



BILLET D'ÉTAT

WEDNESDAY, 25th MAY, 2005

ENVIRONMENT DEPARTMENT

THE FUTURE OF SOLID WASTE DISPOSAL IN GUERNSEY –
RESPONSE TO THE REPORT OF THE PANEL OF INQUIRY

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TO THE MEMBERS OF THE STATES OF THE ISLAND OF GUERNSEY

I have the honour to inform you that a Meeting of the States of Deliberation will be held at **THE ROYAL COURT HOUSE, on WEDNESDAY, the 25th MAY, 2005,** at 9.30am, to consider the item contained in this Billet d'État which has been submitted for debate by the Policy Council.

DE V. G. CAREY
Bailiff and Presiding Officer

The Royal Court House
Guernsey
6th May 2005

ENVIRONMENT DEPARTMENT

THE FUTURE OF SOLID WASTE DISPOSAL IN GUERNSEY – RESPONSE TO THE REPORT OF THE PANEL OF INQUIRY

The Chief Minister
Policy Council
Sir Charles Frossard House
La Charroterie
St Peter Port

1st April 2005

Dear Sir

Executive Summary

- i.) In January 2005, the Independent Panel (The Panel) chaired by Advocate Dadd released “The Report of the Panel of Inquiry” (The Report) reviewing the future of solid waste disposal in Guernsey. At approximately the same time, the Environment Department took receipt of a report it had jointly commissioned with Jersey into the feasibility of a joint EfW facility located in Jersey serving both islands. The Environment Department has reviewed the findings and recommendations contained in those reports and has considered the potential long-term strategies it could recommend to the States for the future management of Guernsey’s waste.
- ii.) The Department notes that The Report has drawn heavily from the Department’s draft Waste Management Plan (WMP) in respect of future waste minimisation and recycling initiatives. The Department broadly concurs with The Panel’s view and proposals that more can be done in this area. The Department also agrees that waste minimisation and recycling alone cannot meet Guernsey’s waste management needs and that a long-term disposal route is required.
- iii.) The Panel identified as a preferred long-term strategy a joint facility with Jersey. Notwithstanding the fact that the joint facility report had been commissioned by the Department soon after the Panels formation and that a draft of the report had been issued to The Panel prior to The Panel completing its work, The Panel recommended that this option be investigated as soon as possible. The joint facility report concludes that this option is feasible. However, the Department is concerned that a joint facility will result in additional costs and additional risks when compared to an on island mass burn facility. As such, it is unlikely that this option could be selected on best value grounds. The option is attractive if the deferral of taking a long-term decision is considered to present too great a

- risk and on island incineration capacity is considered undesirable on social and visual grounds. More investigations would be required before this option could be selected.
- iv.) The Panel concluded that if the joint facility option proved not to be feasible, Guernsey should wait until 2008, when the Department of the Environment, Food and Rural Affairs (DEFRA) New Technologies Demonstrator Programme should have concluded, and then consider the merits of on island mass burn incineration against the alternative technologies. The Department agrees with The Panel that a decision to procure alternative technologies cannot be taken now. However, the Department is not convinced that the 2008 date put forward by The Panel represents the key decision date. The New Technologies Demonstrator Programme seeks to develop investor confidence by providing financial support to pilot plants. Unless Guernsey wishes to be in the vanguard of procurement of an alternative technology plant that has not been proven at full commercial scale, then a commercial commission for one of the pilot plants must first be awarded elsewhere, and that plant built and operated. This will probably take a minimum of three years after 2008.
 - v.) The Panel concluded that soon after 2008, Guernsey should procure its long-term solution, that solution being built and commissioned by 2011. The Panel recommended that, on that date, five years landfill life should remain. This would require a landfill extension of approximately two years. In view of iv.) above, the Environment Department considers that the landfill extension required is more likely to be a minimum of six years. The Department has examined the potential for extending landfill life but does not consider that the required extension is achievable without relying on export as an interim solution.
 - vi.) Although the legal obstacles to export are not as absolute as the Department had previously been given to understand, a legal route to export is by no means certain. The Department is satisfied that export would involve significant capital expenditure in the form of a transfer facility or very high tonnage charges if this capital investment were to be made by the private sector. Whichever funding route is chosen, a high degree of certainty over the life of the export route would be required. The Department is concerned that this degree of certainty is unlikely to be achieved and that disposal costs will be significantly higher than the on island mass burn option. The Department is of the view that export presents very real risks both in the long and short term.
 - vii.) As the Department is unable to assure the States that export and/or waste minimisation and recycling present interim strategies to prolong the life of the landfill, such that the decision to procure a long-term solution can be deferred, the Department cannot support The Panel's recommendation to wait until 2008 [*or beyond*]. Neither can the Department, with its current level of knowledge, recommend the joint Guernsey/Jersey facility as the best value option. The Department has formed the view that the States does not wish to proceed with

the Lurgi UK contract and that the States does not wish, at this stage, to retender a mass burn option under a different procurement route.

viii.) As a consequence of the above, the only option that the Department can recommend to the States is one of further investigation in order to build confidence. The Department recommends that this further investigation be carried out with the support of DEFRA and that, in the interim, various waste minimisation and recycling measures be introduced. The Department recommends that further investigation be centred on:

- Securing a guaranteed medium-term export route;
- Evaluating the alternative and emerging technologies;
- Further evaluating the joint Channel Islands facility option;
- The categorisation of waste for disposal including predicting future arisings.

And that the following waste diversion and minimisation strategies be adopted:

- Run a proactive PR campaign to promote waste minimisation and recycling.
- Improve the coverage of recycling sites around the Island.
- Provide cardboard recycling banks at the most popular recycling sites alongside the well-recognised glass and can banks.
- Provide recycling facilities at schools, etc.
- Pilot waste electronic and electrical equipment recycling banks in partnership with the private sector.
- Explore, as a matter of urgency, the on island use of glass as inert fill or aggregate substitute.
- Explore with all Parishes the early piloting of low technology based kerbside recycling collection schemes as a precursor to a permanent kerbside recycling scheme introduced as part of the long-term solution.
- Through the Chamber of Commerce and direct, seek to persuade commercial premises to improve source segregation of recyclables.
- Through discussions with the private sector, seek to facilitate waste specific collection rounds for recyclables from commercial premises.

- In liaison with the Public Services Department, further increase landfill gate fees.
- In liaison with the Public Services Department and the private sector, pilot the segregation of clean, untreated wood for reuse/recycling.
- In liaison with the Public Services Department and the private sector, pilot the diversion of mixed waste from Mont Cuet to waste sorting facilities for segregation.
- Investigate the commissioning of an in-vessel composting plant for green waste.
- Investigate the commissioning of Civic Amenity (CA) sites.

1. Background

- 1.1 In June 2004, the States resolved to appoint an Independent Panel of Inquiry (The Panel) to review the future of solid waste disposal in Guernsey. The findings of the panel (The Report) were made public in January 2005. The background leading to the appointment of The Panel is significant.
- 1.2 Waste disposal in Guernsey has been the subject of a number of States debates over the last decade. In July 1994, the States considered two reports which both highlighted the conflicting demands of the identified needs of water storage, stone extraction and the urgent requirement for new putrescible waste disposal facilities. The States reaffirmed previous decisions that Mont Cuet should be the island's next putrescible landfill site and resolved not to pursue stone extraction on the Chouet Headland. The States directed the Advisory and Finance Committee to carry out a comprehensive assessment of the Island's most appropriate future strategy for the disposal of all Island waste.
- 1.3 In November 1994, the States considered the Advisory and Finance Committee's review of the Strategy on Waste, Water and Stone and resolved that local requirements for stone should be met from Les Vardes Quarry until circa 2020.
- 1.4 In June 1997, the Advisory and Finance Committee submitted its Liquid Waste Strategy Report (WSA1). This strategy preceded the Solid Waste Strategy as it was acknowledged that the solid waste strategy would need to take account of any solid waste streams (sludge) that might result from the liquid waste treatment works. The States resolved, in principle, that sewage should be treated to an appropriate standard and that the Public Thoroughfares Committee should prepare a business plan taking note of this decision. In April 1999, the States resolved, in response to a policy letter arising from an amendment to the former Public Thoroughfares Committee's Business Plan, that sewage treatment should

be centralised at a single location unless there were overriding reasons to consider localised treatment.

- 1.5 In June 1998, the Advisory and Finance Committee submitted its Solid Waste Strategy Report (WSA2) and the States resolved in principle that Les Vardes Quarry was unsuitable for the landfill of putrescible waste. The Committee's report acknowledged that export of waste for disposal was not sustainable and that there were no other suitable landfill sites available on island. As a consequence the report recognised that a sustainable waste disposal strategy must be centred on waste volume reduction by incineration in a mass burn Energy from Waste (EfW) facility. The States directed the Board of Administration to investigate the feasibility of commissioning an EfW facility.
- 1.6 As part of the consideration of the same report the States resolved that recycling initiatives should be limited to those that are economically justifiable. **The Environment Department has not supported the former States Strategy in this respect**
- 1.7 The emphasis in the above paragraphs has been applied. Whilst not wishing to divert attention from the more fundamental issue, i.e. reconsideration of the Solid Waste Strategy, it is important to address an error that has been repeatedly stated and which has also been made in the opening line of the main body of The Report. The former Board of Administration did NOT decide upon the procurement of a mass burn EfW facility as the most appropriate means of dealing with the Island's solid waste. The States considered the Advisory and Finance Committee's report, the States supported the recommendations in that report and the States directed the former Board of Administration to investigate the feasibility of the procurement of a mass burn EfW facility. In addition, the States directed the former Board of Administration to implement economically justifiable recycling measures. These distinctions are fundamental to an understanding of the current position.
- 1.8 Much has been said about the lack of recycling measures undertaken by the current Environment Department. This has included calls for the Department to do more during the period of The Panel's review. However, it can be seen that the former States Strategy restricted, on cost grounds, the extent to which new recycling initiatives could be pursued. Prior to the Machinery of Government changes, the Department's project team had prepared an outline Waste Management Plan (WMP) which sought to "push the boundaries" of this States Strategy by redefining "economically justifiable". A copy of the draft WMP was submitted to The Panel and is also attached to this report (appendix 1). **The Environment Department is pleased to note that The Report, in its recommendations on recycling issues, has drawn heavily from this WMP and agrees with the Department that recycling initiatives should be reviewed.**

- 1.9 In April 2002, the States considered the Island Development Committee's report setting out the findings of the Planning Inquiry into the Longue Hougue site which had been identified, as a result of a two year Environmental Impact Assessment, as the preferred site for the location of an EfW facility. The States resolved that an integrated waste management facility should be constructed at Longue Hougue including an EfW facility, a Materials Recovery Facility (MRF), a CA site and a scrap metal yard. It is recognised that the Longue Hougue site selection has been criticised and it is recognised that due to its tidal nature and the fact that it is reclaimed land, the site presents engineering difficulties for any infrastructure construction. Nevertheless, Longue Hougue was chosen only after other possible sites in Guernsey were subjected to an Environmental Impact appraisal by independent consultants in accordance with best practice. The findings of those consultants were subjected to peer review by the Institute of Environmental Management and Assessment before becoming part of the body of evidence submitted to the Independent Planning Inquiry. The Planning Inquiry supported the use of Longue Hougue and this view was endorsed by the States. **The Environment Department welcomes The Report's endorsement of this site.**
- 1.10 In June 2002, the former Board of Administration, in accordance with the directions of the States, presented proposals in respect of the procurement of an mass burn EfW facility. The procurement route proposed by the Board and approved by the States was for a design, construct and two year operate contract to be signed by a Special Purpose Company wholly owned by the States of Guernsey. The Board was directed to proceed with the seeking of tenders. Further comment on the procurement route is provided in section 16.
- 1.11 In September 2003, the States considered the outcome of the tendering process and post tender negotiations and resolved to procure the EfW facility through a two-stage contract let with Lurgi UK. The first stage conducted between October 2003 and May 2004 involved the detailed design of the plant and the securing of all necessary permissions. The second stage of the contract would have been the construction of the facility and its operation for two years.
- 1.12 In June 2004, the States resolved to appoint an Independent Panel of Inquiry to review the proposed strategy and resolved that the signing of the second stage of the contract with Lurgi UK should be deferred.

