

DESIGNING WASTE FACILITIES

a guide to modern design in waste



Prepared by Enviro Consulting Limited on behalf of Defra.

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www.defra.gov.uk/environment/waste



Commission for Architecture
and the Built Environment

www.cabe.org.uk

Written and researched by:



www.enviros.com

Foreword






'We are committed to making a big effort to reduce waste and improve our recycling ability. To do that Britain needs new infrastructure for the better management of waste. New infrastructure will only be built if local communities are happy and this means the best possible design must be applied to win that all important public endorsement. I hope this new guidance will help achieve that aim.'

Jane Kennedy
Waste Minister

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Chapter 1: Introduction

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Introduction



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Overview

A revolution is underway in the way we deal with waste in the UK. What used to be seen as a problem to be solved is now seen as resources that can be exploited. Valuable resources that previously would have gone straight to landfill sites will be reprocessed and recycled or turned into energy in new facilities at the heart of our communities. The government's Waste Strategy 2007 is leading to investment in a large number of new waste facilities and an enhanced profile for the industry. However, this radical new approach to waste also demands a revolution in attitudes to the design of those facilities. It is important that those engaged with the development of waste facilities embrace all aspects of good design practice.

This guide aims to promote better understanding of the importance of design in the waste sector and to help drive improved standards.

Chapters 2 to 4 of this document provide the background to the delivery of waste management facilities. Chapters 5, 6 and 7 set out ways in which this may be realised.

Who should use this design guide?

Whether you work for a waste management company, a planning authority, a waste disposal authority or are a professional engaged in the procurement or development of waste facilities this guide is for you. This guide:

- outlines the key design principles for waste facilities
- references and signposts relevant existing design documentation
- explains how good design is central to the delivery processes, highlighting key design considerations, the stakeholders involved and their respective roles.

The waste management industry is learning from good design practice being applied successfully in other development sectors and there are many examples of good design that the waste industry can already be proud of. Research for this guide included extensive discussions with waste management professionals, consultation with organisations that play a role in the procurement and delivery of new waste facilities, a programme of waste facility visits and a review of a wide range of published design literature. Much of the existing literature has been produced for non-waste industry audiences but most aspects of good design are common to all development types.

Good design is not a simple case of replicating approaches adopted

elsewhere. It cannot be used as a 'shopping list' to achieve a pastiche of a model facility or indeed a tick box way of achieving a successful planning outcome. Good design needs to be bespoke; tailored to the needs of each site, its setting, the specific demands of the project and the local environment. It is about much more than whether facilities look good. Design embraces various themes including scale, mass, layout, materials, energy efficiency as well as the more intangible aspects of aesthetics and good place making.

Technology will also play a big part in decisions. Many authorities are looking to the future and exploring reductions in carbon emissions through combined heat and power (CHP), composting and anaerobic digestion (AD). Each technology type may need a different design response. All will need to respond appropriately to the site and its context.

A changing agenda and approach

Waste is now widely recognised as a resource to be exploited rather than as a problem to be solved. The infrastructure and buildings developed to realise the resource and energy potential from waste will often be at the heart of our communities and not hidden away. In the past there has been heavy emphasis on the role of landfill in the UK. However, as a result of European and national legislative drivers to recover resources this is changing.



There is an urgent need to recover more value from our waste and there are strong fiscal incentives to do so. A new era in the history of waste management in the UK is now underway.

The only way that the required change in approach will be achieved is through the delivery of new facilities using a range of treatment techniques and technologies. Facilities will be required at all scales, from civic amenity sites to energy from waste plants. Many new facilities have already been developed or are currently going through design and planning stages but the peak in new development is expected between 2010 and 2015.

Scope

The guide specifically considers 'high level' design issues associated with waste facilities that require new planning permissions. These could be facilities that collect, recycle, transfer, treat or recover energy from the waste. They may be single process facilities or integrated facilities where a number of treatment types have been grouped together in one building or on a strategic site.

It focuses on the non-functional components of waste facilities and does not address issues associated with technical or process related design components, although clearly the interface between the two is critical. The guide does not

consider matters relating to costs, detailed technical specifications of buildings, or matters relating to building regulations, and associated requirements relating to health and safety. Design issues associated with landfill sites have been well documented over many years and are also not considered further in this guide.

'Good design and layout in new development can help to secure opportunities for sustainable waste management, including for kerbside collection and community recycling as well as for larger waste facilities. Planning authorities should ensure that new development makes sufficient provision for waste management and promote designs and layouts that secure the integration of waste management facilities without adverse impact on the street scene or, in less developed areas, the local landscape.'

Planning Policy Statement 10;
Planning for Sustainable
Waste Management (2005)
paragraph 35

Key drivers

At present there are no authoritative design guides for waste facilities that can be used by practitioners to guide the promoters, professional design teams, sponsors and regulators. The requirement for good design is clearly set out in national, regional and local policy drivers and this document will assist in the application of these principles. The key drivers are therefore:

- responding to the climate change agenda
- meeting sustainable design expectations
- formulating local planning policy
- applying design standards to waste procurement.

Waste practitioners currently draw inspiration from a wide range of disparate sources of advice on design. This document provides a central reference point that will allow professionals involved in the delivery of waste facilities to make better informed choices about the design of new developments.

As part of their forward planning responsibilities some local authorities have already recognised the need to produce their own design guides, either as stand alone documents or as supplementary planning documents forming part of the local development framework. One of the aims of this guide is to provide some consistency about basic design principles and allow local authorities to concentrate on

Document overview

Chapter 2 - Background & context

- Where has the industry come from?
- Where is it going?
- Why do we need good design?

Chapter 3 - The design process

- How do we deliver good design?
- There are no set rules, design is an iterative process, not just the end result.

Chapter 4 - Stakeholders & their roles

- Who is involved in the design process?
- How do they engage with this agenda?

Chapter 5 - Setting the design agenda

- Where does the design process start?
- The need for strategic vision to set expectations and benchmarks.

Chapter 6 - Core design

- How can good design be delivered?
- What elements should be considered in the design process?
- How can you translate theory into practice?

Chapter 7 - Design realisation

- Going from drawings to a working facility.
- How is a proposed development delivered on the ground?

Chapter 8 - The final word

- Re-inforcing the messages



Images courtesy of Enviro Consulting and Islington Council



local design issues relevant to their particular areas. There is also a clear need to provide some context for considering design credentials as part of waste facility procurement and how the design aspects of tenders are evaluated.

The private sector wants consistency in design expectation and clarity in understanding how proposals will be judged by regulators and clients. This guide should help to fulfil this objective.

'Good design ensures attractive usable, durable and adaptable places and is a key element in achieving sustainable development. Good design is indivisible from good planning.

Planning authorities should plan positively for the achievement of high quality and inclusive design for all development, including individual buildings, public and private spaces and wider area development schemes. Good design should contribute positively to making places better for people. Design which is inappropriate in its context, or which fails to take the opportunities available for improving the character and quality of an area and the way it functions, should not be accepted.'

Planning Policy Statement 1 ;
Delivering Sustainable
Development (2005)
paragraphs 33 and 34

How to use the guide

The guide is not presented as a fixed, prescriptive set of instructions but as a description of the process by which a suitable design can be developed. It is a guide to the issues that should be considered, by whom and at what point in the development cycle. Where appropriate, it highlights specific design aspects of facilities, but does not promote or endorse any particular plant or facility.

Structure

The guide aims to help practitioners to access information relevant to their needs and role in the design process. Key design principles and key actions relating to specific topics, together with illustrations and photographs of local case studies, are provided throughout the document. Sources of further information are identified to enable users to undertake more detailed research.

The focus is on the key decision-making steps in the development of waste facilities and how design issues should be considered, from the selection of sites through to the final design stages and post-development issues.

Chapter 2: Background & context

Where we have come from & where we are going

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Background & context



Images courtesy of Enviros Consulting and RecycleNow

Overview

Good design is now a core part of government policy. Local authorities are required to consider design quality when determining all planning applications. And the government's 'Better Public Building' (2006) report demands a dramatic improvement in the quality of the buildings procured by all public sector bodies.

At the same time the UK waste industry is witnessing a paradigm shift from reliance on landfill disposal facilities towards investment in a range of treatment options, including previously tried and tested solutions as well as new and emerging technologies. This is resulting in a push towards a greater number and variety of facilities. As a society we are becoming increasingly aware of the environment that we live in and the impact that we have on it and it is widely recognised that sustainable waste management is fundamental to this. We need to reduce the waste that we produce and wherever possible recover the most value from it. These principles have driven the legislative changes to which the industry and local authorities now have to respond.

The evolution of waste infrastructure

The nature of waste management and its associated infrastructure has changed markedly since the days before the Public Health Acts and subsequent environmental legislation. Originally there was an unmanaged disposal route that meant waste was left lying in close proximity to people's houses, which led to a concern for public health. The next step was that specific areas for dumping waste were defined on land away from towns and cities to remedy the problems experienced in the mid and latter parts of the 19th century.

In the UK, landfill has been the mainstay of the waste management industry. This is a consequence of living in a country rich in minerals that were mined or extracted for aggregate, building or industry which left holes in the ground that needed infilling. Landfill has traditionally been an acceptable route to restore quarry sites. Despite extensive engineering for environmental protection the cost of landfill remained relatively low. The UK has also used incinerators to deal with a significant amount of its waste. The first destructor (as they were originally known) was commissioned in Nottingham as early as 1874. However, there have been fluctuations in the popularity and use of this treatment option because of public perception and changing legislation.

With the rise of consumerism and individual wealth our possessions became increasingly disposable. In simple terms, everyone began to dispose of more and more waste. This has had major implications for the waste management industry and local authorities. However, the cost and acceptability of the traditional disposal routes coupled with increasing public awareness of the environmental implications of the 'throw away' society has led to a shift in waste treatment techniques. The waste management industry has responded to this by developing a range of new facilities to recover more value from the waste and respond to legislative drivers.

The pressure and need to recycle has gained increasing momentum in the past few years. Since the late 20th century, industry has evolved to move away from the traditional landfill approaches.

The push to change our approach has been reinforced by fiscal measures coupled to specifically more targeted 'green' legislation, for example the landfill tax and the landfill allowance trading scheme (LATS).



Climate change is something we must all address. The development of waste facilities should be seen as a potential opportunity to reduce carbon emissions and authorities' carbon footprint. New technologies incorporating combined heat and power are becoming more prevalent, as authorities explore solutions for reducing carbon emissions when addressing waste and tapping its potential as a resource. To assist in this, the Environment Agency has developed WRATE (Waste and Resources Assessment Tool for the Environment) to model technical assumptions so that the impact of a proposed facility in terms of carbon can be modelled prior to technology selection and become an integral part of facility design prior to construction.

Landfill will continue to be used for the disposal of treatment residues and some types of residual waste that cannot be dealt with in other ways, or waste that has no intrinsic value, such as certain types of inert waste. Existing landfill sites and mineral voids should also be viewed as an important long-term resource to be used sparingly and for a small range of waste types only.

The design of waste facilities has previously been dominated by engineering and practical solutions. Clearly a facility has to work and be able to carry out its function, but now the process of design has a much broader remit.

We are moving to a point where all sectors, including waste management, have to demonstrate the way in which the design process has positively influenced new development proposals. New facilities should not only be as attractive and/or unobtrusive as possible but should exemplify a deeper understanding of sustainable design issues in the round.

The increasing importance of good design is most evident when it comes to large scale thermal treatment plants. The design of energy from waste facilities, for example, has gradually evolved from relatively functional buildings lacking in design inspiration to more distinctive design statements.

Drivers for increased investment

There are a number of drivers for incorporating good design principles into the commissioning of waste facilities. EU legislation that has been implemented through domestic legislation and guidance calls for higher levels of treatment and more sophisticated levels of separation of the different categories of hazardous, non-hazardous and inert waste and is influencing the need for an increased number and range of waste management facilities.

National legislation and guidance

Overarching legislation and guidance

There is a host of legislation and guidance that relates to waste management and the planning system in England and Wales. Waste Strategy 2007 sets out the government's vision for sustainable waste management in England. It establishes a framework and approach to waste strategy, central to which is moving waste management up the waste hierarchy and meeting European waste targets.

The core objectives of national legislation and strategy are to:

- decouple waste growth (in all sectors) from economic growth and put more emphasis on waste prevention and re-use
- meet and exceed the Landfill Directive diversion targets for biodegradable municipal waste in 2010, 2013 and 2020
- increase diversion from landfill of non-municipal waste and secure better integration of treatment for municipal and non-municipal waste
- secure the investment in infrastructure needed for increased recovery of resources and for the management of hazardous waste
- get the most environmental benefit from that investment, through increased recycling of resources and recovery of energy from residual waste using a mix of technologies.

Construction of new waste management facilities is fundamental to delivering this strategy. Other tools are applied at a national level to assist in the implementation of Waste Strategy 2007, such as the landfill allowance trading scheme (LATS).

Defra's Waste Infrastructure Delivery Programme (WIDP) published planning guidance directed at the procurement of new waste facilities. This guidance encourages a proactive approach to waste planning from strategic decisions to the delivery of facilities on the ground. This was followed by WIDP's 'Planning Health Framework' which provides a means to evaluate the potential strategic and site specific opportunities and constraints to the development of new waste facilities. Authorities are strongly encouraged to understand and proactively manage planning risks.

Planning legislation and guidance

A range of planning legislation and guidance is directly relevant to the delivery of new waste facilities. The planning system essentially provides the land use framework within which new waste facilities should be delivered. Forward planning (plan making) provides the policy framework for defining what is required and where, while development control evaluates proposals against these policies and other material planning considerations such as national planning guidance. At national, regional and local levels there is strategic guidance relating to

Evolution in Waste Management



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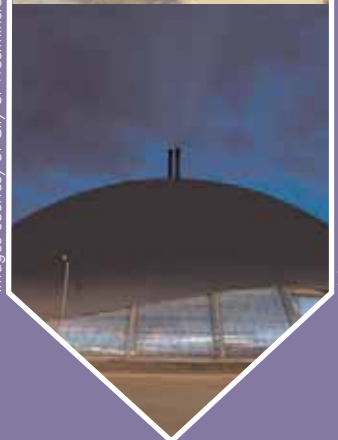
1930



1970



1980



2000

Images courtesy of City of Westminster, CWM and Veolia Environmental Services



forward planning and development control. Development control is the primary tool for establishing how a new development is delivered. Environmental permitting also plays an important role in this delivery process and covers many of the process-related issues.

The Planning and Compulsory Purchase Act (2004) requires that applications for planning permission must be accompanied by a Design and Access Statement, which sets out the design principles and concepts that have been applied to the development and incorporates a statement relating to access to the development and how any issues have been dealt with. This is reinforced in Circular 01/06 (Communities and Local Government): Guidance on Changes to the Development Control System, which provides more detailed advice on the preparation of a Design and Access Statement.

Planning Policy Statements (PPSs), and in some instances the older planning policy guidance notes (PPGs), provide guidance for new development at a national level. PPS1: Delivering Sustainable Development (2005) and PPS10: Planning for Sustainable Waste Management (2005) are of particular relevance to this guide. PPS1 makes clear reference to the need for the principles of good design to be applied at a strategic level and for these to be embedded in relevant local policy documents. National guidance plays a pivotal role in plan making

and can be a material consideration for planning applications.

'Waste management facilities in themselves should be well-designed, so that they contribute positively to the character and quality of the area in which they are located. Poor design is in itself undesirable, undermines community acceptance of waste facilities and should be rejected.'

Planning Policy Statement 10,
Planning for Sustainable
Waste Management (2005)
paragraph 35

Good design is something that is likely to be critical to good planning decisions, but design is important for the whole of a waste management project from the initiation phase through to project completion and the operation of the facility on the ground.

Planning for Sustainable Waste Management: A Companion Guide to Planning Policy Statement 10 (2006) builds on and reinforces the need for good design in new waste facilities. It states clearly that sustainable waste management will be best delivered through good design in waste and non-waste developments. It also refers to some of the drivers and constraints required to deliver good design. In addition, *Planning Policy Statement: Planning and Climate Change - Supplement to Planning Policy Statement 1* (2007) makes clear links between waste management and the contribution that it can make to sustainable development.

'Delivering a fundamental change in the design quality of waste management facilities requires investment in design and appropriate design skills being brought to bear at the right time. The planning system has a key role to play but the success of new development depends on the skills of designers and the commitment of those who employ them.'

Planning for Sustainable Waste Management: A Companion Guide to Planning Policy Statement 10 (2006)

The Barker Review of Land Use Planning (2006) also made direct reference to the importance of good design, especially chapter 5, which was dedicated to 'improving the quality of design of new development'.

'These improvements in quality of service should not, however, mean less focus on wider quality outcomes. Good building design and urban open space are paramount for quality of life, efficient use of space and productivity of working buildings. The planning system has a role in securing high-quality design...Design coding, design review panels, design champions and pre-application discussions are tools which the planning system should use to deliver a high-quality built environment.'

Barker Review of Land Use Planning (2006) paragraph 24

Incorporating sustainable development in the design process

Successful new development constructed within a high quality built environment is dependent on the concept of the 'sustainable building'. This can be defined as building practices that strive for integral quality (including economic, social and environmental performance) in a broad way. Examples of this approach include: considering the responsible use of natural resources and appropriate management of the building stock that will contribute in the long-term to saving of scarce resources; reducing energy consumption; and improving environmental quality.

'Planning authorities, developers and other partners in the provision of new development should engage constructively and imaginatively to encourage the delivery of sustainable buildings.'

Planning Policy Statement: Planning and Climate Change - Supplement to Planning Policy Statement 1 (2007) paragraph 30

A number of guiding principles have been identified for achieving sustainable development. Key principles for design in the waste sector are:

- resource efficiency – for example in construction methods and materials





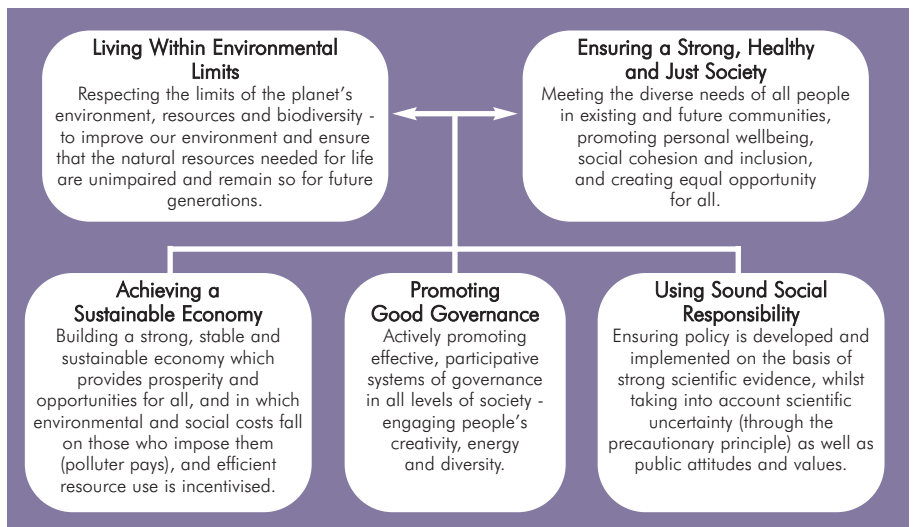
- energy efficiency, including greenhouse gas emissions reduction
- pollution prevention, including indoor air quality and noise abatement
- harmonisation with the environment, including environmental mitigation
- integrated and systemic approaches, for example an environmental management system.

Sustainable building involves considering the entire life cycle of buildings, taking environmental and functional qualities into account. Good design is synonymous with sustainable construction: no new development can be considered well designed if it does not contribute to environmental, social and economic sustainability.

The waste hierarchy seeks to minimise, reuse and recycle waste (in that order of priority) and can be used as a basis for achieving the objectives associated with sustainable building. When delivering new facilities it is appropriate to consider how the proposal fits with the hierarchy via:

- the reduction of materials needed for construction through the design of simple low-technology structures and the use of recycled materials where possible
- considerations to enable the building to be easily decommissioned or reused for a new purpose
- enabling the future recycling of building fabric for its composite materials.

Shared UK principles of sustainable development



www.sustainable-development.gov.uk

About half of the UK's carbon emissions arise from the built environment and the resultant climate change impact demonstrates how design and sustainability are intrinsically linked. Modern construction methods mean that buildings are designed to have longer life spans and therefore different environmental issues may apply. 'Carbon inefficient' buildings consume more conventional energy sources for heating and cooling, have a high amount of associated hardware and systems and therefore cost more than low-carbon buildings to run, maintain and refurbish.

Research has also shown that environmentally friendly buildings are more pleasant working environments and encourage high productivity among staff and users within them. In other words, the design of buildings has an environmental, economic and social impact influencing all aspects of sustainability.

'....the financial benefits of green buildings are approximately ten times larger than the average additional cost of building them.'

The Costs and Financial Benefits of Green Buildings (2003)

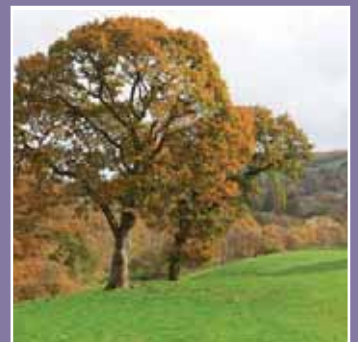
Sustainable design generally encompasses a building and its surroundings including landscape planting, roads and footpaths. The BRE (Building Research Establishment) Trust, a research, consultancy, training, testing and

certification organisation that aims to deliver sustainable development and innovation throughout the built environment, has developed a range of assessment methods called the BRE environmental assessment method (BREEAM). These are designed to help construction professionals understand and mitigate the environmental impacts of the developments they design and build.

