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Waste Aware Scotland

National Waste Strategy: Scotland

Lanarkshires

Environmental Assessment of Plans and Programmes (Scotland) Regulations 2004

Strategic Environmental Assessment of

Waste Management Options for North and South Lanarkshire Councils

ENVIRONMENTAL REPORT
(Interim Draft)

July 2007

SEPA
Scottish Environment Protection Agency

GLASGOW & CLYDE VALLEY AREA WASTE PLAN REVIEW

WASTE MANAGEMENT OPTIONS FOR NORTH AND SOUTH LANARKSHIRE COUNCILS

STRATEGIC ENVIRONMENTAL ASSESSMENT – ENVIRONMENTAL REPORT - SUMMARY

1. INTRODUCTION

1.1 This document is a draft interim Environmental Report summary which assesses the potential environmental effects of options for waste management for the North and South Lanarkshire Council areas. It assesses options for waste management in these areas that are currently being considered by the two authorities (as part of the Lanarkshire Waste Management Project - LWMP) and which will be set out in bids to the Scottish Executive for funding. It also assesses, and reports upon, what the significant environmental effects of each of the options may be and sets out mitigation actions to prevent, reduce or offset any adverse effects.

1.2 In 2003, 11 Area Waste Plans (AWP) covering the whole of Scotland were prepared by the Scottish Environment Protection Agency (SEPA), in partnership with the Scottish Executive, local authorities and other stakeholders. These set out a strategic framework for delivery of waste management facilities across Scotland in order to improve Scotland's rates of waste recycling and recovery and to reduce the amount of waste being disposed of in landfill sites.

1.3 The Glasgow and Clyde Valley (GCV) AWP covers the local authority areas of Glasgow City, North and South Lanarkshire, East and West Dunbartonshire, Inverclyde, Renfrewshire and East Renfrewshire.

1.4 In 2004/05 420,496 tonnes of municipal (or household) waste was generated in the Lanarkshire local authority areas. The amount of waste that was recycled in 2004/05 by North and South Lanarkshire was 17.4% and 28.4% respectively. This represents a significant improvement on previous years and is the result of considerable effort by all the authorities involved and by the public. It remains the case that a large proportion is still disposed to landfill. This is not a sustainable or desirable approach to manage waste and Scotland has set itself challenging targets to divert waste from landfill.

1.5 Landfill sites can have a number of environmental problems, including odour, noise, litter, potential to contaminate water through leaching of contaminants and emissions of methane, a powerful greenhouse that contributes to climate change. Moving away from landfill is therefore a key objective for the Area Waste Plan.

1.6 Since publication of the GCVAWP in 2003, the Scottish Executive has invited proposals from the local authorities for funding for residual waste management facilities[1]. The Glasgow and Clyde Valley Area has split into 2 strategic groups when developing these proposals :

Glasgow and Clyde Valley :	Glasgow City, East and West Dunbartonshire, Inverclyde, Renfrewshire and East Renfrewshire (also includes Helensburgh and Lomond area from Argyll & Bute).
Lanarkshires :	North and South Lanarkshire

1.7 This draft Environmental Report covers options which have been prepared by North and South Lanarkshire Councils via the Lanarkshire Waste Management Project. Options have been

[1] *Residual Waste – waste that remains after reduction, reuse, recycling and composting.*

prepared by the Glasgow and Clyde Valley strategic group but these are being reviewed in light of Scottish Executive direction for this group to work with the Ayrshires Strategic Option Group. These will be considered separately as they are developed.

1.8 Although preparation of the proposals for funding is the responsibility of the Local Authorities, SEPA considers that it is important to assess them to take account of their potential impact. Accordingly, SEPA has undertaken a draft Best Practical Environmental Option (BPEO) Assessment and this draft interim Strategic Environmental Assessment (SEA). Both of these are required when Area Waste Plans are reviewed and SEPA wants to ensure that consideration of the bids (once submitted to the Scottish Executive) is supported by evidence about the environmental effects of the options presented. This draft Environmental Report is the preliminary outcome of the SEA.

1.9 The funding proposal does not identify specific waste management technologies[2] nor does it identify sites. A separate site search process is currently being undertaken by the Lanarkshire Waste Management Project. Accordingly, the review has not identified areas where facilities should be sited and as a result, this SEA only considers the generic effects. SEPA anticipates that effects on specific areas will be identified through SEA of local authority development plans.

1.10 SEA of the Glasgow and Clyde Valley Area Waste Plan (as a whole, including bids from both the Lanarkshires and the rest of the waste plan area) as and when it is reviewed is a requirement under the Environmental Assessment of Plans and Programmes (Scotland) Regulations 2004. SEA is a systematic method for assessing the potential environmental effects of plans during their preparation in order to make sure the plan considers environmental matters and so measures to address adverse effects can be identified and put into place early.

1.11 As details of the Lanarkshires options are only available at this time, a draft SEA of these options has been conducted. A formal SEA including options presented by the rest of the Area Waste Plan authorities will be completed when details of these are available. Accordingly, it should be noted that this draft Environmental Report is not compliant with the requirements of Schedule 2 of the Environmental Assessment of Plans and Programmes (Scotland) Regulations 2004 at this time. A full Environmental Report which contains all the information required under the Act will be prepared when options for the rest of the Glasgow and Clyde Valley Area Waste Plan are presented.

2.0 The Lanarkshires – Options Presented

2.1 The Lanarkshire Waste Management Project has considered three possible options which are noted below. An initial funding proposal was submitted in December 2004 which appraised option 1a and 2a. A revised funding bid, submitted in December 2006, considered options 1a, 2b and 3a. A final bid is due to be submitted by the end of September 2007 which has modelled options 1b, 3b and 3c . The preferred option from the 2006 funding bid was option 3a. It should be noted these options are for the treatment of residual waste after maximising source segregated recycling and composting as far as practicable.

Option 1	**Do minimum (source segregated recycling and composting with no residual waste treatment)** Option 1(a) - 40% recycling and composting by 2020 (2004 and 2006 option) Option 1(b) - 52% recycling and composting by 2020 (2007 option)
Option 2	**Mechanical Biological Treatment** Option 2(a) - with Refuse Derived Fuel Production (2004 option)

[2] *A summary of the different types of waste management facilities is provided in Appendix B*

	Option 2(b) - with no end market (treated waste to landfill) (2006 option)
Option 3	**Energy from Waste Facility** Option 3(a) - 40% recycling and composting with 250,000tpa facility (2006 option) Option 3(b) - 52% recycling and composting with 200,000tpa facility (2007 option) Option 3(c) - 52% recycling and composting and 300,000 capacity EfW facility (to treat all residual waste generated in final year of contract and which LWMP feel offers best value for money) (2007 option)

2.2 **Option 1 – Do Minimum**

With this option no residual waste treatment facility would be constructed and all residual waste would be disposed to landfill. Options 1(a) and 1(b) differ only in terms of the percentage of waste that is recycled or composted prior to residual waste being disposed to landfill.

2.3 **Option 2 – Mechanical Biological Treatment**

Mechanical Biological Treatment is a process which combines biological and mechanical techniques. The process takes post-collected un-sorted residual wastes from the domestic and commercial waste streams which is treated mechanically then biologically,(or vice versa) through various screening, conditioning and sanitising processes. This reduces the volume of waste and separates it into different waste types, extracting some of the recyclable materials and produces from the resulting organic-rich residual materials a stabilised 'biowaste'. The biodegradable fraction of the waste is treated in a managed biological process in which it is broken down by naturally occurring micro-organisms. Two options have been considered. Option (a) where a refused derived fuel is produced from the resultant organic mixture which is then incinerated (assumed with energy recovery) in a combustion plant and option (b) where there are no markets for the stabilised biowaste and it is landfilled.

2.4 **Option 3 – Energy from Waste**

Energy from waste may encompass a whole range of thermal treatment technologies such as incineration, gasification, pyrolysis, anaerobic digestion. For the purposes of this report incineration with subsequent recovery of energy has been profiled and used in the Life Cycle Analysis modelling. Incineration is the controlled combustion of waste. Heat released from the combustion can be recovered and used to generate electricity, heat, steam or hot water; this process is often known as Energy from Waste.

Incineration can significantly reduce the volume of waste and reduce the hazardousness of waste. Incineration can treat a wide range of waste types including Municipal Waste (MW), Commercial and Industrial Waste, and Refuse Derived Fuel (RDF). While large-scale plants can treat unsorted waste, small-scale plants can be specifically designed to take pre-sorted waste.

Waste is deposited in a bunker, mixed and is then fed into a furnace where it is burned. The unburned residue, known as bottom ash, is stabilised and is deposited into a tank. Magnets remove any ferrous metals from the ash for recycling, and the remaining ash can be recycled for use in construction. The hot gases produced during combustion are then directed to a boiler where electricity can be generated and heat recovered. Gases are thoroughly cleaned using a range of emission control systems before they are emitted to the atmosphere. Filtered particles are collected and sent to special waste landfill as fly ash. Under the Waste Incineration (Scotland) Regulations 2003 all emissions are continuously monitored.

2.5 **Option 4 –Area Waste Plan BPEO**

This is the original option proposed for the Glasgow & Clyde Valley area in the 2003 Area Waste Plan. It consists of utilising clean material recycling facilities (MRF) and mixed waste processing facilities (which were based on Mechanical Biological Treatment options), composting facilities and 'other recovery technologies' (these could be pyrolysis, gasification, incineration, Refuse Derived Fuel, autoclave etc)[3].

Note: this option is for the whole of the Glasgow & Clyde Valley Waste Strategy Area (WSA) and does not differentiate between the current two sub-groups (Lanarkshire Waste Management Project and the Glasgow & Clyde Valley Strategic Option Review Group) within the WSA.

Assessment Method

2.6 An assessment of each of the options described above was undertaken. This assessment involved considering whether the options were working towards or away from a set of identified objectives or desired outcomes. This is a typical approach to completing an Environmental Report and reflects guidance published by the Scottish Executive.

2.7 The objectives used were:

- To increase the rates of reuse, recycling and recovery in the area in accordance with the waste hierarchy;
- To reduce landfilling of MW waste in the area;
- To manage waste in a way that reduces emissions to air;
- To manage waste in a way that reduces emissions to land and soil;
- To manage waste in a way that reduces emissions to water;
- To manage waste in a way that protects and enhances biodiversity;
- To manage waste in a way that reduces greenhouse gas emissions;
- To reduce energy use and support the development of renewable energy supplies;
- To reduce the movement of waste;
- To manage waste in a way that protects communities and their local environment;
- To manage waste in a way that protects and enhances cultural heritage;
- To manage waste in a way that protects and enhances landscape.

2.8 To undertake this assessment, a matrix was used which assesses each of the options put forward by the local authorities against the environmental objectives. The completed matrices are set out in Appendix A. The matrix is comprised of the following elements:

A. SEA objectives – the objectives were used to assess all options considered.

B. Assessment – this box considers the contribution each option may make towards achieving each environmental objective. The assessment was simple and high level and sets out whether each option may contribute to achieving the objective. The symbols used in the matrices are described below:

↑	is making a positive contribution to the objective	↓	is moving away from the desired objective
O	has no significant relationship with the objective	?	may have an effect on the objective, but its nature and extent are unknown

[3] *A summary of the different types of waste management facilities is provided in Appendix B*

C. Short, Medium and Long Term Effects – This box records whether the effects are likely to be short, medium or long term. The following definitions and abbreviations were used:

Short Term (S) – up to 3 years from adoption of proposals resulting from the AWP review;
Medium Term (M) – 4 to 7 years from adoption of proposals resulting from the AWP review;
Long Term (L) – 8 or more years from adoption of proposals resulting from the AWP review.

Due to the long lead in time for the planning, licensing and construction of new waste management facilities, no short term effects were identified.

D. Cumulative and Other Effects – If cumulative effects or other types of effects may be likely, then this is identified with a tick in box D and a description of the potential effects in the comments box (F).

E. Comments and Supporting Information – This box is used to:

- record supporting information as required;
- justify the score given for box B;
- identify the nature of any cumulative or other effects in box D; and
- set out mitigation measures to address effects identified in the assessment.

Summary – This column summarises the overall effects of each option.

Mitigation – Actions to prevent, reduce or offset any adverse effects are recorded at the end of each assessment matrix.

2.9 One matrix has been completed for each group of options.

Completing the Preliminary Assessment

2.10 The assessment and the preparation of the Environmental Report was conducted in three stages following the Scoping Report consultation. These stages are described below:

2.11 **Stage 1 – Preliminary SEPA Assessment** –An initial assessment of the options was undertaken internally by SEPA. This was achieved through a day workshop held on 15 August 2006, which included environmental experts from across the Agency, including water, ecology, air, waste, human health, soil and also included regulatory staff involved in the licensing of waste management facilities.

The workshop tested each option through the application of the assessment matrix and resulted in a preliminary assessment of the potential significant environmental effects of implementing the plan. This preliminary assessment was then presented to an external "expert group" comprising representatives from the Waste Strategy Area Group and an invited group of external stakeholders (see Stage 2 below).

2.12 **Stage 2 – External Input** – A workshop was held on 12 September 2006 with an external "expert group" comprising of an invited group of external stakeholders to consider SEPA's preliminary assessment. Workshop attendees were given the opportunity to comment on any part of the preliminary assessment and invited to make recommendations for changes or additions. The findings of this workshop were then considered by SEPA as Responsible Authority and, where appropriate, the preliminary assessment was changed.

2.13 **Stage 3 – External Validation** - To ensure robustness of the assessment and to secure an "independent" review of the findings, SEPA contracted external consultants (Envirocentre) to undertake an independent validation process of the assessment and the findings derived from it.