2 Overview of The Report

- 2.1 A copy of The Report is attached (appendix 2). The report makes many statements and assumptions which merit comment. However, in an attempt to focus the body of this States Report on the key issues, detailed comments on The Report have been presented as a commentary inserted into the report (appendix 2). **It should not be assumed that because this commentary has been provided as an appendix rather than within the body of the report that it is of less importance.** The issue of a long-term sustainable waste disposal strategy

is of such fundamental importance to the health and development of Guernsey that the Environment Department would commend members to examine the commentary fully. In addition, correspondence with the Health and Social Services Department and the Public Services Department commenting on The Report is attached at appendix 3.

2.2 The Report does not purport to provide a long-term sustainable waste management solution for Guernsey but rather proposes a watching brief along with areas of investigation. However, it does contain a number of conclusions and recommendations which are considered within the following sections of this report. Behind those conclusions and recommendations are a number of implied beliefs which should perhaps be articulated. Whilst The Report does not set out beliefs in the form suggested below, they are a logical conclusion of the report's findings and recommendations.

2.3 The Panel believes:

- a.) that a joint facility with Jersey will present best value and can be procured within the required time frame i.e. before 2011 (*Report recommendations 3.1. and 3.2 and 4.12*)
- b.) that the alternative technologies, primarily Pyrolysis and Gasification, are at a turning point and that there are reasonable grounds to believe that they will, driven by support funding provided by DEFRA, be proven by 2008; (*Report executive summary para 12*)
- c.) that the alternative technologies, perhaps as a package of combined technologies, will be able to deal with Guernsey's solid waste streams; (*Report executive summary para 14*)
- d.) that the alternative technology suppliers will have the resources to deliver a plant within Guernsey's required time frame and will be able and willing to provide contractual guarantees ensuring the required reliability and performance standards; (*Report main body paras 3.18 to 3.21*)
- e.) that the alternative technologies will be able to meet these requirements at whole life costs below that of conventional mass burn incineration; (*Report main body para 3.18*)
- f.) that Guernsey can, by providing for export as an interim solution, afford to wait for the above beliefs to come about; (*Report executive summary para 17, main body paras 4.9 and 4.10*)
- g.) that in waiting, Guernsey can handle its waste in such a way that a strategic reserve of five years of landfill life can be retained (*Report executive summary para 17, main body paras 4.6 to 4.11*). **The Report**

is unclear as to whether this five year life must remain after commissioning of the plant (para 4.9) or whether the life can be depleted to below five years during the commissioning of the plant (para 4.6). The Department has attempted to obtain clarification on The Panel's thinking behind the five year strategic reserve recommendation without success (correspondence attached at appendix 4).

- h.) that the way in which Guernsey handles its waste during this period will not in any way confine or limit future options and, in particular, will not prevent the adoption of mass burn incineration in 2008 if this proves necessary; (*Report executive summary para 14*)
- i.) that should Guernsey be forced to adopt mass burn incineration in 2008, it can be procured at a cost which is acceptable and which justifies the wait; (*Report executive summary paras 6, 8(5), 14, recommendation 3.4*)

If any of the beliefs above are considered to be intrinsically unsafe then the way forward presented by the Panel must, as a minimum, be modified.

- j.) that a solution can be obtained at better value and that tenderers would be willing to compete in an undefined contract and procurement route tender process (*Report executive summary para 8(5) and recommendation 3.4*)
- k.) that Guernsey's current and future waste arisings for disposal, in the plant procured, will be less than those specified for the proposed mass burn EfW facility. (*Report executive Summary para 8(1)*)
- l.) that in light of the above, the uncertainties and risks of going ahead with the proposed EfW facility outweigh the risks and uncertainties of deferring the taking of a decision. (*Report key conclusion and main conclusion part 1*)

If it were felt that, through analysis of the above beliefs, the risk and uncertainty pendulum swung in the opposite direction, then the logical conclusion would be to progress with the proposed EfW mass burn facility.

3 Alternative Technologies - The DEFRA New Technologies Demonstrator Programme

- 3.1 In 2002 and 2003, Juniper commented on the suitability of the alternative technologies for Guernsey. Juniper concluded:

“The ability of a technology to provide a satisfactory track record which supports a plants’ operating reliability and ability to accept similar waste to

those that will arise in Guernsey can in our opinion only be provided at present by Incineration.

“The emerging technologies which are at demonstration level will need to develop through their semi-commercial phase and be successfully operated at full scale with MSW [Municipal Solid Waste] for two years for them to become, in our opinion, proven. We estimate the shortest time frame that this would be possible is 3-4 years.

“With this in mind, Juniper believes that incineration with energy recovery is the most appropriate route for Guernsey in light of the requirements of the Island community.”

- 3.2 In the intervening period, none of the alternative technologies have met the Juniper criteria and the technologies previously promoted to Guernsey have not yet entered the full-scale commercial phase. The DEFRA New Technologies Demonstrator Programme will provide around £30 million to help to establish new waste technologies that require pilot plants to demonstrate their viability. Funding will be allocated in two bidding rounds to ten companies. The aim is to have five demonstration plants in operation by the end of 2005 and a further five by the end of 2006. The technologies and processes being supported are those aimed at the reduction and diversion of the biodegradable fraction of municipal waste. The plants are to run for 2 years and hence results are expected by the end of 2007 and 2008 respectively.
- 3.3 The DEFRA programme is intended to provide accurate and impartial technical, environmental and economic data to stimulate investor confidence. However, under the European rules governing the issue of State aid, it is understood that the pilot plants cannot be commercial undertakings. The DEFRA New Technologies Demonstrator Programme may, therefore, at best, deliver the first stage of the criteria of acceptance according to Juniper’s recommendations; namely that as a result of DEFRA funding, one or more of the plants will attract commercial investment and contracts in early 2008 or 2009, such that a plant can be constructed and commissioned thereafter. Juniper’s recommendation, as previously accepted by the States, was that two years of commercial operation would be required before an island community, such as Guernsey, could be recommended to adopt the alternative technology. The Panel acknowledged Juniper “as experts in the field” and considered the Juniper review as being “thorough”.
- 3.4 If the States continues to accept Juniper’s recommendation, and no grounds have been put forward for ignoring that recommendation, then if the DEFRA programme delivers within the intended time frame, and allowing the minimum period of 36 months for tendering, contracting, planning, constructing and commissioning, followed by two years operation of the commercial plant, Guernsey could not take a decision to procure an alternative technology or package of technologies before 2013. This assumes that an alternative

technology plant or package of processes develops to a stage where there is confidence in investment during the first two years of the DEFRA programme i.e. by the end of 2007.

- 3.5 Whilst the Environment Department does not discount the potential of the alternative technologies becoming proven at full commercial scale on waste streams similar to those produced in Guernsey at some stage in the future, the Department has serious reservations over the 2008 time frame proposed by The Panel and considers 2013 to be the earliest date when a decision on the alternative technologies could **potentially** be taken. If a decision were to be taken around this date then the plant would not be commissioned and fully operational before the end of 2015, by which time Mont Cuet Landfill Site would be full at current fill rates.

4. Alternative Technologies - Guernsey's Waste Stream

- 4.1 It should not be assumed that there is anything particularly unique or difficult about Guernsey's waste stream that renders it inherently unsuitable for the application of an alternative technology solution. Rather, the problem is that Guernsey does not have access to a range of treatment processes without relying on export to other jurisdictions. UK Counties may, in due course, consider applying an alternative technology solution to, for example, fractions of the household (black bag/Parish) waste whilst relying on composting, Mechanical Biological Treatment (MBT), landfill or mass burn incineration for other fractions including commercial and industrial and/or construction and demolition waste. DEFRA recognises that mass burn incineration has an important role to play within the overall package of waste management options available. Discussions with DEFRA at staff level have confirmed that it is most unlikely that any one of the technologies which may be piloted under the DEFRA New Technologies Demonstrator Programme would be proven as capable, alone, of dealing with Guernsey's mixed waste arisings.
- 4.2 The Panel implicitly recognises that a single alternative technology, even if proven for some waste streams, may not be able to deal with Guernsey's mixed waste. Recommendation 3.5 of The Report states: *Multi-solution options involving more than one type of plant or technology should not be ruled out*". The discussions with DEFRA would imply that, if Guernsey is to adopt on island treatment, other than mass burn incineration, then this must be via a package of technologies.
- 4.3 Whilst the Environment Department recognises that a combination of current technologies and emerging alternative technologies may, in due course, be able to deal with Guernsey's mixed waste arisings, this in itself presents a further complication. Not only would a thermal treatment process need to be demonstrated during and after the DEFRA programme, but a complimentary pre-processing facility would also need to be identified and proven. To date, this has been one of the major stumbling blocks with a number of promising

pyrolysis solutions having failed as a result of an inability to match the pyrolysis plant with a pre-processing facility capable of turning the mixed waste into a suitable consistent and homogenous feed stock in a commercially viable manner. DEFRA recognises this problem and acknowledges that, at present, up to 30% of waste going through MBT plants is ultimately sent to landfill. DEFRA also acknowledges that markets for Refuse Derived Fuel (RDF), which is a by-product of MBT plants, are very limited and that in the majority of cases the RDF is sent to landfill. One of the objectives of the DEFRA New Technologies Demonstrator Programme, which would be of key interest to Guernsey, is to match MBT processes with Pyrolysis or Gasification so that the RDF can be subjected to small scale heat treatment processes.

- 4.4 In 2002, the former Board of Administration visited three companies in the UK which were developing Pyrolysis technology. Two of those companies were attempting to treat the organic fraction of waste remaining after an MBT process. To date, those companies have been unable to generate RDF of a consistent quantity and quality suitable for pyrolysis. One company has now ceased operating and the other continues to landfill the RDF. The third company was not treating municipal waste.
- 4.5 Whilst technically the matching of multi-technology solutions may present the best hope of a commercial alternative to mass burn incineration, the additional complexities make the procurement and commissioning time frame set by the Panel (2011) all the more difficult to meet.