The Building Regulations represent an additional tool for aiding the implementation of sustainable development and need to be considered early in the design process. The 2006 regulations require an improvement in energy or carbon performance of a building over that required in 2002.

Public perception and planning

Public perception of the waste management industry and specific plants is of critical importance when delivering new waste infrastructure. It is important that the local authority and/or the developer engage with local communities and stakeholders before and after submitting a planning application. The facts need to be presented carefully, as a bad reaction to a new development can undermine a proposal, lead to a more protracted planning process and sometimes to planning failure. The local community have a meaningful role to play in the evolution of design proposals. Even now, waste development can be



Images courtesy of Enviro Consulting and PPS



viewed as a bad neighbour and well-designed new facilities provide an opportunity to change the perception of a specific development and the waste industry as a whole. Experience from Europe and increasingly in the UK shows that waste facilities can be embraced by the communities that they serve, particularly when they understand the benefits that they deliver.

Conflicts surrounding public perception and waste management facilities stem in part from the fact that traditionally they were constructed with pure function in mind and were regarded as low quality developments with limited regard for their integration within the local setting. There have also been some well documented examples of bad management practices at waste facilities leading to environmental impacts and concerns over possible health effects. The design of new facilities has a pivotal role in changing the perception of specific development and the industry as a whole.

The primary route for opinions to be raised by the public on new waste development is through the planning system and media. Consultation and transparency in the forward planning and development control stages allows the local community to voice their opinions on development plans as well as being able to comment on specific proposals in a planning application.

'The delivery of the Marchwood energy recovery facility involved extensive consultation with the local community including discussion about the design solution. The process has encouraged local ownership of the facility.'

Richard Read
Head of Planning
Hampshire County Council

Content and structure of strategy for sustainable construction

	Chapter Headings	Overarching Target
The 'Means'	Procurement	To achieve improved whole life value through the promotion of best practice construction procurement and supply side integration, by encouraging the adoption of the Construction Commitments in both the public and private sectors and throughout the supply chain.
	Design	The overall objective of good design is to ensure that buildings, infrastructure, public spaces and places are buildable, fit for purpose, resource efficient, sustainable, resilient, adaptable and attractive. Good design is synonymous with sustainable construction. Our aim is to achieve greater use of design quality assessment tools relevant to buildings, infrastructure, public spaces and places.
	Innovation	To enhance the industry's capacity to innovate and increase the sustainability of both the construction process and its resultant assets.
	People	An increase in organisations committing to a planned approach to training (e.g. Skills Pledges; training plans; Investors in People or other business support tools; Continuous Professional Development (CPD); life long learning). Reduce the incidence rate of fatal and major injury accidents by 10% year on year from 2000 levels.
	Better Regulation	A 25% reduction in the administrative burdens affecting the private and third sectors, a 30% reduction in those affecting the public sector by 2010.
The 'Ends'	Climate Change Mitigation	Reducing total UK carbon dioxide (CO2) emissions by at least 80% on 1990 levels by 2050 and by at least 26% by 2020. Within this, Government has already set out its policy that new homes will be zero carbon from 2016, and an ambition that new schools, public sector non-domestic buildings and other non-domestic buildings will be zero carbon from 2016, 2018 and 2019 respectively.
	Climate Change Adaptation	To develop a robust approach to adaptation to climate change, shared across Government.
	Water	To assist with the Future Water vision to reduce per capita consumption of water in the home through cost effective measures, to an average of 130 litres per person per day by 2030, or possibly even 120 litres per person per day depending on new technological developments and innovation.
	Biodiversity	That the conservation and enhancement of biodiversity within and around construction sites is considered throughout all stages of a development.
	Waste	By 2012, a 50% reduction of construction, demolition and excavation waste to landfill compared to 2008.
	Materials	That the materials used in construction have the least environmental and social impact as is feasible both socially and economically.

Strategy for sustainable construction (2008)



Image courtesy of Enviro Consulting



Signposting

There is a diverse range of guidance and references that relate to the design of built development. This guide has been prepared with reference to numerous publications, which are set out in detail at the end of this document. Some of the core references are signposted below. This guide has been prepared to complement these references and should be read in conjunction with them.

<p>By Design- urban design in the planning system: towards better practice (DETR and CABE, 2000)</p> <p>Provides advice on implementing the Government's commitment to good design and encourages those who influence and shape development decisions to think carefully about the living environments being created. It puts across that good design is important in all contexts. It also highlights the role that the planning process can play in driving good design.</p>	
<p>Better Public Building (CABE, 2006)</p> <p>This document provides arguments and the evidence demonstrating that good design makes places work better. It provides practical advice for creating new public building that is value for money, sustainable and a source of civic pride. Better Public Buildings also sets out the steps that public bodies need to follow if they are to ensure that all those who use public services benefit from good design.</p>	
<p>Urban Design Compendium (Llewelyn-Davies, 2007)</p> <p>The Urban Design Compendium provides guidance on good urban design. It covers the principles of urban design, how they can be applied and the processes which lead to successful places. As well as guidance the Compendium also incorporates case studies explaining how these principles could be applied in practice.</p>	
<p>Improving Standards of Design in the Procurement of Public Buildings (CABE and OGC, 2002)</p> <p>Prepared to communicate the steps required to ensure further improvement in the design quality of public sector building and infrastructure projects. The document presents a number of recommendations that reinforce Government Policy.</p>	
<p>Creating Excellent Buildings A Guide for Clients (CABE, 2003)</p> <p>Provides a thorough guide to commissioning and delivering a building project successfully. It passes on the lessons learnt by CABE's enabling programme to those about to embark on a construction project for the first time. The document is divided into the four main stages of a building project – preparation, design, construction and use of the building.</p>	

Making Design Policy Work: How to Deliver Good Design through your Local Development Framework (CABE, 2005)

This document sets out five fundamental factors for good local design policies. It explains where different types of policy can fit into the different local development plan documents, and suggests key objectives for a range of design policies from landscaping to architecture.



Getting Good Value from Construction Projects Through Design (NAO, 2004)

This document has been prepared to provide auditors with an understanding of the value of good design in construction, and a firm basis for examining whether good design has been achieved in a particular project. It is primarily intended to guide internal and external auditors to making sound judgements when auditing public sector construction projects.



Design and Access Statements: How to Write, Read and Use Them (CABE, 2006)

This short guide provides information regarding how to write and read Design and Access Statements. It accompanies the Government circular 'Guidance on Changes to the Development Control System' and provides practical advice on getting the best from statements to help deliver well-designed, inclusive places.



Green Guide to Specification (Jane Anderson, David Shiers and Mike Sinclair, BRE, 2002)

The Green Guide to Specification is a document that provides guidance for people involved in building specification and design. It describes the relative environmental impacts of a wide range of construction materials and components.



Achieving Excellence in Construction Procurement Guide 11; Sustainability (OGC, 2007)

This guide highlights the importance of sustainable development in construction projects throughout the decision making/delivery process. It sets out the processes by which construction projects can be procured and delivered by the public sector, while promoting sustainable development and achieving optimum whole life value for money.



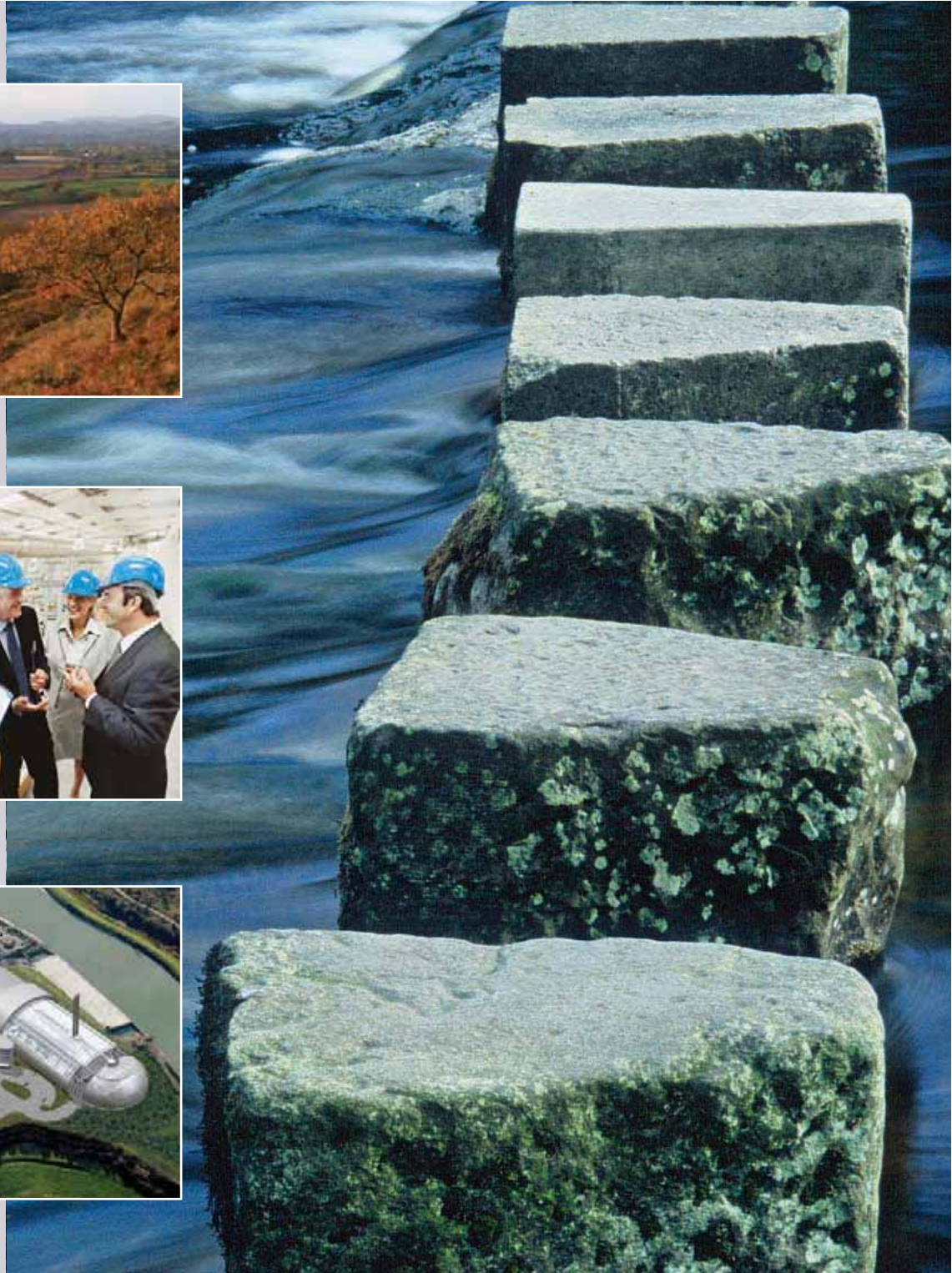
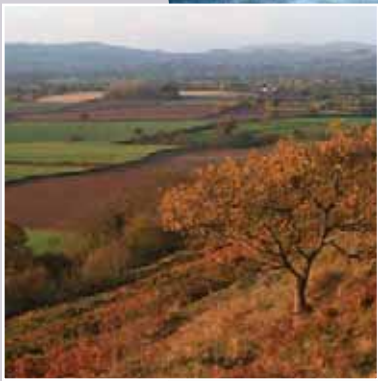
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Chapter 3: The design process

Driving & delivering new developments

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The design process



Images courtesy of Enviro Consulting and Veolia Environmental Services (www.veolia.co.uk)

Overview

Good design draws together a number of different themes, disciplines and stakeholders and integrates them to realise an effective and well-executed development. Approaching design as a considered process should result in a quality outcome. With waste facilities, as with any other development, good design should be a core part of the project plan.

Demonstrating that resources are being invested wisely is at the core of both public and private sector accountability. A systematic approach to achieving a good design outcome must be central to any project plan and this is critical in promoting a positive image for waste management. The design process starts with policy and strategy development, gathers pace through the core design and planning stages and continues through construction and operation. It can be a lengthy and iterative process involving many individuals bringing different skills and perspectives. However the process is managed and led, those involved should always come back to certain core principles centred on sustainability, the quality of places and how the development contributes to the local community.

What is a good design?

Design is more than just the way something looks or whether it works, and cannot be achieved simply by following a prescriptive approach. It is a process that should be a defining part of any project. It will often be an iterative process and will evolve as the project develops. Good design also needs to be forward looking and able to respond to future policy and regulatory requirements.

Just as with any construction project, a waste management facility will need to ensure it offers the right balance in terms of quality, time and cost.

Quality must be considered not only in terms of the immediate functional needs of a waste facility but in terms of wider design issues, such as:

- will it harmonise with the setting?
- is the facility fit for purpose?
- can the site accommodate the proposed use?
- does it minimise the use of resources?
- will the building be flexible/adaptable?
- is there suitable access?

Time refers to the need to meet appropriate timescales in terms of getting the facility financed, permitted, designed, built, fitted out and ready for service. Often the project will need to be delivered to meet time-related fiscal pressures such as the landfill tax escalator.

'Good design can be summarised as a mix of the following attributes:

- i. **functionality in use:** *is the building fit for purpose, or even better, does it use know-how and innovation to provide business and social value? Does it optimise the operational cost of core services and, in particular, the productivity of staff?*
- ii. **build quality:** *is the building built on whole life cost principles – built to last and easy to maintain?*
- iii. **efficiency and sustainability:** *is the building designed in a way that it will be completed on (or before) time, to budget and to specification? Is the building environmentally efficient, in terms of where it is located, how it has been constructed and how it will be used?*
- iv. **designing in context:** *is the building respectful of its context, strengthening the identity of the neighbourhood in its landscape? The government's guidance on urban and rural design, *By Design*, states that any new development should accord with the following principles – character, continuity and enclosure, quality of public space, ease of movement, legibility, adaptability and, where appropriate, diversity of use.*
- v. **aesthetic quality:** *the procurer may have architectural requirements that will form an essential element of the design process. These could include the need for distinguished architecture, or the need for a building to harmonise with other existing buildings.'*

Improving Standards of Design
in the Procurement of Public
Buildings (2002)



The time to gain permission for a waste facility is likely to be considerable compared to other building projects because of the need for greater consideration of environmental impacts, and for community engagement. The start of a project is when most can be done to add value through careful preparation and adequate time for design.

Cost covers the construction, materials and all related expenses including operational costs. The cost of planning, and securing the input of professional advisors can also be significant.

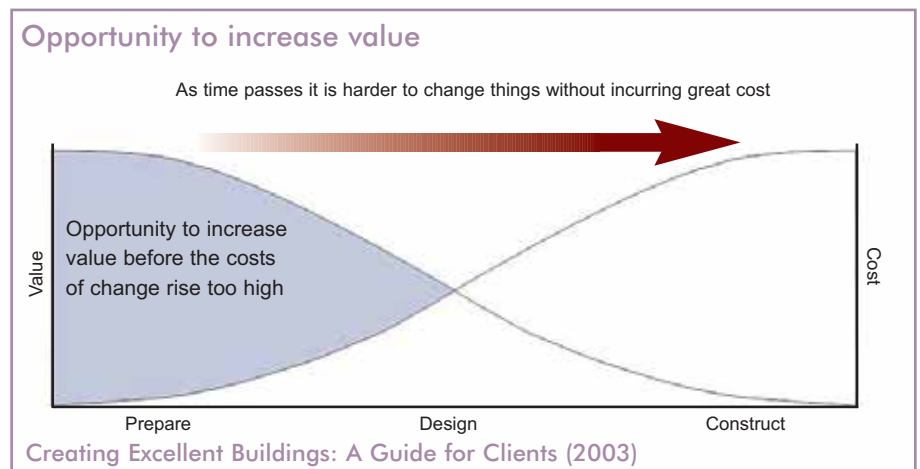
There are three principal phases in the design of a waste facility, which can be simply broken down into prepare, design and construct. There is a degree of overlap between these phases and it is at the start of the project that most can be done to add value through careful preparation and adequate time for design.

Importance of design

The quality of cities, towns, villages and the urban and rural landscape are important in defining a nation and its culture. The design of new waste facilities should be considered in that context. Waste management practitioners need to pay careful attention to the local setting when devising design solutions for waste facilities. The spaces between buildings are often as important to a sense of place as the buildings themselves.

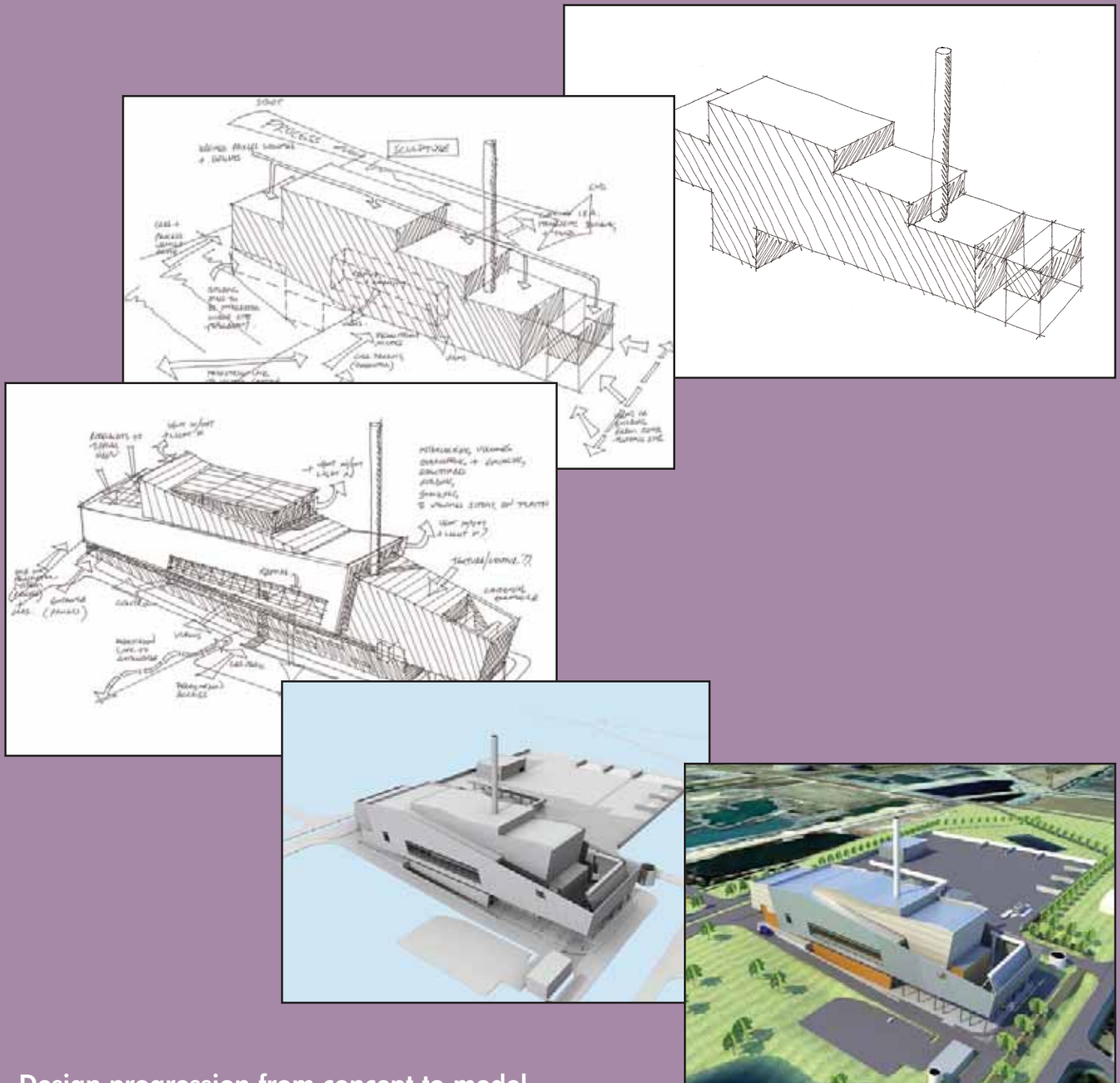
'It is now widely accepted across local government that good design in buildings and public spaces both enhances existing high quality built environments and contributes to the regeneration of run-down areas. These social and economic benefits come from an integrated approach to the built environment, which values both heritage and new development, and recognises how the two can best complement each other.'

Local Authority Design Champions:
an Introduction (2004)



DESIGNING WASTE FACILITIES

a guide to modern design in waste



Design progression from concept to model

Images courtesy of Studio E Architects



A strong body of evidence on what constitutes urban quality already exists. This can be applied to waste facilities in the same way as to other developments. The relationships between different components of a building as described by its design are significant to the quality and sustainability of buildings as well as to the welfare of its users.

Informed choices that are based on the principles of sustainable design will help to fulfil wider objectives set out in Waste Strategy 2007, PPS 10 (2005) and Securing the Future (2005). Embracing concepts such as sustainable consumption and production or sustainable products and materials will help to achieve effective waste management. Sustainable design will need a long-term perspective and a degree of vision to justify the additional outlay that may be incurred initially.

Good design is not just about appearance or linking a building with the surroundings. It also makes sound economic sense by:

- increasing the flexible use and adaptation of a property
- reducing the whole-life cycle costs and environmental impacts of a project
- maximising the value of a building
- minimising the waste produced by the construction process
- minimising maintenance and upgrading costs
- maximising the longevity of a development.