Envirocentre were provided with the "final draft" assessment matrices following stages 1 and 2 above. These findings were then considered by SEPA and, where appropriate, the assessment was changed.

Assumptions and General Principles of the Assessment

2.14 A number of general principles and assumptions were adopted in undertaking this assessment. A summary of these is provided below:

1. Environmental Baseline – All of the options considered have been scored in comparison with the current baseline conditions.

2. Life Cycle Assessment (LCA) - This was used to assess the some of the potential environmental impacts of the options considered. LCA provides a way of assessing the environmental burdens associated with the whole life cycle of a product or service, from its cradle to its grave. In the context of waste management this includes not only the treatment and final disposal of the waste but all of the associated infrastructure as well. This helps the identification of significant potential environmental impacts and allows for remedial measures to be identified and built in from the outset. Accordingly, LCA data where appropriate have been used to help compile the assessment matrices. Life cycle models can only be considered indicative at this stage as no locations for the required infrastructure have been identified, and within any waste management technology there are a vast range of variations, each with there own advantages and problems. So LCA has been used in this assessment primarily to give a quantitative indication of the relative differences between the waste management options being assessed. These are described in the matrices and summarised in Part 3 of this Chapter. A full summary of the LCA findings are provided in the BPEO assessment forming part of the Consultation Pack.

3. Weighting – No weighting has been applied to the scores set out in box B. Rather, a simple indication of whether each option moves towards or away from an environmental objective is given.

4. Assumptions – It has been assumed that waste management facilities that may emerge from the options considered will:
(a) be designed and constructed to modern, efficient standards;
(b) that site specific environmental effects will be able to be managed through effective siting and design through statutory land use planning;
(c) that site specific environmental effects arising from the operation of a facility will be able to be managed through effective Pollution Prevention & Control (PPC) regulation;
(d) that any facility will be operated efficiently and in accordance with any planning or licence conditions applied.

3. PRELIMINARY ASSESSMENT FINDINGS - OVERVIEW

3.1 The table below summarises the identified effects across the four options. This table shows whether it is considered each option will move towards or away from the stated objective.

3.2 In summary, all four options could potentially have a combination of positive and negative significant environmental effects. When considered together, the options tend to present more potentially positive effects, although it was difficult to identify the nature and extent of some effects due to the strategic nature of the options being considered by the Lanarkshires Councils and due to the fact that it does not identify specific technologies or locations.

Environmental Objective	Optn 1a	Optn 1b	Optn 2a	Optn 2b	Optn 3a	Optn 3b	Optn 3c	Optn 4	Summary
1. Increase rates of Recycling and Recovery	↑	↑	↑?	↑	↑	↑	↑	↑?	All options moving towards this objective. Option 2a has a question mark.
2. Reduce landfilling of municipal waste	↑	↑	↑	↑	↑	↑	↑	↑	All options moving towards this objective.
3. Reduce emissions to air	↑↓	↑↓	↑↓?	↑↓?	↑↓?	↑↓?	↑↓?	↑↓?	All options have both positive and negative effects although the extent of these is uncertain. Emissions to air require mitigation.
4. Reduce emissions to land	↑?	↑?	↑↓?	↑	↑↓	↑↓	↑↓	↑↓?	All options have both positive and negative effects. Some options have question marks. Emissions to land require mitigation
5. Reduce emissions to water	↑?	↑?	↑↓	↑↓	↑	↑	↑	↑↓?	Option 2 and 4 potential to have negative effects on water. Other options moving towards this objective
6. Protect and enhance biodiversity	?	?	?	?	?	?	?	?	Uncertain as effects on biodiversity dependent upon where facilities are sited. Need to assess effects at land use planning stage
7. Reduce GHG emissions	↑	↑	↑	↑	↑	↑	↑	↑	All options moving towards this objective.
8. Reduce energy use and support renewables	↑↓	↑↓	↑↓	↑↓	↑	↑	↑	↑↓?	All options moving towards this objective, except option 1 which is more energy intensive.
9. Reduce movement of waste	?	?	?	?	?	?	?	?	Uncertain as movement of waste dependent upon where facilities are sited. Need to assess effects at land use planning stage
10. Protect communities and the local environment	0	0	↑↓?	↓?	↑↓?	↑↓?	↑↓?	↑↓?	All options will have some negative effects on local environment and communities. These can be mitigated through good siting, design and effective regulation once sites are licensed. Positive impacts of EfW options.
11. Protect and enhance cultural heritage	0	0	?	?	?	?	?	?	Uncertain as effects on biodiversity dependent upon where facilities are sited. Need to assess effects at land use planning stage
12. Protect and enhance landscape	0	0	?	?	?	?	?	?	Uncertain as effects on biodiversity dependent upon where facilities are sited. Need to assess effects at land use planning stage

3.3 It is the case, however, that all waste management options have the potential to create adverse environmental effects that must be considered and where possible mitigated. The assessment process found that these adverse environmental effects were likely to be most prevalent in relation to impacts on local communities and upon air quality. Land quality was also potentially likely to be affected depending on how waste derived compost and other outputs were used. It

is important the effects identified are addressed through effective mitigation, including further assessment, good design and planning, effective regulation and efficient operation of facilities.

3.4 There are uncertainties for all four options as to their potential effects on biodiversity, cultural heritage and landscape. This is because the environmental effects will depend on the type of facilities and where they are located.

3.5 All options should have a positive effect on reuse, recycling and recovery rates in Lanarkshire. This is particularly the case for options 1b, 3 and 4 as these aim to attain higher recycling and composting targets, although there is concern from the Local Authorities about whether these are achievable. All of the options are predicted to reduce the amount of waste going to landfill and therefore all score positive in relation to this objective.

3.6 Overall, while all options may result in both positive and negative effects with respect to the environmental objectives, it is likely to be the case that all will deliver significantly better outcomes than the current situation where rates of landfill of waste remain very high. It is also important to note that negative effects will need to be addressed through effective mitigation. In particular, all options and waste management technologies that may emerge under them will be subject to rigorous regulatory processes including planning, Pollution Prevention Control permitting and Waste Management Licensing which are designed to protect the environment.

Preliminary Objective Specific Findings

3.7 The findings of the Environmental Report in respect of the objectives are summarised below:

3.8 *Objective 1 - Increase reuse, recycling and recovery* - All of the options will likely improve recycling and recovery rates and significantly reduce the amount of waste going to landfill.

3.9 *Objective 2 – Reduce landfill of municipal waste* - All of the options are predicted to reduce the amount of waste going to landfill and therefore all score positive in relation to this objective. Options 2a and 3 which utilise some form of thermal treatment and thus reduce the quantity of waste the most and perform best in this regard, but they still retain a proportion of waste that will go to landfill.

3.10 *Objective 3 – Reduce emissions to air* – All options have positive and negative effects with respect to emissions to air. The options scored positively as many of the waste treatment technologies will be undertaken within buildings therefore emissions such as odour and dust will be more easily controlled as opposed to the fugitive emissions[4] that can result from landfill. All options will also likely deliver a significant reduction in emissions of methane due to lower volumes of waste being sent to landfill. It is recognised that emissions to air will still occur eg from bio-aerosols[5] from the biostabilisation process and composting in options 2a,2b and 4 and green waste composting in all options and that there will be emissions from the thermal treatment options. All options will have air emissions which need to be properly managed and mitigated. Option 2a, 3 and 4 have the potential to increase NOx and SOx emissions (resulting from the combustion process) and potential for metals in emissions to air. There is also a potential for cumulative effects on air quality for all options if facilities are located in areas with existing air quality problems. These effects will require to be addressed through effective mitigation.

3.11 *Objective 4 – Reduce emissions to land and soil* - All options are likely to have a positive effect on land because there will be less waste going to landfill compared to the current levels. Option 2a and 3 are likely to deliver the greatest reduction in quantity of waste going to landfill due to

[4] *Definition in Appendix B*
[5] *Definition in Appendix B*

the thermal treatment which will considerably reduce waste bulk. Any energy from waste facility will also generate ash which will require to be treated as required and disposed to landfill.

3.12 *Objective 5 – Reduce emissions to water* - All options are likely to have a positive effect on water because there is less waste going to landfill (landfill sites have the potential to cause harm to waterbodies and groundwater from leaching of contaminants). Options 4 may produce outputs like biostabilised waste and compost which could be applied to land and which could therefore affect waterbodies. Risk assessment is required for such activities.

3.13 *Objective 6 – Protect and enhance biodiversity* - The LWMP funding bid does not identify types of facilities or their locations. Accordingly, it is not possible to identify individual effects upon biodiversity from any of the options at this stage as this will be very dependent upon location. However, waste management facilities do have the potential to impact upon biodiversity – for example, where facilities are sited on or close to protected habitats or where protected habitats and species may be disturbed by activities and noise. The LWMP are currently undertaking a site search for potential locations for a waste treatment facility and biodiversity and environmental sensitivity criteria have been identified as factors for consideration in this process. It is important that a more detailed assessment is undertaken as and when sites are considered in order that significant effects on biodiversity can be identified and appropriate mitigation measures put in place.

3.14 *Objective 7 – Reduce greenhouse gas emissions* - All the considered options recorded a likely marked improvement in release of greenhouse gases. All options are designed to reduce levels of waste going to landfill, which will in the long term significantly reduce emissions of methane, a powerful greenhouse gas.

3.15 *Objective 8 – Reduce energy use and support renewables* – Option 2a and option 3 and 4 have the potential to generate energy from combustion of waste. This energy can be classified as renewable energy under the *Renewables Obligation (Scotland) Order*[6] and can qualify for Renewables Obligation Certificates. Accordingly, this source of energy will contribute to meeting Scotland's target of generating 40% of its energy needs from renewable sources by 2020. All the options except option 1 and 2b have the capability of producing energy and can, depending upon the technology, contribute to renewable energy generation. Options with thermal treatment (options 2a, 3 and 4) performed better in relation to this objective as they can generate electricity and heat. Option 4 is likely to be the most energy intensive and scored less well in relation to this option.

3.16 *Objective 9 – Reduce the movement of waste* - The significance of the impact of transport resulting from the movement of waste will depend on the location of the facilities. The uncertainties surrounding the site location will need to be dealt with through land use planning. Planning will also seek to ensure that facilities are sited to make best use of existing transport networks and keep treatment facilities close to source of the waste, by applying the proximity principle.

3.17 *Objective 10 – Protect local communities and their local environment* - SEPA has used a study by the Department for Environment, Food and Rural Affairs to guide its consideration of human health as it is not possible at this stage to consider potential effects on individual areas as specific facilities and sites are not identified in the LWMP funding bid. A summary of the generic effects of waste management facilities on human health is provided in the box on the following page.

All of the options assessed could have impacts upon local communities, but the extent and nature of effects will depend upon where facilities are located. Generic effects which have been identified include the potential for noise, odour, visual impacts and increased traffic generated

[6] *For legislation, go to: www.opsi.gov.uk/legislation/scotland/ssi2007/20070267.htm#8*

by facilities. All of these effects can be effectively mitigated through good siting, good design and effective operation of facilities. The assessment identified the potential for cumulative effects on local communities if new facilities are located on or adjacent to existing waste management sites. This is especially important where local communities are already living with the effects of existing waste management facilities. These factors do, however, have to be balanced with the benefits (e.g. reduced transport) that may accrue from co-location of waste management facilities.

Potential Health Effects of Waste Management Facilities

There is concern that waste management facilities can lead to health problems for those working in them or living nearby. In 2004 the Department for Environment, Food and Rural Affairs (DEFRA) published a comprehensive UK review of the environment and health effects of waste management. This report represents the most authoritative and comprehensive information currently available and SEPA has used this as the basis for its consideration of human health in this Environmental Report. A full copy of the report is available on the DEFRA website http://www.defra.gov.uk/environment/waste/research/health/pdf/health-report.pdf. An extended summary is also available http://www.defra.gov.uk/environment/waste/research/health/pdf/health-summary.pdf .

The following summarises the findings for waste management technologies:

Landfill – Many studies have been carried out to investigate the health effects of landfill sites. One UK study identified a possible link between living close to a landfill site and occurrence of some birth defects although it was unable to say if the effects were causal or reflecting other factors. A more detailed study in Scotland on 61 sites did not find any significant risk. Other studies have found no evidence to suggest that living close to landfill sites increases the chance of cancer developing.

Composting - A few studies have shown that there may be an increased rate of certain health effects such as bronchitis, coughing and eye irritation as a result of particulates released from the process although there is no evidence of increased rates of asthma. A few studies have looked at emissions of volatile organic compounds (VOCs) and whether there is additional cancer risk due to emissions from composting sites. No additional risk of cancer in populations living close to composting facilities was found.

Materials Recycling Facilities - A few studies have been carried out in the workplace and these indicate that flu-like diseases, eye and skin problems, tiredness and sickness are higher in the workers than would be expected in other comparable groups. So far as we know, there are no studies of health effects in people living near MRFs. If there were any health effects, these would be expected to be similar in nature to those associated with composting facilities.

Energy From Waste – Dioxins – There has been concern about the release of dioxins from energy from waste plants. Exposure to dioxins has been linked to many human diseases including links to some cancers. Modern energy from waste facilities have reduced dioxin emissions by 99% over previous generation facilities and less than 1% of all UK dioxin emissions come from household waste incinerators (compared to 18% for domestic heating and cooking). This is due to the strict emission limits that are placed on all energy from waste facilities. The Government's independent expert advisory Committee on the Carcinogenicity of Chemicals in Food, Consumer Products and the Environment concluded that "*any potential risk of cancer due to residency near to the MSW incinerators was exceedingly low and probably not measurable by the most modern techniques*".

