste (LACW) is not distinguishable from Commercial and Industrial Waste by reference to EWC Codes. It is, however, possible to cross reference data from Wastedataflow (WDF), the online reporting portal for waste collection and disposal authorities. This allows the quantities of waste managed through specific sites to be ascertained. Cross referencing between the sites identified in WDF and the category assigned where that site is listed in the WDI enables attribution to specific routes, as follows:

Table 5: Local Authority Collected Waste Received at Facilities included in WDI Count for Waste Arising from the Plan Area (tonnes).
Source: WasteDataFlow 2016 &WDI 2016

	Landfill	Inert Landfill	Metal Recycling Sites	Treatment				Treatment Subtotal	Transfer
				Anaerobic Digestion & Composting	MBT	Physical	MRF		
Plan Area arisings managed at Plan Area sites	110,117	0	1,172	128,865	274,663	0	0	**403,528**	*300,831*
Plan Area arisings managed at sites outside Plan Area[10]	24	4,270	0	29,743	0	99,534	90,074	**219,351**	86,777

Footnote to Table: The entries shown in italics relate to waste that has been transferred on so include an element of double counting, so the actual tonnage managed is exceeded.

When values displayed in Table 5 are deducted from the values in Table 4 the remaining value is just over 1.73mt as shown in the grand total of Table 6 below. This may be referred to as the 'gross C&I waste arising' value.

Table 6: Gross C&I Waste Arising from the Plan Area (tonnes) .
Source: Table 4 minus Table 5.

	Landfill	Metal Recycling Sites	Transfer	Treatment	Recovery to Land	Grand Total
Plan Area arisings managed at Plan Area sites	169,964	81,018	462,724	164,133	0	**877,839**
Plan Area arisings managed at sites outside Plan Area	76,683	99,103	292,665	385,471	2,351	**856,273**
Totals	**246,647**	**180,121**	**755,389**	**549,604**	**2,351**	**1,734,112**

[10] Inputs of waste to facilities outside England are not reported through the WDI.

Step 3: Make adjustments to account for intermediate sites (inc. waste transfer stations).

Adjustments may be needed to address recording waste at intermediate sites due to:

1. Double counting - the same waste being recorded once as an input from the Plan area to an initial facility in the Plan area, and then again as an input from the Plan area to a further facility (if it goes for onward management) and;
2. 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 source identity gets lost, are not distorting the final C&I waste arisings value.

Step 3a: Deduct movements of waste arising in the Plan Area to transfer stations and metal recycling sites within the Plan Area that may be double counted elsewhere in the WDI:

The national methodology (the 'Reconcile' method) discounts inputs to all types of transfer facility 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 below:

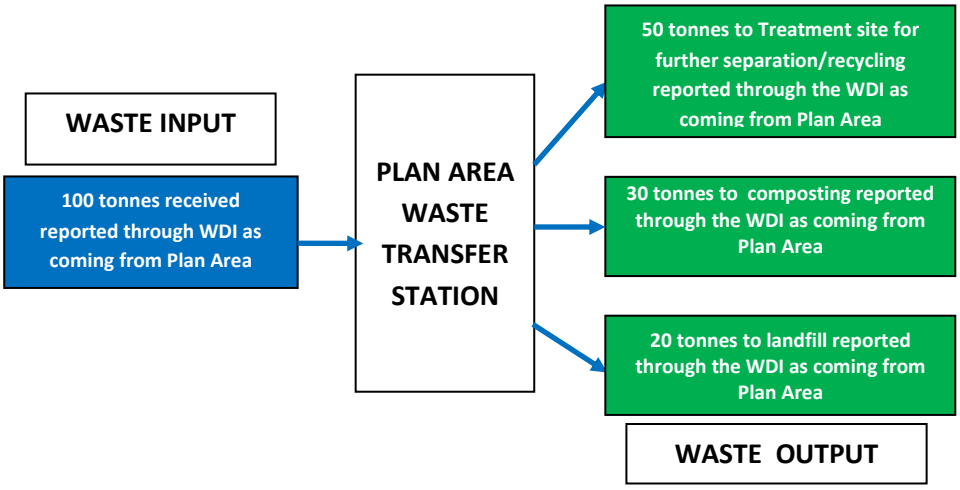

Figure 1: Schematic of Flows for Waste Transfer Stations Showing Double Counting of Wastes in WDI

The same principle might be said to apply to Metal Recycling Sites, where waste input will be transferred on to facilities that convert material to scrap suitable for use in steel works at home or aboard.