It is important that new waste facilities are adaptable.

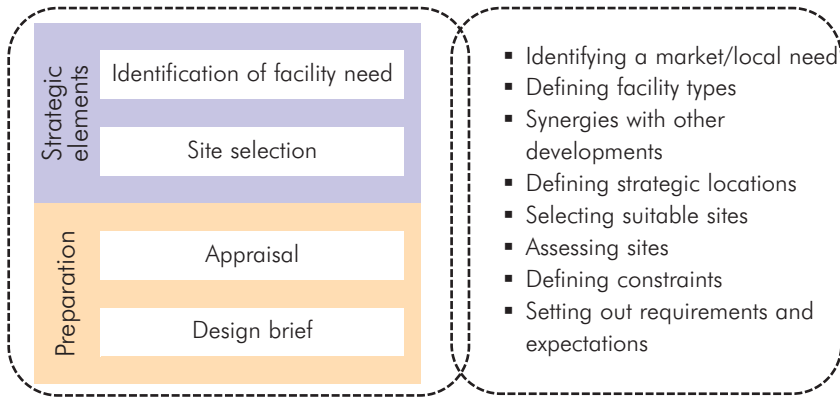
Circumstances and technologies are continually evolving and materials previously considered to be unrecycleable can now be put to beneficial uses. Waste facilities are typically built for long-term use and adaptability may be crucial to their sustained use.

The design process

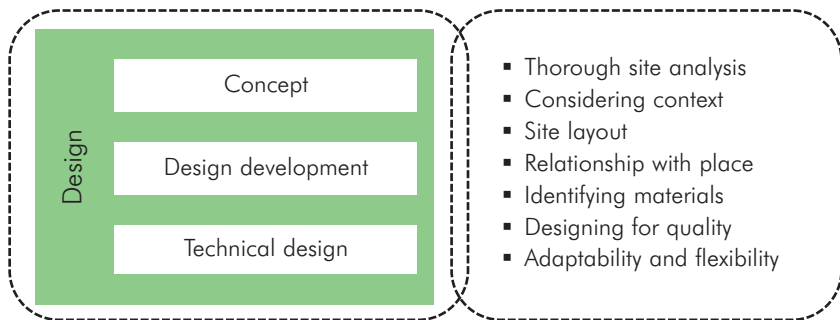
The design process is not a fixed, prescriptive set of rules, but should flow with the natural development of a project, from the identification of a need through to the delivery of the final development. The basic design process is applicable to all scales of development but the importance and level of detail will vary with scale. It should not be viewed as a simple linear process, but as an iterative one with various stages that inform the final solution.

The process in outline is relatively simple; a need is defined, which is then worked up in increasing levels of detail until a proposed development can be constructed on the ground. The stages of work set out by the Royal Institute of British Architects (RIBA) provide a useful overview for delivering a new waste facility. These stages are concerned with the mechanics of designing a new development and focus on site specific aspects. They should be used to provide a strategic context for the design of new waste developments.

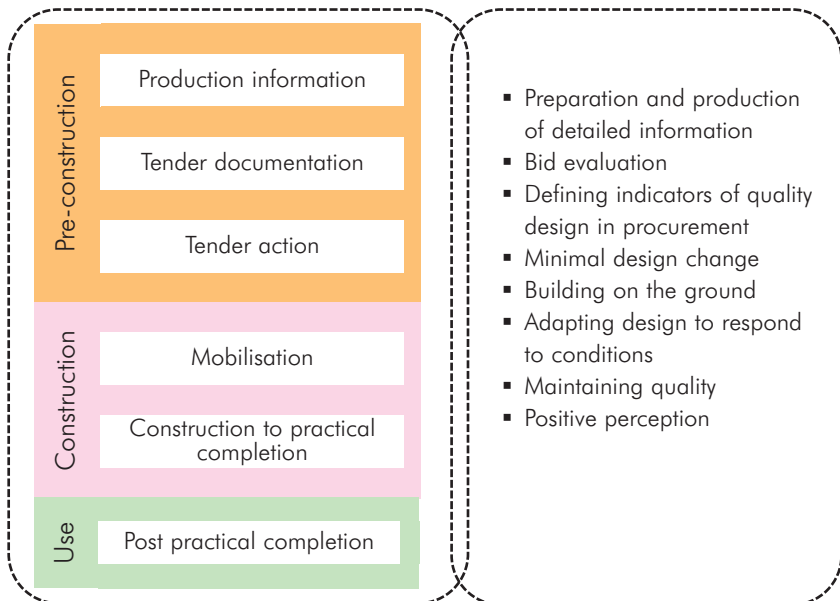
Stage 1 : Setting the design agenda



Stage 2 : Core design



Stage 3 : Design realisation and operation



Adapted from RIBA Outline Plan of Work (2007)



Images courtesy of Enviro Consulting and Defra



There are several key steps in the process of arriving at a solution for a site, each with a greater or lesser emphasis on design.

Stage 1 : Setting the design agenda

Identification of need

The need for waste facilities and the choice of technology is often defined at a strategic level. The need will have been considered within the regional and local context in waste management strategies and forward planning policies. The waste strategy will provide the context for what is required to serve the needs of the local community. At this stage in the process questions of what and where may not be relevant, but it is the place to set the tone in terms of design philosophy and quality expectations. Consideration of design should be factored into these early debates to ensure new proposals meet strategic requirements.

Various questions will be raised at this stage in the process: what is the most appropriate type of facility? What type of technology will be appropriate? What scale of facility will be required? How will materials be transported to and from it? What sites are available and appropriate for this type of development?

It is clear that important design considerations are fundamental to these questions and will enable effective integration of a new waste facility into a given context.

Proposals for industrial and commercial waste facilities will follow a similar decision process. While some of the drivers are different, there are many common themes. All facilities have to be economically viable and a strong business case will need to be prepared. The identification of need and location are comparable with private sector developments, although it is acknowledged that some of the initial drivers may vary.

'Five fundamental factors for better design policies

- 1 *embed design concerns across the new local development framework policy hierarchy and beyond to the community strategy*
- 2 *treat design as a cross-cutting issue which infuses all other policy areas*
- 3 *base design policies on an in-depth understanding of local context and the design process*
- 4 *recognise that design is important beyond the scale of individual sites and can help establish local development framework objectives at different spatial levels*
- 5 *ensure design policy addresses social and sustainable as well as visual and functional concerns.'*

Making design policy work:
how to deliver good design
through your local development
framework (2005)

Site selection

Site selection is a core part of the process for delivering a new waste facility. *Planning Policy Statement 10: Planning for Sustainable Waste Management (2005)* says planning authorities should identify sites

'In their consideration of the environmental performance of proposed development, taking particular account of the climate the development is likely to experience over its expected lifetime, planning authorities should expect new development to:

- *comply with adopted DPD (Development Plan Document) policies on local requirements for decentralised energy supply and for sustainable buildings, unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable*
- *take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption, including maximising cooling and avoiding solar gain in the summer; and, overall, be planned so as to minimise carbon dioxide emissions through giving careful consideration to how all aspects of development form, together with the proposed density and mix of development, support opportunities for decentralised and renewable or low-carbon energy supply*
- *deliver a high quality local environment*
- *provide public and private open space as appropriate so that it offers accessible choice of shade and shelter, recognising the opportunities for flood storage, wildlife and people provided by multifunctional green spaces*
- *give priority to the use of sustainable drainage systems, paying attention to the potential contribution to be gained to water harvesting from impermeable surfaces and encourage layouts that accommodate waste water recycling*
- *provide for sustainable waste management*
- *create and secure opportunities for sustainable transport in line with PPG13 including through:*
 - *the preparation and submission of travel plans*
 - *providing for safe and attractive walking and cycling opportunities including, where appropriate, secure cycle parking and changing facilities*
 - *an appropriate approach to the provision and management of car parking.'*

Planning Policy Statement: Planning and Climate Change,
Supplement to Planning Policy Statement 1 (2007) paragraph 42



Images courtesy of EGW, Veolia Environmental Services (www.veolia.co.uk) and Enviro Consulting



and areas in their development plan documents that are suitable for new or enhanced waste management facilities that will meet the waste management needs of their areas. Elements that need to be evaluated include the relationship with waste arisings, the site area required, site availability and site context. Good site selection is fundamental and many design considerations stem from this core decision.

As well as the strategic and practical decisions around site selection, there are also design and environmental considerations that need to influence the choice. The relevant issues vary greatly with scale and specific operational requirements but, as with all types of development, waste management facilities need to be located sensitively. They need to consider the reaction of the local community and various environmental considerations such as ecological designations. Environmental constraints may inform the site selection process, or have a big influence on the design solution, particularly on key elements such as layout, orientation and even the height of certain structures.

The approach to site selection may vary. There is no prescriptive approach to this but methodologies should have a number of common themes in terms of selection criteria. It is important that the strategies and plans set out clear objectives in terms of design quality and requirements.

Project scope and analysis

This stage in the process involves a review of a client's needs and objectives. Various feasibility studies may be required at this stage to analyse specific site constraints and opportunities. On-site and off-site constraints and opportunities should be identified. The character and setting of a site should also be considered.

Studies may be undertaken in parallel at this stage to evaluate different dimensions of a potential development. Work may include detailed evaluation of the proposed strategy and business case and may also include the evaluation of certain site constraints, for example traffic flows and potential site access arrangements. Such appraisals may also consider related off-site issues such as potential combined heat and power synergies associated with some waste management technologies.

It is important to consider design flexibility at this stage to allow for future changes in waste processing techniques, regulatory reform etc.

Design brief

The design brief is an important document that expresses requirements and expectations. It will be prepared by the client for the designer and will communicate what needs to be delivered on a site, the potential constraints and the likely means of delivery. It can also be used as part of a procurement project in tender specification and evaluation.

A Client Design Advisor (CDA) may be appointed to assist in the development of a brief. A CDA is usually an architect (but not the one designing the building) sitting on the client's side of a project, independent of the supply team, monitoring and helping to manage the design process from its earliest stages. A design brief may include:

- the overall objectives for the development
- work already undertaken - how/why the site has been selected;
- any specific design objectives or criteria
- site location and area/footprint for development
- description of the proposed development including any specific operational requirements
- access to the site (during construction and operation)
- availability of services
- any constraints identified such as services and environmental constraints such as flooding
- the timeframe and budget for delivery
- details of any relevant consultation, for example with the local planning authority.

STAGE 1 : SETTING THE DESIGN AGENDA

KEY ACTIONS

- define the project needs/challenges
- identify potential locations/sites
- identify potential technologies/treatments
- consider funding mechanism
- assemble project team
- identify overall project manager
- set aims and objectives
- define strategy and programme
- collate available data
- undertake site analysis and appraisals - planning policy, character, environmental issues, engineering/ground conditions
- meet and discuss with local stakeholders
- consider service provision
- establish design principles and visions for site
- define criteria.

DELIVERABLES AND RELATED PROCESSES

- plan and strategy preparation
- develop business case
- procurement initiation
- develop brief
- define objectives
- feasibility studies
- contextual analysis.

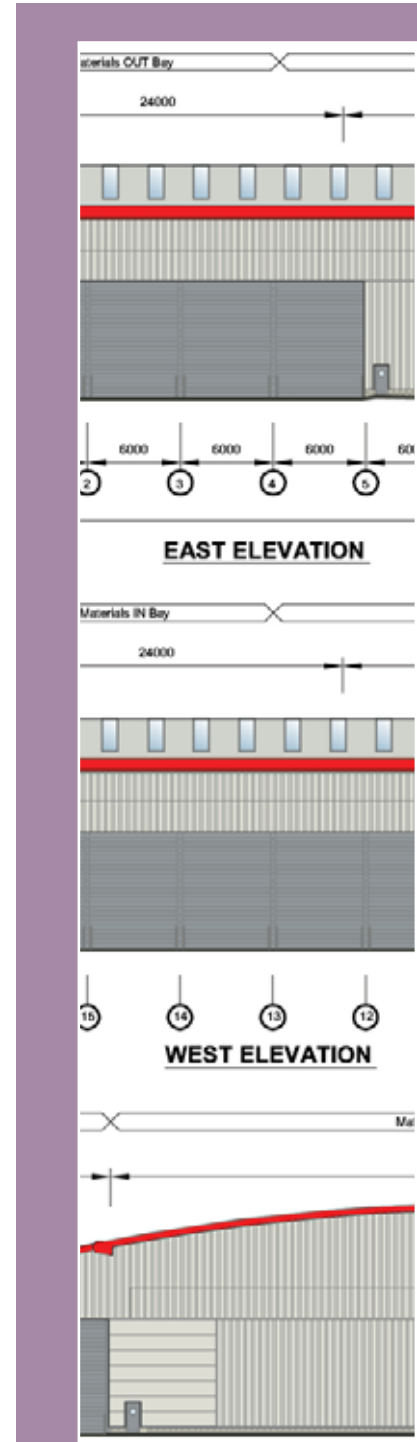


Image courtesy of Biffa Waste Services



Stage 2 : Core design

Concept

Once a site has been selected, there are various design challenges that have to be considered. The successful integration of the new development must be a key objective. Key questions include how a proposed development would relate to its surroundings and what type and scale of development would be appropriate.

The design concept should begin with a thorough analysis of a site and its context. This may overlap with elements of work undertaken during the appraisal stage. An understanding of context is fundamental to arriving at a solution that respects the existing urban or rural character and grain.

There is no single design solution for a given site. Creativity, subjectivity and interpretation mean different project teams will arrive at different solutions. However, the solution arrived at must be justified and explained.

The design solution

The detailed design will require a decision to identify a preference for one design concept and this stage in the process will refine and develop this. Detailed analysis of the technical and logistical requirements of the site will need to be considered and finalised.

Issues such as the choice of construction materials will also have important implications in terms of noise, odour and visual

impacts. If it has not already happened this will be the point at which plans for the site will be published as part of the consultation process prior to the planning application. If the project involves a large structure there is likely to be considerable local interest and it may be worthwhile employing a communications/PR consultancy or manager to carry out the engagement process.

Once a design solution for a site has been arrived at this should be reviewed by the project team to ensure that the original design objectives have been achieved.

At this stage it may be beneficial to obtain expert advice from external sources. The Commission for Architecture and the Built Environment (CABE) is a government-funded, national organisation with a remit to champion high standards of design in the built environment in England. Similar organisations with comparable objectives also exist in Wales and Scotland (Design Commission for Wales and the Royal Fine Art Commission for Scotland).

For major projects CABE offer a design review service which provides expert advice on the design of schemes in England that may have a significant impact on their environment. It reviews schemes which are significant because of their size, use, site, impact on local planning policy or potential to set a precedent. CABE encourages consultation at the earliest possible opportunity,

ideally before a planning application has been submitted. Advice given before the planning application is submitted is confidential. For further information refer to the CABE website.

Delivering quality

It should be noted at the outset that there is never a single design response. Design needs to relate to context and there will always be a range of potential solutions. The evaluation of design quality is probably as subjective as the design itself. It is primarily related to three attributes: impact, build quality and function.

In terms of impact, a design solution should respect local character and context. It should be assimilated into its setting and use materials appropriate to its context. As an integral part of this, the impact on the environment should be minimised in terms of factors such as noise impact and flooding.

Build quality relates to the structural integrity of the development, its fixtures, fittings and finishes. It covers the whole-life cost of the building. Is it designed and built to last? Is it easy to maintain? Will it be adaptable/flexible? Will it (eventually) be easy to dismantle? Attention to detail is a key component in delivering quality. The individual components of a building should be considered both in isolation and in relation to the development as a whole.

Function is clearly a core part of any proposal for a waste management facility. A new development must be fit for purpose. Due to the type of operations taking place, health and safety considerations must be taken into account. If there is a public interface at a facility, safety requirements are heightened further. The scale and number of vehicles visiting a facility mean good layout and access will be essential.

The ability to evaluate the design of new waste facilities is fundamental to the process and needs to recognise the way in which waste management facilities function. Evaluation should be open and integral throughout the delivery of new facilities, from setting out the initial brief to the completed building.

Design and planning

Achieving a successful planning outcome is obviously fundamental. Design information and the key design messages need to be communicated as an integral part of the planning application submission process. The application is invariably made up of different components:

- planning application form
- required drawings
- planning support statement
- environmental statement
- design and access statement.



Images courtesy of EGW and Enviros Consulting



There will invariably be a need to support the application with further reports and analyses. These will typically be discussed at length as part of screening and scoping exercises and may vary from the analysis of specific topics (such as traffic, noise, air quality, flood risk etc) to preparation of a full environmental statement in accordance with the Environmental Impact Assessment (EIA) Regulations.

The Department for Communities and Local Government (CLG) has published guidance on the validation of planning applications (The Validation of Planning Applications: Guidance for local planning authorities (2007)). This document contains the national list of planning application

requirements, together with recommendations on how local authorities can extend this. Planning application requirements may influence the design of a proposed development, or at least the information provided with the planning application.

The Design and Access Statement should explain the design thinking behind a proposed development. It should demonstrate how a development has been designed to accommodate people's needs as well as justifying elements such as building layout, form, scale etc. The EIA process (if required) should be integral to the design process, allowing the design to evolve, and incorporate appropriate measures to mitigate potential adverse impacts.

STAGE 2 : CORE DESIGN

KEY ACTIONS

- prepare and evaluate design options
- outline development form
- undertake relevant assessments, for example environmental impacts
- define and justify solution
- identify means for delivery
- continue local consultation
- identify priorities
- develop delivery programme
- refine masterplan and building design.

DELIVERABLES AND RELATED PROCESSES

- design options
- detailed masterplan for site and building(s)
- delivery programme and mechanism
- environmental impact assessment
- design and access statement
- planning application documents
- link with Environmental Permitting.

Stage 3 : Design realisation and operation

During the construction phase some minor amendments may be required to adapt the detailed design to site constraints and accommodate changes in the internal technical specification. If the outline and detailed design phases have been effectively implemented these changes should be minimised. Any major changes to the footprint, height or detail of the building should be avoided. All conditions attached to the planning permission must also be adhered to. Section 106 agreements can also be used to

provide planning gain relevant to design. These are legally binding and not subject to appeal.

Long-term management, maintenance and decommissioning should be important considerations in the design process. It is useful to keep a record of feedback on the design quality of the facility to help guide future decision making. Considering the long-term management of the facility during the design stage will help to reduce overall project cost and resultant long-term potential impacts on the environment.

STAGE 3 : DESIGN REALISATION AND OPERATION

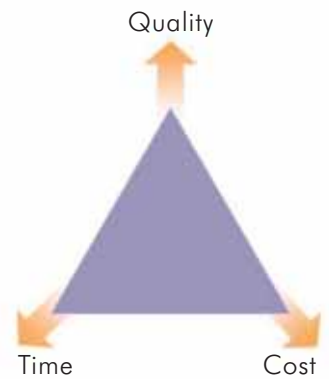
KEY ACTIONS

- confirm arrangements for implementation
- adopt plans and designs
- develop delivery programme
- refine masterplan and building design
- maintain local engagement with stakeholders
- building maintenance
- maintain clean and tidy site
- educate and inform
- review facility performance.

DELIVERABLES AND RELATED PROCESSES

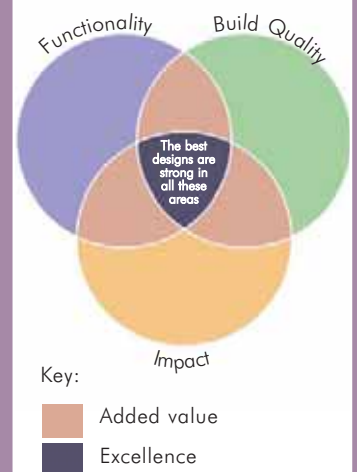
- completed development
- meeting planning conditions
- sustainable environmental management plan
- ongoing monitoring.

Balancing time, quality and cost is key to getting the most out of a development



Creating Excellent Buildings (2003)

Design Quality Indicators; overlapping quality fields



Design Quality Indicator Online



Consultation and stakeholder engagement

The design process draws together a range of skills and disciplines to arrive at the desired solution. A good design solution will also have been informed by inputs from stakeholders integrated within the design process. Only by taking this approach can aspirations and limitations be effectively incorporated into the final solution.

Connecting the design process with procurement

It is important to recognise how the design process relates to the delivery of new waste facilities. Whether financed or developed publicly or privately there are several consistent stages:

- establish need
- develop business case
- define and design the solution
- implement proposals.

The procurement of a waste facility may come before or after the site-specific design stage, but it is important that the proposals for a given site relate to the means of securing finance. A waste management company or local authority will have to consider the logistics of construction of a new waste facility. At this stage design aspirations should be clearly set out and included within the project brief alongside cost and delivery targets. It may also be appropriate to include specific design criteria as part of the bid evaluation process to test bidders' ability to deliver the required quality of

design and their appreciation of site constraints and opportunities. It is critical that the procurement process does not ignore design given its significance to the planning process. Without good design there may not be a project.

'Good design, layout and aesthetic treatment are essential when delivering waste infrastructure projects. This not only facilitates community acceptance of such projects, but maximises waste management opportunities for the site.'

Waste Infrastructure Delivery Programme
Planning Systems Guidance (2007)

The value of good design

Proposing a high-quality solution may reduce planning risk, which in turn may reduce some of the associated up-front costs. It is important to recognise that achieving good design has several intangible benefits relating to the contribution to sense of place, ownership and perception.

Whilst it is difficult to quantify the positives and negatives of good design, it is easier to relate the cost of design to the delivery process. The earlier design is incorporated in the delivery process the more cost effective it is and the greater the benefits become.