Energy from Waste - Particle matter and SO_2 - Other health concerns relate to respiratory disease associated with emissions of particle matter and SO_2 . The DEFRA review concluded that there is little evidence that emissions from energy from waste facilities make respiratory problems worse and that in most cases the facility contributes only a small proportion to the local level of pollutants. Such emissions can also be strictly controlled for example using filter systems.

3.18 *Objective 11 – Protect and enhance cultural heritage* - The LWMP funding bid does not identify types of facilities or their locations. Accordingly, it is not possible to identify individual environmental effects upon landscape from any of the options at this stage as this will be very dependent upon location. Therefore it is important that more detailed level assessment is undertaken as and when sites are considered in order that significant effects on cultural heritage can be identified and appropriate mitigation measures put in place.

3.19 *Objective 12 – Protect and enhance landscape* - The LWMP funding bid does not identify types of facilities or their locations. Accordingly, it is not possible to identify individual environmental effects upon landscape from any of the options at this stage as this will be very dependent upon location. Therefore it is important that more detailed level assessment is undertaken as and when sites are considered in order that significant effects on landscape can be identified and appropriate mitigation measures put in place.

4. MITIGATION

4.1 The following mitigation measures are identified and should be put into place as required following:

4.2 *Planning* - The land use planning system will need to ensure that facilities are sited and designed in a way that reduces impacts on the environment and local communities. Planning Authorities are also encouraged to provide a framework for delivery of waste management facilities by identifying suitable sites in Development Plans.

4.3 *Operation* – A range of regulatory controls exist to ensure that waste management facilities are designed and operated in a way that protects the environment and human health. As and when proposals for facilities come forward, these will be used to address potential effects identified in this assessment.

4.4 *Considering Funding Bids and Tendering for Proposals* - Further details about the environmental performance of some of the options could be sought as part of the Scottish Executive's decision making process on what proposals should go forward. Tenders for facilities should also seek highest environmental performance from bidders.

4.5 *Waste Outputs* - Ensure market testing undertaken before facilities are developed to ensure that there is a viable and environmentally acceptable market for outputs. In addition, risk assessment criteria must be applied prior to the application of outputs from treatment processes with respect to their impact on the air, soil and water environment.

4.6 *Thermal Efficiency* – Ensure that any Energy from Waste facility has maximum thermal efficiency to maximise generation of heat and electricity in line with SEPA guidance[7].

4.7 *Engagement and Involvement* – Local communities potentially affected by waste management facilities should be given early and effective opportunities to involve themselves in decision making.

4.8 *Design* – Facilities should be designed to enhance the environment where possible.

4.9 *More detailed assessment in other Plans and Programmes* – This assessment is a strategic assessment that is consistent with the scale and nature of the Area Waste Plan. There will be a need for more detailed level assessment to take place as more detailed level plans and programmes are prepared. In particular, local authority Development Plans which identify locations or areas of search criteria for waste management facilities will need to consider the environmental implications of proposed locations.

[7] *SEPA has published Thermal Treatment Guidelines(www.sepa.org.uk/pdf/nws/guidance/thermal_treatment.pdf) and is also developing criteria for thermal efficiency of waste treatment facilities which will be available later in the year.*

5. CONSULTATION

5.1 This Environmental Report and the AWP Review is out for consultation between 23rd July 2007 and 3rd September 2007. SEPA welcomes your comments.

5.2 Comments should be made in writing by 3rd September 2007 to either:

FREEPOST, Glasgow and Clyde Valley AWP Consultation, SEPA Glasgow Office, Law House Todd Campus, West of Scotland Science Park, Maryhill Road, Glasgow. G20 0XA

Or by email to: glasgowandclydevalley.AWP@sepa.org.uk

Consultation Questions
Question A Do you have any comments on the interim evaluation of the environmental effects of the options and the findings derived from them? If not, please explain which parts of the interim evaluation you disagree with
Question B Has the interim evaluation covered all of the environmental issues that you would like to see considered? If not, please tell us which environmental issues should also be included
Question C Do you think SEPA has identified appropriate mitigation actions to prevent, reduce as fully as possible or offset any significant adverse environmental effects of the Lanarkshires waste options on the environment?
Question D Are there any other points in respect of this interim Environmental Report that you would wish to make?

APPENDIX A – DRAFT ASSESSMENT MATRICES

Set out below is an assessment of each of the options being considered by the Lanarkshires Waste Management Project (North and South Lanarkshire Councils). The potential effects of each option against the assessment objectives are detailed. Where adverse effects have been identified, mitigation measures to prevent, reduce or offset the adverse effects have been identified. A description of the assessment method is provided in paragraphs 2.6 to 2.14 above.

Option 1 - Do Minimum Approach – No waste treatment facility constructed. All residual waste goes to landfill

Option 1(a) - 40% recycling and composting by 2020 (2004 and 2006 option)
Option 1(b) - 52% recycling and composting by 2020 (2007 option)

Both options achieve recycling and composting from source segregated kerbside collection and Household Waste Recycling Centres

1. **A. SEA OBJECTIVE 1 – To increase the rates of reuse, recycling and recovery in the area in accordance with the waste hierarchy**

B. Is this part of AWP moving towards/away from objective	↑	C. Short, medium or long term effects ?	M	D. Any other types of effects ?	

E. Comments and Supporting Information :

Supporting information :	Reasons for score in Box B-D:
Recycling and composting will be increasing from current performance from 28% in 2005/06 to; Option a) 35% in 2010, 36.5% in 2013 and 40% in 2020 Option b) 42% in 2010, 45% in 2013 and 52% in 2020	**Positive score** as recycling is increased from current baseline. Option 1 is diverting additional waste from landfill via increased recycling/composting arising from the roll-out of new collection methods.

2. **A. SEA OBJECTIVE 2 – To reduce landfilling of Municipal Waste in the area**

B. Is this part of AWP moving towards/away from objective	↑	C. Short, medium or long term effects ?	M	D. Any other types of effects ?	

E. Comments and Supporting Information

Supporting Information :	Reasons for score in Box B-D:
Option 1a and 1b propose reduced landfill in 2020 compared to current levels of approximately 72% presently landfilled in Lanarkshires	**Positive score** as reduction in waste to landfill.

3. **A. SEA OBJECTIVE 3 – To manage waste in a way that reduces emissions to air**

B. Is this part of AWP moving towards/away from objective	↑↓	C. Short, medium or long term effects ?	M/L	D. Any other types of effects ?	✓

E. Comments and Supporting Information :

Supporting information	
Based on Life Cycle Analysis (LCA) evidence option 1a and 1b both perform better than the baseline, showing a reduction in acidifying gases (e.g. SO2 and NOx). There are no significant air impacts from transporting waste between different plants relating to air emissions. However, it was noted that Air Quality Management Areas (AQMA's) in Scotland have been designated based on traffic movement. There are 4 AQMA's in Lanarkshire namely, Airdrie, Coatbridge and Chapelhall (Harthill is also being considered) Likely to be odour issues associated with storage and handling of waste. Note: Composting operations are managed under Waste Management Licence regime and therefore do not have limits for air emissions.	**Positive score** In comparison to current baseline where majority of waste is landfilled options 1a and 1b reduces to waste to landfill due to increased recycling rates therefore less methane emissions to air. **Negative score** against objective 3 because there are air emissions (odour, dust, bio-aerosols etc) which need to be properly managed and regulated. **Cumulative effects** where air quality is already a concern (especially Air Quality Management Areas)

4.	A. SEA OBJECTIVE 4 - To manage waste in a way that reduces emissions to land and soil				
B. Is this part of AWP moving towards/away from objective	↑?	**C. Short, medium or long term effects ?**	**M**	**D. Any other types of effects ?**	
E. Comments and Supporting Information					
Supporting information : The quality of the composted material from source segregated green compost can be uncertain. The majority of waste in 2005/06 (baseline) was landfilled which creates a pollution legacy which will last up to 25 years or more. The long term effects cannot be judged for Municipal Waste Landfill Site as no site has been stabilised and no licence has been surrendered under Waste Management Licensing regime. There is a risk of accidental pollution due to failure of landfill liner particularly over a long period.		**Reasons for score in Box B-D:** **Positive score** as, there is less waste to landfill in 2010, 2013 and 2020 than in 2005/06. Option 1b has higher recycling and composting rates so will divert more waste from landfill than 1a **Question mark** against objective 4 because there is a dependency on the capacity of the market to absorb outputs of compost in relation to land application which may impact on land and soil.		

5.	A. SEA OBJECTIVE 5 – To manage waste in a way that reduces emissions to water				
B. Is this part of AWP moving towards/away from objective	↑?	**C. Short, medium or long term effects ?**	**M**	**D. Any other types of effects ?**	✓
E. Comments and Supporting Information :					
Supporting information : Based on LCA evidence, for emissions to water; options 1a and 1b perform better than the baseline for eutrophification. In terms of freshwater aquatic ecotoxicity option 1a performs similar to the baseline whereas option 1b performs better. Reducing waste going into landfill and therefore reduced potential for leachate pollution of local water courses.		**Reasons for score In Box B-D**: **Positive score** recorded as less biodegradable waste to landfill which reduces potential for leachate pollution from landfill. **Question mark** score is due uncertainty about what happens to outputs - eg compost applied to land or to landfill. **Potential Cumulative Effects** if applied to land where other pressures on adjacent waterbodies.		

6.	A. SEA OBJECTIVE 6 - To manage waste in a way that protects biodiversity				
B. Is this part of AWP moving towards/away from objective	?	**C. Short, medium or long term effects ?**	**?**	**D. Any other types of effects ?**	
Supporting information : Biodiversity duties under the Nature Conservation (Scotland) Act 2004 will apply in relation landfill of residual material and composting.		**Reasons for score in Box B-D:** **Question Mark** scored as impacts from the use of compost in Option 1 may have impacts on biodiversity due to their potential impact on air, soil and water environments.			

7.	A. SEA OBJECTIVE 7 – To manage waste in a way that reduces greenhouse gas emissions				
B. Is this part of AWP moving towards/away from objective	↑	**C. Short, medium or long term effects ?**	**M**	**D. Any other types of effects ?**	
E. Comments and Supporting Information :					
Supporting information : Based on LCA evidence, options 1a and 1b perform better than the baseline in terms of greenhouse gas emissions showing an avoided impact for climate change. This is due to any option diverting more waste away from landfill will produce better results, particularly methane emissions.		**Reasons for score in Box B-D:** **Positive score** as greenhouse gas emissions likely to reduce.			

8.	A. SEA OBJECTIVE 8 - To reduce energy use and support the development of alternative, renewable, energy supplies				
B. Is this part of AWP moving towards/away from objective	↑↓	**C. Short, medium or long term effects ?**	**L**	**D. Any other types of effects ?**	
E. Comments and Supporting Information					
Supporting information: According to LCA, Options 1a and 1b both reduce the loss of non-renewable resources compared to the baseline.		**Reasons for score in Box B - D:** **Positive score** as increased recycling rates reduces extraction for virgin materials thus overall energy use is less than baseline.			

	Negative score as option 1 does not have potential for generating the same capacity of landfill gas as baseline therefore less potential for utilising landfill gas extraction.

9.	**A. SEA OBJECTIVE 9 – To reduce the movement of waste**				
B. Is this part of AWP moving towards/away from objective	**?**	**C. Short, medium or long term effects ?**	**?**	**D. Any other types of effects ?**	✓

E. Comments and Supporting Information :	
Supporting information: No information as not known where sites will be located or where recyclate will be going (Scotland, UK or overseas).	**Reasons for score in Box B-D**: **Question mark** as dependent on location of re-processing facilities. Could be transporting waste between multiple facilities if at different sites. If using existing sites then movement of waste will likely be same as current situation. **Potential secondary** effects of "through route" traffic on communities

10.	**A. SEA OBJECTIVE 10 - To manage waste in a way that protects communities and their local environment**				
B. Is this part of AWP moving towards/away from objective	**0**	**C. Short, medium or long term effects ?**		**D. Any other types of effects ?**	

E. Comments and Supporting Information	
Supporting information : ***Odour/Dust*** - Potential odour/dust nuisance if process involves storage / handling of raw material prior to processing. ***Noise***: More equipment may result in more noise (can be mitigated, but dependent on operator), level of impact dependent on location of facilities. ***Litter***: Less landfill over long term may result in less litter from MW sources, but all sites would need to be effectively operated. ***Local Traffic***: Some effects on local communities from vehicle movements in local area. See Objective 9 also. ***Health***: See generic assessment of health effects in environment report. See section 3 of Environmental Report ***Environmental Justice:*** Potential environmental justice issues if new facilities are located on same sites as existing landfill other facilities. ***Accident***: Potential increased risk of accident overall with more processing equipment being used.	**Reasons for score in Box B-D:** As no residual waste treatment facilities will be constructed in this option no impact recorded as option is similar to the current baseline of landfilling residual waste.

11.	**A. SEA OBJECTIVE 11 – To manage waste in a way that reduces impacts on cultural heritage**				
B. Is this part of AWP moving towards/away from objective	**0**	**C. Short, medium or long term effects ?**		**D. Any other types of effects ?**	

E. Comments and Supporting Information :	
Supporting information / Discussion: May not be any difference between option 1 and baseline due to being similar therefore option 1 has no significant impact on cultural heritage from existing practices	**Reasons for score in Box B-D**: No score given as it option 1 does not move towards or away from the objective

12.	**A. SEA OBJECTIVE 12 – To manage waste in a way that reduces impacts on landscape**				
B. Is this part of AWP moving towards/away from objective	**0**	**C. Short, medium or long term effects ?**		**D. Any other types of effects ?**	

E. Comments and Supporting Information :	
Supporting information / Discussion: Where option 1 does not require any new facilities there will be no additional impact on landscape compared to baseline.	**Reasons for score in Box B-D**: No score given as it option 1 does not move towards or away from the objective

Summary of Overall Effect of this Option:
The performance of Option 1against each objective can be summarised as follows:

Uncertainties denoted by a Question Mark (?)