5. Alternative Technology Suppliers - Available Resources

- 5.1 To date, the alternative technology suppliers have struggled to secure the necessary funding to develop pilot plants through the semi commercial phase to the full commercial scale. The Environment Department recognises that given time and sufficient support from DEFRA or others, this situation may be overcome. To date there has been reluctance on the part of Local Authorities and others to invest in these plants. To develop investor confidence is one of the prime objectives of the DEFRA New Technologies Demonstrator Programme.
- 5.2 However, if an alternative technology supplier(s) can break through this barrier and is able to offer a fully commercial, proven plant, capable of substituting for mass burn incineration or landfill at a competitive price, the demand for that plant can be expected to be very high. The supplier will be a new entrant to the market and will be building a market presence. It is reasonable to assume that the supplier will not be in a position to deliver a number of plants simultaneously. This will particularly be the case if the supplier is offering, or the client is seeking to procure under a design, build, fund and operate contract. As such, it must be highly questionable whether Guernsey would be able to procure such a successful facility, within a tight time frame and at an attractive price.

6. Alternative Technology Suppliers – Price Competitiveness

- 6.1 To date, there are no grounds on which to assume that an alternative technology, once proven, will be able to offer, on a contractual like for like basis, a substantial price discount over mass burn incineration. Juniper commented in 2002 that, from its experience, the prices promoted by the alternative technology providers were rarely reflected in a competitive tendering situation. Juniper also commented that in Asia, where alternative technology plants had been the subject of much greater research and development commitment from major corporations (primarily steel works) and were now proven to be able to compete, on a technology basis, with mass burn incineration, the plants did not offer a price incentive and in some cases were dearer than mass burn incineration.
- 6.2 It, of course, remains possible that an alternative technology provider may be able to compete financially with mass burn incineration but this should not be assumed as a given. The comments in section 5 above are also of relevance when considering price competitiveness. Supply and demand is as relevant to the waste management industry as for any other. An alternative technology supplier seeking its first commercial client in order to be able to set up a flagship plant to court other business will naturally seek to market at competitive prices in order to become a market leader. This position will of course change if, and when, an alternative technology supplier has a full order book.

7. Can Guernsey Afford to Wait for the Alternative Technologies?

- 7.1 The question of whether Guernsey can afford to wait before committing to a long-term waste strategy has been given consideration by the Environment Department. The overriding factors determining this issue are:
- the date on which it is anticipated that the alternative technology could be commissioned and operating on island (2016 see para 3.5 above);
 - the extent to which the decision maker is prepared to allow the landfill at Mont Cuet to be depleted (retain 5 years life until after the plant is commissioned see 7.2 below); and
 - the extent to which landfill life can be prolonged through waste diversion policies.

This latter point is a complex consideration and the following must be taken into account:

- The current rate at which landfill life is used up
- The theoretical and practical extent to which that rate can be reduced

- The extent to which the diversion policies are publicly acceptable and, consequently, the extent to which they receive public take up
- The additional life that can thus be generated
- The infrastructure needed to generate that additional life
- The programming (time lines) for procuring that infrastructure and hence the date from which the savings can be realised
- The extent to which the presence of that infrastructure may hinder subsequent development of infrastructure required for the long-term strategy

7.2 The Report suggests that the decision on the long-term strategy can be deferred until 2008 whilst retaining a strategic reserve of five years landfill life. The Report does not provide sufficient detail as to how such a deferral should be achieved. Neither does the report provide any argument in support of the five year criteria. Further, as indicated in para 2.3 g.) above, there is some doubt as to The Panel's intentions in respect of the five year life criteria.

7.3 It should be recognised that no matter what final strategy is adopted, there remains a need for available landfill for the future. This landfill resource would be likely to be used for asbestos disposal, contaminated soil disposal, bottom ash if leachability tests demonstrate that it cannot be used for land reclamation, and for handling other wastes during unforeseen outages of the other waste disposal infrastructure. At present rates of infill and allowing for a domed final profile, Mont Cuet is expected to be full in 2014. If a decision to procure a plant could be taken towards the end of 2008, as suggested by The Report, then following procurement, construction and commissioning, only approximately two years life would remain for long term future needs. The Department does not consider this to be a realistic proposition. Any margin for delay in the project or for plant failure or outages is so small as to constitute a very high risk. The Department does not believe that the landfill reserve should be allowed to fall below five years before full commissioning of the preferred long-term solution. The Department recognises that this may also have been The Panel's intention as The Panel recommends that the long-term solution be commissioned by 2011 and that export should be provided for in order to maintain a five year strategic reserve of landfill. The Department will seek to extend the life of the landfill as set out in section 10.

7.4 As indicated in section 3.5 above, the Department considers that 2008 is an unrealistic date on which a decision on the alternative technologies could be taken and views 2013 as more realistic. With a decision taken on this time frame, and provided there were no delays, commissioning of the plant could potentially take place around mid 2015 at which time five years of remaining landfill life would be required i.e. a landfill life extension of six years. The table

at paragraph 9.1 below sets out the potential scenarios and the resulting necessary landfill life extension. It can clearly be seen that to defer taking a decision will require a significant resource commitment in respect of an interim strategy and the associated infrastructure if the five year long-term landfill reserve is to be maintained. **Therefore, whether or not Guernsey can afford to wait depends on the robustness of any interim strategy and the willingness to commit the required resources.**

- 7.5 The form of the interim strategy adopted depends on the decision makers view on the extent to which the life of Mont Cuet can be extended. If it were considered that through radical waste diversion methods the landfill life could be extended, then the interim solution would be based on waste minimisation and recycling. If this was not considered to be feasible then the interim strategy must be one of export, provided the legal and contractual issues can be overcome.

8. The Waste Management Plan

- 8.1 Arising from the June 1998 States debate about the Solid Waste Management Strategy was a resolution to prepare a 'Waste Disposal Plan'. This would set out in detailed terms the facilities and policies that together form an integrated waste management system in accordance with the findings of the Waste Strategy Assessment. The former Board of Administration commissioned consultants to develop the Plan, conventionally known as a Waste Management Plan (WMP). The Environment Department has taken on responsibility for the WMP.
- 8.2 The WMP is concerned with the entire waste management process from collection, sorting and treatment through to disposal. One objective of the Plan is to ensure that the operation of each individual facility will complement the other parts of the waste infrastructure. For example, sorting operations within a MRF would be designed to remove wastes that are incompatible with the treatment technology.
- 8.3 Similarly, detailed recommendations are made about the administration and regulation of the entire process. For example, differential pricing is recommended to encourage delivery to a MRF of wastes that could be sorted.
- 8.4 The WMP functions as an integrated whole and consequently it has not been possible to put it before the States until the island's long-term disposal route is known. Development of the Plan has, therefore, been held in abeyance since the States decision to appoint the Panel of Inquiry to review the future of solid waste disposal in Guernsey. A copy of the latest draft is attached to this report (appendix1).
- 8.5 The Plan contains a number of key features which focus on reducing the quantities of waste requiring treatment and disposal including:

- Promotion of various waste minimisation initiatives to businesses and individuals.
- Provision of one or more CA sites to receive bulky and recyclable wastes from the public.
- Provision of kerbside collection for recyclable materials in household waste.
- Provision of a MRF to enable wastes from household kerbside collection and waste from commercial sources to be sorted in order to remove recyclable materials.
- Provision of an in-vessel composting plant to receive green waste from horticulture and amateur gardeners and produce a soil improver.

8.6 On the basis that the WMP makes recommendations for a long-term strategy spanning 25 years, the facilities it describes would be established with sufficient investment and support to perform to a high standard. The annual tonnages forecast by the WMP consultants to arise from the above are estimated to be:

- Reduction in arisings due to waste minimisation initiatives: 3,000t
- Recyclable material collected at CA site(s): 4,500t (note some proportion of this is already collected through existing routes)
- The research for the draft WMP predicted that household waste recycling rates would increase to 21% following the introduction of a kerbside collection round.
- Recyclable material separated at MRF: 4,000t
- Tonnage of green waste received by in-vessel composting system: 6,000t

8.7 As noted above, removal of the EfW plant from the strategy would influence the requirement and/or operating regime for the above facilities. For example, if an MBT process were selected in favour of EfW, then the need for pre-sorting of waste before delivery would be altered and the justification for activities such as kerbside recycling would have to be re-examined.

9. Delivering an Interim Strategy

9.1 To assist members to form a view on the likelihood of achieving an interim strategy without export, the following table provides suggested time frames for specific mile stones over three scenarios along with a marker showing the necessary landfill extension times beyond the current projected closure date of 2014. **It should be borne in mind that the levels of minimisation, recycling**

or diversion required for any of the three scenarios cannot be achieved without commitment to additional resources in terms of manpower, revenue and capital.

Activity	Earliest achievable	Reasonable expectation	Allowing for slippages/unforeseens
DEFRA reports results of New Technologies Demonstrator Programme	End 2008	Mid 2009	End 2009
Guernsey decides to procure alternative technology	Early 2009	End 2012 (Ref para 3.4)	End 2013
Contract signed	End 2009	Early 2013	Early 2015
Build complete	Mid 2011	Early 2015	Mid 2017
Commissioned and tested	End 2011	Mid 2015	End 2017
Required 5 years landfill life left	End 2011	Mid 2015	End 2017
Landfill full	End 2016	Mid 2020	End 2022
Landfill extension required	2 years	6 years	8 years

10. Waste Minimisation as an Interim Strategy

- 10.1 When considering waste minimisation and recycling as a means of prolonging the life of the landfill site as an interim strategy, it is necessary to consider the nature of the waste, its source and its method of delivery. These factors determine whether waste is suitable for pre or post-delivery segregation and minimisation in the absence of a high-technology infrastructure. A categorisation of waste according to its suitability for pre or post-delivery segregation, using weighbridge data for 2004, is outlined in the table below.

	Suitability for Pre or Post-Delivery Segregation	Weighbridge Category	Tonnage
A.	Waste types which could be subject to improved minimisation and recycling by waste producers pre-delivery to the landfill site	Parish waste	14,962
		Compacted commercial waste	8,907
		Total	23,869
B.	Waste types which could be subject to a higher degree of segregation pre-delivery to the landfill site	Fontaine Vinery - Pre-segregated	2,484
		Island Waste - Pre-segregated or deemed unsuitable for segregation	10,348
		Total	12,832
C.	Waste types which are potentially suitable for post-delivery segregation	Commercial green waste	1,207
		CA Site – not bagged	1,226
		Commercial waste hauliers – Assumed unsegregated	14,816
		Total	17,249
D.	Waste types which are unsuitable for pre or post-delivery segregation	Special waste	555
		Coastal litter	257
		Street cleaning	386
		Drainage cleaning	8
		Waste from scrap processing	1674
		Site preparation material / internal	375
		Total	3,255
TOTAL WASTE LANDFILLED IN 2004			57,205

- 10.2 It can be seen from the table above that 'parish waste' and 'compacted commercial waste' (category A.), which essentially consists of mixed biodegradable waste delivered to Mont Cuet in compactor vehicles, constituted 23,869 tonnes in 2004. The potential to divert waste from this compacted waste stream relies on minimisation of waste production and segregation of recyclable materials at source by householders and businesses such as shops, restaurants, bars, hotels and offices.
- 10.3 In 2004, 4,100 tonnes of household waste was recycled, equating to a household waste recycling rate of 19.25%. Whilst the Department is extremely keen to introduce initiatives to increase this rate, it notes that the 2003 recycling rate of 18.94% would have placed Guernsey in the top 20 performing areas in England

in a league table of nearly 400 District and Borough Councils. This was achieved primarily through the 35 'bring sites' located around the island where people can deposit brown, clear and green glass bottles and jars, steel tins and aluminium drinks cans, paper and textiles, and secondarily through the informal CA site located at Mont Cuet Landfill Site where members of the public can take metal items (e.g. washing machines, fridges, bicycles, etc) and cardboard free of charge.