'Good design may initially cost a little more in time and thought, although not necessarily in money. But the end result is more pleasing to the eye and more efficient, costs less to maintain and is kinder to the environment.'

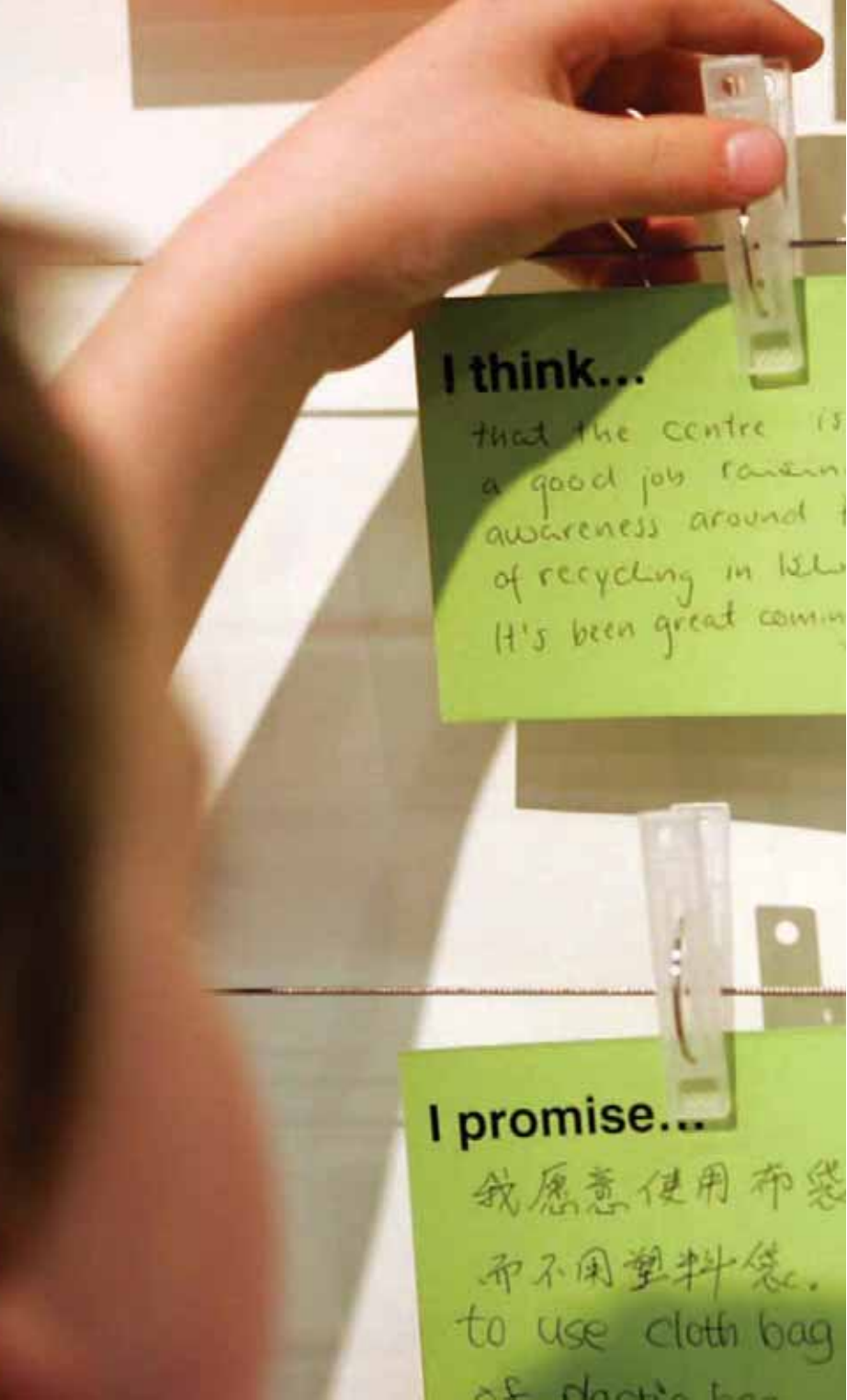
Hansard – Lord Rea, House of Lords
29 January 2003

Chapter 4: Stakeholders & their roles

Who's involved - where and why

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	Who are the stakeholders?	39
	Linking stakeholders with the design process	44
	Opportunities for stakeholder involvement	46

Stakeholders & their roles



Images courtesy of Islington Council, Enviros Consulting and RecycleNow

Overview

Many different companies, organisations, groups and individuals will be involved in the design of new waste facilities. This chapter defines who the lead design stakeholders are and how they can contribute to the development of better places and buildings. It considers at what stage and to what level in the design process different stakeholders should become engaged.

Achieving good design is not the responsibility of one party alone but requires teamwork, and at times conflict management, to achieve resolution and consensus. Some members of the core design team may be engaged at a number of stages, whilst others may have only limited windows of opportunity to influence outcomes. Input from many different perspectives is required to get a balanced final design.

Who are the stakeholders?

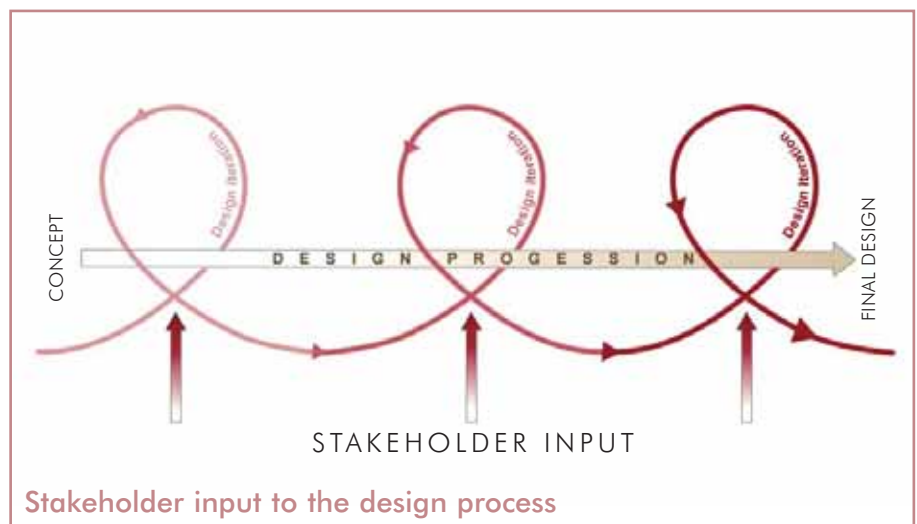
The term stakeholder in this report refers to anyone (individual, organisation or business) who has an interest in or influence on the design, construction and operation of waste management facilities.

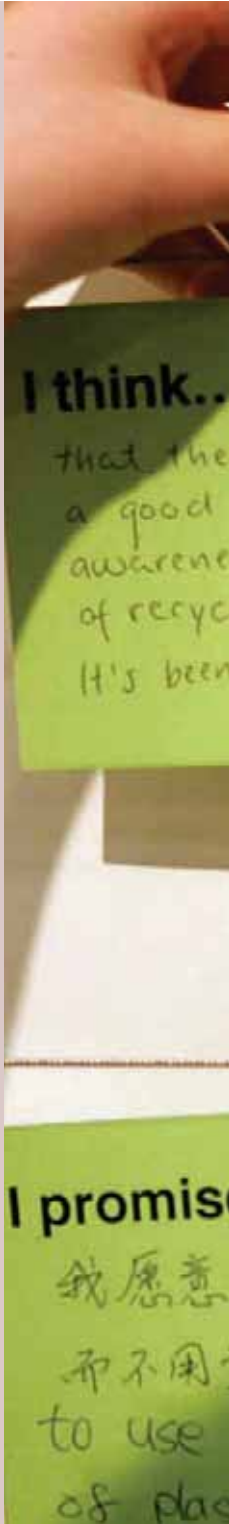
The waste sector is complex. It has been evolving very quickly over recent years to respond to the changing demands associated with the requirements of Waste Strategy 2007. Although statutory responsibility for this change in municipal waste management often rests with public sector service providers, delivery is commonly achieved through public-private partnership. Private sector companies are the driving force behind facilities for commercial waste.

Best value in the use of public funds is a key driver in the management of household waste streams and different stakeholders have a role in measuring and assessing this value. While a similar value needs to be demonstrated in the private sector the dynamics are often different and driven by profit and loss margins, funding issues, investor confidence and shareholder issues.

'The ultimate aim is not only to build good buildings, but also to ensure that the right buildings are built to meet the requirements of all stakeholders, particularly the end users.'

Getting Value for Money from Construction Projects Through Design (2004)





Private sector

During the early 1990s, the Environmental Protection Act was instrumental in altering the way in which municipal waste was managed in the UK. In an attempt to improve standards and introduce an element of competition, disposal authorities were required to use a third-party contractor (although this

could be a local authority waste disposal company). The Clean Neighbourhoods and Environment Act 2005 removed this restriction. In practical terms the letting of long-term collection and disposal contracts, together with the growth in private sector waste companies, has resulted in a loss of skills and delivery mechanisms within authorities.

The client/developer

The developer is often the waste management company and lead player but could also be a local authority (Waste Disposal Authority). They will typically have made a strategic or business/commercial decision to develop the new facility either as part of a local authority contract procurement process or independently. Commercial organisations will be clearly focused on commercial considerations of profitability and satisfying shareholders.

The landowner(s)

In many cases the developer will also be the landowner although this is not necessarily the case. Local authorities may retain the freehold to the property or the developer may have a leasehold arrangement with a third party landowner.

Landowners clearly play an important role in the process. They may be public or private sector but essentially they have similar objectives: to realise as much value as possible from their land holding. In some cases they may wish to influence the characteristics of a proposed development, particularly if they also own adjoining land.

Adjoining landowners may also state clear opinions on the use of a site. While their input to the design may often be limited, a solution for a site should consider their interests particularly where longer term relations are an important consideration.

Financiers

The development of new waste facilities is an expensive process. Although some large waste management companies will be able to fund new projects out of private equity, others will require third party investment. Where a municipal facility is being developed certain government bodies may also be acting in the role of financiers.

Those funding the delivery will expect the planning and delivery risks to be minimised and design parameters will be an important component of this.

This means that many new waste facilities in England will be delivered by the private sector whether they are managing municipal or commercial waste. Although proposed developments will often be driven by a single waste management company or consortium there are often very different players within the design team.

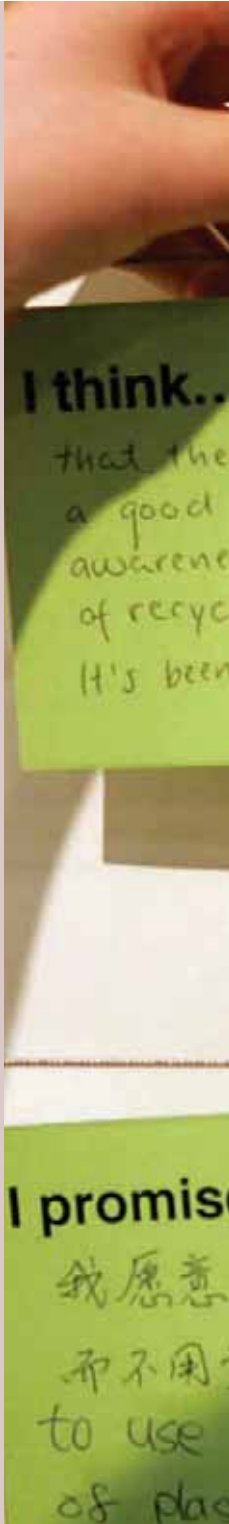
Suppliers

New waste facilities will require input from numerous suppliers. These will include manufacturers of construction materials and in some cases specialist technology providers. Construction materials selection and availability will have a significant influence over the appearance of a development and potentially the construction cost. Input from technology providers is particularly appropriate where new, novel or specialist treatment techniques are required. Technology providers tend to receive some level of financial support from government bodies to trial their process and establish pilot plants. In more complex facilities technology providers may also play a key role in on-going management and maintenance.

Advisors

The role of independent, specialist advisors has grown dramatically over the past 30 years, with specialist consultancies advising on a wide range of issues. Advice is provided to both the private and public sectors and covers all aspects of waste management, from strategy formulation to detailed design and permits. It is also possible to involve a Royal Institute of British Architects (RIBA) client design advisor who can provide sound, impartial and informed design advice. Having the advisor on board from the earliest stages can help bring certainty and control to the whole design process. A Client Design Advisor (usually an architect) maybe employed to provide independent design advice.





The public sector

Public sector organisations have many roles to play in the delivery of waste facilities and have wide-ranging involvement in the design process. Government at all levels has responsibilities for delivering Waste Strategy 2007 and controlling development. It plays a critical role in setting the tone and expectations for design standards.

The strategists

Public sector bodies at national, regional and local levels have clear responsibilities for developing strategies and plans for the future management of waste in their areas. These strategies and plans are driven, to a large degree, by requirements passed down through European legislation, as described in Chapter 2, and set the tone for new development. This is spelt out within the aims, objectives and policy instruments within national guidance, regional strategies and the local development framework.

The providers

The key players in the public sector charged with the responsibility for delivering new facilities are those that are legally responsible for collecting waste and for managing it. These are commonly referred to as the waste collection and waste disposal authorities (WCAs and WDAs). In a unitary authority area these are generally the same authority. These authorities are often the project funders and will need to make judgements about the level of design quality, investment required and value for money.

The regulators

These are stakeholders with input into the permission process required before proposals can be implemented. The main bodies concerned with planning and permitting are the local planning authority and the Environment Agency. Within a local authority ultimate responsibility for many of the decisions made rests with the elected council members. Some decisions may be delegated to officers but most waste applications are likely to go in front of the relevant planning committee. There are also a series of statutory and non-statutory consultees with responsibility for protecting certain interest areas.

The Planning Inspectorate also has a role to play in processing planning and enforcement appeals and holding inquiries into development plans.

community should be at the heart of the delivery of new waste facilities. It is important to remember that the 'local community' may take several guises, most obviously in the form of parish councils, local residents and community groups, but also including local businesses and interest groups such as wildlife trusts. The community may also have a long-term involvement with a facility, particularly where it provides a key service (e.g. household waste recycling centres) or incorporates a local resource (e.g. an education centre).

Formal community involvement

Some members of the community can play a formal role in the decision making process, most commonly as consultees to the planning process. Parish Councils and other local groups are likely to make formal comment on planning applications and their views will be taken on board by the local planning authority.

Informal community involvement

Local people are likely to come to their own conclusions regarding a proposed development and may voice strong opinions for or against. Effective involvement and communication with the local community should be at the heart of the delivery of a new facility and can play a major role in a successful planning outcome. Demonstrating that a facility is needed, together with clear justification for a design solution is critical. A structured and well-designed public communication strategy with or without expert assistance can greatly assist in alleviating any unfounded fears or concerns.

PRINCIPLES IN PRACTICE

i-recycle Centre, Islington, London



What is it?

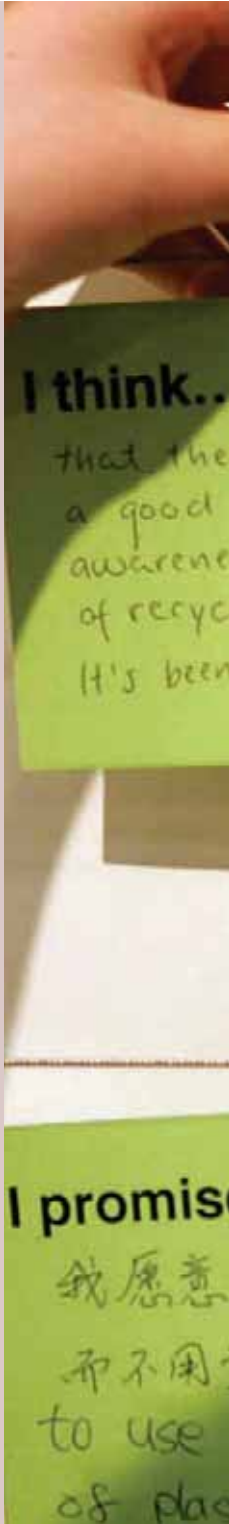
- Innovative education centre within working waste management facility; Hornsey Street Waste, Re-use and Recycling Facility

Design Features

- Elements within the centre are made entirely of recycled or sustainable material.
- Resource for Islington schools and community groups.
- Developed in collaboration with experts from the National Science Museum.
- Features touch-screen displays, games and videos as teaching aids to inform children and adults about recycling and waste issues



Images courtesy of Islington Council



Linking stakeholders with the design process

Setting the design agenda – The process of establishing the need for the facilities gives local authorities an ideal opportunity to explain the design requirements that are likely to influence future proposals. Design considerations should be integrated with plan preparation to ensure that the design process is effective. Procuring authorities should establish design objectives and evaluation criteria early in the project specification and tendering process.

It is desirable to develop a design brief with the project team and review it with relevant stakeholders to ensure that it covers current functional and operational needs. This will allow early consensus and provide a reference point throughout the life of the project. Where sites form a part of a wider regeneration scheme or masterplan, planning authorities might find it helpful to include a design or planning brief as an addendum to its development plan documents.

The point where objectives are agreed and high level design options are considered is critical to achieving an appropriate level of quality. Getting this stage right with the stakeholders can help ensure future iterations of designs are effectively guided, thereby minimising future changes. It may be appropriate to employ a Client Design Advisor (CDA) at this point in the process to ensure that strong design principles are embedded from an early stage.

Core design – Any organisations involved in the project must have a commitment to effective design. A project that results in a well-designed waste facility will depend on the project team effectively working together to achieve a defined design brief.

Concept designs will be developed at this point, offering opportunities for engaging with the whole project team and wider stakeholders. Visualisation techniques such as photomontages can be useful at this stage to illustrate development scale and location. The technical advisor team and specialists such as architects, planners and engineers will have significant input at this stage.

It is important that all information, especially that targeted at a non-technical audience, is presented unambiguously. The ability to explain how the internal technical aspects of the facility have dictated the external design will be important in helping people's understanding.

The establishment of a local liaison group may provide focus and promote effective communication about a proposed development. This can be difficult and can be contentious, but it is often worth the extra effort. It is also at this point in the design process that the planning application will be submitted and details of a proposed development will become more widely available.

Design realisation – Stakeholder involvement should continue through the construction phase. It is likely that planning conditions will need to be met and this could require discussion and agreement with the local planning authority and relevant consultees. Continued community involvement will also help address any issues that may arise that may result in the construction methods/ approach being adapted.

Operation - Involvement does not stop when the facility is constructed. Appropriate consultation with stakeholders needs to be undertaken during the post-construction period. While the building is in use it is important to ensure that the building satisfies stakeholder requirements, particularly the waste disposal authority. Maintaining a local liaison group

can help to ensure that any operational concerns or issues can be addressed effectively. Incorporating a visitor centre into an operational facility can provide a valuable local resource and develop links with the community.

Interaction

Many individuals and organisations are involved in the design process. Each of these stakeholders has various degrees of influence at each stage.

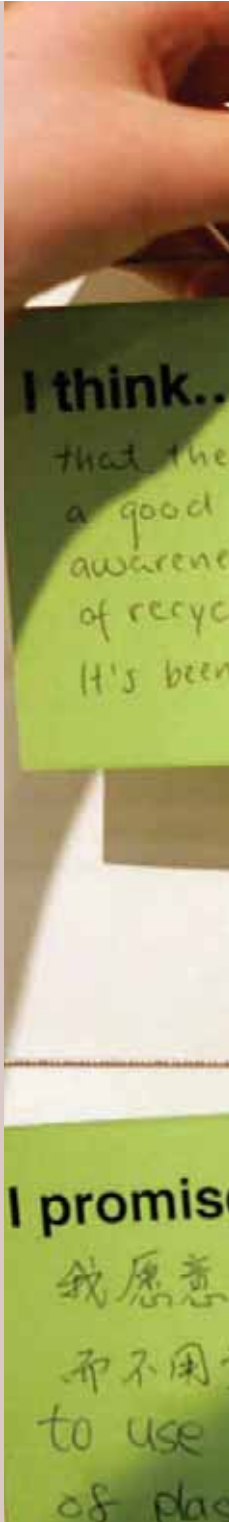
The diagram below gives an indication of the stakeholders and their interaction with the design process. It should be noted that the level of influence is likely to vary from project to project depending on the site location, treatment type, project team and project objectives.

Interaction between stakeholders and the design process

	Setting the design agenda	Core design	Design Realisation	Operation
PUBLIC SECTOR				
Strategists	Lead	Consultative	Consultative	Consultative
Providers	Consultative	Lead	Lead	Lead
Regulators	Consultative	Consultative	Lead	Lead
PRIVATE SECTOR				
Developer	Consultative	Lead	Lead	Lead
Landowner	Consultative	Consultative	Consultative	Consultative
Financier	Consultative	Consultative	Consultative	Consultative
Technology Provider	Consultative	Consultative	Consultative	Consultative
Advisors	Consultative	Lead	Consultative	Consultative
COMMUNITY				
Formal e.g. parish councils	Consultative	Consultative	Consultative	Consultative
Informal e.g. local residents	Consultative	Consultative	Consultative	Consultative

Key: lead role team role consultative role





Opportunities for stakeholder involvement

Involving stakeholders will help reveal their concerns and enable them to develop their understanding of the project. The intention is to allow them to express any concerns or queries they have and therefore help decision-makers progress towards a smooth planning process. Waste Infrastructure Delivery Programme (WIDP) planning systems guidance includes reference to stakeholder engagement.