- A Question mark against objective 4 because there is a dependency on the capacity of the market to absorb outputs of compost in relation to land application and potential to impact to land and soil environments
- A Question mark for objective 5 due to uncertainty about what happens to outputs - eg compost applied to land or to landfill.
- Objective 6 was given a question mark as impacts from the use of compost in Option 1 may have impacts on biodiversity due to their potential impact on air, soil and water environments.
- Objective 9 has a question mark as dependent on location of re-processing facilities. Could be transporting waste between multiple facilities if at different sites. If using existing sites then movement of waste will likely be same as current situation.

Positive

- In objective 1 recycling, composting and recovery rates are increased when compared to the baseline (current waste management practices being carried out in 2005/06).
- Option diverts more from landfill than the baseline which will result in less uncontrolled emissions (e.g. leachate to land and water and methane to air, odour, dust).
- Greenhouse Gas emissions are likely to be reduced due to increased recycling rates and subsequently less waste to landfill in objective 6
- less biodegradable waste to landfill in objective 7 which reduces potential for leachate pollution from landfill.
- increased recycling rates reduces extraction for virgin materials thus overall energy use is less than baseline in objective 8

Negative

- air emissions (odour, dust, bio-aerosols etc) which need to be properly managed in objective 3
- option 1 does not have potential for generating the same capacity of landfill gas as baseline therefore less potential for utilising landfill gas extraction in objective 8

Overall this option performs better than the baseline against which it is compared.

Mitigation Actions – Option 1

Mitigation actions applicable to all objectives with this option	
▪ Environmental regulation of facilities will ensure that sites will be regulated to high environmental standards and will consider in detail emissions to air, emissions to water and land, emissions of greenhouse gases, noise, odour, dust and effects on human health	
Specific mitigation actions relevant to specific SEA objectives	
Obj	**Action**
4	▪ Ensure market testing undertaken before facilities are developed to ensure a product can be recovered and used as a useful product
5	▪ At tender stage and when Scottish Executive review bids, check proposed application of outputs. ▪ Risk assessment criteria must be applied for application of any composting to land that will include risk to local watercourses. ▪ The Water Environment (Controlled Activities) (Scotland) Regulations 2005 will apply to protect the water environment.
6	▪ Need to take account of local biodiversity action plans. ▪ Risk assessment criteria must be applied for the application of compost with respect to their environmental impacts on all media
9	▪ Proximity principle should be taken into account in terms of markets for recyclate reprocessing
10	▪ Local communities potentially affected must be given effective opportunity to engage in the decision making process at both planning and Pollution Prevention Control permit application stages ▪ Planning and environmental licensing can set conditions on vehicle movements on site

Option 2 – Mechanical Biological Treatment

Option 2(a) – MBT with production of Refuse Derived Fuel (2004 option)
Option 2(b) - MBT with no end markets (2006 option). Output from MBT process is landfilled

Mechanical Biological Treatment can be simply described as a process which combines biological and mechanical techniques. The process takes post-collected un-sorted residual wastes from the domestic and commercial waste streams which is treated mechanically then biologically,(or vice versa) through various screening, conditioning and sanitising processes. This reduces the volume of waste and separates it into different waste types, extracting some of the recyclable materials and produces from the resulting organic-rich residual materials a stabilised 'biowaste'. The biodegradable fraction of the waste is treated in a managed biological process in which it is broken down by naturally occurring micro-organisms. A refused derived fuel is produced from the resultant organic mixture which is then incinerated in a combustion plant.

1. A. SEA OBJECTIVE 1 – To increase the rates of reuse, recycling and recovery in the area in accordance with the waste hierarchy

B. Option 2a Is this part of AWP moving towards/away from objective	↑?	**C. Option 2a Short, medium or long term effects?**	**M**	**D. Option 2a Any other types of effects?**	
B. Option 2b Is this part of AWP moving towards/away from objective	↑	**C. Option 2b Short, medium or long term effects?**	**M**	**D. Option 2b Any other types of effects?**	

E. Comments and Supporting Information :

Supporting information	**Reasons for score in Box B-D**:
Option 2a and 2b would increase recycling and composting from current performance of 28.6 to 44% and 50% respectively by 2020 Option 2a MBT output produces Refuse Derived Fuel (RDF). Bottom ash is considered inert once stabilised and recycling as aggregate is technically feasible but is not guaranteed. Option 2b MBT outputs are landfilled as LWMP assuming no market available for outputs of MBT.	**Positive score** recorded as recycling is increasing from current baseline. In option 2a bottom ash from Energy from Waste processes (direct combustion) can be used as building material. Use of fly ash may be more viable in the future as technologies advance to treat this material. Refuse Derived Fuel also has the potential to be stored if it cannot immediately go to combustion and it can also be transported to other markets giving flexibility of use. **Question mark** given for Option 2a as there may be uncertainty over markets for RDF

2. A. SEA OBJECTIVE 2 – To reduce landfilling of Municipal Waste in the area

B. Is this part of AWP moving towards/away from objective	↑	**C. Short, medium or long term effects ?**	**M**	**D. Any other types of effects ?**	

E. Comments and Supporting Information

Supporting Information :	**Reasons for score in Box B-D:**
Both options propose reduced landfill in 2020 compared to current levels 72% presently landfilled in Lanarkshires.	**Positive score** recorded as reduction in waste to landfill.

3. A. SEA OBJECTIVE 3 – To manage waste in a way that reduces emissions to air

B. Is this part of AWP moving towards/away from objective	↑↓?	**C. Short, medium or long term effects ?**	**M/L**	**D. Any other types of effects ?**	✓

E. Comments and Supporting Information :

Supporting information :	**Reasons for score in Box B-D:**
According to the Life Cycle Analysis results, Option 2a and 2b both perform better than the baseline, and indicate a net reduction in acidifying gases (e.g. SO2 and NOx). Life Cycle Analysis modelling indicates that there are no significant air impacts from transporting waste between different plants relating to air emissions. However, it was noted that Air Quality Management Areas (AQMA) in Scotland have been designated based on traffic movements and therefore there is the potential for local effects. There are 4 AQMA's in Lanarkshire namely, Airdrie, Coatbridge and Chapelhall (Harthill is also being considered).	**Positive score** in comparison to current baseline where majority of waste is landfilled option 2a and 2b reduces waste to landfill due to increased recycling rates therefore less emissions to air via landfill gas generation. In both options MBT process would be inside a building which would minimise odour/dust emissions compared to baseline. Less handling of waste in EfW in option 2a stage therefore less issue of bioaerosols and as odour/dust. EfW process in enclosed section of facility. There are limits for air emissions for Energy from Waste which are set under the Waste Incineration Directive and included in the Pollution

Potential concern about air emissions from Energy from Waste facilities, particularly dioxin release and effects on human health. Energy from Waste is used widely throughout Europe where facilities must meet the same strict emission standards (see Objective 10). May be odour issues associated with storage and handling of waste.	Prevention Control Permit for the plant and take into account the local air quality in the area. There are recognised emission benchmarks for waste incinerators so the Scottish Environment Protection Agency is confident that air emissions can be quantified and are reduced when compared to landfill. **Negative score** against objective 3 because there maybe air emissions (odour, dust, bio-aerosols etc) from MBT which need to be properly managed. **Question mark** as emissions will vary depending on facility and location. **Potential Cumulative effects** possible where air quality already of concern (e.g. Air Quality Management Areas areas). Although strict controls / specific limits applied under WID, harder to apply such specific air emission limits to Mechanical Biological Treatment.

4. A. SEA OBJECTIVE 4 - To manage waste in a way that reduces emissions to land and soil

B. Option 2a Is this part of AWP moving towards/away from objective	↑↓?	**C. Option 2a Short, medium or long term effects ?**	**M**	**D. Option 2a Any other types of effects ?**	
B. Option 2b Is this part of AWP moving towards/away from objective	↑	**C. Option 2b Short, medium or long term effects ?**	**M**	**D. Option 2b Any other types of effects ?**	

E. Comments and Supporting Information

Supporting information : Less waste going to landfill under option 2 than current baseline. The majority of waste in 2005/06 (baseline) was landfilled which creates a pollution legacy which will last up to 25 years or more. The long term effects cannot be judged for Municipal Waste Landfill Site as no site has been stabilised and no licence has been surrendered under Waste Management Licensing regime. There is a risk of accidental pollution due to failure of landfill liner particularly over a long period. So, Option 2 offers more control and considerably reduces the pollution of soils than the baseline. Fly ash from Energy from Waste processes are hazardous and must be treated to prevent leaching of hazardous materials from the ash prior to landfill. Footprint for this option will be smaller than for landfill	**Reasons for score in Box B-D:** **Positive score** recorded for both 2a and 2b as there is a reduction in waste being deposited in landfills and there will be a smaller footprint compared to new landfill facilities **Negative score recorded** as option 2a will generate hazardous fly ash that is assumed to be disposed to landfill. Quantities of fly ash produced not known. **Question mark** as there would be a dependency on a market for RDF in option 2a

5. A. SEA OBJECTIVE 5 – To manage waste in a way that reduces emissions to water

B. Is this part of AWP moving towards/away from objective	↑↓	**C. Short, medium or long term effects ?**	**M**	**D. Any other types of effects ?**	

E. Comments and Supporting Information :

Supporting information : According to Life Cycle Analysis results, Option 2a and 2b both perform better than the baseline for eutrophication and aquatic ecotoxicity. Assumed for Strategic Environmental Assessment purposes Mechanical Biological Treatment process takes place inside a building (and leachate is treated before entering the sewage system). There is a risk of accidental pollution, due to failure of landfill liner particularly over a long period, causing water pollution. Therefore, Option 2a and 2b offers more control and considerably reduces the pollution of water environment. However, there is potential leaching from hazardous ash which may be landfilled.	**Reasons for score in Box B-D**: **Positive score** recorded in comparison to baseline because there is less biodegradable waste going to landfill, therefore generation of leachate within landfill site will be reduced and therefore less potential impact on water. **Negative score** recorded due to effluent produced from MBT process that would have to be treated prior to discharge to watercourse/sewer – potential to impact on water bodies.

6. A. SEA OBJECTIVE 6 - To manage waste in a way that protects biodiversity

B. Is this part of AWP moving towards/away from objective	?	**C. Short, medium or long term effects ?**	**?**	**D. Any other types of effects ?**	

E. Comments and Supporting Information

Supporting information / Discussion:	**Reasons for score in Box B-D**:

No relevant biodiversity data as the Lanarkshires' funding proposal does not identify sites for facilities and therefore impossible to predict specific effects. Initial site search undertaken by LWMP has identified biodiversity and environmental sensitivity criteria Biodiversity duties under the Nature Conservation (Scotland) Act 2004 will apply.	**Question Mark** score as impacts on biodiversity depends on where facilities are located and site specific information is not available at this level of assessment. Impacts from different outputs from the treatment processes in Option 2a and 2b following use may have impacts on biodiversity due to their potential impact on soil, air and water environments

7. **A. SEA OBJECTIVE 7 – To manage waste in a way that reduces greenhouse gas emissions**

B. Is this part of AWP moving towards/away from objective	↑	**C. Short, medium or long term effects ?**	**L**	**D. Any other types of effects ?**	

E. Comments and Supporting Information :

Supporting information : Life Cycle Analysis data indicates that option 2a and 2b will result in reduced Greenhouse Gas emissions compared to the baseline showing an avoided impact for climate change. This is because any option that diverts more waste from landfill will perform better with respect to methane emissions.	**Reasons for score in Box B-D:** **Positive score** recorded as Life Cycle Analysis indicates that greenhouse emissions are improved from current baseline option.

8. **A. SEA OBJECTIVE 8 - To reduce energy use and support the development of alternative, renewable, energy supplies**

B. Is this part of AWP moving towards/away from objective	↑↓	**C. Short, medium or long term effects ?**	**L**	**D. Any other types of effects ?**	

E. Comments and Supporting Information

Supporting information: Life Cycle Analysis Data indicates that Option 2a and 2b performs better than the baseline for non-renewable resource depletion (which assumes that energy is being generated from landfill gas). Option 2a performs better than 2b as RDF incineration has potential for the Energy from Waste to produce electricity and heat which can be used for industrial use and therefore ideally should be located reasonably close to heat sink. Additional energy will be used to process waste through Mechanical Biological Treatment but difficult to estimate as different processes more/less energy intensive than others For option 2a qualification for Renewable Order Certificates depends on the type of technologies and inputs into the plant. Unlikely that Mechanical Biological Treatment refuse derived fuel will be able to achieve the requirements of The Renewables Obligation (Scotland) Order and thus would not qualify for Renewable Obligation Certificates.	**Reasons for score in Box B-D:** **Positive score** recorded as both options reduce use of non renewable resources compared to baseline and option 2a is more energy efficient (compared to baseline) and can provide electricity and a local heat source (if combined heat and power technology) Also due to potential applicability for Renewable Obligation Certificates. **Negative** against objective 3 because there are air emissions (odour, dust, bio-aerosols etc) which need to be properly managed

9. **A. SEA OBJECTIVE 9 – To reduce the movement of waste**

B. Is this part of AWP moving towards/away from objective	?	**C. Short, medium or long term effects ?**	**?**	**D. Any other types of effects ?**	✓

E. Comments and Supporting Information :

Supporting information: No information as not known where sites will be located or where recyclate will be going (Scotland, UK or overseas). If using existing sites to locate facilities, then likely there will be same level of transport.	**Reasons for score in Box B-D**: **Question mark** as dependent on location of facilities. Could be transporting waste between multiple facilities if at different sites. If using existing sites then movement of waste likely to be same as current situation. **Potential secondary effects** of "through route" traffic on communities.

