Chapter 13

WASTE

13 Waste

Introduction

13.1 Envision has produced a waste and resource management statement, which is set out in full in technical appendix K, and Terence O'Rourke Ltd used this as the basis of the waste assessment in this chapter. The references and data sources used in the assessment are set out in table 13.1.

Building Research Establishment, 2012, BRE SmartWaste benchmark data
Building Research Establishment, 2006, Construction waste report
Cambridgeshire County Council and Peterborough City Council, 2011, Cambridgeshire and Peterborough Minerals and Waste Development Plan Core Strategy Development Plan Document
Construction Resources and Waste Platform Group, 2008, Resource Planning Tool
Envirowise, 2002, EN336 Reducing waste and utility use in managed shopping centres
Jacobs, 2009, Waste Management Statistical Basis for the Cambridgeshire and Peterborough Minerals and Waste Development Plan 2006-2026 Addendum – Final Draft Report
Jacobs, 2008, Cambridgeshire and Peterborough Facility Location Study NetWaste Site Selection Report
South Cambridgeshire District Council, 2016, South Cambridgeshire Annual Monitoring Report
South Cambridgeshire District Council, 2013, Proposed Submission Local Plan
South Cambridgeshire District Council, 2010, District Design Guide: High Quality and Sustainable Development in South Cambridgeshire Supplementary Planning Document
South Cambridgeshire District Council, 2007, Development Control Policies Development Plan Document
Waste Watch, 2005, Resource management in the education sector
WRAP, 2015, Green Office: A Guide to Running a More Cost-effective and Environmentally Sustainable Office
WRAP and Capita Symonds, 2010, Final Report – Construction, demolition and excavation waste arisings, use and disposal for England 2008
Table 13.1: References and data sources

Legislation and policy

National and international

13.2 The European Waste Framework Directive (2008/89/EC) has been transposed in England largely through the Waste (England and Wales) Regulations 2011 (as amended), which require separate collections for paper, metal, plastic and glass to be set up where technically, environmentally and economically practicable. These are supported by a number of further regulations relating to issues such as landfilling and the management of hazardous waste.

13.3 National waste planning policy is set out in the *Waste Management Plan for England* (2013) and *National Planning Policy for Waste* (2014). The latter promotes the principle of driving waste management up the waste hierarchy, which means that waste planning authorities should always try to ensure that waste is managed by the best possible environmental means.

Local

13.4 Policy CS2 Strategic Vision and Objectives for Sustainable Waste Management of the Cambridgeshire and Peterborough Minerals and Waste Development Plan: Core Strategy Development Plan Document (2011) requires that all major new developments undertake sustainable waste management practices,

including the provision of temporary waste management facilities that will be in place throughout the construction of the development. Policy CS28 Waste Minimisation, Re-use and Resource Recovery requires developments to put in place practicable measures to maximise waste minimisation, sorting, re-use, recovery and recycling of waste and contribute to the provision of bring sites.

13.5 Policy DP/1 Sustainable Development of South Cambridgeshire District Council's adopted Development Control Policies Development Plan Document (2007) includes requirements to use sustainable building methods and verifiably sustainable, locally sourced materials, including recycled materials, and to minimise use of resources. Policy DP/6 Construction Methods includes the requirements to recycle construction waste, prepare a resource, re-use and recycling scheme to cover construction waste, accommodate construction spoil within developments and maximise the re-use and recycling of any suitable raw materials currently available on sites during construction.

13.6 The council's District Design Guide: High Quality and Sustainable Development in South Cambridgeshire Supplementary Planning Document (2010) includes the requirement for developments to incorporate the principles of the waste management hierarchy, and provide adequate, safe and secure storage for waste and recycling bins.

13.7 Emerging policy is provided by the council's Proposed Submission Local Plan (2013). Policy CC/6 Construction Methods requires developments to carefully manage materials already on site, or brought to site, to reduce the amount of waste produced and maximise the re-use or recycling of materials, either on site or locally.

Methodology

Baseline

13.8 A desk-based study was undertaken to collate information on existing commercial and industrial and construction, demolition and excavation waste arisings in Cambridgeshire. The references and data sources used in the study are set out in table 13.1. Limitations in the availability of information are identified in the baseline section below.