However, relatively few sites classed as transfer stations under the Environment Agency permitting classification actually only operate purely as waste transfer stations, i.e. sites at which waste is solely received and bulked up for onward management, and inputs to metal recycling sites may be managed through routes that do not report through the WDI, e.g. exported to steel works abroad or delivered directly to reprocessing sites in 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 to both type of sites within the Plan Area that received waste from the Plan Area in 2016 have been further analysed to determine whether outputs do in fact go to destinations that would otherwise be captured in the WDI or not.

1. The principal sites within the Plan Area classed as Waste Transfer Stations and Metal Recycling Sites receiving significant tonnages of C&I waste were identified.
2. Then the principal outputs of these sites were analysed by EWC code and destination.
3. For each tonnage of output waste, the input data listed in the WDI by receiving WPA and EWC code was cross checked to confirm if a comparable or greater tonnage of that waste type was declared as being received in the destination WPA area.
4. Where a greater or comparable tonnage did not appear as an input, the difference between any input value and the Plan Area site output value was recorded on the basis that where a shortfall in the WDI entry was identified that means the tonnage needs to be counted at the WTS, otherwise it will be lost (unless it appears in another dataset e.g. incineration).
5. Where a greater or comparable tonnage did appear as an input, the WTS and MRS site input was taken as having been accounted at the 'next step' site and therefore was deducted to avoid double counting.

Table 7 presents the outcome of the analysis for each waste type (EWC) and named destination (WPA) in turn. Where the WPA is not codeable below regional level a review of entries for destination WPAs within the specific region has been conducted to identify 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. For waste identified as going outside the UK it is assumed that this travels directly from Essex with the source site counted as the point of exit.

Table 7: Destinations & Fates for Principal Outputs (500t or more) of sites classified as Waste Transfer Stations within the Plan Area identified as taking C&I waste

Source: WDI 2016 .

EWC code	Named Destination (WPA)	WDI Cross check shortfall (tonnes)
080112 waste paint &varnish	WPA not codeable (London)	800
160103 end-of-life tyres	Outside UK	3,224
	WPA not codeable (East of England)	855
191001 iron & steel waste	Outside UK	5,144
191201 paper & cardboard	Essex	7,944
	Outside UK	5,735
	Kent	2,561
191202 ferrous metal	Suffolk	1,470
191204 plastic & rubber	Outside UK	2,198
	Essex	1,492
191205 glass	Outside UK	1,691
	Sheffield	913
191207 wood	Essex	5,855
	Suffolk	2,661
	Northamptonshire	818
191210 combustible waste (refuse derived fuel)	Essex	2,935
	Outside UK	2,042
200102 glass	WPA not codeable (Yorks & Humber)	2,044
200201 biodegradable waste	WPA Not Codeable (South East)	2,017
Total shortfall between output and declared inputs		**52,399**

Table 8: Destinations & Fates for Principal Outputs (500t or more) of sites classified as Metal Recycling Sites within the Plan Area identified as taking C&I waste

EWC code	Named Destination (WPA)	WDI Cross check shortfall (tonnes)
160117 ferrous metal	Essex	10,206
	Suffolk	4,266
160118 non-ferrous metal	Essex	4,220
160106 depolluted end-of-life vehicles,	Suffolk	953
191202 ferrous metal	Suffolk	571
Total Shortfall between output and declared inputs		**20,216**

The above exercise indicates that some of the output waste from Plan Area WTS and MRS do not appear to be accounted for at 'next step' sites, Therefore instead of completely disregarding the inputs to Plan Area MRS and WTS by zeroing the values displayed (on the basis that the tonnages are managed through 'next step' facilities reporting through WDI), the shortfall tonnages derived from the above computation exercise, i.e. 52,901t for WTS & 20,213t for MRS have been inserted instead. This gives a revised gross C&I waste headline value of just over 1.26mt after deductions at this stage in the computational process. This is shown in Table 9 below.

Table 9: Gross C&I Waste Arising from the Plan Area (tonnes)
Source: Table 6 plus Plan Area WTS & MRS Step 3a

	Landfill	Metal Recycling Sites	Transfer	Treatment	Recovery to Land	Grand Total
Plan Area arisings managed at Plan Area sites	169,964	20,216	52,399	164,133	0	**406,712**
Plan Area arisings managed at sites outside Plan Area	76,683	99,103	292,665	385,471	2,351	**856,273**
Totals	**246,647**	**119,319**	**345,064**	**549,604**	**2,351**	**1,262,985**

Step 3b Deduct inputs of C&I waste to Treatment sites whose outputs are managed at 'downstream' permitted sites to avoid double counting