10. **A. SEA OBJECTIVE 10 - To manage waste in a way that protects communities and their local environment**

B. Option 2a Is this part of AWP moving towards/away from objective	↑↓?	**C. Option 2a Short, medium or long term effects ?**	**M/L**	**D. Option 2a Any other types of effects ?**	✓

B. Option 2b Is this part of AWP moving towards/away from objective	↓?	C. Option 2b Short, medium or long term effects ?	M/L	D. Option 2b Any other types of effects ?	✓

E. Comments and Supporting Information

Supporting information:	Reasons for score in Box B-D:
Supporting information / Discussion: ***Odour/Dust*** - Potential odour/dust nuisance if process requires storage or handling of raw material prior to processing. ***Noise***: More equipment may result in more noise (can be mitigated, but dependent on operator), level of impact dependent on location of facilities. ***Litter***: Less landfill over long term may result in less litter from MW sources, but all sites would need to be effectively operated. ***Local Traffic***: Some effects on local communities from vehicle movements in local area. See Objective 9 also. ***Health***: See generic risk assessment of health effects in environmental report. See Section 3 in Environmental Report. ***Environmental Justice:*** Potential environmental justice issues if new facilities are located on same sites as existing landfill or other facilities. Energy from Waste has a negative public image/perception and associated stress levels ***Accident***: Potential increased risk of accidents from more processes. This requires management through risk assessment. ***Local Energy Source*** : whilst option can provide a local heat source (if combined heat and power technology used), will have an increased impact for the local communities that are in proximity to the heat source	**Positive score may be** recorded if the option can provide a local heat source (if Combined Heat and Power technology) and this may have positive effect impact on the community **Negative score** recorded as more facilities are being proposed therefore will have local effects on local communities wherever sited. **Question mark** as extent of impact will depend upon siting Potential for **cumulative effects** if existing sites are chosen for new facilities.

11. A. SEA OBJECTIVE 11 – To manage waste in a way that reduces impacts on cultural heritage

B. Is this part of AWP moving towards/away from objective	?	C. Short, medium or long term effects ?	M/L	D. Any other types of effects ?	

E. Comments and Supporting Information :

Supporting information / Discussion:	Reasons for score in Box B-D:
No specific information as not known where sites will be located. This will be for land use planning decisions.	**Question mark** as dependent on location of facilities. Potential for traffic levels to affect cultural heritage, but effects likely to be relatively minor. Potential for emissions to effect cultural heritage, but effects likely to be minor.

12. A. SEA OBJECTIVE 12 – To manage waste in a way that reduces impacts on landscape

B. Is this part of AWP moving towards/away from objective	?	C. Short, medium or long term effects ?	M/L	D. Any other types of effects ?	

E. Comments and Supporting Information :

Supporting information / Discussion:	Reasons for score in Box B-D:
No information as not known where sites will be located. Most likely that facilities will be located on established industrial sites, but this is not assumed for the purposes of this assessment.	**Question mark** as dependent on location of facilities. Potential for waste facilities to intrude on landscape, particularly where stacks form part of facility, but impacts likely to be minor as long as sited sensitively.

Summary of Overall Effect of this Option:

The performance of option 2 against each objective can be summarised as follows:

Uncertainties

- there may be uncertainty over markets for RDF in objective 1for option 2a
- Air emissions may vary depending on facility and location in objective 3
- Impacts on biodiversity in objective 6 depends on where facilities are located and site specific information is not available at this level of assessment.
- Impacts from the use of different outputs from the treatment processes in Option 2a and 2b may have impacts on biodiversity due to their potential impact on soil, air and water environments in objective 6
- Uncertain whether option reduces movement of waste as dependent on location of facilities. Could be transporting waste between multiple

facilities if at different sites. If using existing sites then movement of waste likely to be same as current situation in objective 9

- A question mark was put next to a number of the criteria being assessed because the impact on the criteria depends on the site location. This includes impact on: local communities, cultural heritage, landscape and biodiversity. However, these criteria will be covered in more detail in site specific studies e.g. Environmental Impact Assessment and the site locations will be largely under the control of Land Use Planning.

Positive

- recycling is increasing from current baseline in objective 1
- In option 2a bottom ash from Energy from Waste processes (direct combustion) can be used as building material. Use of fly ash may be more viable in the future as technologies advance to treat this material.
- Refuse Derived Fuel also has the potential to be stored if it cannot immediately go to combustion and it can also be transported to other markets giving flexibility of use.
- reduction in waste to landfill in objective 2
- In both options MBT process would be inside a building which would minimise odour/dust emissions compared to baseline.
- option reduces to waste to landfill due to increased recycling rates therefore less emissions to air via landfill gas generation in objective 3
- Less handling of waste in EfW stage therefore less issue of bioaerosols and as odour/dust. EfW process in enclosed section of facility.
- Strictly regulated by WID limits and PPC Permit to minimise air pollution in objective 3
- reduction in waste being deposited in landfills and there will be a smaller footprint compared to new landfill facilities in objective 4
- less biodegradable waste going to landfill, therefore generation of leachate within landfill site will be reduced and therefore less potential impact on water in objective 5
- greenhouse emissions are improved from current baseline option in objective 7
- both options reduce use of non renewable resources compared to baseline and option 2a is more energy efficient (compared to baseline) and can provide electricity and a local heat source (if combined heat and power technology) Also due to potential applicability for Renewable Obligation Certificates in objective 8
- where local heat source provided (if Combined Heat and Power technology) and this may have positive effect impact on the community in objective 10

Negative

- there maybe air emissions (odour, dust, bio-aerosols etc) from MBT which need to be properly managed in objective 3
- option 2a will generate hazardous fly ash that is assumed to be disposed to landfill in objective 4
- effluent produced from MBT process that would have to be treated prior to discharge to watercourse/sewer – potential to impact on water bodies in objective 5
- Mechanical Biological Treatment is an energy intensive process in objective 8
- more facilities are being proposed therefore will have local effects on local communities wherever sited in objective 10

Overall this option performs better than the baseline against which it is compared.

Mitigation Actions – Option 2

Mitigation actions applicable to all objectives with this option	
	▪ Land use planning system will take into account local issues – air quality, effects on communities, landscape, cultural heritage, transport of waste etc – to ensure protection of the environment through sensitive location of facilities. ▪ Environmental regulation of facilities will ensure that sites will be regulated to high environmental standards and will consider in detail emissions to air, emissions to water and land, emissions of greenhouse gases, noise, odour, dust and effects on human health. Suitable abatement technologies will be required as part of regulation of facilities to address these effects. ▪ PPC regulation will require use of Best Available Technology (BAT) for waste management processes ▪ When considering options for funding, Scottish Executive should take account of issues raised in this Environmental Report.
Specific mitigation actions relevant to specific SEA objectives	
Obj	**Action**
1	▪ Improve source segregated waste recycling and composting rates where affordable and practicable. ▪ Could investigate ash recycling opportunities to improve option further ▪ Ensure market testing undertaken before facilities are developed to ensure ash product can be recovered and used as a useful product
3	▪ Energy from Waste technology that is operational today is much better at reducing emissions , compared to perceived emissions from combustion processes and all Energy from Waste facilities throughout Europe must meet the same emission standards ▪ In-vessel processes to contain and manage potential emissions from Mechanical Biological Treatment processing. ▪ Refuse Derived Fuel can be stored, therefore combustion process does not need to take place in the short term (i.e. technology will continue to improve with better controls for minimising air emissions)
4	▪ Bottom ash from Energy from Waste can be used as aggregates in building materials, however, further work is required to understand the risks and opportunities with this waste residue. Similarly further work will be required on the potential use of fly ash ▪ The facility will be regulated in respect of handling and managing ash residues under Pollution Prevention Control permit conditions for the protection of the environment and human health.
5	▪ Process should recover as much heat as possible through identified heat sink to avoid need for cooling. ▪ The Water Environment (Controlled Activities) (Scotland) Regulations 2005 will apply to protect the water environment.
6	▪ Design of facility to enhance local biodiversity.

	▪ Need to take account of local biodiversity action plans. ▪ Risk assessment criteria must be applied for the application of outputs from treatment processes with respect to their environmental impacts on all media.
7	▪ At tender stage and when Scottish Executive review bids, check levels of greenhouse gas emissions.
8	▪ At tender stage and review bids - application of Scottish Environment Protection Agency's thermal treatment guidelines and thermal efficiency guidance the latter which is in production. ▪ Energy generated can be offset against the energy requirements of the Mechanical Biological Treatment facility ▪ Refuse Derived Fuel could be stored until such time it is eligible for Renewable Order Certificates
9	▪ Planning and environmental licensing able to control transport routing. ▪ Ash from Energy from Waste can be reused (e.g. building material) to reduce transport.
10	▪ Local communities potentially affected must be given effective opportunity to engage in the decision making process at both planning and Pollution Prevention Control permit application stages ▪ Planning and environmental licensing can set conditions on vehicle movements on site ▪ Education/early participation of public on Energy from Waste facilities and Scottish Environment Protection Agency's regulatory responsibilities and powers. ▪ Potential local energy source (Combined Heat and Power).

Option 3 – Energy from Waste

Option 3(a) - 40 % recycling/composting and 250,000 tpa Energy from Waste (EfW) residual waste treatment facility (2006 option)

Option 3(b) - Maximum recycling (52%) and 200,000 tpa EfW residual waste treatment facility (2007 option)

Option 3(c) - Maximum recycling (52%) and 300,000 tpa EfW residual treatment facility – facility sized to treat all the residual waste generated in the last year of the contract and which LWMP believe offers value for money. (2007 option)

Energy from waste may encompass a whole range of thermal treatment technologies such as incineration, gasification, pyrolysis, anaerobic digestion. For the purposes of this report incineration with subsequent recovery of energy has been profiled and used in the Life Cycle Analysis modelling. Incineration is the controlled combustion of waste. Heat released from the combustion can be recovered and used to generate electricity, heat, steam or hot water; this process is often known as Energy from Waste.

Incineration can reduce the volume of waste significantly and reduces the hazardousness of waste. Incineration can treat a wide range of waste types including Municipal Waste (MW), industrial waste, and Refuse Derived Fuel (RDF). While large-scale plants can treat unsorted waste, small-scale plants are specifically designed to take a relatively homogenous, pre-processed feedstock.

Waste is deposited in a bunker and mixed to ensure a more consistent and even calorific mix. It is then fed into a furnace where it is burned. The unburned residue, known as bottom ash, is stabilised and is deposited into a tank. Magnets remove any ferrous metals from the ash for recycling, and the remaining ash can be recycled for use in construction. The hot gasses produced during combustion are then directed to a boiler where electricity can be generated and heat recovered. Gases are thoroughly cleaned using a range of emission control systems before they are emitted to the atmosphere. Filtered particles are collected and sent to special waste landfill. Under the Waste Incineration (Scotland) Regulations 2003 all emissions are continuously monitored.

1.	**A. SEA OBJECTIVE 1 – To increase the rates of reuse, recycling and recovery in the area in accordance with the waste hierarchy**				
B. Is this part of AWP moving towards/away from objective	↑	**C. Short, medium or long term effects ?**	**M**	**D. Any other types of effects ?**	

E. Comments and Supporting Information :	
Supporting information : Option 3a, 3b and 3c would increase recycling and composting from current rate of 28.6% (2005/06) to 40%, 52% and 52% respectively in These figures have arisen from modelling undertaken by consultants who produced the Outline Business Case Options 3a, 3b and 3c may also provide additional recycling from back end recovery of ferrous/non-ferrous metals from the bottom ash. Incinerator bottom ash can be used in different markets and this could increase the recycling %, but further work is required to understand the risks and opportunities that this waste stream could provide	**Reasons for score in Box B-D**: **Positive Score** recorded as recycling is increasing from current baseline Bottom ash from Energy from Waste processes (direct combustion) can be used as a building material, and potential for fly ash to be used in future when advanced technologies become available to treat fly ash.

2.	**A. SEA OBJECTIVE 2 – To increase the rates of reuse, recycling and recovery in the area in accordance with the waste hierarchy**				
B. Is this part of AWP moving towards/away from objective	↑	**C. Short, medium or long term effects ?**	**M**	**D. Any other types of effects ?**	

E. Comments and Supporting Information	
Supporting Information : Option proposes reduced landfill in 2020 compared to current levels of 72% which is presently landfilled in Lanarkshire area	**Reasons for score in Box B-D:** **Positive score** as there will be a reduction in waste to landfill for this option.