- 10.4 If Guernsey was to benchmark itself against the best recycling regions in Europe, thereby exceeding the performance levels forecast in the draft WMP, it could potentially increase that figure to approximately 35%. It should be noted that regions of Europe which achieve higher recycling rates, include in their rates all garden waste diverted away from landfill as well as composting of kitchen and food waste. As Guernsey does not allow garden waste to be collected as part of the Parish rounds, this waste is not in the waste stream to start with and hence can not be removed from the waste stream by diversion i.e. it would be impossible for Guernsey to hit the highest recycling rates quoted in Europe of approximately 70% without first increasing the waste stream by adding in garden waste. This would, of course, be nothing more than a numbers exercise and would not contribute to increasing the life of Mont Cuet.
- 10.5 If Guernsey were to achieve an ambitious household waste recycling target of 35%, then an additional 3,335 tonnes of waste would be diverted per annum, assuming that household waste production remains static. If Guernsey could also achieve a recycling rate of 35% from the commercial compactor waste stream by segregation of recyclables at source, then a further 3,100 tonnes of waste would be diverted from landfill.
- 10.6 As indicated in section 8, achieving consistent high performance, both in quality and quantity of waste diversion, requires significant capital investment in infrastructure to deliver the long-term strategy. However, as also indicated in section 8 this investment can only be committed as part of an integrated solution when the end disposal route and technology is known. As a consequence, the decision to adopt an interim strategy that relies on achieving these ambitious diversion rates must be taken with great caution. Even without the capital investment, achieving any significant increase in diversion of waste will require significant additional involvement and effort from householders and businesses along with some investment in temporary new collection systems and infrastructure. For example, it is unlikely that Guernsey could maximise the household waste recycling rate without introducing an island-wide kerbside collection system for recyclables, along with the construction of a MRF for the storage and processing of the recyclable materials collected, and construction of purpose built CA Sites, in addition to the provision of a network of bring sites.
- 10.7 As shown in the table above, 12,832 tonnes of waste were delivered to Mont Cuet Landfill Site in 2004 which had been subject to pre-segregation, either at Fontaine Vinery Waste Segregation Facility or at Island Waste Ltd's yard at

Pointes Lane (category B). It may be possible to achieve a higher diversion of this type of waste from landfill if an acceptable reuse or recycling route could be found for wood. If an extremely ambitious target of obtaining an additional 30% diversion from this waste stream was set this would result in diversion of a further 4,850 tonnes.

- 10.8 Of the 17,249 tonnes of waste delivered to Mont Cuet in 2004 which has been identified as potentially suitable for post-delivery segregation (category C), it must be accepted that not all of this waste can be recycled, composted or rendered as inert. In discussions with the Public Services Department, Island Waste Ltd. has indicated that up to 10,000 tonnes of this type of waste could be segregated at their yard at Pointes Lane with a potential diversion rate of 80%, equating to 8,000 tonnes. However, this proposal must be considered with a degree of caution as the maximum diversion rate claimed by any high-technology MBT plant is only 70% and this figure is achieved with heavy reliance on removing the organic fraction from household waste which would not be present in the waste processed by Island Waste. If such a plant were to achieve a diversion rate of 70% over the total 17,249 tonnes of waste in this category, then approximately 12,100 tonnes of waste would be diverted from landfill. It must be assumed, therefore, that in the absence of an MBT plant, the actual amount of waste that could realistically be diverted will be much less than either of these two figures. The Island Waste proposal is currently the subject of investigation by a cross-department staff level working party.
- 10.9 3,255 tonnes of waste does not lend itself to pre or post-delivery segregation because of the nature of the material (category D).
- 10.10 It can be seen that any additional diversion of waste that can be achieved beyond that which is already occurring is limited to a theoretical maximum figure of 19,300 tonnes per annum as set out below.

Waste Category	Annual Tonnage	Diversion Rate	Additional Tonnage Diverted
A - Compacted Parish	14,962	35% of total household waste (not just compacted Parish)	3,350
A - Compacted Commercial	8,907	35%	3,100
B - Already pre segregated	12,832	30%	4,850
C - Not currently pre-segregated	17,249	80% (of 10,000 tonnes)	8,000
D - Not suitable for diversion	3,255	0%	0
Total	57,205		19,300

- 10.11 **In using the above figures, a great degree of caution must be exercised. As an interim solution, the diversion rate is a theoretical maximum requiring 100% participation and success without sophisticated technology procured for the life of the long-term strategy.** As such, it should be understood that this rate of diversion is challenging in the extreme. Even if this target could be achieved, it should not be assumed that this results in an equivalent extension in the life of Mont Cuet as the diversion rates discussed above are in tonnes whilst the life of Mont Cuet is expressed through void depletion or space usage in cubic meters. Put simply, heavy items diverted from Mont Cuet, such as metal and inert waste, are dense so use up less landfill space than light, low-density materials that are not suitable for diversion. It can be seen that using tonnage figures, input to Mont Cuet could, in theory, be reduced by no more than one third and, if tonnes were directly equivalent to void space, this would result in the life of Mont Cuet being prolonged by no more than three years. This would also require this theoretical maximum diversion rate to be achieved immediately which is not a realistic assumption. This would generate a landfill closure date of 2017.
- 10.12 If a five year strategic landfill reserve is to be retained, then Guernsey would need to fully commission its long-term waste disposal solution by the end of 2012 i.e. the earliest achievable scenario in table 9.1. However, in reality, the life of Mont Cuet, even with dramatic waste diversion and minimisation initiatives, is very unlikely to last until 2017. In addition, as can be seen from section 7.4, it is very unlikely that a waste disposal system based on alternative technology could be fully operational by the end of 2012. As a consequence, adopting waste minimisation and diversion as an interim strategy whilst deferring the taking of a decision until after the results of the DEFRA New Technologies Demonstrator Programme are known at the end of 2008, must be seen as a very high risk strategy which is likely to compromise the retention of a five year strategic reserve of landfill.

11. Export as an Interim Strategy.

- 11.1 If waste minimisation pending the outcome of the DEFRA New Technologies Demonstrator Programme presents an unacceptably high-risk strategy, it is necessary to consider alternative scenarios.
- 11.2 Export of waste presents the greatest theoretical diversion rates potentially prolonging the life of Mont Cuet for many years. However, as recognised in The Report, export carries risks, particularly as a long-term strategy. Even as a short-term interim solution, export is not an obvious or easy choice. An export facility would need to be constructed. Budget costs for such a facility have been calculated by Ramboll and Babbie Fichtner as part of the Guernsey/Jersey joint EfW proposal and are extracted and attached (appendix 5). The nature of the facility has been discussed with the Regulator and it is considered that the assumptions adopted for the purposes of the report and the resulting

specification are valid. Such a facility could not be operational before late 2006 and would cost in the region of £8 million.

- 11.3 This figure could potentially be reduced significantly if export was restricted solely to compacted black bag (household type) waste and very basic plant procured, with the Regulator's approval, as an interim solution. If export is to be treated solely as an interim solution then this figure must be depreciated over the interim period. However, it could be argued that at least some of the infrastructure, for example the building envelope would have a purpose after the interim period and hence, for the purposes of costing export as an interim solution, allowance has been made for these elements and the costs calculated accordingly. Therefore, in order to obtain a more reasonable cost per tonne, the building and associated infrastructure £2,500,000 has been depreciated over 20 years whilst the export specific Mechanical and Electrical (M&E) elements £790,000 have been depreciated over the period of the export contract.
- 11.4 If Guernsey were to commit such capital investment as an interim solution, it would be necessary to put in place binding contracts with the receiving plant(s) and jurisdictions. Such contracts would need to be binding on pain of damages. However, Force Majeur clauses would be inevitable meaning that damages would not be payable if the contract and export route were terminated due to the outcome of any international challenge over the legality of the export route. In addition, to merit such capital expenditure and to provide sufficient time for the States to make a decision and procure a plant on the back of the results of the DEFRA New Technologies Demonstrator Programme, the contract would need to be binding until 2011, or, more realistically, until 2015. Whether such a contract can be procured, whilst ensuring value for money, can only be tested by tendering the disposal contract, seeking undertakings from the receiving jurisdiction by means of a long-term Duly Motivated Request (DMR) and examining the procurement options for the on island export facility.
- 11.5 These investigations would take several months to complete and would require a further report to the States, and in view of the fact that they necessitate Guernsey moving away from its international undertakings contained in the Basle Convention (see section 12 below), these investigations can only commence once a States resolution has been made to that effect. Should it be possible to secure long-term DMR agreements with the receiving jurisdiction, then at that time construction of the transfer facility could commence. It must be assumed that export could not take place prior to the start of 2007. It must also be recognised that because the shipments are reliant on the political will of the receiving jurisdiction, the contracts held with the plant operator, and the challenges that could be forthcoming from any interested party, there can be no guarantee that export can be secured for a prolonged or even given period. The capital investment in the export plant would, therefore, be a high-risk investment.

Export to Le Havre, France

- 11.6 The cost per tonne of export depends on the price quoted by the receiving plant plus taxes, transport costs, operational costs of the on island transfer facility and the capital depreciation of the transfer facility. These costs are produced in the table below. They are tabulated against the figures quoted in The Report for comparison purposes. The prices listed in the right hand column were provided during a site visit to Le Havre, (the option identified in The Report) carried out on 14 March 2005.

Cost of Export per Tonne of Waste

	The Report Non-syndicated cost per tonne (Waste spread between three plants)	The Report Syndicated cost per tonne (Opening a third line)	Environment Department cost per tonne
Transfer station depreciation	Not quoted	Not quoted	£15
Transfer station operation	Not quoted	Not quoted	£15
Shipping, including port fees	50.00 €	50.00 €	£32
French transport	22.00 €	2.12 €	5.00 €
Treating waste	90.00 €	60.00 €	80.00 €
Taxes	21.00 €	12.18 €	15.68 €
Capital cost of third line	N/A	Not quoted	N/A
Total	183.00 € / £126	124.30 € / £86	190.60 € / £ 131.50

- 11.7 During the Le Havre site visit, the Environment Department established that the operator only had a contract for ten years. By 2007, the contract life remaining would be seven years and, as a consequence, the operator could not enter into a contract with Guernsey that would provide for export of waste beyond 2014. This then limits the depreciation of the export infrastructure to a seven year period (the figure used in the table above). The plant at Le Havre was constructed during 2002 and 2003 and currently has spare capacity of 50,000 tonnes per annum. The original intention was to serve eight regions but currently only six are served. It is understood that one of the remaining regions (which produces 15,000 tonnes of waste per annum) could send its waste to the facility in the near future, reducing spare capacity to 35,000 tonnes.
- 11.8 The Department also established that the syndicate option (the middle column above) is an impractical option for the following reasons:

- The capital cost of the third line, estimated by Le Havre to be £25 million, would need to be funded by Guernsey (with or without Jersey);
- Guernsey (with or without Jersey) would have to guarantee an annual tonnage for the life of the line (a minimum of 20 years) of 90,000 tonnes per annum;
- The line (as for the whole of the Le Havre plant) **would only accept compacted black bag household type waste;**
- Guernsey and Jersey jointly does not generate 90,000 tonnes of household type waste per annum
- A long-term (20 years plus) export route carries unacceptably high risks
- The total cost per tonne would be in excess of £173 having included transfer, shipment, processing costs and taxes.