Appropriate levels of stakeholder involvement early in a project are important to ensure that accurate information is conveyed and that people's opinions can be heard. This process can also help to generate confidence and trust. If third parties are consulted too late in the design process, their requirements cannot be easily accommodated in the design without abortive work, often at significant cost. Involving local councillors presents an opportunity to explain the background to the proposed development and councillors can play an important role in disseminating information to local residents through local meetings, surgeries etc.

Internal consultation and discussion within the project team should not be forgotten. The team will include the client and often a group of technical advisers. Sufficient time must be allowed for all stakeholders including the design members of the team to work through their ideas, communicate with the rest of the team and provide maximum added value. The client needs to be clear about how it will contribute to design reviews and make sure that it has adequate design expertise available to help them do so.

Community involvement routes

The local community can be involved in the proposals in a variety of ways including:

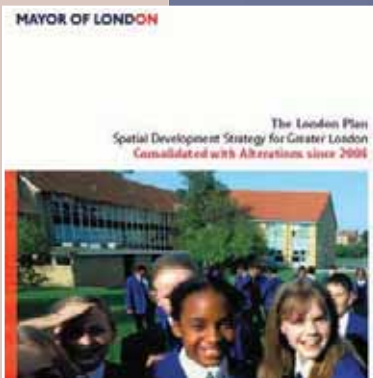
- face to face consultation
- meetings
- focus groups
- questionnaires
- newsletters
- exhibitions and open days
- posters
- internet sites
- the media, particularly local newspapers
- television and radio stations.

Chapter 5: Setting the design agenda

Driving good design

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Setting the design agenda



Overview

This chapter looks at the different factors and mechanisms that influence the design agenda for new waste facilities. Planning policy and national guidance are the obvious public sector instruments available to government agencies from a land use planning perspective. Waste collection and disposal strategies also have important implications for the size, distribution and management options. With waste treatment facilities the waste disposal authority plays a pivotal role in driving the design agenda and setting expectations. Waste management companies can also play an equally important role through adoption of their own corporate design policies and industry benchmarks for quality in the development of new facilities.

The benefits that good design can bring to good planning decisions must be embedded from the start through strong, effective and enforceable policies. Wider design benefits often require careful presentation and communication in policies and project plans. Issues associated with sustainable construction and full project life cycle costs can be complex. They require strong commitment and vision on the part of design professionals to influence political sponsors and other project decision makers.

The starting point for the design process

National level policy documents establish the overall principles and incentives for good design whether specific to waste or not (such as PPS 10 and Waste Strategy 2007). At this level design reference is likely to be broad, non-specific and possibly aspirational. However, it is critical that design requirements and overall expectations are embedded in policy at this level. Otherwise there is no incentive to implement these objectives at a local level.

Regional government is responsible for identifying broad locations for national, regional and sub-regional waste facilities and initial consideration of the treatment requirements to meet the region's needs. The regional spatial strategy sets the agenda for policy formulation at a local level and design considerations should be intrinsic to this.

For local authorities, the starting point in terms of municipal waste facilities is the preparation of the local waste strategy. Key decisions at this stage influence various things such as the number and size of facilities and potential technology solutions to be considered.

According to national planning guidance, waste facilities should be brought forward in accordance with a plan-led system where clear policies provide structure and control to land use planning. From

a local planning perspective the role of design therefore begins with the formulation of local development documents which can set the scene for high aspirations in design. Site allocations should have regard to how facility design will fit with site setting, neighbours and other appropriate selection criteria, including environmental constraints.

'In planning for the achievement of high quality and inclusive design, planning authorities should have regard to good practice set out in By Design – Urban design in the planning system: towards better practice (2000); By Design – better places to live (2001); Safer Places – the Planning System and Crime Prevention (2004); and Planning and Access for Disabled People: A Good Practice Guide (2003).'

Planning Policy Statement 1: Delivering Sustainable Development (2005) paragraph 37

From a private developer perspective, good design at the outset needs to be integrated into the *raison d'être* of the project, leading to planning benefits, community acceptance, sustainable credentials, whole life cost savings and so on. Developers will often maintain a singular focus on commercial drivers, so it is important they understand that good design may be the key to whether their project proceeds or not. As in other sectors, such as urban design, developers know that certain minimum standards have to be met. These may go well beyond the pure functionality of the use of the building they are developing.



Key public sector instruments to reinforce principles for good design

- Regional Spatial Strategy
- Municipal Waste Management Strategy
- Local Development Framework
- Statement of Community Involvement and other stakeholder engagement strategies
- the role in procurement, invitation to tender, bid evaluation, design briefs, contract specifications and performance criteria.

How design impinges on the initial planning stages of a project might have significant implications for setting the budget. Of particular relevance is the balance between the cost of providing a purely functional facility and the added value that good design can bring.

The local waste collection strategy also has design implications. The approach to domestic waste collection has implications for streetscape and the attractiveness of the places in which we live. There are also practical considerations. For example, if sorting takes place at the kerbside, what impact could this have on road congestion in high-density areas? In addition, issues such as vehicle size and requirements for bin storage can influence wider urban design considerations.

In urban centres waste collection infrastructure also has an important role. It is important that

suitable facilities are provided to maintain a tidy appearance but this can be detrimental to the local environment in terms of street clutter and the overall appearance of our towns and cities. Strategic and urban design considerations need to be factored into key decisions regarding waste collection.

People involved in the design and consideration of waste collection facilities need to think laterally. How can waste collection be best integrated with the local community, streetscape or urban design principles? When waste management is considered in this way it is clear that the design of infrastructure and strategy has a major influence on the places that we live in.

Creating the vision

Good design needs to begin with a vision of what represents the ideal design outcome. This will mean different things for different stakeholders and is likely to evolve over time as the project or concept develops and as more project definition is provided. In any sphere of life it is important to have a context for actions - without order and context there is chaos.

'There will be situations where it could be appropriate for planning authorities to anticipate levels of building sustainability in advance of those set out nationally. When proposing any local requirements for sustainable buildings planning authorities must be able to demonstrate clearly the local circumstances that warrant and allow this. These could include, for example, where:

- *there are clear opportunities for significant use of decentralised and renewable or low carbon energy; or*
- *without the requirement, for example on water efficiency, the envisaged development would be unacceptable for its proposed location.'*

Planning Policy Statement : Planning and Climate Change, Supplement to Planning Policy Statement 1 (2007) paragraph 31

PRINCIPLES IN PRACTICE

Envac, Wembley:



What is it?

- Innovative mixed waste collection system

Design Features

- Use of an underground network of pipes feeding from above ground waste bins
- Waste is drawn through pipes by use of a partial vacuum system; which draws waste to a central depot reducing the need for road transportation.



Images courtesy of Envac UK



The overall design vision should extend beyond simply providing part of the waste management service for the area. It also needs to meet design performance criteria that cover all aspects of sustainable design and a vehicle that communicates a change in approach to waste management. If this can be achieved it can create a cleaner, more acceptable image so that the public feel inspired and feel a sense of ownership for waste facilities.

'The 'development plan' provides an essential framework for guiding and controlling development. The development plan may comprise one or more types of plan depending on geographical location.

Among other things, the development plan:

- *provides a vision for the area*
- *identifies the main objectives to realise that vision*
- *defines the local context of people and places*
- *sets out the overall design policy framework (and other considerations) against which the local authority will assess development proposals*
- *provides the policy foundation for supplementary planning guidance.'*

By Design, Urban Design in the Planning System : Towards Better Practice (2000)

Forward planning

The local planning authority plays a central role in setting the design agenda for all waste facilities. It sets the tone for design policy and requirements at a local level,

demanding good design in new proposals through the planning system. Opportunities for embedding design principles in the vision for a local area begin with the early stages of the plan making process. Local authorities should be encouraged to strive for design excellence.

The development plan system provides the essential framework for guiding and controlling new waste facility development. It also helps local authorities achieve better standards of design for new waste buildings. The development plan documents allow scope for providing input at various levels so that design considerations are an integral part of the plan preparation and decision making process. The core strategy and site policies should set the agenda while the role of a supplementary planning document on design could be to describe the detailed route plan. When these documents start to make specific recommendations, for example on the allocation of sites, it is important that design considerations feed into this process.

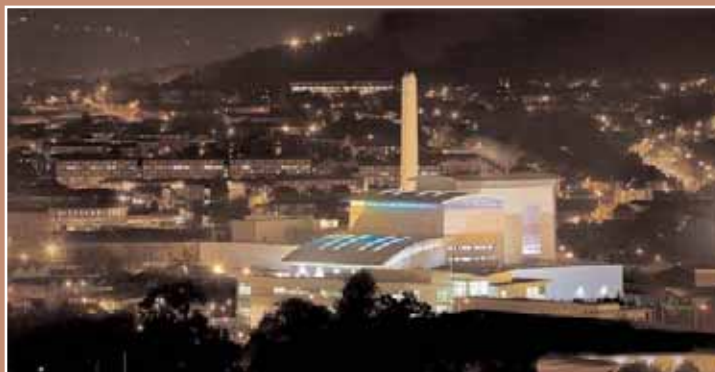
Specific design guidance within supplementary planning documents may relate to waste management facilities or a particular site or it can be more generic. This can provide an effective means for communicating local planning authority expectations and requirements to prospective developers.

DESIGNING WASTE FACILITIES

a guide to modern design in waste

PRINCIPLES IN PRACTICE

Sheffield EfW and Combined Heat and Power

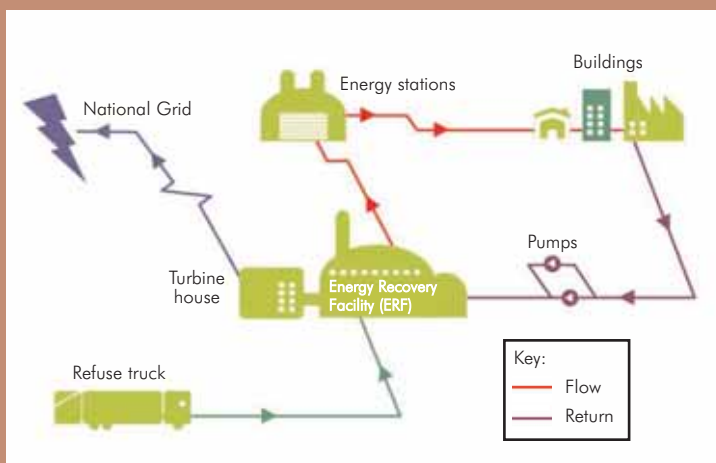


What is it?

- Large scale combined heat and power (CHP) network, forming one of the largest waste fuelled district heating and power generation systems in the UK.

Design Features

- Combined electricity (19MW) and Thermal (Hot Water) (60MW) energy plant.
- The district energy network successfully connects over 140 public and commercial buildings via a 44km pipeline.
- Demonstrates effective multi agency and (non waste and waste) stakeholder co-operation for wider community benefit.



Images courtesy of Enviro Consulting and Veolia Environmental Services (www.veolia.co.uk)

Setting the design agenda



	Policy Document	Importance in Design Terms	Example
National ↓	<p>Planning Policy Statement 10 (PPS10)</p> <p>National policy on sustainable waste management</p>	<p>The policies in this PPS should be taken into account by:</p> <ul style="list-style-type: none"> ▪ waste planning authorities in discharging their responsibilities ▪ regional planning bodies in the preparation of regional spatial strategies ▪ the Mayor of London in relation to the spatial development strategy in London ▪ local planning authorities in the preparation of local development documents. 	<p><i>'Waste management facilities in themselves should be well-designed, so that they contribute positively to the character and quality of the areas in which they are located.'</i></p> <p>Office of the Deputy Prime Minister, PPS10 (2005)</p>
Regional ↓	<p>Regional Spatial Strategy</p> <p>Broad development strategy for the next 15-20 years</p>	<p>The Regional Spatial Strategy (RSS) will provide a general idea on what waste facilities are likely to be required (and their general location) and can provide general design comments.</p>	<p><i>'Requiring sustainable construction and design as the norm in all future development and when opportunities arise, improving the region's existing building stock in line with current best practice.'</i></p> <p>South West Regional Assembly, Regional Spatial Strategy (2006)</p>
Local ↓	<p>Local Development Framework</p> <p>Development plan documents to guide planning and development within an area</p>	<p>All Councils in England and Wales are required to produce various development plan documents as part of the Local Development Framework. These documents include a number of policies and principles that are key to the design process.</p>	<p><i>'New developments, whatever their use or design idiom, must have a demonstrable commitment to creating places of lasting quality and character, and reinforcing those characteristics in the places around them. Buildings in Cornwall are and should be robust as well as respecting the historic environment and character.'</i></p> <p>Cornwall County Council, A Design Statement for Cornwall (2002)</p>

Development control

Decisions on new development proposals should be made in accordance with appropriate design-related policies in local development documents. Where up to date policies do not exist then decisions need to comply with relevant policies set out in PPSs, which are a material consideration.

'Applicants for planning permission to develop waste management facilities should expect expeditious and sympathetic handling of planning applications on sites and in locations identified in development plan documents, where their proposals reflect the planning strategy for waste management and policies set out in the development plan.'

Planning Policy Statement 10 : Planning for Sustainable Waste Management (2005) paragraph 38

Planning authorities should make use of design and access statements to understand how a proposed development will contribute to policy objectives on design. Applicants should ensure that these statements effectively communicate positive design attributes of the proposed facility.

In their consideration of the environmental performance of a proposed development, planning authorities should take particular account of climate change issues and should expect new developments to incorporate a range of good design features which respond to this agenda. These issues are explored further in Chapter 6.

Cost

The economic bottom line will always be an important consideration from the outset of a building project. However, the capital costs do not tell the whole story and the whole

PRINCIPLES IN PRACTICE

East London Community Project



What is it?

- Local based recycling initiative serving 1,000 high-density residential units collecting dry recyclables and biodegradable waste

Design Features

- System achieved through engagement and co-operation of local community groups
- The biodegradable waste collection forms part of a closed loop system, converting it into a compost type product for use within the estate.
- Use of a small scale 'Rocket' in vessel composting plant at a local level.



Images courtesy of ELCRP

Setting the design agenda



	Strategy Document	Importance in Design Terms	Example
National	<p>Waste Strategy 2007</p> <p>Sets out the vision for sustainable waste management</p>	<p>This new strategy builds on Waste Strategy 2000 (WS2000) and the progress since then but is more ambitious in addressing the key challenges for the future (such as climate change) through additional steps. Its focus is on the design of products to minimise waste, rather than on the appearance of facilities. But the strong emphasis on reducing waste arising is likely to influence the type and number of waste facilities required in the future.</p>	<p><i>'Producers will have to make products using more recycled materials and less newly extracted raw materials. They will have to design products that are less wasteful and take responsibility for the environmental impact of their products throughout their life.'</i></p> <p>Waste Strategy 2007</p>
	<p>Regional spatial strategy</p> <p>Proposes how a region can manage its waste more effectively</p>	<p>The regional spatial strategy details a number of policies for the effective treatment within the region as a whole. It considers waste arising, disposal routes and indicative allocations for what should be treated within the sub-regions and states the recycling performance and statutory targets. It therefore provides the background of waste facilities that are likely to be required within a region.</p>	<p><i>'Well-designed and adequately staffed civic amenity sites (HWRCs) and provision of bring banks also offer opportunities to improve recycling and green waste collection for local authorities.'</i></p> <p>North West Regional Waste Strategy (2004)</p>
Regional	<p>Waste disposal authority</p> <p>Municipal waste management strategy</p> <p>Sets out a strategic framework for the management of municipal waste</p>	<p>The MWM strategy will set out a strategic framework for the management of municipal waste, jointly developed and subscribed to by the waste collection authorities (WCAs) and waste disposal authority (WDA) in an area. Some strategies refer to design issues.</p>	<p><i>'Proposals for energy from waste facilities would be expected to demonstrate design standards, in terms of emissions and architecture, at least equivalent to the highest operational standards anywhere in the world.'</i></p> <p>Lancashire's Municipal Waste Management Strategy 2001-2020</p>
	<p>Company philosophy and specific proposals</p> <p>Establishes an approach to projects and overarching corporate objectives</p>	<p>Company performance indicators will influence potential design solutions. Such considerations could include; deliverability, construction waste reduction, energy efficiency etc.</p>	<p><i>'embedding good design principles in our overall philosophy ensures the solutions that we propose are appropriate, which in turn improves our corporate image.'</i></p> <p>Jeff Rhodes, Biffa Waste Services</p>
Local			

life costs must be evaluated and used in comparisons. It should also be noted that in some circumstances high-quality design linked with effective stakeholder engagement can reduce planning risk, which in turn can reduce lead-in times. This sort of consideration should be part of the debate when overall design objectives are initially considered and when procuring authorities are defining their tender specifications.

Buildings have always been designed to achieve their functional requirement, but good building design also addresses issues such as appearance, cost and durability. This agenda is now becoming increasingly broad, taking account of the principles of sustainable development in particular as well as factors such as inclusive access (e.g. for the disabled), environmental impacts and regulations. Treating such requirements as 'add-ons' to the basic facility can increase the cost and compromise the integrity of the design. However, if these factors are considered as integral to the design process, facility designers can meet several objectives economically. A range of expertise and disciplines will be required within the project team if all objectives are to be achieved effectively.

Sustainable design measures should not simply be viewed as an added capital cost. They can bring long-term savings. For example, maximising natural daylight can reduce operating costs, increase safety and improve working conditions and morale. Other factors such as thermal efficiency and minimising energy use can bring similar benefits. Some benefits cannot be measured purely in monetary terms and often community concerns and issues can be pre-empted and prevented through early investment in quality design.

PRINCIPLES IN PRACTICE

South Shropshire, Ludlow



What is it?

- The first full-scale waste fuelled anaerobic digester pilot plant in the UK, designed to recycle 5,000 tonnes of source-separated household biowaste per year.

Design Features

- Dedicated local collection system utilising a vehicle that runs on electricity produced from the plant.
- Produces soil improver for use on local farms providing a closed loop system to minimise transport.
- Potential to provide CHP to neighbouring eco industrial park.
- Incorporates an education/conference room where aspects of the process can be viewed and presentations given.



Images courtesy of Enviro Consulting and Greenfinch

Chapter 6: Core design

Arriving at good solutions

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Core design



Images courtesy of Enviro Consulting and Veolia Environmental Services (www.veolia.co.uk)

Overview

Once the strategic decisions about the delivery of a new facility have been made, the design process can focus on the detail of the proposed solution. Many factors come into play at this stage and design decisions specific to the site and facility are made.

Key issues about the scale and height of the building, the materials to be used and energy and water efficiency have to be made at this stage. The design team needs to reflect on policy prompts and on the limits and opportunities presented by the site as well as the functional requirements of the facility. Much of the hard technical work is done at this stage in the process. Drawings and written details of the development begin to emerge that set the scene for the content of the planning application.

This chapter focuses on several core design themes. It looks at the planning application and some of the associated documents and explores sustainable design considerations.

Project team and design iteration

The design of a facility has to balance a wide range of themes, including technical considerations. It is likely that a range of stakeholders will have been and will continue to be involved in the design of a given facility and their views and opinions need to be taken on board. It is important that the outcome is not design by committee but equally important that key aspects are carefully considered by the design team.

Arguably the most important of these considerations relate to the technical or operational constraints. Will a particular waste management or treatment technology fit within the building proposed and can operational requirements be accommodated? Clearly this also needs to relate to the approach to procurement. Is the design for the facility tailored to a specific technology solution or can a variety of solutions be accommodated?

Environmental criteria may be equally important. For example, are predicted noise levels acceptable and can air dispersion requirements be met?

These considerations are very site specific and the design needs to take account of any local constraints. It is important that sufficient flexibility and opportunity for design iteration is allowed for in the development programme.

'Will the place look good? Will it delight and inspire people? Some places should be inconspicuous, while others should create new high-quality landmarks. But they should all look good, using the best possible materials, detailing and craftsmanship.'

Design and Access Statements;
How to Write, Read and Use Them
(2006)

Design process

At this stage in the design process there should be a definite shift from strategic decisions and choices to more focussed work on specific proposals for the selected site. There should be a detailed analysis of the site and its setting and this should inform the development of appropriate design concepts and ultimately the final solution.

Key outputs

The ultimate output from this stage is likely to be a planning application and associated documents. The exact requirements for the planning application will need to be determined through consultation with the local planning authority. The government guidance document, *The Validation of Planning Applications: Guidance for local planning authorities* (2007) sets out a long list of information/assessments that a local planning authority may require. Combined with the standard planning application form (1App), this is intended to make the planning application



process more consistent around the country. It is also likely to increase the requirements for developers to provide more information as part of the planning process.

Various outputs from the design process will be central to the planning application. Clearly, a range of design drawings will be essential but it is also important that the design process is effectively communicated. The evolution of the design from the early strategic decisions through to the detail of the final proposal should be put across succinctly and coherently. The Design and Access Statement provides the ideal opportunity to communicate this narrative and should be seen as an opportunity to effectively sell the design proposals.

Design and Access Statements

Design and Access Statements are documents that explain the design thinking behind a planning application. For example, they should show that the applicant has thought carefully about how everyone, including disabled people, older people and young children, will be able to use the places they want to build. Guidance on the preparation of Design and Access Statements is provided in Design and Access Statements - how to write, read and use them (CABE, 2006).