There are also a number of intermediate sites which also need to be assessed to ensure reporting of waste movements to these sites does not result in double counting (see Figure 2 below). As with Transfer Stations these sites may receive both C, D & E waste as well as C&I waste and they may be classed as 'treatment' sites solely because of the processes applied to treat C, D & E waste only, while the mixed C&I waste is simply transferred - with perhaps some minor manual processing removing key recyclable components. This adds a further layer of complexity to the computation as illustrated in Figure 2 below:

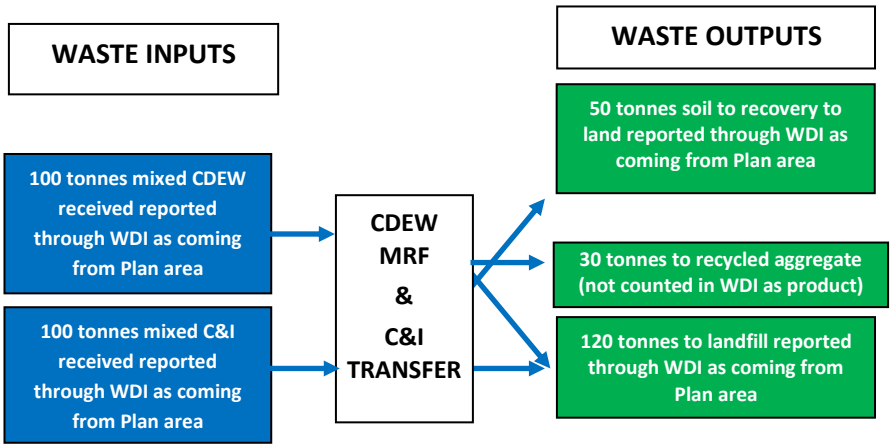

Figure 2: Schematic of Flows for Sites operating CDEW Treatment & C&I Waste Transfer Showing Potential Double Counting of Wastes in WDI

As some of these sites may receive both CDEW, LACW and C&I waste, the LACW and CDEW input element has been deducted. The actual inputs of 'remaining waste' to these sites in the Plan Area in 2016 is shown in Table 10.

Table 10: Quantities of 'Remaining' Waste from the Plan area received at sites classified as Treatment sites within The Plan area receiving 1,000t or more, after deductions.
Source: WDI 2016 & WDF 2016.

Facility Type	Site Name	Operator	Total (tonnes)
Biological Treatment	Basildon Wastewater Treatment Works	Anglian Water Services Ltd	**25,046**
Composting	Ongar Recycling Facility	T J Composting Services Ltd	23,520
	Pitsea Composting Site	Veolia E S Cleanaway (U K) Ltd	1,887
	Stewards Yard	Tree Fella Ltd	1,771
		Total	**27,178**
MRF	E W D Depot, Martell's Quarry	Eastern Waste Disposal Ltd	2,070
	Veolia MRF	P G R Waste Management Ltd	5,386
		Total	**7,456**
Physical Treatment	Greenacre Farm, Canewdon	Greenacre Smallholdings Ltd	**1,401**
Physical-chemical Treatment	Batemans Farm	G & B Finch Ltd	4,518
	Halstead Highway Depot	Ringway Jacobs Ltd	1,166
		Total	**5,684**
Waste Transfer/Treatment	Colchester Skip Hire Ltd	Colchester Skip Hire Ltd	43,010
	Park Farm	Clive Peter Morley	2,599
	Essex Reclamation	Essex Reclamation Ltd	22,928
		Total	**68,537**

Inputs of waste to the types of facility included in the 'Treatment category' shown in Table 9 (column 4) to be considered further. For the sake of clarity, the entry in Table 9 for Treatment in the Plan Area (column 1 line 2) has been sub-divided to reflect the different types of facility that fall under the 'Treatment' category as follows:

- Biological treatment,
- Composting,
- Physical Treatment,
- Physical -Chemical Treatment sites; and
- Waste Transfer/ Treatment.

This breakdown is shown in Table 11:

Table 11: 'Remaining' Waste Arising from the Plan Area managed at Treatment Facilities (showing different types of treatment in the Plan Area).

Source: Table 9& WDI 2016

	Biological Treatment	Composting	MRF	Physical Treatment	Physical-chemical Treatment	Transfer/ treatment	Sub Total
Plan Area to Plan Area	25,046	27,178	7,456	1,401	5,684	68,537	135,302

To determine the quantity of C&I waste from the Plan Area actually managed at each type of facility requires consideration of inputs and outputs to each as below:

1.3.3 Final Treatment Sites

1.3.3.1 Biological treatment sites

Examination of inputs and outputs of waste at the biological treatment site in the Plan Area[11] taking 'remaining waste' arising in the Plan Area shows that the site reported removals of waste at substantially reduced levels to the inputs of waste which is to be expected given that the waste inputs are being subjected to biological treatment which may involve breakdown of waste as well as dealing primarily with liquid waste which means that the bulk of the output will be discharged as a liquid under a consent to either sewer or a watercourse rather than physically removed. Discharges of treated liquid waste are not recorded or reported as outputs through the WDI.