11.9 Export of waste to Le Havre, subject to obtaining the necessary DMR, could be an option for Guernsey's compacted waste (23,869 tonnes per annum) from 2007 until 2014 at a cost in the order of £131.50 per tonne. This cost is significantly higher than that quoted for the on island incinerator. The Environment Department is concerned at the costs and risks associated with this option. Should this option be chosen then assuming a transfer station could be commissioned and export commence at the start of 2007 then over the seven year contract the life of the landfill could be extended by 2.7 years.

11.10 Export to Europe as an interim solution becomes more valid if it is an essential element of the long-term disposal route, for example, future export to the joint Jersey/Guernsey facility. This option is fully detailed in the joint report commissioned by the Environment Department and Jersey's Public Services Department (appendix 6). It should be noted that export to a jointly owned facility does not appear to carry a high level of savings and the savings that might be accrued may not warrant the additional risks. It is not at all clear whether the joint solution offers both islands the best value for money. This option requires further consideration by both islands during the next few months.

11.11 If the States holds the view that an interim strategy can only be delivered by export, then there would appear to be little grounds for delay and export should commence at the earliest possible date in order to prolong the life of Mont Cuet for as long as possible

12. Export - The Legal Position.

- 12.1 Many claims have been made about the legality of export and many companies have offered to take Guernsey's waste assuming that export is legally possible. Notwithstanding the costs and risks of setting up a transfer facility, there are real legal issues that must be resolved. The legal facts are outlined in the proceeding paragraphs of this section.
- 12.2 The UK's signatory to the Basle convention has been extended to Guernsey. Guernsey has, therefore, given an international undertaking with regard to the management of its waste. Guernsey has undertaken to handle its own waste, if possible, and to do so in an environmentally safe manner. It has signed up to the principle of 'self-sufficiency'. It has also mirrored the EC waste regulation in domestic legislation thus committing to the principle of 'proximity'. Guernsey should, therefore, only export waste if it cannot deal with it itself and should then export to the nearest jurisdiction willing and able to handle that waste in an environmentally safe manner.
- 12.3 Guernsey has not, as yet, enshrined the Basel Convention into domestic legislation. As such, the principle of self-sufficiency that Guernsey has signed up to is not legally binding. It is, therefore, a matter for the States and its relationship with the UK, (in that it is the UK's signatory to the Basle Convention that has been extended to Guernsey) as to whether it abides by its international undertakings.
- 12.4 Guernsey is not in the EU. Guernsey's association with the EU through Protocol Three extends some EU legislation to Guernsey for the purposes of trade. Protocol three does not appear to encompass EU waste legislation. Therefore, for the purposes of regulating export of waste from Guernsey, the EU legislation does not come into play other than to the extent that that legislation is mirrored in domestic legislation.
- 12.5 Guernsey does have domestic legislation that regulates export of waste – The Transfrontier Shipment of Waste Ordinance 2002. That legislation requires that the export is to a Basle or European Free Trade Association (EFTA) country. Jersey is neither of these and so export of waste to Jersey would only be possible if Guernsey amended its legislation or Jersey became a Basle territory. This is contrary to the statement contained in The Report. (*para 3.10*). The legislation, which effectively mirrors the EC waste regulation, also affords the Regulator the opportunity to object to the waste shipment. Guernsey's legislation requires that export (and import) of waste is only conducted in accordance with the published plan. To date Guernsey has not published such a plan. This may, therefore, present an obstacle to the Guernsey Regulator raising an objection to a shipment of waste. The UK's equivalent plan bans the export and import of municipal solid waste for disposal. Export of waste for recovery is generally less problematical. Incineration (with or without energy recovery) is deemed to be disposal. It is, however, recognised that waste turned into RDF (the output of

some pre-process plants) can be used as a fossil fuel substitute in some boilers or other plants and such “incineration” would not be disposal.

- 12.6 For the purposes of exporting to Europe, Guernsey is considered to be a third country. Any European country contemplating accepting Guernsey’s waste must comply with the provisions of the Basle Convention and the EU Waste Shipments Directive. The receiving jurisdiction would have to satisfy itself, following discussions with the Guernsey Regulator, that Guernsey “*does not have and cannot reasonably acquire the technical capacity and the necessary facilities to dispose of its waste in an environmentally sound manner*”. It could be argued that, in that Guernsey has secured a valid tender for a plant and has accepted that tender, it could not demonstrate an inability to acquire the necessary facilities. Whether or not Guernsey could demonstrate that, in the short-term, it cannot handle its waste is open to debate but the fact that the licensed landfill site has nine years remaining life, which is ample time to procure a facility, should be pertinent. In addition, the receiving jurisdiction could only accept Guernsey’s waste if that jurisdiction’s published plan so allowed. The German published plan “*restricts the import of hazardous and other waste for disposal*”. The French published plan appears not to restrict the import of waste for disposal but in 2001 (the latest published figures) the country only authorised the import of 30 tons of “other” i.e. non hazardous waste.
- 12.7 Any decision to accept (or reject) Guernsey’s waste is open to third party challenge. In a recent case, the European Court of Justice considered the interpretation of the European legislation dealing with the supervision and control of shipments of waste within, into and out of Europe. The case concerned shipments of wood from Germany to Italy. The German competent authority objected to the shipment expressing concern at the quantities of lead and arsenic within the wood. The relevant German waste trader challenged this decision. The court held that the European legislation (Regulation 259/93) took effect and that the German competent authority could raise objections to the shipment. Whilst this case is not definitive, it serves to demonstrate that the waste brokers and processors seeking to bring about transfrontier shipments of waste are not the relevant decision makers. That role rests with the respective Country’s competent authorities.

13. Alternative Strategies

- 13.1 Proceeding with the previous States resolution to contract with Lurgi UK remains an option. The nature of the contract, plant and procurement route have been fully commented on in previous reports considered by the States and there is little the Environment Department wishes to add. However, members should be advised that during the period of The Panel’s investigations, the Environment Department worked with Lurgi UK to produce an alternative architectural concept. Whilst it was not possible to lower the height of the building without sinking substantial amounts below ground at excessive cost, Lurgi UK has

proposed a more sculptured form around a more symmetrical plant layout. The cost for this alternative proposal generates a saving of approximately £600,000 against the original tendered price once inflated in line with the contract. Lurgi UK has also indicated that a smaller capacity plant (60,000 tonnes per year) could be constructed with the new architecture at an indicative price of £68.5 million. The Environment Department has formed the view that this is not an option the States wishes to consider.

- 13.2 One of the concerns raised in The Report was that the procurement route adopted for the proposed EfW facility resulted in a lack of tenders and failed to achieve value for money. The factors driving the procurement route are addressed in section 16. It, of course, remains an option to re-tender an on island mass burn solution through a different procurement route in an attempt to demonstrate that savings can be made. However, an industry response to such a tender process should not be expected unless a firm commitment is made to move forward with the mass burn EfW option. Again, the Environment Department has formed the view that this is not an option the States wishes to consider at this juncture.
- 13.3 If Guernsey could procure its long-term sustainable waste management system in advance of DEFRA reporting the results of the New Technologies Demonstrator Programme or remove some of the uncertainty whilst waiting for the DEFRA report, then the risk of the “watching brief” strategy could, to a greater or lesser extent, be mitigated. This would require a much greater confidence in the performance of the interim waste diversion policies referred to in section 10 above and a greater confidence in the export routes. It would also require a greater knowledge of the probable alternative and emerging technology packages and the likelihood of those packages meeting Guernsey’s needs within an acceptable time frame. This is the Environment Department’s preferred strategy and is set out below.

14. Short Term Measures

- 14.1 If Guernsey is to delay taking a decision on its long-term waste disposal strategy, it is essential that it extends the life of Mont Cuét as far as possible. The extent to which interim alternative waste management practices are taken up is, therefore, of importance. This information may also be of value when specifying the final disposal facilities, as the extent of waste diversion away from final disposal will impact on the character, as well as the quantity, of the waste for disposal. The Department recognises that a great deal of work has previously been done on waste arisings and projections involving many different consultants. However, The Report has cast doubt over the previous findings based primarily on an economic impact assessment of the proposed EfW facility carried out by the Commerce and Employment Department in September 2004 (see appendix 7). Whilst the Environment Department considered this assessment to be flawed in a number of respects and submitted a response to The Panel (see appendix 8), the Panel was of the view that it should not be lightly

discounted. The Environment Department does recognise that much of the previous work is now some years old and the Department recognises the fundamental importance of accurate data in this area.

14.2 The Environment Department proposes the following short-term interim measures as part of a short-term strategy to prolong the life of Mont Cuet:

- Run a proactive PR campaign to promote waste minimisation and recycling.
- Improve the coverage of recycling sites around the Island.
- Provide cardboard recycling banks at the most popular recycling sites alongside the well-recognised glass and can banks.
- Provide recycling facilities at schools, etc.
- Pilot waste electronic and electrical equipment recycling banks in partnership with the private sector.
- Explore, as a matter of urgency, the on island use of glass as inert fill or aggregate substitute.
- Explore with all Parishes the early piloting of low technology based kerbside recycling collection schemes as a precursor to a permanent kerbside recycling scheme introduced as part of the long-term solution.
- Through the Chamber of Commerce and direct, seek to persuade commercial premises to improve source segregation of recyclables.
- Through discussions with the private sector, seek to facilitate waste specific collection rounds for recyclables from commercial premises.
- In liaison with the Public Services Department, further increase landfill gate fees.
- In liaison with the Public Services Department and the private sector, pilot the segregation of clean, untreated wood for reuse/recycling.
- In liaison with the Public Services Department and the private sector, pilot the diversion of mixed waste from Mont Cuet to waste sorting facilities for segregation.
- Investigate the commissioning of an in-vessel composting plant for green waste.

- Investigate the commissioning of CA sites.

- 14.3 Estimated costs and potential waste diversion targets in respect of the above initiatives are set out in the table on the following pages. It should be noted that the costs provided in the table are, at this stage, only rough estimates. The Department will return to the States as necessary with detailed proposals for specific initiatives (for example, the in-vessel composting plant and CA sites) where the associated resource implications in terms of capital, revenue or staff exceed those available to the Department. It must be noted that these short-term measures move away from the previous States decision in support of economically justifiable recycling in favour of promoting recycling on social grounds.
- 14.4 The Department has considered the option of commencing plastic PET bottle recycling as an interim initiative. If Guernsey was benchmarked against the better UK authorities, it could expect to collect approximately 225 tonnes of bottles per annum, which is equivalent to 0.4% of the island's putrescible waste stream. 225 tonnes is equivalent to 4,500,000 bottles or 6,400 full eurobin movements per annum (20.5 bins per day). In addition, to spike and bale the bottles for export requires capital equipment in the order of £30,000. The Department does not believe this level of resource expenditure is justifiable as an interim measure to divert 225 tonnes of waste that can, otherwise, readily be crushed at the landfill site.
- 14.5 In addition to the practical waste minimisation measures described in the table overleaf, the Department will commission consultants to carry out a further waste audit with a view to categorising waste types and quantities and applying reasonable projections on future diversion, recycling and growth, in order that this most up to date data can be used to specify the future waste treatment facilities and set short and longer term targets for waste management.
- 14.6 In addition to the waste minimisation and auditing initiatives outlined above, the Department will, with support offered by DEFRA, seek to acquire a greater knowledge of the probable alternative and emerging technology packages and the likelihood of those packages meeting Guernsey's needs within an acceptable time frame. This proposal is explained in full below.

