

## 13.0 Alternatives

### Introduction

13.1 This section considers the alternative sites and technologies that have been considered as part of the EIA process.

### Alternative Sites

13.2 The sites considered for review have been previously selected by a complex regime of testing and suitability studies carried out by ERM on behalf of Oxfordshire County Council. The ERM work identified 8 potential sites which were considered to offer potential for a strategic waste management facility.

13.3 The sites that shortlisted by ERM were as follows:

- **site 1** - Gosford Grain Silos;
- **site 2** - Former Quarry, Shipton-On-Cherwell;
- **site 3** - West of M40 Banbury;
- **site 4** - Culham Science Centre;
- **site 5** - Land at Banbury Cross Business Park, Banbury;
- **site 6** - Sutton Courtney Landfill;
- **site 7** – Ardley Landfill;
- **site 8** – Land at Palmer Avenue nr Bicester.

13.4 To test the appropriateness of the 8 sites for an EfW facility, a list of site assessment criteria was defined. Many of the criteria are defined from National and regional planning policy i.e. Annex E of PPS10 and the South East Plan Policy W17 and thus are material planning considerations. The remainder are linked to practical issues associated with the site e.g. site deliverability, and proximity and accessibility to the waste catchment area, see Appendix 2, Volume 4.

13.5 The criteria used were as follows:

- Proximity to Housing;
- Accessibility;
- Distance from Oxford;
- Site Size;

- Deliverability;
- Existing land use;
- Distance from European Ecological Designations;
- Proximity to AONB;
  
- Proximity to Flood Plain/Water;
- Proximity to listed buildings/conservation areas;
- Green Belt allocation; and
- Proximity to businesses/industries which can utilise the generated energy.

13.6 Ardley Landfill and land at Palmer Avenue, Bicester emerged as the best performing sites. However as Ardley Landfill is under the control of the waste management industry and is considered to be in accordance with PPS10 and policy W17 of the South East Plan as the site has an existing waste use. The deliverability of Palmer Avenue has not been confirmed. Therefore, there is a question mark over how quickly land at Palmer Avenue can be delivered for a waste management facility as it is currently in MOD use.

13.7 With regard to access and surrounding highway network Ardley is considered to outperform land at Palmer Avenue, with direct access on to the B430 which is a former trunk road and its close proximity to junction 10 of the M40.

13.8 Neither Ardley Landfill nor land at Palmer Avenue are within 10km of a Special Area of Conservation or a Special Protection Area for ecology. In terms of proximity to waste arisings, the highway connections from Oxford to Ardley are considered be excellent, with journey times being 25 minutes from the centre of Oxford. The Ardley Landfill site will also be deliverable in the short term to allow Oxfordshire County Council to make significant progress to achieving its targets for diverting waste from landfill and renewable energy generation.

13.9 Ardley Landfill is therefore considered to be the best performing site having regard to site access, highway network and proximity to international nature conservation designations.

### **Alternative Technologies**

13.10 The Environment Agency life cycle assessment software 'Waste and Resource Assessment Tool for the Environment' (WRATE) was utilised to model the environmental impacts of the proposed facility. The WRATE software is a life cycle assessment tool specifically designed to model environmental impacts of waste and waste management processes. The

WRATE tool<sup>1</sup> and its use is endorsed and encouraged by the Environment Agency (EA) and Department for Environment, Food and Rural Affairs (Defra).

13.11 In summary, the environmental burdens has been calculated for the processing of 300,000 tonnes of municipal solid waste through a number of waste treatment processes, as follows:

- Landfill;
- Energy from Waste (EfW);
- Advanced Thermal Treatment (ATT);
- Mechanical Biological Treatment (MBT) with Refuse Derived Fuel (RDF) to EfW; and
- Mechanical Biological Treatment (MBT) with Refuse Derived Fuel (RDF) to landfill.

13.12 The above scenarios are consistent with options assessment work undertaken for Oxfordshire County Council which informed the Municipal Waste Management Strategy development.

13.13 The proposed facility will process commercial and industrial (C&I) wastes in addition to municipal waste. The C&I wastes destined for treatment at the facility are likely to those included under the Environment Agency (EA) heading 'mixed waste' as outlined in the EA Strategic Waste Management Assessment 2002/03 survey of C&I waste<sup>2</sup>.

13.14 A recent study by SLR for the Environment Agency Wales<sup>3</sup> demonstrates that the 'mixed' commercial and industrial waste stream is similar in composition to municipal waste. For the above reason, the use of a municipal waste composition for the input waste stream is deemed suitable for the purposes of this comparative technology assessment.

### Review of Alternative Technologies

13.15 The outputs from WRATE are life cycle impact assessment (LCIA) indicators (for example global warming potential, human toxicity etc), these can be specified by the user and measure the potential impacts of the waste treatment technologies. The WRATE default impact assessments are:

- Abiotic Resource Depletion;
- Global Warming Potential (GWP100);
- Human Toxicity (HTP inf.);
- Freshwater Aquatic Ecotoxicity (FAETP inf.);
- Acidification (AP); and
- Eutrophication (EP19912).

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<sup>1</sup> <http://www.environment-agency.gov.uk/wtd/1396237/>

<sup>2</sup> <http://www.environment-agency.gov.uk/subjects/waste/1031954/315439/923299/1071046/?version=1&lang=e>

<sup>3</sup> <http://www.environment-agency.gov.uk/regions/wales/816243/1913565/?version=1&lang=e>

- 13.16 Each technology has been assessed against the 6 sustainability indicators to generate overall performance scores. Performance scores for each indicator represent a quantitative evaluation that can be used to compare the options within a particular impact. Units of measurement vary between different impact categories (for example antimony equivalent for abiotic resource depletion, CO2 equivalent for global warming etc).
- 13.17 To enable comparison inter-impact, and enable a preferred technology to be identified the scores have been valued. Valued scores are derived by 'normalising' the overall performance scores on a scale of 0 to 1, where 0 represents the worst scenario and 1 represents best scenario. Using this methodology, the higher the score the more sustainable the option is considered to be
- 13.18 The results of this modelling are set out in Appendix 3 of Volume 4 and are summarised below.
- 13.19 The WRATE modelling results indicates that when considering the six environmental impact criteria in WRATE, the best performing options are Energy from Waste and Advanced Thermal Treatment. Energy from Waste scores highest on 3 criteria (abiotic resource depletion, global warming and freshwater aquatic ecotoxicity) and ATT scores highest on 1 criterion (eutrophication), but close to the top scoring technology on two other criteria (abiotic resource depletion, human toxicity).
- 13.20 Although scoring comparably to EfW on the life cycle impact assessment it should be considered that ATT is not currently a bankable solution for the treatment of municipal waste, and there are no full scale operational plants in the UK. It is also unclear if ATT is a viable technology for quantities of waste as large as 300,000 tonnes per annum.
- 13.21 In summary, through the use of the WRATE life cycle assessment software, it can be demonstrated that Energy from Waste yields an environmental impact that is comparable to Advanced Thermal Treatment, and better than other competing technologies. On this basis it is concluded that the proposed Ardley EfW facility will result in a negative environmental footprint, that is, an overall reduction in environmental impacts such as global CO2 emissions.
- 13.22 It is further concluded based on the assumptions within the model that the same level of environmental footprint is unlikely to be deliverable via an MBT type treatment technology.

### Conclusions

- 13.23 In respect of alternative sites that have been considered Ardley and Palmer Avenue have emerged as the top performing sites with Ardley being preferred because of its access, surrounding highway network and its deliverability.

- 13.24 The review of alternative technologies confirms that EfW offers the best performing, deliverable technology