In the case of this type of facility while the possibility of double counting of outputs as inputs to other facilities exists, since the primary management routes of the waste output (sludge or digestate) will either be application to land (for beneficial effect) or to energy from waste (sludge fired power station), neither of which are reported through the WDI, the actual prospect is considered to be minimal. Therefore no deduction has been made to adjust for the prospect of double counting of waste managed at this type of facility.

1.3.3.2 Composting sites

Examination of inputs and outputs of waste at the three sites in the Plan Area reported as taking 'remaining waste' from the Plan Area shows that in all cases, the removals of waste are minimal which is to be expected given that the waste inputs are being converted to compost which is considered to be a product not a waste and so is not required to be recorded and reported through the WDI. The residue from composting will tend to go to landfill so while it does present a possibility of double counting through the WDI, in reality the output arising is insignificant in all cases. Therefore no deduction has been made to adjust for the prospect of double counting of waste managed at this type of facility.

[11] Only inputs to sites in the Plan Area as outputs from sites receiving the Plan Area waste located outside the Plan Area will be recorded as coming from the site's host WPA i.e. somewhere other than the Plan Area.

1.3.4 Intermediate Treatment Sites

Unlike organic waste treatment sites, for which the majority of inputs are converted to product and hence act as a final fate for input waste, intermediate treatment sites generate output materials that do go on for further management. Therefore a different computation is undertaken to balance between recorded C&I inputs and outputs to gain a net C&I value.

1.3.4.1 Plan Area Sites classed as Material Recycling Facilities (MRFs)

Examination of inputs and outputs of remaining waste at the 2 sites classed as Material Recycling Facilities in the Plan Area reported as taking significant quantities (taken as over 1,000 tonnes) of 'remaining' waste from the Plan Area indicates that one, EWD Depot, Martell's Quarry, declared a minor amount as output as non CDEW/ hazardous waste and therefore the input value obtained requires no adjustment. The Veolia MRF declared output of 5,424t as compared with an input of 5,386 t showing a minor difference and therefore the input value obtained requires no adjustment. Therefore the total for Plan Area C&I waste managed through Plan Area MRF sites remains at 7,456 tonnes (Table 11).

1.3.4.2 Plan Area Sites classed as Physical Treatment sites

Examination of inputs and outputs of remaining waste at the only Physical Treatment site in the Plan Area reported as taking significant quantities (1,000 tonnes and over) of 'remaining' waste from the Plan Area is shown in Table 11. Since inputs exceed outputs the site was subject to further interrogation as described below. The input of C&I waste from the Plan Area as listed in Table 11 is presented alongside for context only.

Table 12: Total Inputs & Outputs of Waste at Plan Area Physical Treatment sites receiving 'remaining' waste from the Plan Area during 2016

Source: WDI 2016

Site Name	Total Input Total (tonnes)	Total Output Total (tonnes)	Inputs minus Outputs (diff)	*Plan area C&I input after deductions (from Table 10)*
Greenacre Farm, Canewdon	1,401	1,157	244	1,401

Since 100% of inputs are shown as deriving from the Plan Area and all the output went to Treatment outside the Plan Area it is assumed that the site output tonnage will be recorded as incoming waste from the Plan Area at the 'next step site' so the output tonnage is deducted from the total input.

Revised total for Plan Area Physical Treatment sites = 244 tonnes (1,401 (Table 11) minus 1,157t treatment deduction.

1.3.4.3 Plan Area Sites classed as Physical-Chemical Treatment sites

Examination of inputs and outputs of remaining waste for the two sites classed under this type in the Plan Area reported as taking significant quantities (1,000 tonnes plus) of C&I waste from the Plan Area is shown in Table 13.

Table 13: Inputs & Outputs of Plan Area Physical Chemical Treatment site receiving 'remaining' waste from the Plan Area

Source : WDI 2016

Site Name	Input Total	Output Total	Diff	*Plan area C&I input after deductions (from Table 10)*
Batemans Farm	17,881	0	17,881	4,518
Halstead Highway Depot	1,166	1,011	155	1,166

This shows that the first site reported sending no waste out in 2016. Therefore there is no risk of double counting. The Halstead Highway Depot appears to be a highway depot which received street cleaning residues (82t) and wastes from solvent extraction (1,084t). It is believed that this waste code entry is in error (the EWC code for street cleaning residues is 20 03 03 and that for waste from solvent extraction 02 03 03, hence almost identical save for the inverted 2 and 0). This being the case, since street cleaning residues are counted as LACW, inputs to this site have been discounted.