Impact assessment

13.9 The impact assessment identified potential effects that may arise as a result of the proposed development. The following issues were considered:

- Generation and management of waste during construction
- Generation and management of commercial waste post-construction

13.10 The assessment estimated the volumes and types of waste likely to be generated during the construction and post-construction phases and established the potential for effects on the capacity of existing waste management facilities in the area. Strategies were developed for reducing waste and facilitating re-use and recycling.

Baseline

Generation and management of waste in Cambridgeshire

Commercial and industrial waste

13.11 The disposal of commercial and industrial waste is not regulated by the council's waste management authorities, so there is only limited information on flows of waste within the county. Cambridgeshire County Council and Peterborough City Council estimate that approximately 1.33 million tonnes of commercial and industrial waste required management in the county in 2011. This was estimated to rise to 1.53 million tonnes by 2016. No information is available on how this waste was managed, although the councils set a target of 84.2% of commercial and industrial waste to be recycled in 2016, within a total recovery target of 92%.

Construction, demolition and excavation waste

13.12 Cambridgeshire County Council and Peterborough City Council estimate that approximately 2.72 million tonnes of construction and demolition / inert waste required management in the county in 2011. This was estimated to rise to 2.83 million tonnes by 2016.

13.13 No information is available on how this waste was managed, although the councils set a target of 65% of this waste to be recycled / recovered in 2016. However, the Waste and Resources Action Programme (WRAP) and Capita Symonds (2010) estimate that, in England as a whole, 50% of construction, demolition and inert waste was 'hard inert' waste generating recycled aggregate, 11% was recovered as recycled soils, 13% was spread on exempt sites, 12% was beneficially used for quarry restoration or landfill engineering / capping, 10% was largely inert waste deposited at landfills, 3% was non-inert waste deposited at permitted landfills and 1% was non-inert waste sent for external recovery.

Existing waste generation on site

13.14 No information is available on the amount of agricultural waste currently generated on site.

Local waste management facilities

13.15 At the time of the production of the Cambridgeshire and Peterborough Minerals and Waste Development Plan Core Strategy Development Plan Document (adopted in 2011), the management facilities that handled commercial and industrial waste (as well as municipal solid waste) in the plan area included the following (Jacobs, 2009):

- Five non-hazardous waste recycling facilities, with a total capacity of 150,000 tonnes per annum
- 10 non-hazardous composting facilities, with a total capacity of 463,000 tonnes per annum
- Three non-hazardous treatment facilities, with a total capacity of 1.04 million tonnes per annum

- 11 non-hazardous landfill sites, with a total void space of 15.74 million cubic metres

13.16 Since the plan was adopted, Amey has opened a materials recycling facility at the Waterbeach Waste Management Park, which has a capacity of 86,000 tonnes per annum. In addition, Viridor has opened an energy recovery facility in Fengate, which has a capacity of 85,000 tonnes per annum. There are also several waste transfer stations throughout the plan area that handle both commercial and industrial and municipal solid waste.

13.17 The following waste management facilities in the Cambridgeshire and Peterborough Minerals and Waste Plan area handle inert / construction, demolition and excavation waste (Jacobs, 2009):

- 32 inert recycling facilities, with a total capacity of 2.46 million tonnes per annum
- 14 inert landfill sites, with a total void space of 2.23 million cubic metres

Future baseline

13.18 In the absence of the proposed development, the site would remain in its current agricultural use and existing levels of waste generation would continue. However, waste generation in the wider area is forecast to continue to grow, with Cambridgeshire County Council and Peterborough City Council (2011) predicting that 2.05 million tonnes of commercial and industrial waste and 2.99 million tonnes of construction and demolition / inert waste will require management in the county by 2026.