Estimated Resource Requirements of Proposed Interim Measures

Interim Measure	Estimated Capital	Estimated Cost	Tonnage Diversion Target
PR campaign to promote waste minimisation and recycling	Nil	£25,000 p.a	Refer to comments below.
<p><i>Comments: The role of the PR campaign will be to inform and educate the public and businesses about waste minimisation and recycling initiatives available on the Island and the importance of diverting waste from landfill. The campaign will help to ensure that existing initiatives and the proposed interim measures are widely adopted and perform to the best possible standards.</i></p>			
Improve the coverage of recycling sites around the Island	£6,250	£150/t	40 t.p.a
<p><i>Comments: 3,634 tonnes of recyclable material (paper, glass bottles and jars, steel and aluminium cans) were collected through the 'bring scheme' during 2004. The Island is currently well served by the existing network of 36 recycling sites with 89% of dwellings within 1 km of their nearest site, however, there is scope to improve accessibility of recycling sites in densely populated areas and in some rural areas to ensure convenience for householders. It should be noted that this is unlikely to generate a significant increase in the amount of recyclables collected as approximately 80% of materials are collected at the top ten sites. Therefore, it appears that the proximity to people's homes is not the driving factor but rather the convenience of the location in relation to other activities (shopping, etc).</i></p>			
Provide cardboard recycling banks at the most popular recycling sites	£8,000	£50/t	500 t.p.a
<p><i>Comments: Provision of bins at the top eight paper collection sites. Tonnage diversion target is an estimate based on household waste composition analysis.</i></p>			

Provide recycling facilities at schools, etc	£3,000	£50/t for baling and export plus estimated annual collection charges of £4,000	50 t.p.a
<i>Comments: Schools taking part in the Healthy Schools Programme are discouraging fizzy drinks so recycling efforts should concentrate on paper and cardboard, as opposed to aluminium and steel can recycling.</i>			
Pilot Waste Electrical and Electronic Equipment (WEEE) recycling banks	Nil	£43/t delivered to recycling company. Assumed additional 400t of WEEE will be collected per annum	120 t.p.a
<i>Comments: Integrated Skills Ltd., the consultants that advised during the preparation of the draft WMP, estimated that 1,130 tonnes of WEEE was generated in 2001. Inflating this quantity using growth forecasts from the EU would give a current estimate of WEEE production of 1,800 tonnes per annum. Some of this WEEE is already being recycled. White goods such as fridges, freezers, washing machines, dishwashers, cookers, etc are segregated at Mont Cuet Landfill Site and Fontaine Vinery Waste Segregation Facility and account for a proportion of the 1,161 tonnes of metal diverted from landfill at States operated facilities in 2004. However, IT equipment, audio-visual equipment and small household electrical goods such as toasters, kettles, power tools, etc are currently not recycled locally to any great extent.</i> <i>Under the proposed pilot scheme, suitable receptacles would be provided at Mont Cuet and at a few other selected recycling sites. A local recycling company has indicated that it could recover most of the 10% to 40% mixed metallic content in WEEE following fragmentation. A generous average metallic content of 30% has been assumed to calculate the tonnage diversion target of 120 tonnes. The residue would be landfilled.</i>			

Explore on island use of glass as inert fill or aggregate substitute	Nil	Plate glass - estimated saving of £50/t Bottle glass - estimated saving of £47/t Based on 2004 quantities, this would equate to a saving of approximately £70,000 p.a	No additional diversion from landfill as glass is currently reprocessed in the UK
<i>Comments: The above cost savings assume that the glass will be used for land reclamation at Longue Hougue and that no decontamination will be necessary. Plate glass will not require decontamination prior to disposal at Longue Hougue but bottle glass may need to undergo pre-treatment such as screening, washing, magnetic and eddy current separation to remove food particles, paper labels, bottle tops, corks, etc. This may not be economic at small scale. Laboratory tests will have to be carried out on crushed bottle glass to establish if the organic fraction is acceptably low to allow disposal at Longue Hougue. Use of crushed glass as an aggregate substitute is preferred and will be investigated in consultation with the private sector.</i>			
Pilot kerbside collection of household recyclable materials	Not less than £150,000	Estimated net cost (profit) per tonne of processing/shipping the additional recyclables collected: Glass - £63.50 (if exported as at present) Paper - £50.00 Textiles - £0 Steel cans- (£2.00) Aluminium cans – (£590.00) Estimated total cost of processing /shipping an additional 3,335 tonnes of recyclables (based on 2004 proportions) = £155,000	Increase of approx 56kg per capita per year above current recycling rate of 69kg per capita. Theoretical maximum increase of 3,335 tonnes of recyclables if trial encompassed whole Island and an ambitious recycling rate of 35% was achieved.
<i>Comments: It is suggested that a reasonable budget for a pilot scheme would be not less than £150,000. Additional costs will be incurred in processing and shipping the collected material.</i>			

In 2004, 4,128 tonnes of household waste was recycled through the 'bring scheme' and at the informal CA site at Mont Cuet, equating to a household waste recycling rate of 19.4%. On average, 69kg of household waste was recycled per capita in 2004. If kerbside collection increased this rate to 35% (see section 10.4) a total of 125kg per capita would be collected (assuming that household waste production remains static), an increase of 56kg above current levels. Actual performance of the scheme will be dependant on the materials collected, the manner in which they are collected and the level of participation.

Collection of recyclable materials from commercial premises	Nil	Nil	Assuming a recycling rate of 35%, 3,100 tonnes would be diverted
<i>Comments: The cost of commercial waste collection and disposal is borne by businesses themselves and therefore any costs or saving realised by separating commercial waste would be borne by those businesses. The recycling rate achieved by any such scheme would be entirely dependant on the level and extent of participation.</i>			
Pilot wood chipping scheme – woody horticultural	£8,000 to purchase a shredder. Alternatively, this could be hired.	£10,000 p.a.	850 t.p.a
<i>Comments: A wood chipping scheme for woody horticultural waste would create 850t of wood chips but there is not a clear market for this amount of material. It is likely that a chipping operation would be tendered in conjunction with the in vessel composting facility as the input to the composting facility would require shredding and the opportunity of using wood chip as a compost feedstock.</i>			
<i>There may also be the opportunity to divert untreated timber for reuse/recycling. Potential markets will need to be investigated and facilities specified accordingly.</i>			
In-vessel composting facility for garden and horticultural waste	£700,000	£35/t gate fee, 6,000 t.p.a	2,400 t.p.a

15. Developing Confidence - Working with The Department of the Environment, Food and Rural Affairs (DEFRA)

15.1 During February 2005, discussions were held with DEFRA in order to better understand the nature of DEFRA's Waste Implementation Programme (WIP) and the extent to which DEFRA might assist Guernsey's decision making process.

15.2 WIP is DEFRA's response to the package of strategic measures recommended by the Strategy Unit report 'Waste Not Want Not' published in November 2002, and the Government's Official Response. The remit of the Strategy Unit was to consider action to be taken to help the UK to meet the legally binding targets under Article Five of the EU Landfill Directive. The Strategy Unit's report to the Government recommended a number of economic and regulatory changes, strategic investment measures, and funding and delivery structures to address these challenges. Building on the Strategy Unit's recommendations, WIP's programmes combine to drive waste management solutions up the waste hierarchy, improving the sustainability of waste management. The eight WIP programmes are:

- i. Local Authority Support
- ii. Local Authority Funding
- iii. New Technologies
- iv. Data
- v. Research
- vi. Waste Minimisation
- vii. Kerbside
- viii. Waste Awareness

15.3 As a result of those discussions DEFRA has offered Guernsey the services of DEFRA's independent consultants in the same way that any other local authority would be able to use those services. DEFRA consultants would be willing to work alongside the Environment Department to examine the nature of the island's waste stream, consider the extent to which waste can be diverted away from end treatment as part of a long-term strategy, identify the types of plant required to deliver those diversion rates, examine the nature of the remaining waste and identify possible packages of treatment plant. DEFRA would also provide access to its database of treatment processes and manufacturers providing unbiased facts and figures to assist the decision process. In addition, DEFRA consultants would be willing to accompany Guernsey on any necessary site visits. This work, carried out alongside further investigation into the Jersey/Guernsey joint facility option, the practical recycling and waste minimisation measures described above, as well as a re-audit of waste arisings

and future projections assessed in light of the DEFRA advice, should provide the Department and the States with a definitive view on the possible options for moving forward and the pros and cons of those options.

- 15.4 Whilst the Department recognises that the States has been saturated with reports on Waste Management over the last decade and whilst the Department recognises that the expectation was that The Report would present the States with an assessment of the options through which a decision on the long-term solution could be taken, the reality is that the Report does not contain the facts and figures, scheduling, arguments and justifications on which a long-term decision can be taken. The Panel's proposal is, in many respects, equal in risk and greater in uncertainty than the previous States supported Lurgi UK contract option.
- 15.5 The Department does not have enough confidence in the time frame proposed by The Panel, nor the potential to extend the life of Mont Cuet, to support The Panel's proposal to wait until 2008. Neither does the Department have enough confidence in the reliability of the export route to recommend the required capital investment to support export as either a long or short-term strategy. Finally, the Department is not yet convinced that the Jersey/Guernsey joint option will provide best value for money with least risk over the long-term. Whilst the Department is most reluctant to recommend further delay whilst further investigation is carried out, there appears to be little consensus over the facts and even less consensus over the expectations of what the future may hold. As a consequence, further investigation supported by DEFRA's independent consultants appears to be the only justifiable recommendation that can be made.

16. Procurement Route

- 16.1 The Report criticises the procurement route adopted by the States in respect of the Lurgi UK EfW facility and argues in favour of a solutions based contract where waste operators are invited to tender for the management of Guernsey's waste with the freedom to select the methods of treatment within broad guidelines. The Report also recommends that the contract should be based on the tenderer funding the capital investment. However, these proposals ignore a number of key facts.
- 16.2 At the time of selecting the design, build and two year operate (DB2O) procurement route, Guernsey had no mechanism for regulating the waste management activities of the private sector. As such, all emissions standards, operating practices, etc, would have had to be covered by the contract rather than by applying evidence based performance standards under the more typical Integrated Pollution, Prevention and Control (IPPC) regulatory mechanism. This situation is soon to be addressed but at present remains the case.
- 16.3 Secondly, at the time of selecting the DB2O contract, Guernsey was in the process of commercialising the Electricity Board. However, the full Regulation

of Utilities was not in place and there were no means by which the sale of electricity generated from the plant could be guaranteed and hence a key income stream identified.