Revised total for Plan Area Physical-Chemical Treatment sites = 4,518tonnes (5,686 (Table 11) minus 1,166 Highway Depot LACW input).

1.3.4.4 Plan Area Sites classed as Transfer/ Treatment sites

Examination of inputs and outputs of remaining waste for the 3 sites classed under this type in the Plan area reported as taking significant quantities (1,000 tonnes plus) of 'remaining' waste from the Plan Area is shown in Table 14.

Table 14: Inputs & Outputs of Plan Area Transfer/ Treatment sites receiving 'remaining' waste from the Plan Area *Source : WDI 2016*

Site Name	Input Total	Output Total	Diff	*Plan Area input after deductions (from Table 10)*
Colchester Skip Hire Ltd	43,010	38,311	-4,699	43,010
Park Farm	73,715	45,912	-27,803	2,599
Essex Reclamation	26,664	43,871	17,207	22,928

This shows that one out of three sites, Essex Reclamation, reported an increase in waste outputs to inputs suggesting that no loss has occurred in processing. Hence this site has been disregarded from further analysis.

Table 15: % Inputs to Plan Area Transfer/ Treatment Sites represented by 'remaining' waste from the Plan Area

Source: WDI 2016

Site Name	Total Input after deductions	The Plan area contribution (Table 14)	The Plan area as % of total input
Colchester Skip Hire Ltd	43,010	43,010	100%
Park Farm	4,041	2,599	64%

Table 16 summarises the fate and destination of outputs of each of the sites with outputs pro-rated to reflect % of the Plan Area inputs for each fate.

Table 16: Fate and Destination of non CDEW & non Hazardous Outputs from Plan Area Transfer/ Treatment Sites

Source: WDI 2016

		Fate			
Site		**Landfill**	**Treatment**	**Recovery**	**Incineration**
Colchester Skip Hire Ltd	*Total amount from WDI 2016*	*27*	*575*	*15,162*	*22,547*
	From the Plan Area (% in Table 15)	27	575	15,162	22,547
Park Farm	*Total amount from WDI 2016*	*161*	*0*	*1,463*	*0*
	From the Plan Area (% in Table 15)	104	0	941	0
	Total from the Plan Area	131	575	16,103	22,547

The following rules have been applied:

1. Where an output is going to landfill, transfer or treatment within the UK, it is assumed that this input will be recorded at the 'next step site' so it is deducted from the total.
2. Where an output is going for incineration, it has been assumed that this input will not be recorded in the WDI at the 'next step site' as the receiving incinerator will not report through the WDI and hence the value has been retained to count toward the baseline value.
3. Where an output is going for recovery examination of the dataset indicates these went onward to sites in the UK and other than wood were recyclable materials. 1,494t of wood is indicated as having gone to a site in Kent. The receiving site may have been the Ridham Biomass Power Plant at Ridham operated by MVV which is identified in a subsequent section of this report as having received 42,208 t of waste from the Plan Area. Therefore to avoid double counting the portion of this tonnage that may be attributed to inputs from the Plan Area transfer/treatment sites has been deducted.

Therefore, the following quantities have been deducted:

Landfill	131 tonnes
Treatment	575 tonnes
Recovery	16,103 tonnes
Total	16,809 tonnes

Revised total for the Plan Area Transfer/ Treatment sites = 51,728 tonnes (68,537 tonnes (Table 11) minus 16,809 t).

The combined effect of all the adjustments for Plan Area Treatment sites (Step 3b) is shown in Table 17.

Table 17: **Management Routes of 'remaining' waste arising from the Plan Area minus double counting adjustments with Treatment type distinction.**

Source: Table 11 minus Step 3b values

	Biological Treatment	Composting	MRF	Physical Treatment	Physical - Chemical Treatment	Transfer/ treatment	Sub Total
Plan Area to Plan Area (Table 11)	25,046	27,178	7,456	1,401	5,684	68,537	**135,302**
Minus double counting deductions	*0*	*0*	0	*1,157*	*1,166*	*16,809*	*19,132*
Revised Plan Area to Plan Area	**25,046**	**27,178**	**7,456**	**244**	**4,518**	**51,728**	**116,170**

The revised value for 'remaining' waste arising in the Plan Area that is managed at Treatment sites (116,170t) is taken into account in the overall assessment of C&I arisings in Table 18.

Table 18: Management Routes of 'Remaining' Waste Arising from the Plan Area after deductions.