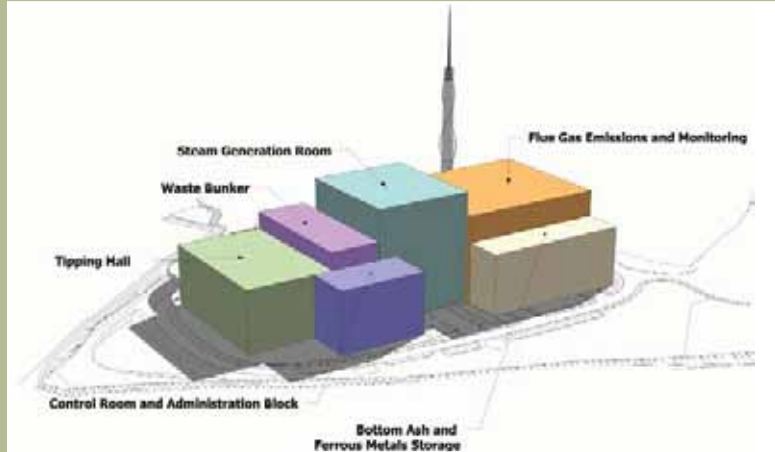
The 'design' part explains and illustrates the design thinking behind a proposal, elaborating on issues of use:

- amount
- layout
- scale
- landscape strategy and appearance, including how the local context has influenced the design
- justification for what is being applied for
- how it meets and complements relevant legislation and policy.

The statement also needs to include reference to aspects of access in a holistic way. Why the access points and transport routes have been chosen, and how the site responds to road layout and public transport provision. It should also cover inclusive access; how everyone can get to and move through the place on equal terms regardless of age, disability, ethnicity or social grouping.

Statements should include a written description and justification of the planning application. Photographs, maps and drawings are likely to be needed to illustrate the points made. They will be available alongside the application for anyone to see and so should avoid jargon or overly technical language. It is important that they are written specifically for the application they accompany. They need not be long, but the amount of detail they contain should reflect the complexity of the application and a statement for a major development is likely to be longer than one for smaller scale proposals.

Accommodating operational plant elements



Images courtesy of Staffordshire County Council and Savage and Chadwick Architects



Design themes

A number of themes feed into the design of a successful waste management facility. A good design solution should draw together many of these themes, although their individual relevance will obviously depend on the proposed development, the site and its location. They should not be seen as a simple checklist or tick sheet. All elements of a facility should be drawn together as a whole and linked with its context.

These design themes are relevant (to a greater or lesser extent depending on the proposed development) to all waste projects:

- creating good spaces
- accommodating size and scale
- roof lines and stack design
- access and infrastructure
- landscape
- materials
- climate change
- energy and water resources.

Each theme is dealt with in turn through the rest of this chapter.

CREATING GOOD SPACES

It has long been a central theme in urban design and town planning that the spaces created by built forms are as important as the buildings themselves. How the waste facility designer considers space is crucial to creating a quality design solution for the site and placement in the wider area.

Key questions

- how does a new facility respond to the surroundings?
- is the building layout appropriate, for example does it minimise visibility of operational area of the site?
- is there a design brief for the site or surrounding area?

In the evolution of our towns and cities spaces came first. For example, open markets and meeting places were established before buildings to house these activities. Buildings create a sense of enclosure. Where this involves a human interface that enclosure needs to be welcoming and non-threatening. With waste facilities the buildings are often designed to accommodate vehicular access, with dimensions and the size of openings geared towards vehicle widths, the height of tipping vehicles and the need for manoeuvring space. Even where functional needs are paramount the familiar shapes associated with good places in an urban design context can be designed into the shapes and profiles of more

PRINCIPLES IN PRACTICE

Spitelau, Vienna



What is it?

- Energy from waste and CHP Facility.

Design Features

- A striking approach to the design of a large scale waste facility in an urban setting.
- The façade of the building was designed by the artist Friedensreich Hundertwasser.
- Design investment and style driven by the Mayor of Vienna.
- Building provides a dramatic backdrop to one of the open spaces within the city, as well as forming a distinctive landmark.
- Forms a core component of the extensive district heat network within Vienna.



Images courtesy of Enviros Consulting and Fernwärme Wien



industrial scale buildings and even reflected in the building façade. The patterns of enclosure found to be pleasing at a human level for buildings such as residential accommodation and offices can also be translated to waste facility buildings with equally good results.

'British architectural education has tended to concentrate on buildings and rather ignored the fact that buildings define spaces, and it is the quality of the public realm that we either enjoy or suffer.'

Urban Design Compendium (2007)

When designing the layout of sites all spaces within the site need to have a distinctive purpose. All space needs to be treated as a valuable resource with maximum value attached to different spaces subject to their usage. There should be no space without a purpose. Where the focus is simply on where to place the building on the site, all too often the site layout results in 'left-over' spaces.

External spaces should be designed positively with clear functional and non-functional demarcations.

Where there is a trade and public interface, such as at civic amenity sites, the road layout, road markings and signage should be clear and unambiguous. Signage and instructions to visitors should be welcoming as well as informative. Even the smallest areas on sites can add value in improving the overall feel of the site.

'Placemaking

- be concerned not with buildings in isolation but with places
- ensure that community consultation is built into the procurement, planning and design processes
- consider how to develop a procurement process that is proactive, preparing design policies, design frameworks and design briefs to promote good design in public buildings
- ensure the project team and determining authorities have access to high-quality design advice.'

Better Civic Buildings and Spaces (2002)

Creating Good Spaces - Design Tips

Do	Don't
<ul style="list-style-type: none"> ▪ look at the site area as a whole, not just in terms of the building footprint and road layout ▪ associate the site with its neighbours, combine or link compatible spaces if better viewed as one entity ▪ consult relevant experts on best use of space for hard and soft landscaping ▪ link building shapes with hard landscaping to provide cohesion. 	<ul style="list-style-type: none"> ▪ plan the site solely on the best building location ▪ waste valuable space if it has an ancillary purpose that adds value to the whole ▪ landscape to hide an ugly building or to provide a sticking plaster on more fundamental design flaws ▪ treat landscaping and building specifications as completely separate issues.

ACCOMMODATING SIZE AND SCALE

The size of new waste facilities presents interesting challenges to the industry and for regulators who have frequently been used to waste management happening outside buildings, for example on landfill sites and open civic amenity sites. Even household recycling centres are now being designed within buildings to provide a better environment for users and to enable more effective environmental management.

Key questions

- can the facility be delivered within the site available?
- is the site context appropriate for the scale of development being considered?
- can any measures be incorporated to help reduce building scale or mass?
- is the architectural solution appropriate for the site and facility proposed?

Waste facility sizes and scales

New facilities can be divided into four principal groups; community facilities such as bring sites; small sheds; bigger sheds with or without tanks and pipe work etc; and large scale developments such as energy from waste (EfW) plants. The scale of the development will be a function of many variables, including the requirements of the waste strategy the size of waste catchment and local needs.

PRINCIPLES IN PRACTICE

Isseane, Paris



What is it?

- A major new Energy from Waste (CHP) and recycling facility in the centre of Paris next to the River Seine.

Design Features

- Combined electricity (52MW) and Thermal (Hot Water) for 79,000 homes.
- A bold approach to constructing a new waste management facility within a high density urban area.
- Scale and visual impact reduced by burying the facility 30m below ground, leaving 21m above ground.
- Incorporates a 'natural' green roof.
- Unusual technical solution for plant emissions has led to a very low profile (5m) stack height.



Images courtesy of Tiru



Examples of Different Scales of Waste Facilities

Small Scale	<ul style="list-style-type: none"> ▪ Bring sites ▪ Civic amenity sites ▪ Local transfer facilities
Medium Scale	<ul style="list-style-type: none"> ▪ Large transfer stations ▪ Mechanical biological treatment (MBT) • Anaerobic digestion (AD)
Large Scale	<ul style="list-style-type: none"> ▪ Thermal treatment facilities ▪ Integrated sites incorporating a number of different treatment options

Footprints and heights of buildings will vary according to the nature of the technology being used and the configuration of operational processes. One common determining factor for most waste facilities is that the internal space and vehicular door openings need to accommodate the height of a raised tipper lorry. As an example this requires the door openings to be 7 metres in height with the building eaves often at a height of approximately 12 metres. This is a similar scale to many commercial distribution buildings.

Energy from waste plants stand out as the most imposing of new waste facilities. Some new technologies have been marketed on the basis that they can reduce the overall bulk of the buildings and the height of stacks, making them more suited to a wider range of potential sites. Nevertheless, the scale of buildings present considerable design challenges that makes 'fitting in' with the existing fabric often inappropriate or impossible.

Setting

There are three general land use contexts with respect to the site setting; each will often require contrasting design responses to similar functional needs:

- urban
- semi-urban/urban fringe
- rural.

Urban

The juxtaposition of new waste facilities with other urban land uses presents a number of design challenges linked to public attitudes toward waste management and urban design issues. It is not the purpose of this guide to deal with the many and varied environmental and perception issues of waste management but good design can play a major role in allaying misconceptions and fears regarding the perceived impacts of waste activities.

There is sufficient technical knowledge within the waste industry to manage effectively the amenity and environmental impacts associated with waste facilities. Indeed the roots of efficient waste management lie in facilities being sited close to the main sources of waste, which are our urban centres. Conflict between waste activities and apparently incompatible sensitive uses such as housing, schools and hospitals is not inevitable. Consideration of key issues such as climate change and the associated use of carbon

footprints encourage this by minimising transport distances and the efficient use of energy, potentially in the form of combined heat and power (CHP).

Semi-urban/urban fringe

New facilities are often linked to industrial or employment allocations in development plans. These are commonly associated with urban fringe locations on the edge of built-up areas. Good transport links, resulting from by-passes or urban perimeter roads may focus attention for site selection in such areas.

The design challenges in this situation are often complex. The architects and designers of such facilities will need to reconcile the need to harmonise with an existing built environment or one that is emerging, whilst at the same time be sensitive to the rural environment. Often such sites will also be on transport nodes, and gateway locations to town and cities. There may be opportunities here for more distinctive or imaginative design statements.

Rural

Local authorities, developers and their advisors often look at existing waste sites when undertaking alternative site assessments for new waste facilities. Landfill sites are often associated with mineral operations in rural locations. There are often planning advantages associated with the continuation of waste activities in

PRINCIPLES IN PRACTICE

Hornsey Street, Islington



What is it?

- Waste Transfer; bulking and civic amenity site incorporating a waste education centre.

Design Features

- Integration of a large scale facility within a tightly constrained high density urban site.
- Innovative multi level layout, enables good use of space on a reduced building footprint compared with most facilities of this type.
- The facility provides opportunities for waste education and awareness through the 'i-recycle' Centre which provides links to schools and the wider community.





locations where there are existing planning precedents and transport links and where local residents have become accustomed to this use. This is particularly true if an existing landfill has a long remaining life.

The siting of large buildings in the countryside is generally contrary to the principles of planning set out in PPS 1 (2005) and other national guidance. Historically, large agricultural buildings have been the obvious exception to this general rule. There are other related issues associated with the location of waste facilities in the green belt policy (PPG 2, 1995).

Assuming a balanced planning assessment results in a strong case for development in the countryside, it may be appropriate to consider imaginative solutions but these need to be evaluated carefully. In most situations even medium-sized waste facilities will not be effectively screened by landscaping or bunds. Indeed, this invites entirely the wrong philosophy. Simple, attractive, well-designed buildings with quality detailing can fit with a rural context without going to great lengths to hide them behind unnatural earth bunds or inappropriate blocks of trees.

Accommodating Size and Scale - Design Tips

Do	Don't
<ul style="list-style-type: none"> ▪ use professional architects with the appropriate skills and experience ▪ think carefully about the scale of neighbouring buildings or where adjacent sites are allocated but undeveloped and what the relationship between future buildings and the waste facility will be. ▪ use computer design technology to produce virtual images of the proposals and surrounding area to a better understanding of how a building will look from key viewpoints. 	<ul style="list-style-type: none"> ▪ underestimate the visual impacts and imposing nature of some waste facilities ▪ simply fit in with the local vernacular without considering design objectives ▪ produce a pastiche of existing forms ▪ be afraid of challenging perceived norms associated with traditional industrial buildings and the potential for design flair.

ROOF LINES AND STACK DESIGN

The scale of many new waste facilities will require architects to think carefully about how the large mass of the building can be broken up. An imaginative design can assist with its integration into the existing built environment. Consideration should be given to short and long distance views and changing conditions associated with weather or seasons.

Key questions

- does the roofline of the proposed facility help to break up its scale and mass?
- how does the shape of the roof respond to the surroundings?
- will the roofline complement that of neighbouring buildings?
- if the proposed facility has a stack how does the design solution for this fit with the other parts of the building?

The traditional rectilinear forms of many waste 'sheds' is functional and cost effective and often fits well within an industrial setting. However, as is the case when considering size and scale, the setting for many new facilities will often require or deserve more than the most basic minimum cost option.

PRINCIPLES IN PRACTICE

Richmond Hill, Isle of Man

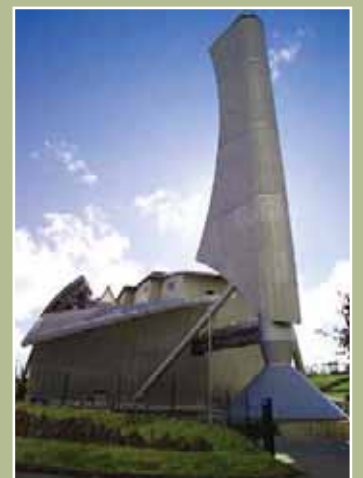


What is it?

- Energy from waste facility in a rural setting.

Design Features

- Use of curving roof structures to mimic landform in the countryside setting.
- Architect inspired Viking ship concept near the coast, with innovative stack design to reflect a sail.
- Effective use of materials in the design to integrate operational elements with architectural shapes.





Proposing the standard simple straight-line solutions may not be enough to respond positively to policy expectations or engender the feeling of quality in design that is required.

Strict adherence with purely functional building forms does not always fit comfortably with the human eye and human perception of what constitutes a 'good place'. The pursuit of good places in design is not purely the domain of urban designers and town planners. The same principles can be applied to waste facilities as to other large urban buildings, offices and civic structures.

Interest can be generated very effectively by simple alterations to the 'basic' design. On a traditional steel portal frame building much can be achieved cost effectively by small alterations to the vertical profile and roof interface. For example, low pitched roofs, simple curves or a stepped roof line can provide the texture that is required. This can break up the mass of the building and provide a more sympathetic profile. More radical solutions, such as curved or flat profiled roofs, may also be considered.

Roofs can be used to improve the overall sustainability credentials of waste facilities, and to provide design interest through features such as:

- roof lights incorporated to maximise natural light
- photovoltaic cells

- collection of rain water ('grey water') for various non-potable uses
- living/green roofs
- eye catching use of shape and texture
- imaginative use of colour and type of roofing materials.

Similar principles apply to stack design. Many new facilities, and in particular energy from waste (EfW) plants are likely to require tall stacks to facilitate effective dispersion of combustion gases. The height will be determined through assessment of a number of factors including local setting, climate and computer modelling of air dispersion characteristics. Computer modelling can also assess the effect of proposed buildings on airflow and this is an important design consideration in terms of the relationship between different elements of the proposed development and any nearby structures.

Stacks associated with waste facilities are often associated with sources of pollution. The reality is that strict European legislation means that potentially harmful emissions from waste facilities can be controlled to levels that are almost negligible and compare favourably with other industries.

Where some architectural treatment can be applied to stacks to fit with the overall design concept this is often helpful in softening the otherwise industrial characteristics of facilities. There

are a number of different approaches that can be used to create interest in the form and also deceive the eye through a partial optical illusion making the viewer believe the stack is actually shorter than it is.

Interesting examples of stack design associated with waste management facilities in the UK and in Europe include:

- **Isle Man EfW plant** – a sail structure used to integrate with overall plant design concept and reduce the perceived stack height
- **Vienna EfW plant** – a distinctive structure and local landmark, with interesting detail that complements the rest of the building
- **Lakeside, Slough EfW plant** – external spiral superstructure around simple narrow flues reduces the mass of the stack and adds visual interest
- **Bolton, EfW** – a traditional cotton town, a relatively old incinerator (1970 refurbished 1990's), a traditional brick stack has been used to reflect the historical industrial heritage of the area.

PRINCIPLES IN PRACTICE

Raikes Lane, Bolton



What is it?

- Energy from waste in a semi urban setting.

Design Features

- The use of a gently tapering brick stack sets this apart from other facilities.
- The brick stack reflects the cotton mill industrial heritage of the Bolton skyline at the time the plant was built in 1970 before the height of the steeplejack, Fred Dibnah's, demolition spree!



Images courtesy of Enviro Consulting and Greater Manchester Waste



Roof Lines and Stack Design - Design Tips

Do	Don't
<ul style="list-style-type: none">▪ use professional architects with appropriate skills and experience▪ provide interest through shapes▪ provide interest through detailing and patterns▪ use optical illusions to reduce the perceived height of tall structures▪ employ appropriate professionals with expertise in air dispersion to inform the design.	<ul style="list-style-type: none">▪ perpetuate mediocrity through mimicking bad design in existing buildings▪ ignore opportunities to challenge engineering norms for example on standard steel portal frame constructions, by use of cladding and surface treatments to create interesting and eye catching rooflines▪ assume that design is a simple process for waste facilities▪ underestimate the required height of emission stacks▪ ignore the impact the stack will have on surrounding viewpoints and how it will 'sit' within the landscape of the area.

PRINCIPLES IN PRACTICE

Marchwood, Hampshire



What is it?

- Energy from waste facility on Southampton Water.

Design Features

- Represents the most striking contemporary design in waste management facilities in the UK to-date.
- Simple dome structure provides a distinctive building form unique in the waste sector.
- A solution which uses the open aspect of the site with a clear vision to 'show off' the design on a prominent site on the edge of Southampton Harbour.



Images courtesy Veolia Environmental Services (www.veolia.co.uk)



LANDSCAPE AND BIODIVERSITY

When designing a new development the setting should be considered from the outset. The design of a facility needs to consider more than just the building footprint or indeed the site in isolation. It is often beneficial if wider site design issues can be included in this process from the outset, which can also set the tone for the ethos of the development as a whole. The space around the building should not be forgotten; the consideration of landscape is integral to design quality. The area around a proposed development can provide great opportunities for providing an appropriate setting as well as enhancing biodiversity.

Key questions

- What type of landscape strategy would be appropriate for a site?
- Can biodiversity gains on the site be realised?
- Can locally native plant species be incorporated within planting schemes?
- How can planting be used to help break up hard elements of the development e.g. planting between roads, living roofs?

An appropriate landscape strategy is an important facet of the whole site design. Often there will be limited opportunities for landscaping, but where they exist they should be grasped. The landscape strategy should be appropriate to the location in which the site sits. It is likely that a very different approach will be taken if a proposed site is set within an urban or industrial context, compared with a rural site. As such soft landscape issues should be considered at the start of the design process. This will avoid landscape design being an afterthought and just being applied to the 'space left over after planning' (Llewelyn-Davies, Urban Design Compendium, 2007).

Landscape architects and designers who have previously applied their expertise to open sites such as landfills need to start from a very different standpoint and design philosophy. Landscape planting schemes associated with quarries and landfills have often been used to screen and indeed hide site operations. To this end, many have been very successful.

With buildings, hiding them is not generally an option. A landscape design strategy that seeks to simply screen a building assumes it is fundamentally unattractive. New buildings should not automatically be seen as a negative. However, in some circumstances minimising potential visual impact may be of paramount importance, and opportunities for screening should be considered even if this is only in relation to certain locations around a site.

The use of appropriate landscape treatment and strategies for sites can bring benefits, both in terms of the appearance of a site and biodiversity gains. Retaining and augmenting existing vegetation on a site can reduce the visual impact associated with a new development, particularly relatively low level elements and manoeuvring vehicles. Fundamentally the landscape strategy should be seen as an opportunity to assist the integration of a new development with its surroundings.

'The character and appearance of land, including its shape, form, ecology, natural features, colours and elements and the way these components combine.This includes all open space, including its planting, boundaries and treatment.'

By Design, Urban Design in the Planning System (2000)

The landscape strategy for the site can be seen as a very good opportunity to maximise biodiversity potential. Habitat creation or replacement as part of the landscape proposals can present beneficial opportunities. Any ecological survey work undertaken as part of an Environmental Impact Assessment should be considered when preparing the landscape strategy. The local Biodiversity Action Plan (BAP) should be referred to, as this can provide valuable pointers with regard to habitat creation and suitable species for inclusion in a planting scheme.

On smaller sites chosen to accommodate small single use waste facilities (civic amenity sites, small transfer stations etc) the opportunities for complex landscape strategies are likely to be limited. However, carefully thought out planting at key nodes such as the access points can be very effective if done well. Planting on buildings themselves (including living/green roofs) can also be used to soften facades, naturalise the look of manmade building materials and break up the mass of the structure. Consideration needs to be given to maintenance and access requirements if this approach is chosen.



Images courtesy of Enviros Consulting



On larger sites, a more complex landscape design strategy is likely to be required. Where there are multiple buildings and different waste activities, landscaped areas can be used to help the overall and layout and flow of the site, providing legibility. Such an approach will be particularly important where there is public access.

In urban design terms the challenge is to use landscape design in a way that helps to provide cohesion and a sense of place; linking buildings, uses and spaces both within the outside the site.

Waste facility designers should share the same ambitions as urban designers as the principles remain the same. The landscape strategy for a site is part of the overall design and is an essential part of creating a good place. It provides opportunities to dispel negative preconceptions about waste facilities as unpleasant places to be and a relatively cost effective way of presenting a more positive image of waste management generally.