- 16.4 Thirdly, Guernsey had no hazardous waste site and no guaranteed disposal route for the plant ash against which disposal costs could be set and included within the contract. This remains the case today. In addition, Government had not, and has yet to, consider the issue of privatisation of strategically essential facilities (other than the rather controversial commercialisation of the utilities).
- 16.5 Finally, and most importantly, government does not own any waste and is, therefore, not in a position to tender a privately funded waste disposal contract. For any company to commit millions of pounds of capital investment in a waste management plant, that company will need comfort in knowing that it has a guaranteed income from a reliable tonnage of waste at the tendered gate fee. It will also require known electricity sale revenues and known residue disposal routes. In the UK, local authorities tender integrated contracts in respect of the household waste that they own as a result of the collection service that they operate and charge for under the Council Taxes. It is not common practice, and indeed the Department is unaware of any case, where a local authority has tendered a privately financed contract which is heavily reliant on income from commercial waste not in the ownership of the local authority. In Guernsey, less than one third of the waste requiring treatment could potentially be brought under the control of government in order to tender such a contract.
- 16.6 The Department recognises that it is possible to structure a regime by which private finance could be used to support a commercialised waste disposal facility. These controls would, in all probability, include a combination of the following: a monopolies law, a regulator of waste (mirroring the utilities regulator), and/or sole trader legislation restricting the setting up of direct or indirect competitors operating against the privatised integrated facility.

17. Ancillary Issues

- 17.1 As a result of previous States resolutions, a number of work streams were commenced in order to facilitate the construction of the proposed EfW facility. Those work streams have resulted in sunk and ongoing costs which must be addressed if the States elects not to proceed with the Lurgi UK contract.
- 17.2 As part of the Environmental Impact Assessment compliance requirements, an air pollution monitoring station was set up at Bulwer Avenue at a cost of £48,114. This facility and the records generated by it are unlikely to be required unless the long-term strategy, adopted by the States, involves some form of incineration. The cost of reagents to run the facility equates to £25.50 per month. In view of the fact that the long-term strategy could involve incineration, the Department is of the view that the operation of this monitoring station should continue.

- 17.3 As enabling works for the construction of the EfW facility, water drainage and electricity connections were provided at Longue Hougue. The monthly standing charges are £30. Again, the Department is of the view that, pending a decision on the long-term strategy, these facilities should not be disconnected.
- 17.4 Funding in respect of the design and other associated work for the EfW facility was provided for under a loan from the States Treasury attracting daily interest payable monthly at the States Treasurer's interest rate. The loan currently stands at £4,000,000 and interest accumulates at approximately £14,000/month. This loan is offset by the additional £25 per tonne charged at Mont Cuet since January 2005. Assuming there is no significant change in the amount of waste landfilled at Mont Cuet or in interest rates, the loan could be repaid within four years.

The States has the following options with respect to this loan:

- To write off the loan
- To move the loan to a suspense account pending a decision on the long term strategy
- To continue to service the loan through the additional income accruing at Mont Cuet.

In consultation with the Treasury and Resources Department it has been agreed that, for the present, service of the loan should continue as at present but that this should be reviewed in the near future.

- 17.5 In order to accommodate the fly ash arisings from the facility along with other hazardous waste, it was intended to commission an Environmental Impact Assessment to identify and evaluate potential hazardous waste sites. This information would have been valuable evidence had it been necessary to demonstrate to the UK that Guernsey could not deal with its own hazardous waste. The Department is of the view that these works can be put on hold pending the decision on the long-term strategy.
- 17.6 Work had progressed on preparing a WMP seeking to implement the previous strategy of the States. As indicated in section 8 above, some areas of this Plan will need to be reassessed and re-specified if the decision is taken to move forward with a non-incineration based treatment facility. However, elements of the Plan could potentially be discussed in advance of a decision on the long-term strategy. These include funding mechanisms and the extent to which the polluter pays principle should apply, procurement routes and the privatisation option, as well as monopoly regulation mechanisms, ownership of waste and hence the ability to guarantee income streams to private funders. The Department will identify those elements of the WMP that it feels can be debated

in advance of a decision on the long-term strategy and will report back to the States on these issues.

18. Resources

- 18.1 The Department is satisfied that the existing team, including support from Guernsey Technical Services, will be able to work with DEFRA consultants in order to carry out the work streams as described in section 15 above.
- 18.2 The Department is also satisfied that the existing team, supported by DEFRA consultants, will be able to specify and oversee the brief to review existing and predicted waste arisings as set out in paragraph 14.5 above
- 18.3 However, the Department estimates that to fund these two work streams provision should be made for a budget of £250,000. The Department's current budget allocation is already severely stretched and the Department is currently using unspent revenue balances to deliver all its services. The Department had not foreseen the need to further investigate these waste management issues and has not therefore set aside the necessary budgets.
- 18.4 If the Department is to introduce, in any meaningful way and over a very short time period, the waste minimisation and reduction measures identified in section 14, additional resources will be required in terms of staff, revenue and capital. The Department believes that it is necessary to appoint, on a three year contract, an officer with relevant experience and qualifications. The Department proposes that this post would initially be a supernumerary post requiring, if an officer has to be recruited from off island, an additional annual revenue budget of up to £55,000 to cover salary, employer's contributions and all disbursements.
- 18.5 In addition to this establishment, it can be seen from the table in section 14 that additional annual revenue will be required, however, if savings can be made by utilising crushed glass on island rather than exporting glass for reprocessing in the UK, a significant proportion of the interim measures detailed in the table in section 14 could be funded without an increase in revenue budgets. It can be seen that potential capital expenditure of up to £175,000 would be required in order to implement the interim measures detailed in the table, excluding procurement of a composting facility and CA site which would need to be the subject of a separate report(s) to the States.

19. Summary

- 19.1 The States appointed the independent Panel of Inquiry, chaired by Advocate Dadd, to review the waste strategy adopted by the States and examine options for the future management of the island's solid waste. The Panel found against proceeding with the contract with Lurgi UK but did not investigate an alternative strategy in sufficient detail, identifying all the logistical, cost and risk

issues, such that the States could vote in favour of that strategy fully aware of the associated implications.

- 19.2 In the short time afforded to the Department to review the Panel's report and prepare a States report for consideration by the Policy Council, it has not been possible to explore in sufficient detail any of the potential schemes put forward by the Panel. It should be borne in mind that the States took over three years to arrive at the Solid Waste Strategy approved in 1998, nearly two years to conduct an Environmental Impact Assessment in respect of that strategy and nearly two years to specify tender and negotiate a contract for the proposed EfW facility. Against this history, arriving at a fully appraised revised strategy within two months of the Panel's six month work period is clearly an unreasonable expectation.
- 19.3 The Panel considered that moving ahead with the Lurgi UK contract exposed the States to too great a risk. Conversely, the Department believes that the potential solutions presented by the Panel carry their own very significant risks and, with the current state of knowledge, the Department cannot recommend that the States supports any of the long-term disposal routes at this time.
- 19.4 The Panel recognises, and the Department agrees, that the alternative technologies are not yet at a stage that they can be relied on to meet Guernsey's waste disposal needs. The Panel recommends joining with Jersey or waiting until 2008 to make a decision. However, the Panel identifies the need to retain a five year strategic reserve of landfill. The Panel does not identify how this reserve can be secured whilst waiting for the outcome of the DEFRA programmes other than by interim export. However, the Panel has not fully costed the interim export option or fully identified the risks.
- 19.5 The Department does not yet have enough confidence in export as an interim solution to be able to recommend it to the States nor does it have confidence in the ability to prolong the life of the landfill site for the necessary time period.
- 19.6 In order to be able to advise the States, the Department wishes:
- to explore the export option further by seeking DMRs with France and Germany;
 - to explore further the option of joining with Jersey either with a joint plant located in Jersey or through separate plants but with the same technology supplier;
 - to appoint consultants to re-audit waste arisings and predict future waste arisings;
 - to initiate a number of pilot and interim waste minimisation and recycling measures;

- to work with DEFRA to explore the suitability of alternative technology packages/solutions to the traditional roller grate mass burn technology;

19.7 Significant additional work is required before a decision on the way forward can be taken. The Department believes that the only way the States can have confidence in the outputs of the necessary work streams is to carry them out in partnership with DEFRA appointed independent consultants.

20. Recommendations

The Department recommends the States:

- i.) to direct the Environment Department, in consultation with the UK Department for Constitutional Affairs, to seek agreement to Duly Motivated Requests submitted to France and Germany for the export of municipal solid waste;
- ii.) to agree not to wait until 2008 to determine a long-term waste management strategy;
- iii.) to agree to continue to investigate the potential of working jointly with Jersey as set out in paragraph 11.10 and report back to the States at the earliest opportunity;
- iv.) to authorise the Environment Department, in liaison with the Treasury and Resources Department, to appoint new independent consultants to carry out waste audits and predict future waste arisings as set out in paragraph 14.5;
- v.) to authorise the Environment Department, in liaison with the Treasury and Resources Department, to work with DEFRA's independent consultants as set out in paragraph 14.6 and report back to the States at the earliest opportunity;
- vi.) to agree that air pollution monitoring should continue at Longue Hougue pending a decision on the long-term waste disposal strategy and that all associated costs and utilities standing charges continue to be raised against the EfW loan facility;
- vii.) to agree that the Environment Department should pursue those interim waste minimisation and recycling initiatives set out in section 14;
- viii.) to direct the Treasury and Resources Department to authorise the Department to appoint, on a three year contract, additional resources as set out in paragraph 18.4;

- ix.) to direct the Treasury and Resources Department to take account of the revenue and additional staff costs, of introducing interim waste minimisation and recycling initiatives, as set out in section 18 and to increase the Department's budget accordingly;
- x.) to direct the Department to report back to the States on those areas of the Waste Management Plan that could be resolved in advance of the decision on the long-term strategy, as set out in paragraph 17.6;
- xi.) to direct the Department to explore, as a matter of urgency, the procurement and funding options for a green waste composting facility and CA sites and to report back to the States at the earliest opportunity.

Yours faithfully

B M Flouquet
Minister

Glossary of Abbreviations

CA Site	Civic Amenity Site
DB2O	Design, Build and Two-Year Operate Contract
DEFRA	Department of the Environment, Food and Rural Affairs
DMR	Duly Motivated Request
EFTA	European Free Trade Association
EfW	Energy from Waste
IPPC	Integrated Pollution Prevention and Control
M&E	Mechanical and Electrical
MBT	Mechanical Biological Treatment
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
PET	Polyethylene Terephthalate
PR	Public Relations
RDF	Refuse Derived Fuel
WEEE	Waste Electrical and Electronic Equipment
WIP	(DEFRA's) Waste Implementation Programme
WMP	Waste Management Plan
WSA1	Waste Strategy Assessment Report – Liquid Waste
WSA2	Waste Strategy Assessment Report – Solid Waste

Appendix 1

WASTE MANAGEMENT PLAN
DRAFT v7 – September 2004

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Glossary

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- A Summary of EU environmental/waste management legislation

Abbreviations

1. INTRODUCTION

1.1 Background

In 1994, the States resolved:

To carry out a comprehensive assessment of the Island's most appropriate future strategy for the disposal of all island waste.