13.19 To meet this demand, together with predicted increases in other waste streams, the councils estimate that the following additional waste management capacity will be required by 2026:

- 627,000 tonnes per annum of recycling
- 10,500 tonnes per annum of in-vessel composting
- 1.86 million tonnes per annum of inert waste recycling
- 12.09 million cubic metres of inert landfill void space

13.20 No additional non-hazardous landfill capacity is required.

Effects during construction

Construction waste

13.21 The types of waste produced during construction include timber, concrete, inert waste, ceramics, insulation, plastic, packaging, plaster and cement. Waste volumes arising from the construction of the proposed development have been calculated using typical construction waste volumes and composition from the Building Research Establishment's (BRE) SmartWaste benchmark data (BRE, 2012). The final floorspace mix has not been fixed at this outline stage, so reasonable worst case assumptions have been made on the likely floorspace breakdown. The results of the calculations are set out in table 13.2.

Building type	Floorspace (m^2)	Tonnes per 100 m^2 floor area	Estimated waste generation (tonnes)
B1 office and light industry	90,000	23.8	21,420
Laboratories	11,800	23.3	2,749
B2 / B8 storage	2,000	12.6	252
A3 café	2,000	27.5	550
D1 (nursery / conference facilities)	3,000	21.6	648
D2 (leisure, including gym)	3,200	21.6	691
Total	**112,000**	**--**	**26,310**

Table 13.2: Estimated waste arisings from the construction of the proposed development

13.22 Table 13.2 shows that the construction waste arisings could reach 26,310 tonnes. The proposed development will be constructed over four phases, giving approximately 6,577 tonnes of waste per phase. Each phase of development will be reviewed, with the aim of reducing waste generation in subsequent phases.

13.23 It should be noted that the estimates in table 13.2 do not include wastes from civil engineering and infrastructure works, as no accurate benchmark data are available for these waste sources. It is recognised that this will be a source of waste and the same levels of management and control will be applied to this waste as to that generated by the construction of the buildings.

13.24 Research conducted by the Construction Resources and Waste Platform Group in 2008 (a collaboration between the BRE and WRAP) provided data that allow the breakdown of construction waste into its different streams to be estimated. These data also provide benchmarks for standard, good and best practice waste management that illustrate the benefits of waste minimisation. Table 13.3 summarises the estimated breakdown of the proposed development's construction waste using both the BRE SmartWaste data and that produced by the Construction Resources and Waste Platform Group. Full details are provided in technical appendix K.

Waste type	Composition	BRE (tonnes)	Construction Resources and Waste Platform Group		
			Standard practice (tonnes)	Good practice (tonnes)	Best practice (tonnes)
Canteen / office	2%	526	188	136	108
Ceramics / bricks	3%	789	282	203	161
Concrete	11%	2,894	1,035	745	591
Electrical equipment	1%	263	94	68	54
Furniture	0%	0	0	0	0
Inert soils	34%	8,945	3,199	2,304	1,828
Insulation	4%	1,052	376	271	215
Liquids and oils	0%	0	0	0	0
Metals	9%	2,368	847	610	484
Packaging	6%	1,579	564	407	323
Plaster / cement	22%	5,788	2,070	1,491	1,183
Plastics	1%	263	94	68	54
Timber	7%	1,842	659	474	376
Total	**100%**	**26,310**	**9,408**	**6,776**	**5,376**

Table 13.3: Waste streams and comparison of estimates using BRE and Construction Resources and Waste Platform Group benchmark data

13.25 Table 13.3 shows that the total construction waste generation could be as little as 5,376 tonnes if best practice waste minimisation practices are followed. The data also show the impact that more dense materials, such as concrete and plaster / cement, can have on total waste generation if not carefully managed on site.

13.26 The worst case estimate of 26,310 tonnes of construction waste equates to an average of 2,361 tonnes per year over the minimum 10-year construction period, which is an increase of approximately 0.08% on the estimated baseline quantities of construction, demolition and excavation waste generated in the county in 2016. As set out below, it is envisaged that the majority of the construction waste will be re-used or recycled. The estimated 2,361 tonnes per year represents approximately 0.1% of the annual capacity of the county's inert waste recycling facilities. Even if all the waste was disposed of to landfill, based on a conversion factor of 1.5 tonnes per cubic metre (Jacobs, 2009), 26,310 tonnes represents approximately 1.8% of the remaining capacity in the area's inert landfills. These changes are of negligible magnitude and no significant adverse effects are predicted on the capacity of the area's waste management facilities.