Landscape and Biodiversity - Design Tips

Do	Don't
<ul style="list-style-type: none">▪ Include landscape thoughts from the start of the design process▪ Use landscape to integrate and enhance a good design▪ Use professional landscape architects▪ Plan ahead with planting where possible prior to construction▪ Consider options for off site planting if appropriate	<ul style="list-style-type: none">▪ Perpetuate mediocrity through mimicking bad design in existing buildings▪ Treat landscape design as an afterthought▪ Do not use landscaping as a sticking plaster on something that is fundamentally bad

ACCESS AND INFRASTRUCTURE

In addition to the waste management facility itself, many larger facilities will incorporate a number of other design elements within the site. Site access and internal roadways are an obvious example, but a working facility is also likely to include a range of other ancillary buildings and structures such as a site office, weighbridge, lighting etc. Although such features may be seen as subsidiary to the main site use they should be considered with equal design rigour as an important part of the whole. How the site access and other infrastructure aspects are configured can be critical to presenting the overall design principles and detailing of the final solution.

Key questions

- is the site access and existing highway infrastructure suitable for the range of vehicular and pedestrian users of the site ?
- if appropriate, how is the interaction between site operations and the general public addressed?
- does high quality design extend to all components of the proposed development?
- how is boundary treatment addressed and does this complement surrounding developments?
- how is the site to be lit and is this approach appropriate to the context?

PRINCIPLES IN PRACTICE

Tesco Store, Shrewsbury



What is it?

- Recycling Centre.

Design Features

- User friendly public interface.
- Neat and tidy appearance integrates it within a retail environment.
- Promotes positive aspects about waste and other environmental issues at the facility and within the store.
- Users incentivised by reward points system for recycling.



Images courtesy of Enviro Consulting



Access

Site access can be a complex issue and can relate to several different aspects. Does the site have good access to the local and regional road network? Is it appropriately located with regard to waste arisings? Some sites may offer the potential to consider alternative modes of transport; rail, river and canal.

Appropriate access for visitors and people with disabilities also needs to be considered. This can apply to all parts of the site including offices, operational areas and visitor facilities. It may be necessary to incorporate suitable pavements, door and possibly lift facilities. Access to facilities with a public interface may need careful consideration. For example, civic amenity sites may need to adapt working practices to provide assistance to disabled members of the public.

Internal movements within a site are a critical design consideration. A waste site needs to be easy for vehicles and pedestrians to move around and should be logical. All waste facilities need to allow for the safe manoeuvring of large vehicles and this can be challenging on sites where space is at a premium. The importance of internal vehicle movements is heightened when there is a public interface. With civic amenity sites it is important that the public are provided with clear instructions as to where they can and cannot go. Where possible, separation of public and trade vehicles should be a priority.

Developers for new waste facilities will be required to submit a Design and Access Statement with their planning applications. This should include all aspects of access and movement of vehicles and people within and through the site and onto the public highway. Circular 01/06 (Communities and Local Government): Guidance on Changes to the Development Control System set out government guidance on the purpose of such statements.

'One statement should cover both design and access, allowing applicants to demonstrate an integrated approach that will deliver inclusive design, and address a full range of access requirements throughout the design process.'

Circular 01/06 (Communities and Local Government): Guidance on Changes to the Development Control System (2006) paragraph 58

Signage

Waste facilities are potentially dangerous places and clear signage and instruction ensures that vehicles or people do not end up in conflict or in the wrong place. Signage also has an important promotional role since the presence of the facility needs to be advertised to users. Signs to and within a facility can also help to raise the profile of sustainable waste management. In addition, signs on the local road network can also play an important role in the appropriate routing of vehicles to avoid highway restrictions or adverse impacts in sensitive locations.

Ancillary buildings

Many waste management facilities, particularly larger scale developments, incorporate a number of ancillary buildings such as a site office and weighbridge. It is important that the design solution encompasses these elements to ensure the overall design works. Design detail is important to maintain quality in the final solution and detail should relate as much to smaller scale elements as it does to the main buildings or infrastructure.

Many new facilities incorporate education or interpretation centres, offering opportunities to explain how waste facilities work as well as promoting messages about waste strategy, minimisation and recycling. These can be a valuable education resource, complementing education objectives within local schools as well as informing the surrounding community of the operations that take place within the site.

Access to facilities for disabled visitors will need to be considered carefully. For example, which parts of the site will they be able to access and how, and will access be available for all?

Fencing

Fencing around the site may be considered to be peripheral to design, but it can set the tone of a development. The main objective of fencing is to provide site security and consultation with the local police liaison officer can provide a valuable input to the proposed solution. However, stark fencing can look imposing and unpleasant and it should be as discrete as possible and can be combined effectively with hedging where space permits. The approach to fencing should link with the proposed landscape strategy for the site boundary as this can result in the most appropriate overall solution and provide an attractive edge and entrance to the facility.

Lighting

Internal and external lighting will be required for almost all waste management facilities. Lighting within a site can have several important dimensions; health and safety, security and appearance. Lighting will be needed on key pedestrian routes, car parks and access roads to ensure security and safety for employees and visitors.



Images courtesy of Enviros Consulting



It is important that any potential adverse impacts associated with lighting are reduced where possible and this can be achieved by measures such as:

- appropriate cowls/shielding of lights to prevent glare
- minimising of light spread and reflected light through the use of directional lighting and downlighting
- positioning light sources at low level rather than on tall structures
- minimising the operational time of the lighting to reduce the potential for disturbance.

Lighting can add an interesting aesthetic dimension to a waste management facility and has been used successfully at facilities such as EfW facilities in Birmingham (Tysley) and Sheffield. It is important that it is appropriate to the context and any advantages are weighed up against disadvantages. For example, lighting a new large-scale facility can complement the architectural solution in an urban context, but may be seen as an unwelcome intrusion creating light pollution in a rural location.

Access and Infrastructure - Design Tips

Do	Don't
<ul style="list-style-type: none"> ▪ consider all components of a facility in the overall site design process ▪ consider access to and within a site carefully ▪ look at potential interaction between public and trade vehicles ▪ provide appropriate and clear signs ▪ consider boundary treatments as part of the overall design solution ▪ consider how lighting can complement design, but avoid unnecessary light pollution. 	<ul style="list-style-type: none"> ▪ disregard the contribution that an ancillary building will make to the overall appearance of the facility ▪ ignore the rights of disabled employees and visitors ▪ treat fencing as an afterthought ▪ introduce unsympathetic lighting, particularly in a rural context.

MATERIALS

The selection of appropriate materials is critical in the delivery of an architectural concept. The choice of materials can make or break a design solution, contributing to the overall quality of a development and its general appearance.

Key questions

- are the materials selected appropriate for this context?
- how do materials reflect and mesh with the local vernacular?
- how do the materials complement the design solution?
- do the materials selected reduce potential impacts, for example by using recycled products?
- will the use of construction materials be minimised?
- can the materials be reused or recycled when the building is demolished?
- where do the materials originate from - can local materials be sourced?

Awareness of the potential environmental impacts from the production, use and disposal of building materials has grown in recent years. This is predominantly due to factors such as the increased costs associated with landfill, the cost of raw materials, changes in legislation, greater pressure on corporate

PRINCIPLES IN PRACTICE

Zug, Switzerland



What is it?

- Household Waste Recycling Centre.

Design Features

- Uses previously developed land and incorporates existing structures on the site.
- Extensive use of timber in the new building.
- The design and appearance of the building help to integrate it within a residential context.



Images courtesy of Enviro Consulting



responsibility and an elevated profile of environmental assessment methodologies such as BREEAM and the Code for Sustainable Homes. These methodologies include the consideration of reusing materials in construction activities, which should be a core consideration in the design and construction of waste facilities.

The construction industry needs to reduce its consumption of fossil fuels and virgin materials by two-thirds to be sustainable. The construction process leads to the release of chemicals that can damage the environment and be harmful to human health.

Considering context

Material use should reflect the setting of the site. Important questions to be considered include how they relate to surrounding buildings, how the local vernacular is considered and whether the materials can reduce visual impact. Responding to context overlaps with themes already considered, but materials selection is a key way in which a new development can relate to those around it. Colour, pattern and detail can all add identity and legibility.

Existing buildings

The re-use of an existing building may lead to considerable cost savings and is likely to reduce the potential impact on the environment. It is also likely that an existing building will be an

accepted part of the urban or rural fabric. If an existing building is being used to house waste uses, replacing or refurbishing elements of a building can bring a new lease of life and make a positive statement.

Minimising impacts

Material selection can minimise potential impacts in a number of ways. The most obvious is visual impact, but careful selection can also have an influence over maintenance costs, thermal and acoustic insulation, drainage etc. They can help to break up mass and create form. Appropriate colouring can also minimise potential impact by linking a building with its surroundings. The potential impact caused by noise can be reduced by the careful selection of materials and the sensible location of certain elements of machinery. Living roofs can make a significant contribution to sustainable drainage strategies for a site and can also lead to biodiversity gains, possibly replacing habitats lost as result of the introduction of the building.

Reused and recycled materials

About 90 million tonnes of waste are produced each year by construction and demolition projects in the UK. Although recycling reduces pressure on landfill, it still requires significant inputs of energy. Using reused materials has the benefit of retaining the embodied energy of the material - the energy required

to abstract, process, manufacture and deliver it.

Reclaimed materials are those that have been reused in their original form with minimal reprocessing.

Recycled materials are reprocessed and remanufactured to form part of a new product.

For example, reusing a tonne of bricks in their existing form saves 878kg of carbon emissions but crushing used bricks to make aggregate saves only 15kg of carbon emissions.

Recycled materials

Increasing recycled content does not inevitably translate to an increase in project cost. There is no need to use unfamiliar or high cost materials. Many of the products with higher levels of recycled content are already mainstream, high-volume products that are cost competitive with, and subject to the same testing arrangements as, equivalent products containing less recycled material.

The Waste and Resources Action Programme (WRAP) maintains a database of the recycled content of commonly used construction products.

Source of materials

Substitution of locally-sourced reclaimed materials in construction

work can reduce the lifecycle environmental impact of that particular item. As well as supporting the local economy, it has added benefits of reducing transport impacts such as congestion, pollution and energy consumption.

Off-site construction/modern methods of construction (MMC)

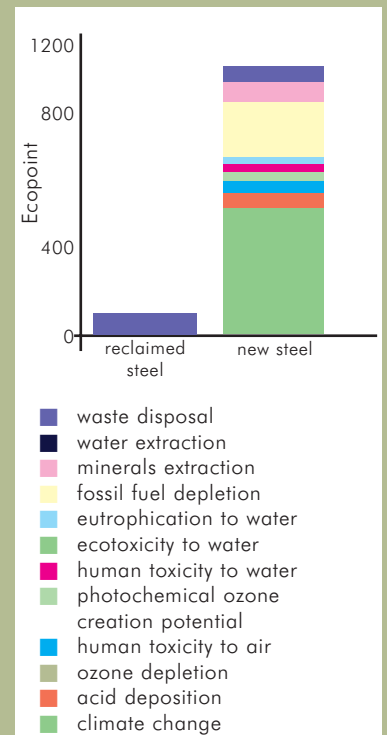
The key feature of off-site fabrication is that much of the process is removed from the site to controlled factory conditions. This reduces the amount of time spent on site and saves on space requirements. Environmentally, it reduces noise, air/water pollution and traffic impacts on the locality, and leads to improved efficiency in the use of resources and less waste. In addition, volumetric construction using prefabricated modules allows buildings to be potentially dismantled and the modules reused at a different location.

Green procurement

The two key decisions that affect the procurement of building products and the building's impact upon the environment are what to buy (product type) and who to buy it from.

Publications such as the Green Guide to Specification (2002) provide assistance to designers deciding what to select. It provides a summary of the environmental impacts of a product from cradle to grave in an easy to understand rating system.

Ecopoint chart for reclaimed vs new steel sections



A UK Ecopoint score is a measure of the overall environmental impact of a particular product or process.

BRE life cycle analyses show that reclaimed steel sections have 96 percent lower environmental impacts than new steel.

Reclaimed Building Materials in the Development of the Thames Gateway (2006)



Image courtesy of JCB Sales Ltd



Certification of environmental management systems (EMS) for the process and/or extraction stages of the product to ISO14001 or EMAS can be used as an indicator of good performance by a supplier and help decide who to buy from. For timber products, the supplier should be able to demonstrate that the material is from a legal and sustainable source through certification schemes such as Forest Stewardship Council (FSC) and documentation such as chain of custody sheets.

Wasted materials

Material wastage during construction can have significant financial implications for a project. An average of 13 per cent of all materials delivered to a construction site is disposed of

without ever being used. Clearly this is a waste of money and resources. Significant benefits can be accrued if this unnecessary cost can be avoided.

WRAP has developed a method for developers to assess their net wastage based on a formula of value of materials wasted versus materials recycled.

$$W - R = Z$$

value wasted – value recovered
= net waste

This approach would fit well with the development of a construction environmental management plan (CEMP).

Materials - Design Tips

Do	Don't
<ul style="list-style-type: none"> ▪ use materials to make a positive statement ▪ carry out a pre-demolition audit to identify reclamation opportunities ▪ specify materials with a high recycled content from a local source if possible ▪ choose products that are constructed off-site if possible ▪ consult the Green Guide for Specification (or equivalent) to choose materials with the lowest environmental impact ▪ include sustainable materials as a tender requirement. 	<ul style="list-style-type: none"> ▪ go for short-term cost savings at the expense of savings over the life of the building ▪ waste construction materials unnecessarily.

CLIMATE CHANGE

There are two aspects of climate change that need to be considered by prospective developers of new waste facilities. First, how will the proposals impact upon the process of climate change through carbon emissions? Second, how will the development be affected in the future as a consequence of the effects of climate change? The global aspects of carbon emissions are touched on elsewhere and more widely in national guidance and other literature. We concentrate here on the consequences of climate change trends.

One predicted consequence of climate change is that extreme weather events such as prolonged periods of unseasonal temperatures and increased rainfall and flooding will become more common. These will impact on sites and buildings and their users in ways that were not accounted for in the initial designs. The potential effect of climate change is an increasingly important aspect to consider when developing new waste facilities. Designers will need to consider how facilities designed for today will be adaptable to future climatic conditions.

Key questions

- how does the proposed development minimise its potential contribution to climate change?
- does the proposed development incorporate measures (for example, materials selection) that will minimise its potential carbon footprint?
- is the building sited or designed to avoid climatic extremes, for example, exposure to high winds, flooding etc?
- does the design of the building take account of potential changes in climate?

Impacts on waste facilities

The main impacts of climate change in the next 50-100 years are expected to be:

- warmer, wetter winters
- hotter and more unsettled summers
- increased flooding due to storms, tidal surge and a rise in sea levels.

In the shorter term there are expected to be more freak weather events such as flash floods, high winds and storms. Given the experiences of places such as Boscastle in 2004 and various parts of the Midlands and Yorkshire in 2007 it is possible that this trend has already started.



Images courtesy of Enviro Consulting



'As buildings generally have an expected lifetime of between 20 and 100 years, thinking about climate change today, when planning new developments for tomorrow, will help to ensure a lasting legacy in the building stock. Buildings and their locations could all be adversely affected by climate change, including their structural integrity, external fabric, internal environment and service infrastructure (e.g. drainage).'

Adapting to climate change: a checklist for development: Guidance on designing developments in a changing climate (2005)

The choice of sites will need to be influenced by the potential impacts of such events. Specification of building materials and the ability to withstand greater climatic fluctuations is also important. Mitigating secondary environmental consequences of climate change through design must be an important consideration.

Odours

With an increase in temperature comes a potential increase in odours. Waste may need to be treated more quickly to prevent odour issues developing. Waste facilities that are not entirely enclosed (for example, waste transfer stations and composting facilities) are the most vulnerable to odour issues as the temperature increases. Although current summertime maximum temperatures are increasing, they have not yet warranted design changes in these facilities.

However, with temperatures predicted to continue rising, design solutions such as enclosing waste storage areas or alternative environmental abatement techniques may need to be considered.

Heating, cooling and energy use

Climate change may alter average seasonal temperatures, which may lead to an increase in the amount of energy used for the heating and cooling of buildings. Ideally, the layout of a building should take advantage of the benefits of landscaping for summertime shading, whilst allowing for the minimisation of heat loss during the winter.

External cladding materials can also affect internal temperature. High mass such as brick and concrete will release heat slowly and can help to regulate temperature, while lighter materials such as wood and steel heat and cool quickly, making it more difficult to control temperature.

Facilities should be designed to make use of and harness warmer temperatures. Building facilities such as staff areas or server rooms should be located away from south facing aspects to minimise cooling requirements. Storage areas, stairwells and unoccupied areas may be better situated in warmer parts of the facility. This reduces requirements for windows and cooling and provides options for renewable energy to be incorporated within the design.

Flood readiness

The floods in the summer of 2007 were the most severe in decades. Although it may not be accurate to attribute these floods entirely to climate change, we are told that extreme weather events are more likely to happen in the future. The design process will need to allow for flood provisions in areas where flooding is likely and these may include locations where there is no previous history of flooding.

Facilities will need a drainage system that can cope with high levels of rainfall and improved attenuation of runoff. Traditional flood event periods may need to be reconsidered and higher capacity mitigation installed. The incorporation of sustainable urban drainage systems (SUDS) may present a solution. Potential measures may include the incorporation of green roofs, soakaways and permeable pavements.

'Climate change is causing sea levels to rise and we can expect more winter storms as well as more frequent and severe tidal flooding. Intense rainfall will also increase the risk of flash flooding from our rivers and overflowing drainage systems.'

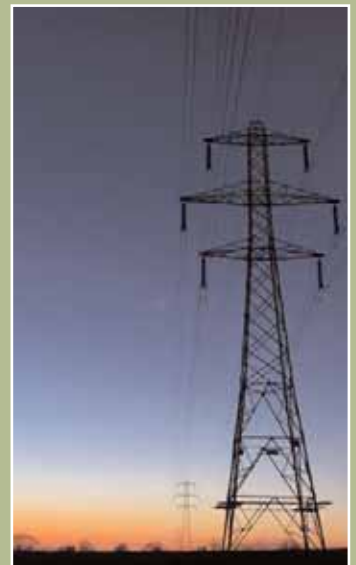
Building a better environment:
A guide for developers (2006)
paragraph 2.2.1

'Flood risk management includes the use of flood defences, where appropriate, but also recognises that more 'managed flooding' is essential to meeting goals for biodiversity and to sustain good ecological status in river and coastal systems. In future, society will come to appreciate and value the positive benefits of the river and coastal 'flood pulses', while simultaneously developing improved coping strategies that will make communities resilient to the negative impacts of flooding.'

Flood Risk Management Research Consortium (FRMRC)

Soil subsidence

The wetting and drying effect on soil may cause subsidence issues, potentially affecting the structure of a building as rainfall and temperature increases. This can be particularly true for areas with clay soils. Developers may need to carry out suitable investigations to determine soil type and provide deeper foundations or piling to avoid subsidence issues where particular soils cannot be avoided. Additionally, root barriers may need to be incorporated depending on surrounding vegetation.



Images courtesy of Enviro Consulting



Property and structural damage

As the number and intensity of storms increase in the UK, damage to buildings is likely to increase. Higher wind speeds, for example, may increase the structural design parameters stacks and other high structures, while periods of intense driving rain may

cause water to infiltrate the building. It is also important to consider suitability of materials in excessive temperatures as some may blister, warp or soften. The design of a building and choice of materials will need to allow for the impacts of these potential issues.

Climate Change - Design Tips

Do	Don't
<ul style="list-style-type: none">▪ select sites carefully considering the proximity to water courses and potential impact of extreme weather events▪ maximise heat gain and loss through use of landscaping and building materials.▪ consider the type of soil to account for potential subsidence issues▪ consider techniques that reduce the risk of flooding, such as permeable surfaces in car parks.	<ul style="list-style-type: none">▪ limit the building design by excluding alternative forms of heating and cooling so they can be added later when required▪ allow the design or layout to increase the risk of flooding▪ install populated or IT areas in south-facing aspects to reduce cooling requirements.

ENERGY AND WATER RESOURCES

The pressure on our finite energy and water resources is increasing as our climate is changing. New legislation is forcing us to make changes in how we approach new development. Government legislation is setting legally binding targets for carbon reductions across the UK and recent changes in national planning guidance emphasises the important role of planning in delivering sustainable developments.

The future is likely to bring further regulation, making it ever more important for new waste facilities to incorporate energy and water efficient design strategies that reduce the impact of the facility, including its carbon footprint. The overall energy and water efficiency of the development may be measured as part of an assessment method such as BREEAM.

Key questions

- does the design of the building incorporate energy saving or generation?
- have low carbon technologies for items such as lighting and plant been incorporated?
- has the design of the building made use of south-facing aspects for harnessing energy available from the sun?
- does the design incorporate water saving features?

PRINCIPLES IN PRACTICE

Gesher, near Dusseldorf, Germany



What is it?

- An integrated waste facility in a rural setting incorporating various mechanical and biological treatment processes.

Design Features

- Incorporates a range of complementary building designs to provide diversity and interest.
- Extensive application of renewable energy; many of the roofs are covered with photovoltaic cells and there are two wind turbines within the site.
- Variety of sculptures adjacent to the main access road form distinctive features.
- Visitor centre to raise awareness and promote positive waste management.