Source: Table 9 with PA Treatment adjusted in line with Table 17

	Landfill	Metal Recycling Sites	Transfer	Treatment	Recovery to Land	Grand Total
Plan Area arisings managed at Plan Area sites	169,964	20,216	52,399	116,170	0	**358,749**
Plan Area arisings managed at sites outside Plan Area	76,683	99,103	292,665	385,471	2,351	**856,273**
Totals	**246,647**	**119,319**	**345,064**	**501,641**	**2,351**	**1,215,022**

Note that waste going to facilities outside the Plan Area is counted as if it has gone to a final fate since any subsequent waste produced will be classified as coming from the Plan Area within which the receiving facility is located. For example, 100t of waste from the Plan Area going to a transfer station in Cambridgeshire will be classed as waste from the Plan Area on arrival at the transfer station, but will then be recorded as waste from Cambridgeshire on receipt at its next (final) destination.

This is illustrated in Figure 3.

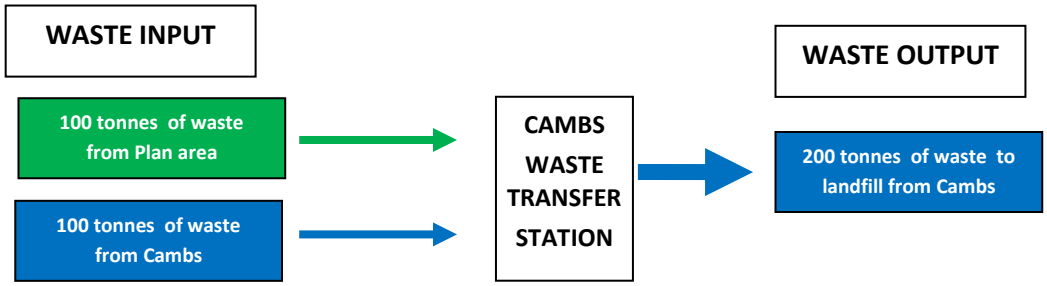

Figure 3: Schematic of how Flows to Sites outside the Plan Area are recorded in WDI

The headline value for C&I waste from the Plan Area following the above stages is now 1.21m tonnes.

1.3.5 Corrections for Omissions & Misattribution

The following additional stages are needed to account for arisings not managed through facilities reporting through the WDI.

Step 4a: Add Inputs made to Energy from Waste (EfW) where surplus over LACW exists

There is no operational EfW plant in the Plan Area.

Examination of a separate EA dataset on inputs to incineration plant indicates that just over 2,860 tonnes of waste, attributed to the Plan Area, was sent to the Suffolk EfW in Suffolk and just under 720 tonnes of waste was sent to the Lakeside EfW plant. A check of the WasteDataFlow dataset for LACW arising from the Plan Area indicates that none of this was LACW therefore this input of 3,580t has been counted as coming from C&I sources.

Also, a combustion plant referred to as Ridham Biomass Power Plant at Ridham (in Kent) operated by MVV took 42,208t of waste from the Plan Area and a facility referred to as Goosey Lodge in Bedfordshire took 3,738t of wood and sludges. Hence that total of 45,946t is carried forward as a proxy C&I waste tonnage.

Step 4b: Add Inputs made to Anaerobic Digestion Plants (AD) omitted from WDI where surplus over LACW exists

During the course of seeking to match the LACW values presented in WDF with that shown in WDI on a site by site basis, it was discovered that inputs to a number of AD plants had not been captured in the WDI. Enquiry with the Environment Agency secured the input datasets. This showed that declared inputs from the Plan Area from non LACW sources accounted for 1,038 tonnes.

Step 4c: Add Inputs made to permitted Paper Recycling Facilities omitted from WDI where surplus over LACW exists

Finally, during the course of seeking to match the LACW values presented in WDF with that shown in WDI on a site by site basis, it was discovered that inputs to a paper recycling facility operated by DS Smith in Kent had not been captured in the WDI. Enquiry with the Environment Agency secured

the input datasets. This showed that declared inputs from the Plan Area from non LACW sources accounted for 9,322 tonnes.

Step 4d: Add Inputs to Plan Area sites not attributed below regional level.

During the course of undertaking the assessment exercise it has become apparent that sites within the Plan Area received over 90,000 (91,556) tonnes of waste in 2016 that was not attributed below Eastern region level, i.e. was not attributed to a specific Plan Area origin within the region. This represents about 1% of total input to these sites.

Of this 10,284 t was hazardous waste, and 73,075t was classed as non-hazardous C, D & E waste, leaving 8,197t 'remaining' that may be either LACW in origin or from commercial and industrial sources. Direct enquiry of the WDA indicates that little of this may be attributable to LACW, leaving 8,197t remaining as proxy C&I waste.