3.	**A. SEA OBJECTIVE 3 – To manage waste in a way that reduces emissions to air**				
B. Is this part of AWP moving towards/away from objective	↑↓?	**C. Short, medium or long term effects ?**	**M/L**	**D. Any other types of effects ?**	✓

E. Comments and Supporting Information :	
Supporting information : According to the LCA analysis results, Option 3a, 3b and 3c all perform better than baseline (current waste management practice in 2005/06) with respect to acidification. LCA indicates that there are no significant air impacts from transporting waste between different plants relating to air emissions. However, it was noted that Air Quality Management Areas (AQMA) in Scotland are largely based on traffic movements and therefore there is the potential for local effects. There are 4 AQMA's in Lanarkshire namely, Airdrie, Coatbridge and Chapelhall (Harthill is also being considered). Potential concern about air emissions from Energy from Waste facilities, particularly dioxin release and effects on human health (see Objective 10). However, energy from waste is in widespread use throughout Europe which is capable of meeting strict air emission standards	**Reasons for score in Box B-D:** **Positive score** as in comparison to the current baseline; Less handling of waste in Energy from Waste stage therefore less issue of bioaerosols and odour/dust. Energy from Waste enclosed section of facility. Comparison to the current waste management practice in 2005/06 where the majority of waste is landfilled; there will be a reduction in methane emissions to air from landfilling of waste There are limits for air emissions for Energy from Waste which are set under the Waste Incineration Directive and included in the Pollution Prevention Control Permit for the plant and take into account the local air quality in the area. There are recognised emission benchmarks for waste incinerators so the Scottish Environment Protection Agency is confident that air emissions can be quantified and are reduced when compared to landfill **Negative Score** given as it is recognised Option 3 will introduce other air emissions compared to baseline. This is however dependent on the degree of separation of materials prior to combustion process. Again, emissions will be strictly regulated. **Question mark** as emissions will vary depending on facility, location and permit conditions. **Cumulative effects** possible where air quality already of concern (e.g. Air Quality Management Areas).

4.	**A. SEA OBJECTIVE 4 - To manage waste in a way that reduces emissions to land and soil**				
B. Is this part of AWP moving towards/away from objective	↑↓	**C. Short, medium or long term effects ?**	**M**	**D. Any other types of effects ?**	

E. Comments and Supporting Information	
Supporting information : Less waste going to landfill in options 3a, 3b and 3c compared to current baseline. The majority of waste in 2005/06 (baseline) was landfilled which creates a pollution legacy which will last up to 25 years or more. The long term effects cannot be judged for Municipal Waste Landfill Site as no site has been stabilised and no licence has been surrendered under Waste Management Licensing regime. There is a risk of accidental pollution due to failure of landfill liner particularly over a long period. So, Option 3 offers more control and considerably reduces the pollution of soils than the baseline. Fly ash from Energy from Waste can be hazardous (fly ash hazardous/bottom ash may be hazardous) and must be treated to prevent leaching of hazardous materials from the ash. Footprint required for Energy from Waste facility will be smaller than for landfill.	**Reasons for score in Box B-D:** **Positive** score as there is a significant reduction in waste going to landfill. EfW plant has smaller footprint compared to new landfill facilities. **Negative** score as will generate hazardous fly ash that is assumed to be disposed of to landfill. Quantities of fly ash produced not known.

5.	**A. SEA OBJECTIVE 5 – To manage waste in a way that reduces emissions to water**				
B. Is this part of AWP moving towards/away from objective	↑	**C. Short, medium or long term effects ?**	**M/L**	**D. Any other types of effects ?**	

E. Comments and Supporting Information :	
Supporting information / Discussion: According to Life Cycle Analysis results, Option 3a, 3b and 3c perform better than the baseline for eutrophication and aquatic ecotoxicity. There is a risk of accidental pollution, due to failure of landfill liner particularly over a long period, causing water pollution. Therefore, Option 3 offers more control and considerably reduces the pollution of water environment. However, there is potential leaching from hazardous ash which could be landfilled.	**Reasons for score in Box B-D**: **Positive score** given in comparison to baseline because there is less biodegradable waste going to landfill, therefore generation of leachate will be reduced and less impact on water.

6.	**A. SEA OBJECTIVE 6 - To manage waste in a way that protects biodiversity**

B. Is this part of AWP moving towards/away from objective	?	C. Short, medium or long term effects ?	?	D. Any other types of effects ?	

E. Comments and Supporting Information	
Supporting information / Discussion: No relevant biodiversity data as Lanarkshires funding proposal does not identify sites for facilities and therefore impossible to predict specific effects. Initial site search undertaken by LWMP has identified biodiversity and environmental sensitivity criteria Biodiversity duty under the Nature Conservation (Scotland) Act 2004 will apply	**Reasons for score in Box B-D**: **Question Mark** score as impacts on biodiversity depends on where facilities are located and site specific information is not available at this level of assessment. Impacts from the different outputs from the treatment process in Option 3 following use may have impacts on biodiversity due to their potential impact on air, soil and water environments.

7. A. SEA OBJECTIVE 7 – To manage waste in a way that reduces greenhouse gas emissions

B. Is this part of AWP moving towards/away from objective	↑	C. Short, medium or long term effects ?	M	D. Any other types of effects ?	

E. Comments and Supporting Information :	
Supporting information / Discussion: Life Cycle Analysis data indicates that option 3a, 3b and 3c will result in reduced Greenhouse Gas emissions compared to baseline. This is because any option that diverts more waste from landfill will perform better with respect to methane emissions.	**Reasons for score in Box B-D:** **Positive score** as Life Cycle Analysis indicates that greenhouse emissions are improved from current baseline option.

8. A. SEA OBJECTIVE 8 - To reduce energy use and support the development of alternative, renewable, energy supplies

B. Is this part of AWP moving towards/away from objective	↑	C. Short, medium or long term effects ?	L	D. Any other types of effects ?	

E. Comments and Supporting Information	
Supporting information: Life Cycle Analysis data indicates that Option 3a, 3b and 3c perform better as it reduces the loss of non-renewable resources compared to the baseline. There is a potential for the Energy from Waste to produce heat and electricity which can be used for industrial use and therefore ideally should be located reasonably close to heat sink. Qualification for Renewable Order Certificates under The Renewable Obligation (Scotland) Order depends on the type of technology and the input to the plant.	**Reasons for score in Box B-D:** **Positive score** as option is energy efficient compared to baseline and will produce electricity and / or heat (ideally sited close to heat sink), however it is not know what type of facility will be used and therefore the extent of thermal efficiency. Potential for Renewable Order Certificates to apply. Qualification will depend on type of technology and input to plant.

9. A. SEA OBJECTIVE 9 – To reduce the movement of waste

B. Is this part of AWP moving towards/away from objective	?	C. Short, medium or long term effects ?	?	D. Any other types of effects ?	✓

E. Comments and Supporting Information :	
Supporting information: No information as not known where sites will be located or where recyclate will be going (Scotland, UK or overseas). If using existing sites to locate facilities, then likely there will be same level of transport.	**Reasons for score in Box B-D**: **Question mark** as this will depend on the location of facilities. If using existing sites where there is waste management infrastructure then movement of waste may be the same as current situation. **Potential secondary effects** of "through route" traffic on communities.

10. A. SEA OBJECTIVE 10 - To manage waste in a way that protects communities and their local environment

B. Is this part of AWP moving towards/away from objective	↑↓?	C. Short, medium or long term effects ?	M/L	D. Any other types of effects ?	✓

E. Comments and Supporting Information	
Supporting information : ***Odour/Dust*** - Potential odour/dust nuisance if process requires storage or handling of raw material prior to processing.	**Reasons for score in Box B-D:** **Positive score may be** recorded if the option can provide a local heat source (if Combined Heat and Power technology) and this may have positive effect impact on the community.

Noise: More equipment may result in more noise (can be mitigated, but dependent on operator), level of impact dependent on location of facilities. ***Litter***: Less landfill over long term may result in less litter from Municipal Waste sources, but all sites would need to be effectively operated. ***Local Traffic***: Some effects on local communities from vehicle movements in local area. See Objective 9 also. ***Health***: See generic assessment of health effects in environmental report. See Section 3 of Environmental Report ***Accident***: Potential increased risk of accidents from more processes. This requires management through risk assessment. ***Local Energy Source*** : whilst option can provide a local heat source (if Combined Heat and Power technology used), will have an increased impact for the local communities that are in proximity to the heat source ***Environmental Justice*****;** Potential environmental justice issues if new facilities are located on same sites as existing landfill or other facilities. Energy from Waste has a negative public image/perception and associated stress levels. **Local Energy Source**: It is potential the option can provide a local heat source (if Combined Heat and Power technology used), and this will have a positive impact for the community	**Negative score** as more facilities are being proposed therefore will have local effects on local communities wherever sited. **Question mark** as extent of impact will depend upon siting Potential for cumulative effects if existing sites are chosen for new facilities. Potential for **cumulative effects** if existing sites are chosen for new facilities.

11.	**A. SEA OBJECTIVE 11 – To manage waste in a way that reduces impacts on cultural heritage**				
B. Is this part of AWP moving towards/away from objective	**?**	**C. Short, medium or long term effects ?**	**M/L**	**D. Any other types of effects ?**	
E. Comments and Supporting Information :					
Supporting information / Discussion: No specific information as not known where sites will be located. This will be for land use planning decisions.		**Reasons for score in Box B-D**: **Question mark** as dependent on location of facilities. Potential for traffic levels to affect cultural heritage, but effects likely to be relatively minor. Potential for emissions to effect cultural heritage, but effects likely to be minor.			

12.	**A. SEA OBJECTIVE 12 – To manage waste in a way that reduces impacts on landscape**				
B. Is this part of AWP moving towards/away from objective	**?**	**C. Short, medium or long term effects ?**	**M/L**	**D. Any other types of effects ?**	
E. Comments and Supporting Information :					
Supporting information / Discussion: No information as not known where sites will be located. Most likely that facilities will be located on established industrial sites, but this is not assumed for the purposes of this assessment.		**Reasons for score in Box B-D**: **Question mark** as dependent on location of facilities. Potential for waste facilities to intrude on landscape, particularly where stacks form part of facility, but impacts likely to be minor as long as sited sensitively.			

Summary of Overall Effect of this Option:

The performance of option 3 against each objective can be summarised as follows:

Uncertainties

- It is difficult to identify the extent of water effects as this will depend upon where facilities are located and operational process. However any abstraction from and discharges to water courses are regulated by Scottish Environment Protection Agency in order to protect the water environment.
- A question mark was put next to a number of the criteria being assessed because the impact on the criteria depends on the site location. This includes impact on: local communities, cultural heritage, landscape and biodiversity. However, these criteria will be covered in more detail in site specific studies e.g. Environmental Impact Assessment and the site locations will be largely under the control of Land Use Planning.
- Impact from air emissions is dependant on facility, location and licence conditions
- The significance of the impact of transport from the movement of waste will also depend on the location of the facilities and if multiple sites are required. (i.e. one incinerator for the Lanarkshire's and one for the rest of the Glasgow & Clyde Valley Waste Strategy Area)

Positive

- recycling is increasing from current baseline in objective 1
- reduction in waste to landfill for objective 2
- Less handling of waste in Energy from Waste stage therefore less issue of bioaerosols and odour/dust. Energy from Waste enclosed section of facility.

- reduction in methane emissions to air as less being landfilled for objective 3 and will be strictly regulated under WID and PPC permit
- significant reduction in waste going to landfill. EfW plant has smaller footprint compared to new landfill facilities for objective 4
  less biodegradable waste going to landfill, therefore generation of leachate will be reduced and less impact on water for objective 5
- greenhouse emissions are improved from current baseline option for objective 7
- option is energy efficient compared to baseline and will produce electricity and / or heat (ideally sited close to heat sink), however it is not know what type of facility will be used and therefore the extent of thermal efficiency for objective 8
- Potential for ROCS to apply for objective 8. Qualification will depend on type of technology and input to plant.
- option can provide a local heat source (if Combined Heat and Power technology) and this may have positive effect impact on the community for objective 10

Negative

- it is recognised Option 3 will introduce other air emissions compared to baseline. This is however dependent on the degree of separation of materials prior to combustion process for objective 3. Again, emissions will be strictly regulated.

- hazardous fly ash will be generated that is assumed to be disposed of to landfill for objective 4. Quantities of fly ash produced not known
- more facilities are being proposed therefore will have local effects on local communities wherever site for objective 10.

Overall this option performs better than the baseline against which it is compared.

Mitigation Actions – Option 3

Mitigation actions applicable to all objectives with this option	
	▪ Land use planning system will take into account local issues – air quality, effects on communities, landscape, cultural heritage, transport of waste etc – to ensure protection of the environment through sensitive location of facilities. ▪ Environmental regulation of facilities will ensure that sites will be regulated to high environmental standards and will consider in detail emissions to air, emissions to water and land, emissions of greenhouse gases, noise, odour, dust and effects on human health. Suitable abatement technologies will be required as part of regulation of facilities to address these effects. ▪ PPC regulation will require use of Best Available Technology (BAT) for waste management processes ▪ When considering options for funding, Scottish Executive should take account of issues raised in this ER.
Specific mitigation actions relevant to specific SEA objectives	
Obj	**Action**
1	▪ Improve source segregated waste recycling and composting rates where applicable ▪ Ensure market testing undertaken before facilities are developed to ensure that ash product can be recovered and used as a useful product.
4	▪ Bottom ash from Energy from Waste can be used as aggregates in building materials, however, further work is required to understand the risks and opportunities with this waste residue. Similarly further work will be required on the potential use of fly ash. ▪ The facility will be regulated in respect of handling and managing ash residues under Pollution Prevention Control permit conditions for the protection of the environment and human health.
5	▪ Process should recover as much heat as possible through identified heat sink to avoid need for cooling. ▪ The Water Environment (Controlled Activities) (Scotland) Regulations 2005 will apply to protect the water environment.
6	▪ Design of facility to enhance local biodiversity. ▪ Need to take account of local biodiversity action plans. ▪ Risk assessment criteria must be applied for the application of outputs from treatment processes with respect to their environmental impacts on all media
7	▪ At tender stage and when Scottish Executive review bids, check levels of Greenhouse Gas Emissions.
8	▪ Application of Scottish Environment Protection Agency thermal treatment guidelines and thermal efficiency guidance the latter of which is in production. ▪ Planning system can support location of facility in proximity to heat users. ▪ At tender stage and review of bids, check proposed process and thermal efficiency of proposed facilities
9	▪ Planning system should seek to ensure that the siting of facilities will make best use of existing transport facilities (particularly rail) and keeping facilities close to source of waste (proximity principle) and also considering co-location of facilities. ▪ Planning and environmental licensing able to control transport routing. ▪ Ash from Energy from Waste can be reused (e.g. building material)
10	▪ Local communities potentially affected will be given effective opportunity to engage in the decision making process at both planning and Pollution Prevention Control permit application stages ▪ Planning and environmental licensing can set conditions on vehicle movements on site ▪ Potential local energy source (Combined Heat and Power).