Management of the construction waste and spoil

Earthworks

13.27 Table 13.3 shows that inert soils can comprise up to 34% of a development's construction waste. As discussed in chapter 2, a site-wide earthworks strategy has been developed to retain all clean spoil on site. Initial calculations (excluding topsoil) estimate total cut and fill volumes of 92,358 m^3 and 91,278 m^3 respectively, leaving 1,080 m^3 of excess material. This can be accommodated within the proposed landscape and public open spaces.

13.28 A considerable volume of topsoil will be generated by the topsoil strip across the development area. Landscaped areas will receive a new topsoil depth of 400 mm, which will still leave an estimated 111,423 m^3 of topsoil to be retained on site. It is proposed to accommodate this in landscaped bunds along the western and southern boundaries of the main site and in the south east of the bus / cycle interchange site. The bunds will have a total volume of 107,933 m^3, leaving 3,490 m^3 of residual topsoil. This will be spread over the land in the south of the site that is to be retained in agricultural use, which will increase the topsoil depth in this area from 340 mm to Defra's recommended maximum of 400 mm.

13.29 Any contaminated spoil would need to be removed to an appropriately licensed landfill for disposal, but the greenfield nature of the site means that quantities are likely to be minimal. Given this, and the strategy to retain all excavated spoil on site, no significant effects are predicted on waste management facilities in the area as a result of earthworks waste.

Construction waste

13.30 Subject to viability, the proposed development is targeting a BREEAM Excellent rating, so it is likely that a target of <6.5 tonnes of construction waste per 100 m^2 will be applied. The principal contractors will be required to register with the

Considerate Constructors Scheme and to develop and manage a site waste management plan for the proposed development. This will set out targets for waste reduction and recovery and standards for quality control and resource management to minimise waste through over-ordering, materials spoilage and disposal of significant off-cuts. Targets will be reinforced through site audits.

13.31 The principal contractor will also prepare a construction environmental management plan (CEMP), which will include the following requirements for the storage and management of construction materials and waste:

- Good site housekeeping will be required for all materials delivered to the site and materials will be held in appropriate compounds until required
- Excess soils stored during earthworks will be mounded and battered and, if necessary, seeded and temporarily landscaped to retain the structure
- Materials storage will be away from sensitive receptors to avoid potential loss, damage or theft
- Waste materials will be stored in colour coded skips and containers to promote waste segregation
- General site management practice will be to coordinate the building process using 'just in time' deliveries to minimise opportunities for waste, damage and theft
- Off site fabrication and methods of modern construction will be promoted to help reduce site wastage

13.32 The contractors will be contractually bound to monitor and report on materials procurement and waste management activities. Contractors will be expected to provide evidence through the collation of waste transfer notes, invoices etc. Monitoring reports will be produced on a monthly basis and will include details of the progress made in diverting waste materials from landfill against pre-agreed targets. Further details of the proposed construction waste management measures are set out in the waste and resource management statement in technical appendix K.

13.33 These measures will enable waste minimisation and the majority of the construction waste to be re-used and recycled and there will not be a significant quantity of waste requiring off site disposal. As a result, no significant effects are predicted on waste management facilities in the area.

Effects post-construction

Waste generation

13.34 As for the construction stage, post-construction waste generation has been estimated based on the assumed floorspace mix (table 13.4). Specific benchmarks are not available for the exact development types proposed, so the estimates have been based on Envision's experience and the assumption that the waste profile will be generally similar to a commercial office environment.