Images courtesy of Enviro Consulting and EGW



Size of the building and building type

The building dimensions and materials used in its construction will be a significant factor in determining the energy and water usage requirements of a facility.

There will not be a one size fits all solution. Buildings for waste facilities will be designed to contain the needs of the waste process activity and scaled to fit the size and throughput of waste required to be treated. It will be important to strike a balance between designing the most appropriate size and type of building with appropriate techniques for achieving high energy and water efficiency standards.

A traditional steel portal construction building commonly used for warehousing, industrial or large retail purposes will often be suitable for housing a range of waste process activities including in-vessel composting, materials recovery, mechanical biological treatment and some thermal treatment technologies. The use of reclaimed materials in new buildings would be a good starting point for energy savings and resource efficiency.

'The energy used in constructing, occupying and operating buildings represents approximately 50% of greenhouse gas emissions in the UK'

Sustainable construction:
position statement (2003)

Sustainable Urban Drainage Strategy

It is also essential to incorporate surface water management, such as a sustainable urban drainage strategy (SUDS), throughout the design process. SUDS can improve water quality and prevent pollution, reduce the risk of flooding, and minimise the use of water resources.

Examples of SUDS include:

- permeable surfaces
- living/green roofs made from sedum or slow growing grass mixes
- rainwater harvesting and re-use
- ponds and wetlands
- pollution interceptors and grease traps.

'Sustainable drainage is a design philosophy that uses a range of techniques to manage surface water as close to its source as possible.'

Sustainable Drainage Systems (SUDS) - A guide for developers

Layout and use of the building

A waste treatment facility may include a reception area, treatment area, offices, facilities for employees and a visitor centre. Each of these areas will have different energy and water requirements. Each use may provide an opportunity for complementary energy and water efficiency strategies and it will be important to consider how one area may benefit another. For example, grey water from employee facilities may be used in the waste treatment process, or excess heat generated from office or waste treatment equipment might be harnessed to reduce heating requirements elsewhere.

Location and orientation

The local climate at the site and the orientation of the building will have an influence on energy and water management and should be a factor when designing the building.

The choice of materials used in construction will affect energy efficiency. For example, using a dark coloured roof cladding in a hot climate will be less energy efficient than choosing a light coloured or reflective finish.

Other factors, such as orienting rooflights to maximise the use of sunlight or incorporating solar water heating or photovoltaics may be relevant.

PRINCIPLES IN PRACTICE

Battlefield Enterprise Park, Shrewsbury



What is it?

- Waste recycling centre and transfer station/bulking facility in an urban fringe setting.

Design Features

- Incorporates a number of design features to reduce the impact on the surrounding environment.
- A ground source heat pump under the car park provides heating for the office building.
- Underground water storage tanks collect storm water run off to help mitigate potential flooding.
- Roof lights and opaque panels to maximise natural light.
- Carefully considered design to fit within an established employment area.
- Strategic site, designed carefully to allow future expansion.



Images courtesy of Enviros Consulting and Shropshire County Council



Certain locations may lend themselves to the incorporation of renewable energy technologies. Wind turbines may be suitable in areas with high wind speeds. Equally, solar water heating, photovoltaics or a ground source heat pump may present opportunities. Certain technologies may lend themselves to the

incorporation of energy generation or combined heat and power (CHP). With CHP such an approach is likely to be most appropriate where an end user for energy is located in close proximity to the proposed facility. This may influence some of the strategic decisions at the start of the design process.

Energy and Water Resources - Design Tips

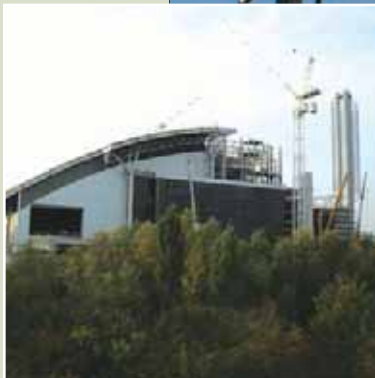
Do	Don't
<ul style="list-style-type: none"> ▪ ensure energy and water efficiency strategies are incorporated into the design from the outset. ▪ set minimum energy and water efficiency requirements to inform the required design standards. ▪ harness process by-products such as heat and steam elsewhere within the facility. ▪ consider how the local climate can maximise the energy and water efficiency of the building. ▪ look at ways in which the internal and external layout of the building might affect water and energy efficiency. 	<ul style="list-style-type: none"> ▪ underestimate the difference that small changes can make in overall efficiency. ▪ waste energy or water. ▪ allow preconceptions to eliminate a potential strategy or technology from the facility design. ▪ allow current Building Regulations to limit the efficiency of your building.

Chapter 7: Design realisation

Arriving at good solutions

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Design realisation



Images courtesy of Enviro Consulting and Tiru

Overview

Planning permission is not the end of the design process. Design input will still be required to ensure that the intentions presented in the planning application are translated through the detailed specification and construction process. It is accepted practice for development proposals to go through a further stage of design iteration after planning approval. Planning authorities typically allow some flexibility on the permitted design. The design of a development should not change significantly during the construction phase and it is important that the approved design is not diluted.

This chapter outlines where design input may still be required when the project progresses beyond a successful planning application. It examines issues that may arise during evaluation of tenders and during construction itself.

Planning approval

All planning permissions have a number of conditions that will need to be met prior to or during the detailed specification and construction phases. These may involve the resolution of design detail, or may relate to key aspects of the development such as the final agreement of specific colours and materials. Some minor design elements of a proposed development may need to be considered afresh during this stage e.g. the lighting strategy, landscaping, materials and colours.

Monitoring of the post construction environmental impacts of the facility is often required and can be an indicator of the effectiveness of some aspects of the facility design.

Other consents and approvals

Other permissions or consents will be required, depending on the scale, location and nature of the proposed development. The key permissions are likely to relate to Environmental Permits, Building Regulations and the Construction, Design and Management (CDM) Regulations.

'Design, construction, operation and maintenance should not be considered in isolation from one another. Design ideas will provide better value when they are developed alongside knowledge of construction options and an understanding of how to obtain value from the whole supply chain, including manufacturers. Constructors are best placed to contribute their own expertise when they are involved in the development of the early design concepts... The principle is simple: the client and the supply team working together can reduce waste, improve quality, innovate and deliver a project more effectively than if the parties are in a fragmented relationship that may be adversarial.'

Design Quality: Achieving Excellence
in Construction Procurement Guide
(2007)

Environmental Permits are administered by the Environment Agency and replace pollution, prevention and control (PPC) permits and waste management licences. A facility cannot commence operations until the permit is in place. It can be beneficial to prepare the permit application in parallel with the planning application (an approach recommended in Planning Policy Statement 23: Planning and Pollution Control (2004)) as there will be several common themes and the outputs from both processes can inform the final design. For example, the permitting process may involve consideration of best available techniques (BAT), which may influence the proposed building envelope, drainage proposals etc.



The Building Regulations apply to most new buildings and alterations to existing buildings. The responsibility for meeting them rests with the person carrying out the building work and/or the owner of the building. They will typically apply during construction, but it is important to consider any potential implications earlier in the design process. It would be prudent to make an application and obtain approval prior to construction starting. It may also be advisable to employ a specialist advisor on the Building Regulations during the design process. Approved inspectors can also pass plans, inspect works on site and issue approval notices upon completion.

The development will also be subject to the CDM Regulations, which are enforced by the Health and Safety Executive (HSE). These regulations are applicable throughout the design and construction phases of a project, so need to be considered early in the design process. They place health and safety responsibilities and duties on almost everyone involved in construction. A CDM coordinator must be appointed to advise the client on projects that last more than 30 days or involve 500 person days of construction work. Their role is to advise the client on health and safety issues during the design and planning phases of construction work.

Other permissions and consents may also be important to the delivery of a new waste management facility. Depending

on the proposed site and development they may include land drainage consents (sometimes referred to as flood drainage consents), discharge consents and those associated with the temporary or permanent diversion of public rights of way.

Design detail

The construction phase will always require detailed design. This should build on, rather than depart from the principles set out in the original planning application.

This stage in the project may require the undertaking of additional specific survey work to ascertain detail that would have been costly or inappropriate to carry out earlier when there was a risk that a development might not obtain planning permission. Such surveys are likely to focus on ground conditions and geotechnical analysis that feeds into the construction detail. A more limited analysis should have already been undertaken to establish development feasibility (and assumptions made on this). However a greater degree of detail is likely to be required to enable construction to take place e.g. nature and detail of foundation design.

This stage in the process requires the preparation of detailed architectural and engineering drawings of all elements of the proposed development. This will be a complex stage in the process

and liaison between the architect and relevant engineers (for example, construction, process mechanical and electrical engineers) will be necessary to arrive at the desired outcome.

Tender evaluation

The tender evaluation process by the client will often focus on technical aspects of the facility but evaluation of design quality can be equally important to deliverability, value for money and fitness for purpose criteria.

For municipal waste management proposals, this step will often be applied to the evaluation of proposals to deliver a service rather than simply the construction of a single building or site. However, common principles will apply when assessing the quality of bids and value for money issues.

When evaluating tenders, consideration should be given to the following criteria:

- deliverability
- design flexibility
- life cycle cost
- quality of innovation
- use of materials
- design image and quality of resulting environment
- efficiency of design.

Construction

The construction of a waste facility can be at least as complex as the design stages that preceded it. The degree of complexity depends on the type of facility being developed. However, it is important to acknowledge that when a development moves from the design stage to construction the main aim is to realise the proposed development within a pre-determined time frame and to an agreed cost. It may be argued that this shift in emphasis can dumb down the influence of design, but the original objectives should be delivered in the completed facility.

All elements of design detail will need to be resolved at the construction stage. These changes should be minor in the context of the overall development. Any significant changes may require amendments to the planning permission. It would be prudent to liaise closely with the local planning authority if design changes are required.

Stakeholders and liaison

Design team - contractor interface

The most significant element at this stage is likely to be the relationship between the design team and the contractor. It is important that those constructing the facility can translate the design



Images courtesy of Enviros Consulting and Tiru



team's drawings to construction on the ground. There needs to be a good working relationship between all concerned with the project. It is likely that the design will need to be applied carefully to take account of changing or unforeseen circumstances.

Ideally the interface between the design team and the contractor should have started while the design was being prepared and, if so, the implementation of the design solution may be relatively straightforward.

The extent of liaison at the detailed design stage can depend on the approach to procurement, which can throw up challenges. For example, if a facility has been designed without the consideration of very specific equipment, the design solution for the building may need to evolve to accommodate a particular technology at a later stage. This may in turn trigger the need to modify the planning permission, depending on the degree of change required.

Community liaison

Waste management is almost always a sensitive subject and new facilities often meet with a degree of local opposition. As discussed earlier in this guide, consultation should be embedded in the design process, but this should not stop when the facility is permitted or indeed when it has been delivered on the ground.

In many instances, particularly in the case of large-scale facilities, it may be appropriate to establish a community liaison mechanism. This would provide a clear link between the facility and the local community, and promote open communication.

Design mitigation

Considerate construction

It is important that construction operations take place in a way that respects the neighbouring community. Whilst not directly a design issue it is important that the programme for delivery factors in such considerations. The Considerate Constructors Scheme is a national initiative, established by the construction industry, to improve its image. If new waste facilities can be constructed in a way that respects the neighbouring community they will get off to the best possible start.

Construction sites that register with the scheme sign up to and are monitored against a Code of Considerate Practice. This code has been designed to encourage best practice beyond statutory requirements. It is concerned with any area of construction activity that may have a direct or indirect impact on the image of the industry as a whole. The primary areas of concern can be divided into three main categories: the environment; the workforce; and the general public.

'THE CODE OF CONSIDERATE PRACTICE

Considerate

All work is to be carried out with positive consideration to the needs of traders and businesses, site personnel and visitors, and the general public. Special attention is to be given to the needs of those with sight, hearing and mobility difficulties.

Environment

Be aware of the environmental impact of your site and minimise as far as possible the effects of noise light and air pollution. Efforts should be made to select and use local resources wherever possible. Attention should be paid to waste management. Reuse and recycle materials where possible.

Cleanliness

The working site is to be kept clean and in good order at all times. Site facilities, offices, toilets and drying rooms should always be maintained to a good standard. Surplus materials and rubbish should not be allowed to accumulate on the site or spill over into the surroundings. Dirt and dust from construction operations should be kept to a minimum.

Good neighbour

General information regarding the Scheme should be provided for all neighbours affected by the work. Full and regular communication with neighbours, including adjacent residents, traders and businesses, regarding programming and site activities should be maintained from pre-start to completion.

Respectful

Respectable and safe standards of dress should be maintained at all times. Lewd or derogatory behaviour and language should not be tolerated under threat of severe disciplinary action. Pride in the management and appearance of the site and the surrounding environment is to be shown at all times. Operatives should be instructed in dealing with the general public.

Safe

Construction operations and site vehicle movements are to be carried out with care and consideration for the safety of site personnel, visitors and the general public. No building activity should be a security risk to others.

Responsible

Ensure that everyone associated with the site understands implements and complies with this code.

Accountable

The Considerate Constructors Scheme poster is to be displayed where clearly visible to the general public. A site's contact details should be obvious to anyone affected by its activities.'

Considerate Constructors Scheme



Images courtesy of Tiru, RecycleNow and Considerate Constructors Scheme



Environmental and site waste management plans

The potential environmental impacts associated with many waste management facilities will have been assessed as part of the planning process. This should have been an integral part of the design process, with predicted impacts leading to design iteration and incorporating mitigation measures into the final solution. As these will have formed a formal part of the planning application it is important that they feed through into the construction phase.

Following the implementation of the Site Waste Management Plans Regulations 2008, all construction projects with a value in excess of £300,000 are required to have a site waste management plan. The aim is to ensure that waste generation within the project is minimised and, where it cannot be minimised, that waste is recovered, recycled or if necessary disposed of in an environmentally sound manner. The contents of the plan, including the selected recycling and recovery routes, should be reviewed periodically to ensure that no opportunities to minimise the environmental impact of development are missed. The plan should be a dynamic document and will change over the length of the project, particularly when any alterations to the design are made.

Depending on the circumstances and scale of the proposed development it may be appropriate to prepare a

construction environmental management plan (CEMP). This document will set out the background to the proposal and its setting, core environmental management objectives, criteria relevant to construction and the mitigation measures proposed as part of the environmental impact assessment process. This may be superseded by a site environmental management plan (SEMP) once the facility is operating.

Adaptability

In certain circumstances it may be appropriate to add certain elements to a waste management facility once it is operating. This may be in response to changes in operations within the facility, changes to the setting of the site (such as the construction of new homes in close proximity), or changes to environmental regulation or best practice. Either way there may be ways to overcome such issues, for example odour suppression or air extraction systems to mitigate impacts.

It is also possible that a degree of testing may be required at the early stages of a new development. Does a theoretical design solution also work in practice? In the majority of cases the proposed design solution will already be tried and tested. The key facility types where the design solution may need to be tested and adapted are those with a public interface, for example civic amenity sites.

Chapter 8: The final word

Achieving good practice

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The final word



Images courtesy of Enviros Consulting and Envac UK

Overview

This guide aims to provide shape and context to improving standards of design within the waste management development sector. Prompting a diverse readership to think about the fundamental values associated with good design is the main objective. Responsibility for good design will ultimately rest with the client. However, it is critical that all involved in the delivery process are aware of the role that they play in design and how their decisions can influence the project outcome.

The final word

Influencing design outcomes is a complex process. The definition of good design and the process by which it can be evaluated will continuously evolve and change. Some aspects of design are highly subjective and will always be associated with a particular time and place, which is how we maintain a sense of place and distinctiveness in our surroundings. Critical components of design are appropriateness to context and quality. However, many of the following principles will also apply:

- good design is inspired by good policy
- plan for a sustainable environment
- design for future generations and not just short term needs
- consider whole life costs and benefits when specifying desired design outcomes
- respect the perceived norms of design, but do not necessarily be bound by them.

These principles apply to a wide range of design agendas, not just waste management, and reflect many of the core themes running through current urban design thinking and associated publications.

However, there are also many issues that are specific to waste management. Not least amongst them is the need to change public perception of the industry. The image of a modern, vibrant waste and resource management industry, in tune with the community it serves and the wider environment, will be achieved if these and similar design aspirations are embraced. Designers and decision makers should grasp this opportunity and not shrink away from the challenge. They should not be tempted to perpetuate mediocrity and in so doing create a bland architectural pastiche.

The temptation to include a detailed checklist or method for assessing design in this document has been resisted. Good design is about a philosophy, a process and a way of thinking and not just manuals and checklists. Indeed within a fast changing world where values are changing, design checklists can only have an ephemeral existence.

Design almost always raises many questions and challenges. It is important that these are embraced as part of the overall delivery process. More can and should be achieved and if we are to raise the bar in waste management practice good design must be integral to a successful waste facility project.



Chapter One

Waste Strategy 2007, Defra

Planning Policy Statement 10: Planning for Sustainable Waste Management, ODPM (2005)

Planning Policy Statement 1: Delivering Sustainable Development, ODPM (2005)

Chapter Two

Better Public Building, CABE and Department for Culture, Media and Sport (2006)

Better Civic Buildings and Spaces, CABE (2002)

Planning Policy Statement 1: Delivering Sustainable Development, ODPM (2005)

Planning Policy Statement 10: Planning for Sustainable Waste Management, ODPM (2005)

Waste Strategy 2007, Defra

Planning and Compulsory Purchase Act (2004)

Circular 01/06 (CLG): Guidance on Changes to the Development Control System, CLG (2006)

Strategy for Sustainable Development, HM Government in association with Strategic Forum for Construction (2008)

Planning Policy Statement 12: Local Spatial Planning, Communities and Local Government (2008)

Planning for Sustainable Waste Management: A Companion Guide to Planning Policy Statement 10, CLG (2006)

Planning Policy Statement: Planning and Climate Change - Supplement to Planning Policy Statement 1, CLG (2007)

Barker Review of Land Use Planning, HM Treasury (2006)

The Costs and Financial Benefits of Green Buildings, A Report to California's Sustainable Building Task Force (October 2003)

Chapter Three

Improving Standards of Design in the Procurement of Public Buildings, CABE and OGC (2002)

Creating Excellent Buildings: A Guide for Clients, CABE (2003)

Better Civic Buildings and Spaces, CABE (2002)

Waste Strategy 2007, Defra

Outline Plan of Work, Royal Institute of British Architects (2007)

Making Design Policy Work: How to Deliver Good Design Through Your Local Development Framework, CABE (2005)

Reclaimed Building Materials in the Development of the Thames Gateway, BioRegional Reclaimed (January 2006)

Planning Policy Statement 10: Planning for Sustainable Waste Management, ODPM (2005)

The Validation of Planning Applications: Guidance for Local Planning Authorities, CLG (2007)

Reclamation Led Approach to Demolition, BioRegional Development Group (2007)

Waste Infrastructure Delivery Programme Planning Systems Guidance, Defra (2007)

Chapter Four

Getting Value for Money from Construction Projects Through Design, National Audit Office (2004)

Environment Protection Act (1990)
Clean Neighbourhoods and Environment Act (2005)

Chapter Five

Planning Policy Statement 10: Planning for Sustainable Waste Management, ODPM (2005)
Waste Strategy 2007, Defra
Planning Policy Statement 1: Delivering Sustainable Development, ODPM (2005)
Planning Policy Statement: Planning and Climate Change - Supplement to Planning Policy Statement 1, Communities and Local Government (2007)
By Design - Urban Design in the Planning System: Towards Better Practice, DETR and CABE (2000)
Better Places to Live By Design: A Companion Guide to PPG3, DETR and CABE (2001)
Safer Places: The Planning System and Crime Prevention, ODPM (2004)
Planning and Access for Disabled People: A Good Practice Guide, ODPM (2003)
Planning Policy Statement 10: Planning for Sustainable Waste Management, ODPM (2005)
The Regional Spatial Strategy, South West Regional Assembly (2006)
A Design Statement for Cornwall, Cornwall County Council (2002)
North West Regional Waste Strategy, North West Regional Assembly (2004)
Lancashire's Municipal Waste Management Strategy 2001-2020, Lancashire County Council (2001)

Chapter Six

Design and Access Statements: How to Write, Read and Use Them, CABE (2006)
The Validation of Planning Applications: Guidance for local planning authorities, CLG (2007)
Planning Policy Statement: Planning and Climate Change - Supplement to Planning Policy Statement 1, CLG (2007)
Urban Design Compendium, Llewelyn-Davies (2007)
Better Civic Buildings and Spaces, CABE (2002)
Planning Policy Statement 1: Delivering Sustainable Development, ODPM (2005)
Planning Policy Guidance 2: Green Belts, ODPM (1995)
Circular 01/06 (Communities and Local Government): Guidance on Changes to the Development Control System, CLG (2006)
Green Guide to Specification, BRE (2002)
Adapting to Climate Change: A Checklist for Development, Greater London Authority (2005)
Building a Better Environment: A Guide for Developers, Environment Agency (2006)
Sustainability: Achieving Excellence in Construction Procurement Guide (11), OGC (2007)
Report on Carbon Reductions in New Non-Domestic Buildings, CLG (2007)
Sustainable Construction: Position Statement, Environment Agency (2003)
Sustainable Drainage Systems (SUDS) - Guidance, Environment Agency

Chapter Seven

Design Quality: Achieving Excellence in Construction Procurement Guide (9), OGC(2007)
Planning Policy Statement 23: Planning and pollution control, ODPM (2004)
Site Waste Management Plans Regulations 2008



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