Option 4 –Area Waste Plan Best Practicable Environmental Option

This was the original option proposed for the Glasgow & Clyde Valley in the 2003 Area Waste Plan. Consists of utilising clean material recycling facilities (MRF) and mixed waste processing facilities (which were based on Mechanical Biological Treatment options), composting facilities and other recovery technologies (these could be pyrolysis, gasification, incineration, Refuse Derived Fuel, autoclave etc. (See Appendix B for a summary of the different waste management technologies).

Note: this option applies to the whole of the Glasgow & Clyde Valley Waste Strategy Area (WSA) which the two Lanarkshire Local authorities are members.

1. **A. SEA OBJECTIVE 1 – To increase the rates of reuse, recycling and recovery in the area in accordance with the waste hierarchy**

B. Is this part of AWP moving towards/away from objective	↑?	C. Short, medium or long term effects ?	M	D. Any other types of effects ?	

E. Comments and Supporting Information :

Supporting information :

Recycling and composting will be increasing from current performance of 28.6% (2005-06) to 55% in 2020.

Some recyclables in the residual waste stream (e.g. glass and plastics) can be removed during the sorting stage, however in practice, most Mechanical Biological Treatment systems only remove metals since the quality of glass and plastics is poor.

Reasons for score in Box B-D:

Positive score as recycling is increasing from current baseline.

Question mark as BPEO is diverting additional waste from landfill following residual waste treatment, however there may be concerns about the quality of the output from Mechanical Biological Treatment and whether there would be suitable markets for the outputs of Mechanical Biological Treatment and compost produced. Therefore diversion rates may not be achievable as there may not be markets available for these outputs/products.

2. **A. SEA OBJECTIVE 2 – To increase the rates of reuse, recycling and recovery in the area in accordance with the waste hierarchy**

B. Is this part of AWP moving towards/away from objective	↑	C. Short, medium or long term effects ?	M	D. Any other types of effects ?	

E. Comments and Supporting Information

Supporting Information :

BPEO proposes 25% landfill in 2020 compared to current levels of approximately 72% which is presently landfilled in Glasgow & Clyde Valley area.

Reasons for score in Box B-D:

Positive score as reduction in waste to landfill.

3. **A. SEA OBJECTIVE 3 – To manage waste in a way that reduces emissions to air**

B. Is this part of AWP moving towards/away from objective	↑↓?	C. Short, medium or long term effects ?	M/L	D. Any other types of effects ?	✓

E. Comments and Supporting Information :

Supporting information

- Concerns around the impact of bio-aerosols but level of impact will depend on where facility is located; whether it is enclosed and future developments in proximity of the plant.
- There are no significant air impacts from transporting waste between different plants relating to air emissions. However, it was noted that Air Quality Management Areas in Scotland have been designated based on traffic movement.
- Likely to be odour issues associated with storage and handling of waste.
- Impacts on other recovery technologies dependant on what technology is actually adopted
- Note: Composting and Mechanical Biological Treatment are managed under Waste Management Licence Regimes and therefore do not have limits for air emissions.

Positive against objective 3 because some of the processes are assumed to be within buildings and therefore escape of emissions and odour to local air environment are limited compared to landfill which is in open.

In comparison to current baseline where majority of waste is landfilled option 4 reduces waste to landfill due to increased recycling rates therefore less emissions to air via landfill gas generation.

Negative against objective 3 because there are air emissions (odour, dust, bio-aerosols etc) which need to be properly managed

Question mark against objective 3 because air emissions and there effects will depend on the type of technologies which a) fall within the categories of Mechanical Biological Treatment and composting and the types of technologies that are adopted under 'other recovery technologies' b) the site/location of the technologies c) how the plants are operated and regulated

Cumulative effects where air quality is already a concern (Air Quality Management Area's)

4. **A. SEA OBJECTIVE 4 - To manage waste in a way that reduces emissions to land and soil**

B. Is this part of AWP moving towards/away from objective	↑↓?	C. Short, medium or long term effects ?	M	D. Any other types of effects ?	

E. Comments and Supporting Information

Supporting information :	Reasons for score in Box B-D:
▪ The quality of the composted material from source segregated green compost can be uncertain. ▪ Output from Mechanical Biological Treatment and its application on land improvement is questionable due to the potential issue of metals content additionally, the application of these outputs to land is risk assessed on a case by case basis. Currently mixed waste composting is used for landfill restoration/daily cover. ▪ The majority of waste in 2005/06 (baseline) was landfilled which creates a pollution legacy which will last up to 25 years or more. The long term effects cannot be judged for Municipal Waste Landfill Site as no site has been stabilised and no licence has been surrendered under Waste Management Licensing regime. There is a risk of accidental pollution due to failure of landfill liner particularly over a long period. So, Best Practicable Environmental Option offers more control and considerably reduces the pollution of soils than the baseline. ▪ Other impacts depend on the residues from the types of 'other recovery technologies' that would be built eg. ash from Energy from Waste, produced when Refuse Derived Fuel burned, can be hazardous (fly ash may be hazardous) and must be treated to prevent leaching of hazardous materials from the ash.	**Positive** score against objective 4 because there is less waste to landfill in 2010, 2013 and 2020 than in 2005/06. **Negative** score as dependant on the type of Other Recovery Technology chosen and the production of hazardous fly ash which would require treatment and disposal **Question mark** against objective 4 because there is a dependency on the capacity of the market to absorb outputs of compost and stabilised biowaste in relation to land application. It is not possible to determine extent of the use of ash residues from other recovery technologies like incineration, Refuse Derive Fuel.

5. A. SEA OBJECTIVE 5 – To manage waste in a way that reduces emissions to water

B. Is this part of AWP moving towards/away from objective	↑↓?	C. Short, medium or long term effects ?	M	D. Any other types of effects ?	✓

E. Comments and Supporting Information :

Supporting information :	Reasons for score In Box B-D:
LCA results show that the BPEO option performs better than the baseline on eutrophication and aquatic ecotoxicity. Assumed for Strategic Environmental Assessment purposes that process takes place (inside a building). Reducing waste going into landfill and therefore reduced potential for leachate pollution of local water courses. Effluent assumed to be treated prior to entry into sewage system.	**Positive score** recorded as less waste to landfill reduces potential for leachate pollution from landfill. **Negative score** recorded due to emissions generated from some of the process and need to contain and manage them. Also scored negative due to potential for application of mixed waste composted material to land – eg due to metals content **Question mark** score is due uncertainty about what happens to outputs - eg applied to land or to landfill. **Potential Cumulative Effects** if applied to land where other pressures on adjacent waterbodies.

6. A. SEA OBJECTIVE 6 - To manage waste in a way that protects biodiversity

B. Is this part of AWP moving towards/away from objective	?	C. Short, medium or long term effects ?	?	D. Any other types of effects ?	

E. Comments and Supporting Information

Supporting information :	Reasons for score in Box B-C:
No relevant biodiversity data as Area Waste Plan does not identify sites for facilities and therefore impossible to predict specific effects. Biodiversity duties under the Nature Conservation (Scotland) Act 2004 will apply.	**Question Mark** score as impacts on biodiversity depends on where facilities are located and site specific information is not available at this level of assessment.

7. A. SEA OBJECTIVE 7 – To manage waste in a way that reduces greenhouse gas emissions

B. Is this part of AWP moving towards/away from objective	↑	C. Short, medium or long term effects ?	M	D. Any other types of effects ?	

E. Comments and Supporting Information :

Supporting information :	Reasons for score in Box B-D:
Life Cycle Analysis modelling indicates that this option will result in reduced greenhouse gas emissions compared to the baseline. This is	**Positive score** as greenhouse gas emissions likely to reduce.

due to any option moving away from landfill will produce better results, particularly methane, a powerful greenhouse gas	

8. **A. SEA OBJECTIVE 8 - To reduce energy use and support the development of alternative, renewable, energy supplies**

B. Is this part of AWP moving towards/away from objective	↑↓?	C. Short, medium or long term effects ?	L	D. Any other types of effects ?	

E. Comments and Supporting Information

Supporting information:	Reasons for score in Box B - D:
Additional energy will be used to process through Mechanical Biological Treatment but difficult to estimate as different processes more/less energy intensive than others. .Assume all residual waste through Mechanical Biological Treatment, then no future flexibility to take advantage of Energy from Waste/renewable energy. Energy from burning waste could be used to power the Mechanical Biological Treatment/Anaerobic Digestion but this would provide no net benefit in renewable energy generated. The effect of the The Renewables Obligation (Scotland) Order is that electricity from combined heat and power plants fuelled by waste are eligible to apply for Renewable Obligation Certificates if the waste is biomass or the electricity has been produced using one of the "advanced conversion technologies". Advanced conversion technologies mean gasification, pyrolysis or anaerobic digestion, or any combination thereof (See Appendix B for a summary of different waste management technologies). Life Cycle Analysis results show that the BPEO option performs better than the baseline when comparing non-renewable resource depletion.	**Positive score** as dependant on type of other recovery technology installed, there will be the ability to recover energy from this process. Positive score provided due to potential biofuel production, Combined Heat and Power and Renewable Obligation Certificates. Potential for facility to produce electricity and heat - if producing heat, needs to be sited close to Heat Sink (ideally industrial heat sink) **Negative score** due to energy intensiveness of Mechanical Biological Treatment process. **Question Mark** as dependant on what Other Recovery Technology is adopted and if Renewable Obligation Certificates may also apply. Question mark as not known what type of facility will be used and extent of thermal efficiency.

9. **A. SEA OBJECTIVE 9 – To reduce the movement of waste**

B. Is this part of AWP moving towards/away from objective	?	C. Short, medium or long term effects ?	?	D. Any other types of effects ?	✓

E. Comments and Supporting Information :

Supporting information:	Reasons for score in Box B-D:
No information as not known where sites will be located or where recyclate will be going (Scotland, UK or overseas). If using existing sites to locate facilities, then likely there will be same level of transport.	**Question mark** as dependent on location of facilities. Could be transporting waste between multiple facilities if at different sites. If using existing sites then movement of waste will likely be same as current situation. **Potential secondary** effects of "through route" traffic on communities

10. **A. SEA OBJECTIVE 10 - To manage waste in a way that protects communities and their local environment**

B. Is this part of AWP moving towards/away from objective	↑↓?	C. Short, medium or long term effects ?	M/L	D. Any other types of effects ?	✓

E. Comments and Supporting Information

Supporting information :	Reasons for score in Box B-D:
Odour/Dust - Potential odour/dust nuisance if process involves storage / handling of raw material prior to processing. ***Noise***: More equipment may result in more noise (can be mitigated, but dependent on operator), level of impact dependent on location of facilities. ***Litter***: Less landfill over long term may result in less litter from MW sources, but all sites would need to be effectively operated. ***Local Traffic***: Some effects on local communities from vehicle movements in local area. See Objective 9 also. ***Health***: See generic assessment of health effects in environment report. See section 3 of Environmental Report ***Environmental Justice:*** Potential environmental justice issues if new facilities are located on same sites as existing landfill or other facilities. ***Accident***: Potential increased risk of accident overall with more	**Positive score may be** recorded if potential the option can provide a local heat source (if Combined Heat and Power technology) and this may have positive effect impact on the community. **Negative score** as facilities in this option will have local effects on local communities wherever sited. **Question mark** as extent of impact will depend upon types of facilities and siting Possibility for **cumulative effect** on local communities if new facilities located on same sites as existing ones.

processing equipment being used. **Local Energy Source**: It is potential the option can provide a local heat source (if Combined Heat and Power technology used), and this will have a positive impact for the community	

11.	**A. SEA OBJECTIVE 11 – To manage waste in a way that reduces impacts on cultural heritage**				
B. Is this part of AWP moving towards/away from objective	**?**	**C. Short, medium or long term effects ?**	**M/L**	**D. Any other types of effects ?**	
E. Comments and Supporting Information :					
Supporting information / Discussion: No specific information as not known where sites will be located. This will be for land use planning decisions.		**Reasons for score in Box B-D**: **Question mark** as dependent on location of facilities. Potential for traffic levels to affect cultural heritage, but effects likely to be relatively minor. Potential for emissions to effect cultural heritage, but effects likely to be minor.			

12.	**A. SEA OBJECTIVE 12 – To manage waste in a way that reduces impacts on landscape**				
B. Is this part of AWP moving towards/away from objective	**?**	**C. Short, medium or long term effects ?**	**M/L**	**D. Any other types of effects ?**	
E. Comments and Supporting Information :					
Supporting information / Discussion: No information as not known where sites will be located. Most likely that facilities will be located on established industrial sites, but this is not assumed for the purposes of this assessment.		**Reasons for score in Box B-D**: **Question mark** as dependent on location of facilities. Potential for waste facilities to intrude on landscape, particularly where stacks form part of facility, but impacts likely to be minor as long as sited sensitively.			