Building type	Gross area (m^2)	Net area (m^2)	Workplace density (m^2/FTE*)	Estimated employment (FTE)	Benchmark (kg/person/yr)	Waste estimate (tonnes/yr)
B1 office	90,000	72,000	20	3,600	200	720
Laboratories	11,800	9,440	36	261	96	25
B2 / B8 storage	2,000	1,900	100	19	200	4
A3 café	2,000	1,600	25	64	30**	48
D1 (nursery / conference facilities)	3,000	2,400	80	30	200	6
D2 (leisure including gym)	3,200	2,560	100	26	200	5
Total	**112,000**	**--**	**--**	**4,000**	**--**	**808**

Table 13.4: Post-construction waste generation
*FTE = full-time equivalent
**kg/m^2/year benchmark used
Note:
B1 office benchmarks from WRAP (2015)
Laboratories benchmarks from Waste Watch (2005)
A3 café benchmarks from Envirowise (2002)
No specific data are available for leisure, conference or light industrial, so it is assumed these are similar to the B1 office benchmarks

13.35 An estimated 808 tonnes of waste per year are predicted to be generated by the proposed development post-construction, which is an increase of approximately 0.05% on the estimated baseline quantities of commercial and industrial waste generated in the county in 2016. This is based on current typical waste generation levels and is likely to be a worst case estimate, because waste reduction practices are likely to improve over time. Envision estimates that the annual waste generation is likely to comprise approximately 424 tonnes of paper and card, 176 tonnes of organic / green waste, 47 tonnes of glass, 119 tonnes of plastic, 16 tonnes of metals, 1 tonne of wood and 24 tonnes of miscellaneous waste. The bulk of the waste generated is therefore likely to comprise easily recyclable paper and card and organic / green waste, which have established merchant collection services.

13.36 An assumption that all the potentially recyclable materials (paper / card, glass, plastics and metals) are sent for recycling results in a total of 606 tonnes of waste requiring recycling each year. This equates to 0.26% of the annual capacity of the county's material recycling facilities. The estimated 176 tonnes of organic / green waste equates to 0.04% of the county's annual composting capacity. Even if all the waste produced was to be disposed of at the energy from waste plant or to landfill, it only represents 0.95% of the annual energy from waste capacity, or 0.004% of the county's remaining non-hazardous landfill capacity (based on a conversion factor of 0.8 tonnes per cubic metre, Jacobs 2009). These are negligible magnitudes of change and no significant effects are predicted on the area's waste management facilities.

13.37 In addition to the waste discussed above, agricultural waste will be generated by the retained agricultural land in the south of the site and green waste will be generated by maintaining the landscaped and public open space areas. At present, there is insufficient information available to estimate the level of waste generated by these uses. However, the replacement of agricultural land on site with built development will lead to an overall reduction in agricultural waste generation on site, so no significant adverse effects are predicted.

Waste management

13.38 Given the nature of the proposed development, it is envisaged that on site treatment in the form of in-vessel composting will be provided. This could remove at least 176 tonnes per year of waste from the quantity requiring off site management. The relatively modest quantities of waste that are likely to be produced and the phased nature of the development mean that a small, fixed modular, continuous running system is likely to be most suitable. This could be accommodated in the proposed infrastructure compound in the south east of the main site.

13.39 Commercial waste storage and collection will be undertaken by a merchant service provided under the management control of SmithsonHill. Green Lease conditions will be used to ensure that tenants liaise closely with SmithsonHill to ensure appropriate storage and collections are maintained. As the proposed development is targeting a BREEAM Excellent rating for waste, subject to viability, adequate provision of dedicated waste storage will be a key credit requirement. This includes dedicated, clearly labelled and accessible storage space for recyclables. Full details of the requirements are set out in the waste and resource management statement in technical appendix K.

13.40 Waste collection frequency will depend on the volume of waste generated, the storage method and the schedule of the appointed waste contractor. However, SmithsonHill will work with tenants to ensure that waste will be compacted and / or baled where possible to reduce the frequency of collection and therefore reduce related traffic impacts.

Mitigation

13.41 As no significant adverse effects are predicted from waste generation, no additional mitigation measures are considered necessary.

Residual effects

13.42 No significant residual effects are predicted on waste management capacity as a result of the proposed development.

Cumulative effects

Introduction

13.43 As set out in chapter 3, the potential for cumulative effects with a number of consented and proposed developments in the area needs to be assessed. No benchmarks are available to enable the assessment of waste generation from the electricity supply connection and the possible off site wastewater rising main. However, the nature of these schemes means that they will generate very limited quantities of waste.