Step 4e: Deduct erroneous attribution.

Detailed consideration of inputs to out of Plan Area Treatment sites revealed that 60% of inputs are attributed to 3 sites as shown in Table 19 below

Table 19: Principal Out of Plan Area Treatment Site Inputs.

Source: WDI 2016

Facility Host WPA	Site Name	Operator	Total	Input as % Total	Cumulative %
Havering	Frog Island Waste Management Facility	Shanks Waste Management	113,190	21%	21%
Thurrock	Tilbury New Site	Hadfield Wood Recycling	105,028	20%	41%
Newham	Jenkins Lane WM Facility	Shanks Waste Management	103,420	19%	60%

Subsequent checks indicate the following:

1 33,218t of the input to Tilbury New Site operated by Hadfields was LACW so that tonnage has been discounted leaving 71,810t to be accounted for. Only c14,655t of timber waste (excluding LACW) is reported in the WDI as having been output from Plan Area sites and little of that actually attributed to Thurrock, the location of the site. Since it is highly unlikely that significant quantities of wood is delivered directly from source sites, this suggests that there is an error in attribution to the Plan Area.

Attempts have been made to clarify this anomaly with the Operator to no avail. It should be noted that it is commonly held that parts of former Essex such as Thurrock, Barking, Dagenham and Redbridge are considered by many to still be part of Essex, so mis-attribution can easily be understood.

On that basis only 14,655t has been attributed to the Plan Area with the remaining tonnage 57,155t discounted as having been attributed in error.

2. Frog Island and Jenkins Lane are MBT facilities built to serve the East London Waste Authority[12] (ELWA) LACW contract. Examination of the total inputs to each site reveals that inputs attributed to Essex account for 47% of total inputs to combined sites. This compares with only 41% from the ELWA London Boroughs. The Defra statistics for 2016/17 report that ELWA sent 337,903t to intermediate plants which equate to MBT type facilities. Therefore given that Frog Island and Jenkins Lane are the MBT facilities contracted to ELWA, the values presented for ELWA in the WDI data appears to under report actual inputs. If the Defra value is substituted then that means 150,972t is deducted from the tonnage attributed to Essex. Even this deduction leaves 66,423t attributed to Essex which given the fact that MBT facilities principally accepts LACW, and given that the WDA has stated no LACW from Essex or Southend is sent to either facility even that tonnage appears erroneous. Therefore the whole value i.e. 217,395t has been deducted.

Table 20: Management Routes of 'Remaining' Waste Arising from the Plan Area after additions (inputs to omitted facilities and unattributed waste).
Source: Table 18 with additions and deductions

	Landfill	Metal Recycling Sites	Transfer	Treatment	Recovery to Land	Additions	Grand Total
Plan Area arisings managed at Plan Area sites	169,964	20,216	52,399	116,170	0	8,197	**366,946**
Plan Area arisings managed at sites outside Plan Area	76,683	99,103	292,665	77,703	2,351	59,886	**548,505**
Totals	**246,647**	**119,319**	**345,064**	**193,873**	**2,351**	**64,520**	**915,468**

1.3.6 Baseline Value

The outcome of this process is that a total value of **0.91m** tonnes of 'remaining' waste was generated in the Plan Area in 2016. This compares with an estimate value of around 1.153m tonnes of C&I waste arising in the Plan Area for 2013 forecast to be 1.210mt at 2016. This is expected as the former higher value was generated using a Point of Production value which generally yields a higher tonnage than a 'Point of Management' approach as it counts waste arising where it is produced which may include waste managed through routes such as onsite or through reverse logistics that are not captured through the Point of Management method that relies on tonnages recorded at permitted sites.. The value is broadly in line with C&I waste arisings values generated for the Plan Area previously as displayed in Table 7: C&I Data Points & Limitations of the rWLP Capacity Gap Report dated September 2014.

The methodology applied to generate the 2016 value reflects the national methodology and has withstood the rigorous of Waste Local Plan examination recently, e.g. Oxfordshire Minerals & Waste Core Strategy. It is considered to have generated a robust value which is recommended to be used for forward planning purposes for C&I waste arising in the Plan Area for 2016 onward.