Summary of Overall Effect of this Option:

The performance of the Area Waste Plan Best Practicable Environmental Option against each objective can be summarised as follows:

Uncertainties

- BPEO is diverting additional waste from landfill following residual waste treatment, however there may be concerns about the quality of the output from Mechanical Biological Treatment and whether there would be suitable markets for the outputs of Mechanical Biological Treatment and compost produced. Therefore diversion rates may not be achievable as there may not be markets available for these outputs/products.
- Question mark against objective 3 because air emissions and their effects will depend on the type of technologies which a) fall within the categories of Mechanical Biological Treatment and composting and the types of technologies that are adopted under 'other recovery technologies' b) the site/location of the technologies c) how the plants are operated and regulated
- There is a dependency on the capacity of the market to absorb outputs of compost and stabilised biowaste in relation to land application.
- Question mark score given to the impact on water in objective 5 is due to uncertainty about what happens to outputs - eg applied to land or to landfill.
- Question Mark score given for objective 6 as impacts on biodiversity depends on where facilities are located and site specific information is not available at this level of assessment.
- Question Mark scored for objective 8 as dependant on what Other Recovery Technology is adopted and if Renewable Obligation Certificates may also apply. Also not known what type of facility will be used and extent of thermal efficiency.
- Uncertain whether option reduced movement of waste dependent on location of facilities for objective 9. Could be transporting waste between multiple facilities if at different sites. If using existing sites then movement of waste will likely be same as current situation.
- A question mark was put next to a number of the criteria being assessed because the impact on the criteria depends on the site location. This includes impact on: local communities, cultural heritage, landscape and biodiversity. However, these criteria will be covered in more detail in site specific studies e.g. Environmental Impact Assessment and the site locations will be largely under the control of Land Use Planning.

Positive

- recycling is increasing from current baseline for objective 1
- reduction of waste to landfill (for objective 2) which will result in less uncontrolled emissions for objective 3 (e.g. leachate to land and water and methane to air).
- less waste to landfill reduces potential for leachate pollution from landfill for objective 5
- Greenhouse Gas emissions are likely to reduce from the proposed technologies in the Area Waste Plan BPEO
- Ability to recover energy from the Other Recovery Technology that is adopted
- There is the potential for Renewable Obligation Certificates as this option may use an advanced thermal treatment technology. It could potentially combine this with combined heat and power for option 8
- option can potentially provide a local heat source (if Combined Heat and Power technology) and this may have positive effect impact on the community for option 10

Negative

- There are air emissions (odour, dust, bio-aerosols etc) which need to be properly managed for objective 3
- Reduction of emissions to land dependant on the type of Other Recovery Technology chosen and the production of hazardous fly ash which would require treatment and disposal in objective 4
- emissions generated from some of the processes and need to contain and manage them. Also scored negative due to potential for application of mixed waste composted material to land – eg due to metals content for objective 4

- The assessment highlights that Mechanical Biological Treatment technologies are energy intensive technologies for objective 8
- Potential effects on water dependant on types of technology adopted
- As with all new waste management sites potential to have negative effect on local community for objective 10

Overall this option performs better than the baseline against which it is compared.

Mitigation Actions – Option 4

Mitigation actions applicable to all objectives with this option	
▪ Land use planning system will take into account local issues – air quality, effects on communities, landscape, cultural heritage, transport of waste etc – to ensure protection of the environment through sensitive location of facilities. ▪ Environmental regulation of facilities will ensure that sites will be regulated to high environmental standards and will consider in detail emissions to air, emissions to water and land, emissions of greenhouse gases, noise, odour, dust and effects on human health. Suitable abatement technologies will be required as part of regulation of facilities to address these effects. ▪ PPC regulation will require use of Best Available Technology (BAT) for waste management processes ▪ When considering options for funding, Scottish Executive should take account of issues raised in this ER.	
Specific mitigation actions relevant to specific SEA objectives	
Obj	**Action**
1	▪ Area Waste Plan Best Practicable Environmental Option data is now 4 years old. More reliable and accurate data has been collected since then and recycling and composting figures within the Area Waste Plan may be too optimistic. BPEO targets may not be achievable without excessive cost. ▪ Ensure market testing undertaken before facilities are developed to ensure a product can be recovered and used as a useful product ▪ Improve source segregated recycling and composting rates where affordable and practicable. ▪ Identify economically viable Mechanical Biological Treatment which promotes the highest recycling and recovery rates.
4	▪ At tender stage and when Scottish Executive review bids, check proposed application of outputs. ▪ Must be no application of residual waste material to land without risk assessment. ▪ With respect to management of ash residues from what ever Other Recovery Technology is chosen this will be done under Pollution Prevention Control permit conditions for the protection of the environment and human health. Bottom ash can be used as aggregates in building materials, however further work is required to understand the risks and opportunities with this waste residue. Similarly further work will be required on the potential uses of fly ash.
5	▪ At tender stage and when Scottish Executive review bids, check proposed application of outputs. ▪ Risk assessment criteria must be applied for application of any waste residues to land that will include risk to local watercourses. ▪ The Water Environment (Controlled Activities) (Scotland) Regulations 2005 will apply to protect the water environment.
6	▪ Design of facility to enhance local biodiversity. ▪ Need to take account of local biodiversity action plans. ▪ Risk assessment criteria must be applied for the application of outputs from treatment processes with respect to their environmental impacts on all media
7	▪ At tender stage and when Scottish Executive review bids, check levels of Greenhouse Gas emissions.
8	▪ At tender stage and when Scottish Executive review bids, check proposed energy use of facilities. ▪ Seek to utilise most energy efficient Mechanical Biological Treatment processes ▪ Energy from Other Recovery Technologies could be used to power the Mechanical Biological Treatment plant but this would provide no net benefit in renewable energy generated. ▪ Planning system can support location of facility in proximity to heat users. ▪ Application of Scottish Environment Protection Agency thermal treatment guidelines and thermal efficiency guidelines (in production)
9	▪ Planning system should seek to ensure that the location of facilities will make best use of existing transport facilities (particularly rail) and keeping facilities close to source of waste (proximity principle) and also considering co-location of facilities. ▪ Planning and environmental licensing able to control transport routing
10	▪ Local communities potentially affected must be given effective opportunity to engage in the decision making process at both planning and Pollution Prevention Control permit application stages ▪ Planning and environmental licensing can set conditions on vehicle movements on site ▪ Potential for a local energy source (Combined Heat and Power)

APPENDIX B – GLOSSARY AND INFORMATION ON WASTE MANAGEMENT TECHNOLOGIES

Anaerobic digestion The anaerobic decomposition of biodegradable waste, by the action of micro-organisms under controlled conditions, in order to produce methane in the form of biogas and, as residue, a fibre fraction (digestate) and a liquid fraction (liquor).

Bioaerosols Extremely small airborne particles that are living or originate from living organisms eg from composting operations

Biological treatment The stabilisation of residual municipal waste, unsorted waste or any other biodegradable waste in order to reduce the fermentability and volume of the waste.

Composting The controlled biological decomposition and stabilisation of biodegradable materials (such as organic garden and kitchen wastes) under predominantly aerobic (oxygen-rich) conditions to produce a humus rich, sanitised and stabilised product that can be beneficial to soil.

Controlled waste Household, industrial and commercial waste or any such wastes that require a waste management licence for treatment, transfer or disposal (as defined by Environmental Protection Act 1990 Section 75).

EC Directive A European Community legal instruction which is binding on all Member States and must be implemented through the legislation of Member State governments within a prescribed timescale.

Ecotoxicity Refers to the potential environmental toxicity of substances on a particular environment

Energy from waste The recovery of energy value from waste by burning the waste directly, or by burning a fuel produced from the waste, such as refuse-derived fuel (gaseous or solid) or landfill gas.

Eutophication This is when the environment becomes enriched with nutrients. This can be a problem in marine habitats as it can cause algal blooms which may disrupt the normal ecosystem functioning.

Fugitive Emissions Intentional or unintentional releases of substances that enter the air without going through a stack, vent, duct or pipe e.g. dust from Mechanical Biological treatment operations, methane from a landfill

Green Waste 'Green and wood waste' means vegetable waste from gardens and parks, tree cuttings, branches, grass, leaves (with the exception of street sweepings), sawdust, woodchips and other wood waste not treated with heavy metals or organic compounds.

Kerbside segregated collection Any regular collection of recyclables or compostable materials from premises. Excludes collection services delivered on demand.

Land use planning The Town and Country Planning system regulates development and use of land in the public interest and has an important role to play in achieving sustainable waste management.

Landfill Directive A key European Directive agreed in April 1999, aims to prevent or reduce as far as possible the negative effects of landfilling on the environment and human health. The main requirements of the directive include treatment of most wastes before landfilling; banning the co-disposal of hazardous and non-hazardous waste; banning certain wastes from landfill completely; and targets for the reduction of biodegradable municipal waste to landfill.

Landfill sites Areas of land in or on which waste is deposited.

Materials recovery facility (MRF) A facility to process wastes for the purpose of recovering useful materials using a variety of processes to separate out different materials, ranging from manual sorting to advanced mechanical separation techniques.

Mixed waste processing facility Any facility using one or more mechanical, biological or thermal processes to extract more than one useful product (recyclables and/or compost and/or fuel or energy and/or other recovered materials) from a mixed wastes stream. This covers a range of existing and emerging technologies, many of which are capable of treating either mixed waste (before or after source separation) or source segregated materials, thus offering flexibility.

Recyclables Materials that are capable of being recycled.

Recycling Using waste materials in manufacturing other products of an identical or similar nature, as defined by Organisation for Economic Co-operation and Development – Strategic Waste Prevention 2000.

Refuse Derived Fuel. This is a solid, liquid or gaseous fuel derived from waste which can be used to generate heat/electricity.

Residual Waste This is the waste that remains after reduction, reuse, recycling and composting.

Source segregation Separation of materials for recycling or composting (e.g. paper, cans, glass, textiles, garden waste, household organics, plastic, steel, etc.) at the point of origin – eg a household. The separation either takes place within the household (or business/institution) through the use of different containers, or parts of containers, for individual materials, or at street level when materials are sorted into the collection vehicle.

Waste Any substance or object in the categories set out in Annex 1 of the Waste Framework directive (91/156/EEC), which the holder discards or intends or is required to discard.

Waste arisings The amount of waste generated in a given locality over a given period of time.

Waste transfer station A site to which waste is delivered for sorting and/or bulking prior to transfer to another place for recycling, treatment or disposal.

AD	Anaerobic Digestion
AWP	Area Waste Plan
BPEO	Best Practical Environmental Option
DEFRA	Department for Environment Food and Rural Affairs
EfW	Energy from Waste
LCA	Life Cycle Analysis
LWMP	Lanarkshire Waste Management Project
MW	Municipal Waste
MBT	Mechanical/Biological Treatment
NWP	National Waste Plan
NWSS	National Waste Strategy Scotland
PPC	Pollution Prevention and Control
RDF	Refuse Derived Fuel
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SWAG	Scottish Waste Awareness Group
WID	Waste Incineration (Scotland) Regulations (2003)
WSA	Waste Strategy Area
WSAG	Waste Strategy Area Group

SUMMARY OF WASTE TECHNOLOGIES

SEPA has prepared a summary of key information about different types of waste technologies. These can be accessed via the links below. Each technology is described in terms of its process, the inputs and outputs, summarises some of the potential impacts and summarises how they are regulated. This information is correct at time of publication (December 2006). Click on the links below to access these information sheets.

- Anaerobic Digestion (39k pdf) - www.sepa.org.uk/pdf/nws/promotion/Anaerobic_Digestion.pdf
- Gasification (58k pdf) - www.sepa.org.uk/pdf/nws/promotion/Gasification.pdf
- In-Vessel Composting (51k pdf) - www.sepa.org.uk/pdf/nws/promotion/In-VesselComposting.pdf
- Incineration (37k pdf) - www.sepa.org.uk/pdf/nws/promotion/Incineration.pdf
- Landfill (57k pdf) - www.sepa.org.uk/pdf/nws/promotion/Landfill.pdf
- Material Recycling Facility (MRF) (35k pdf) - www.sepa.org.uk/pdf/nws/promotion/MaterialsRecyclingFacility.pdf
- Mechanical Biological Treatment (MBT) (52k pdf) - www.sepa.org.uk/pdf/nws/promotion/MechanicalBiologicalTreatment.pdf
- Mechanical Heat Treatment (MHT) (28k pdf) - www.sepa.org.uk/pdf/nws/promotion/MechanicalHeatTreatment.pdf
- Open Windrow Composting (33k pdf) - www.sepa.org.uk/pdf/nws/promotion/OpenWindrowComposting.pdf
- Pyrolysis (129k pdf) - www.sepa.org.uk/pdf/nws/promotion/Pyrolysis.pdf

Other Fact Sheets are available about other topics related to this consultation:

- National Waste Strategy: Scotland (140k pdf) - www.sepa.org.uk/pdf/nws/promotion/nationalwastestrategy.pdf
- Waste Hierarchy (142k pdf) - www.sepa.org.uk/pdf/nws/promotion/wastehierarchy.pdf
- Waste Minimisation (160k pdf) - www.sepa.org.uk/pdf/nws/promotion/wasteminimisation.pdf
- Landfills (147k pdf) - www.sepa.org.uk/pdf/nws/promotion/landfills.pdf
- Composting (143k pdf) - www.sepa.org.uk/pdf/nws/promotion/composting.pdf

1 Orkney and Shetland

2 Western Isles

3 Highland

4 Moray, City of Aberdeen and Aberdeenshire

5 City of Dundee, Angus and Perth and Kinross

6 City of Stirling, Clackmanannanshire and Falkirk

7 Fife

8 City of Edinburgh, West Lothian, Midlothian
East Lothian and The Scottish Borders

9 North Ayrshire, East Ayrshire, South Ayrshire
and Dumfries and Galloway

10 Inverclyde, Renfrewshire, East Renfrewshire,
City of Glasgow, South Lanarkshire, North Lanarkshire,
East Dunbartonshire and West Dunbartonshire

11 Argyll and Bute