13.44 As there is currently no application in the planning system for development at the Chesterford Research Park, it has not been included because insufficient information is available to allow an accurate assessment. In addition, any future application for development at the Chesterford Research Park would need to

take account of the potential for cumulative effects with the proposed park for AgriTech.

Construction waste

13.45 Table 13.5 sets out the estimated cumulative construction waste generation, in addition to that predicted to be generated by the proposed park for AgriTech.

Building type	Floorspace (m^2)	Tonnes per 100 m^2 floor area	Estimated waste generation (tonnes)
B1 office and light industry	28,499	23.8	6,783
Laboratories	51,774	23.3	12,063
B2 / B8 storage	1,775	12.6	224
D2 (leisure, including gym)	3,592	21.6	776
Residential*	N/A	N/A	912
Total	**--**	**--**	**20,758**

Table 13.5: Estimated cumulative construction waste arisings
*Calculated using a benchmark of 9.6 tonnes of waste produced during the construction of a 'generic' semi-detached house (BRE, 2006)

13.46 In addition to the 26,310 tonnes of construction waste predicted to be generated by the proposed park for AgriTech, a further 20,758 tonnes of waste are estimated to be generated by the construction of the cumulative developments, giving a total of 47,068 tonnes. The construction periods of the cumulative projects are not known, but it is likely that some of them will overlap with the proposed park for AgriTech. Using its minimum 10-year construction period as a guide, approximately 4,707 tonnes per year of construction waste are predicted to be generated cumulatively, which is an increase of approximately 0.17% on the estimated baseline quantities of construction, demolition and excavation waste generated in the county in 2016.

13.47 As for the proposed park for AgriTech, the majority of this waste is likely to be recycled. The estimated 4,707 tonnes per year represents approximately 0.2% of the annual capacity of the county's inert waste recycling facilities. Even if all the waste was disposed of to landfill, 47,068 tonnes represents approximately 3.2% of the remaining capacity in the area's inert landfills. These changes are of negligible magnitude and no significant cumulative effects are predicted on the capacity of the area's waste management facilities.

Post-construction waste

13.48 The predicted cumulative post-construction waste generation is set out in table 13.6.

Building type	Gross area (m^2)	Net area (m^2)	Workplace density (m^2/FTE)	Estimated employment (FTE)	Benchmark (kg/person/yr)	Waste estimate (tonnes/yr)
B1 office	28,499	22,799	20	1,140	200	228
Laboratories	51,774	41,419	36	1,151	96	110
B2 / B8 storage	1,775	1,686	115	15	200	3
D2 (leisure including gym)	3,592	2,874	100	29	200	6
Residential	Calculated using a benchmark of 684 kg of total waste per household per year, based on figures for South Cambridgeshire district in 2014/15 (South Cambridgeshire District Council, 2016)					65
Total	**--**	**--**	**--**	**--**	**--**	**412**

Table 13.6: Cumulative post-construction waste generation

13.49 In addition to the 808 tonnes of waste per year predicted to be generated by the proposed park for AgriTech, a further 412 tonnes of waste are estimated to be generated by the cumulative developments. However, the Sawston Trade Park will result in the loss of 8,486 m^2 of existing B2 floorspace, which has an estimated current waste generation of 140 tonnes per year. Overall, therefore, the net cumulative increase in waste generation as a result of all the schemes combined is 1,080 tonnes. Excluding the 65 tonnes of municipal solid waste generated by the residential schemes, this is an increase of 0.07% on the estimated existing quantities of commercial and industrial waste generated in the county in 2016.

13.50 Using the same assumptions for the commercial development as were used for the proposed park for AgriTech, and South Cambridgeshire District Council's (2016) proportions of recycled and composted waste for the residential developments, it is estimated that approximately 782 tonnes of the waste will be recyclable and 239 tonnes will be compostable. These figures equate to 0.33% and 0.05% of the annual capacity of the county's material recycling and composting facilities respectively.

13.51 Even if all the cumulative waste produced was to be disposed of at the energy from waste plant or to landfill, it only represents 1.27% of the annual energy from waste capacity or 0.005% of the county's remaining non-hazardous landfill capacity. These are all negligible magnitudes of change and no significant cumulative effects are predicted on the area's waste management facilities.