[12] ELWA is composed of the London Boroughs of Barking & Dagenham, Havering, Newham and Redbridge

1.3.7 Commercial & Industrial Waste Arisings Forecast

The National Planning Practice Guide on Waste recommends as follow: "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*

The WNA Update of December 2015 relied on a value of 1.153 mt at 2013 and extrapolated this forward applying the growth rates in economic activity forecast by the East of England Economic Forecast Model (EEEFM). This resulted in a value of 1.285 million tonnes produced in 2035. If the same economic forecast is applied to the updated baseline value generated, this yields a value of just over 0.97m tonnes to be managed in 2035 as compared with just under 1.3m tonnes forecast using the rWLP estimate and forecast growth - a difference of 313,000 tonnes . Figure 4 presents the two forecasts.

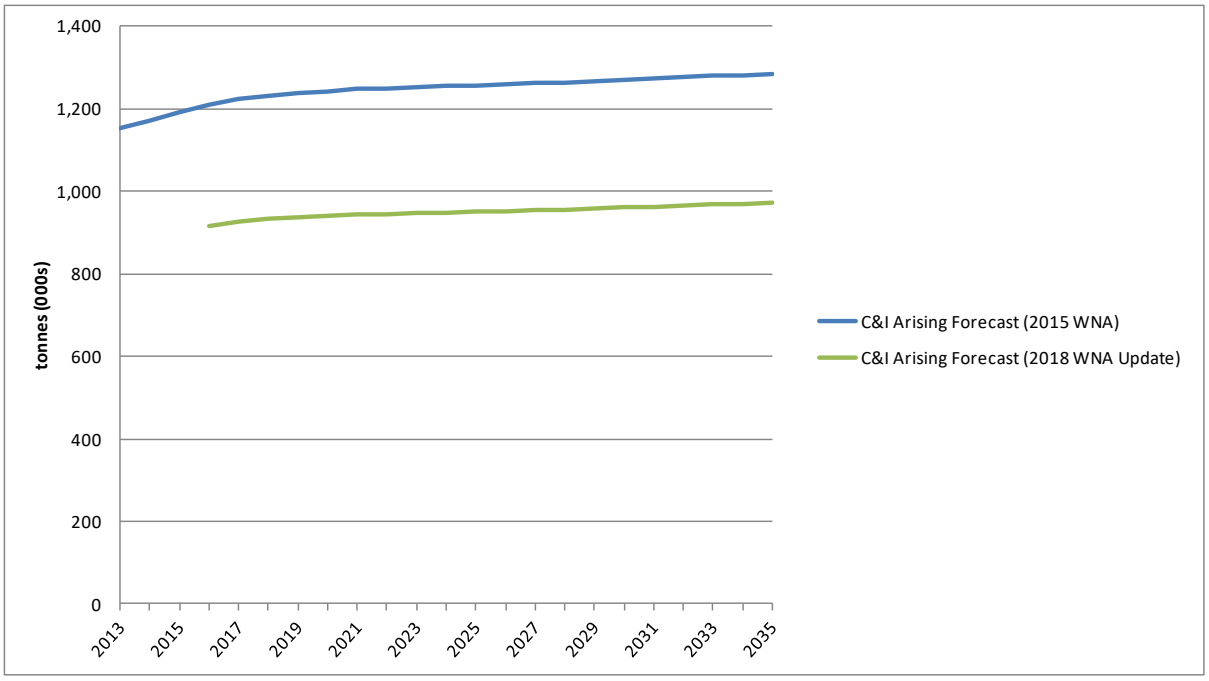

Figure 4: Comparison of C&I Arising Forecasts for the Plan Area to 2035 applying 2013 (Plan baseline estimate) and updated 2016 baselines with same EEEFM growth rates (ktonnes per annum)

When applied to the updated point of management baseline value for 2016

1.4 Sensitivity Analysis for Organic Content of C&I waste

It has been suggested that the proposed treatment rate for organic waste from the C&I waste stream set at 13% to correspond to the estimated organic waste content of this stream[13] is overly ambitious. While it should also be noted that this waste, if going to landfill, will be the source of the greatest quantity of methane produced and as such may be targeted for future diversion through policy means such as a landfill ban, it is suggested that an assessment of capacity using a 10% treatment rate from 2023 would be appropriate. The outcome of modelling this revised treatment rate is shown in Table 21.

Table 21: Projected Capacity Gap for Organic Waste Treatment in the Plan Area - 10% C&I waste sensitivity (tonnes)

	Milestone Year				Peak Capacity Requirement
	2018	2023	2028	2034	
Previous Required Capacity at 13% with 2013 baseline	160,000	163,000	164,000	167,000	167,000
Required Capacity @ 10% C&I waste sensitivity with 2016 baseline	92,000	95,000	96,000	97,000	97,000
Difference	-68,000	-68,000	-68,000	-68,000	-68,000

The implications of this change have been carried through to the revised WNA calculations of capacity requirement including LACW.

[13] 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