Known as the Waste Strategy Assessment, this project recommended sustainable solid and liquid waste management strategies. The core requirement for the solid waste strategy was the need to prolong the life of the island's sole remaining landfill site, located at Mont Cuet. An integrated strategy of waste reuse, minimisation, recycling and volume reduction by energy from waste treatment was recommended as the method for meeting this requirement

The strategy was debated and approved by the States on 24 June 1998. Amongst the resolutions was a requirement to produce a document giving a detailed statement on the implementation of the new strategy:

To direct the States Board of Administration to prepare a Waste Disposal Plan, based on the content and recommendations of that Report [The Waste Strategy Assessment Report No. 2].

Following approval on 15 May 2002 to procure an Energy from Waste plant, the States also resolved:

To direct the States Board of Administration to report back to the States within twelve months on proposals for a long term Waste Management Plan including any proposals for an integrated waste management contract as set out in section 15 of this report.

Furthermore, the Environmental Pollution (Guernsey) Law, 2004, requires the Waste Disposal Authority to prepare a 'Waste Disposal Plan' describing quantities of waste and appropriate disposal methods.

The Waste Management Plan (WMP) has been prepared by the Environment Department and earlier work by the Board of Administration, based upon technical advice from Guernsey Technical Services and Integrated Skills (Guernsey) Ltd. The Board consulted extensively on the interim findings of the research and wishes to express its gratitude to all those who gave their time to participate in consultation.

1.2 Purpose and Scope of the Plan

The 'mission statement' of the Plan is:

“To provide for effective and efficient, sustainable waste management in Guernsey which has regard for environmental and economic costs and benefits, and minimises nuisance and risks to public health.”

In order to accomplish this, the scope of the investigations and recommendations of the WMP are to:

- identify and quantify current waste arisings, past and future trends, and projections during the life of the Plan;
- categorise the waste arisings into specified waste streams and to quantify those waste streams;
- identify options to minimise waste arisings;
- identify appropriate waste management options (e.g. reuse, recycling, disposal) for the various waste categories, taking into account legal, financial and environmental considerations;
- In respect of waste for disposal, to identify the appropriate disposal routes;
- identify and quantify the resultant resource requirements (land, labour, capital);
- identify associated procurement options in respect of infrastructure and services including the extent of integration of services/contracts;
- Where appropriate, to consider the application of targets;
- clarify the role of government (e.g. service provider, procurer or facilitator);
- identify charging structures/fiscal policies and legislative requirements in support of the Plan;
- consider contract/service level agreement structures to support implementation of the Plan;
- set an implementation programme.

1.3 Key Principles

The WMP has been drafted with due regard for the following well-established waste management principles:

- Proximity (waste should be dealt with as near as possible to its source);
- Best Practical Environmental Option (the option which provides the least damage to the environment as a whole at an acceptable cost);
- Polluter Pays (or alternatively ‘User Pays’, whereby those who make use of waste management facilities should pay for the service. The intention is that people and organisations that directly bear the cost of waste management will be inclined to create less waste.);
- Sustainability (the means of dealing with wastes should not negatively impact upon the next generation of islanders, ie the WMP should have a 25 year planning period).

1.4 Legislative Framework

Existing Guernsey legislation relating to waste management comprises:

- The Loi Relative à la Santé Publique, 1934 and its 1936 Ordinance;
- The Refuse Disposal Ordinance, 1959 and its Amendments and Orders of 1963 and 1964 respectively; and
- The Parochial Collection of Refuse (Guernsey) Law 1958, as amended;
- The Trans-frontier Shipment of Waste Ordinance, 2002.
- The Environmental Pollution (Guernsey) Law, 2004;
- The Land Planning and Development (Guernsey) Law, 2003.

The future legislative arrangements are described in section 4.1.

1.5 The Need for Change

Although current waste management practices are appropriate in that the island does not suffer from widespread fly-tipping or pollution of its natural resources, the existing policy and practices are nonetheless unsustainable by leaving the island reliant upon a dwindling capacity of landfill for waste disposal. Current projections suggest that Mont Cuet will be completely full around the year 2013. Beyond this date no other site has been identified for putrescible waste landfilling owing to competition with other land uses. The only remaining major quarry on the island which may be suitable is at Les Vardes and, in 1998, the States passed a resolution that it would not be used for landfilling after stone extraction has finished.

Landfilling untreated waste is also contrary to contemporary waste management practices as described in EU legislation. According to the Landfill Directive, some form of pre-treatment is necessary before waste may be landfilled, options include manual segregation of recyclable materials, composting and incineration for energy recovery.

Landfill capacity is of vital importance to the island because, irrespective of the choice of waste treatment technology or the extent of recycling, some residue will always require disposal. (Note that the export of waste is both prohibitively expensive and heavily regulated under the Basel Convention and European legislation concerning the transfrontier shipment of waste. Even if Guernsey wished to export its waste it could not be accepted by the destination country.)

Therefore a key objective of the WMP is to prolong the life of Mont Cuet, this and further objectives are described in section 3.1.

The WMP sets out technical and operational actions in section 5.0, a complementary set of resource implications are given in section 6.0, and allocation of roles in section 7.0.

2. WASTES AND WASTES MANAGEMENT – CURRENT STATUS

2.1 Key Stakeholders

The stakeholders currently involved in waste management have been set out below according to their role:

Waste Regulator

The Waste Regulator is the States of Guernsey Office of the Director of Environmental Health and Pollution Regulation

Waste Disposal Authority

The Waste Disposal Authority is the States of Guernsey Environment Department

Waste Operators

Waste Operators providing services in the public sector are:

- The parish Douzaines are responsible for collecting rates to fund the collection and disposal of domestic (“dustbin” or “black bag”) waste. The Douzaines also issue tenders and appoint refuse collection contractors.
- Household Waste Collection Operators (under 10 separate Parish contracts)
- Public Services Department – Landfill site management at Mont Cuet and Longue Hougue, green waste disposal at Chouet.
- Environment Department - bulk refuse service management, recycling scheme for glass, cans, and paper
- Guernsey Technical Services – Landfill engineering and monitoring
- States Works Department (under contract to the Public Services Department and Environment Department, and two of the parishes) – Operation of Fontaine Vinery Waste Segregation Facility, bulk refuse collection service, household waste collection, street cleansing, sewer cleansing and coastal detritus collection
- Commerce and Employment Department - Hazardous waste collection and disposal
- Health and Social Services Department - Clinical waste collection and disposal

Specialist private sector and charitable operators providing recycling services:

- Ronez – Crushing of construction waste to produce aggregate substitute
- Guernsey Recycling (1996) Ltd. – Metals, batteries
- Mayside Reclamation Ltd. – Paper and cardboard
- St Peter Port Services Ltd. - Oils and batteries
- Fuel Supplies (CI) Ltd. - Petrol
- Sarnia Autos Ltd. – Tyres
- Scrap-it - Waste Electrical and Electronic Equipment (WEEE)
- Salvation Army - Textiles

In addition, there are numerous waste hauliers which collect industrial, commercial and bulky household wastes.

2.2 Waste Streams and Indicative Quantities of Waste Arisings

A variety of sources were used to quantify the production of waste in Guernsey. Within the limitations of recorded information and based upon experience in similar communities the following indicative waste arisings were used as the basis for projecting future quantities and trends, and evaluating the efficacy of various waste management options.

2001 Waste Arisings in Guernsey	Quantity (tonnes pa)
Household	
Mixed domestic refuse	20,000
Recycling Banks:	
Paper	1,875
Glass	1,050
Aluminium	25
Steel	100
Textiles	225
Garden	1,000
Bulk Refuse	260
Commercial	
Mixed	900
Separated paper for recycling	2,080
Non-hazardous Industrial	
Mixed	30,000
Separated metals	6,750
Electrical and Electronic	1,000
Hazardous Industrial	
Batteries	50
Oils	1,000
Fluorescent tubes	2
Asbestos	375
Other hazardous	66
Healthcare	
Hospital	300
Other Healthcare	100
Agricultural/Horticultural	
Abattoir	350
Animal manure	6,000
Plastics	20
Horticultural	6,000
Construction & Demolition¹	
Inert	127,000
Mixed	40,000

2001 Waste Arisings in Guernsey	Quantity (tonnes pa)
End of Life Vehicles (ELVs)	2,000 (number of vehicles)
Tyres	300
Water Treatment Sludge	364

Table 2.1 Waste Arisings in 2001

¹Although the WMP is based on 2001 waste arisings data, the Plan takes into account the enormous increase in the volume of construction and demolition waste generated since this time.

Detailed analyses of the composition of domestic and commercial refuse were also undertaken. This enabled the scope for separating recyclable material to be determined.

2.3 Future Waste Arisings

The quantity of waste produced by a community is strongly linked to population and Gross Domestic Product (GDP) and other factors such as:

- household size (the number of people per dwelling is declining and this increases waste production per capita);
- changes in economic sectors (e.g. growth in the construction industry resulting in the production of larger volumes of waste);
- the effect of waste management practices such as reduction at source.

Forecasting has focused upon the most significant waste streams in terms of quantity, which, as seen from section 2.2, are Household, Construction and Demolition (inert), Commercial and Non-hazardous Industrial waste.

With regard to construction and demolition, waste production is highly volatile and it is considered reasonable to assume that the recent unprecedented levels of growth in this sector will not continue over the lifespan of the WMP. (The cyclical nature of the construction industry as described in the May 2003 Board of Industry report entitled, "Guernsey Capital Spending Programme and the Construction Industry" is noted. The cycle of growth and contraction described in the report occurs over a shorter time span than the Planning Period of the WMP. Therefore the estimate of long term growth in this waste stream is considered to be reasonable.)

Taking the above into account, annual waste growth rates were forecasted and are outlined in the table below:

Waste stream	Annual Growth rate*
Household	2.25% (2.75%)
Commercial/Industrial	1.65% (2.75%)
Construction and Demolition	-3% (0%)
Healthcare	0.2%
ELVs & tyres	0.2%
Water & waste water sludge	0.2%
Agricultural & Horticultural	-1% (0%)

Table 2.2 Projected growth rates in waste streams

* Figures after 10 years (shown in brackets), reflect the finite effect of waste reduction measures introduced in the early years of implementing the WMP.

Notes:

The prediction for construction and demolition wastes should be taken into consideration with the paragraph preceding the table. Similarly, ELV disposal has grown markedly in recent years but this growth is not anticipated to continue in the long term.

Water and waste water sludge will show an increase with the commissioning of a waste water treatment plant, however at the time of writing provision of such a facility is unlikely to occur within the next 5 years. When waste water treatment sludge is produced, it will result in a step increase of waste arisings by 1100 tonnes after which further increases are forecast to continue at an annual rate of 0.2%.

The effect of these annual growth rates over a number of years is illustrated by the table below.

Waste stream	2001 arisings	+10yrs (2011)	+25yrs (2026)
Household	24535	30649	46041
Commercial/Industrial	40730	47972	72064
Construction and Demolition	167000	123150	123150
Healthcare	400	408	420
ELVs & tyres	2300	2346	2418
Water & waste water sludge	364	371	383
Agricultural & Horticultural	12370	11187	11187

Table 2.3 Projected waste arisings

The most notable observation from this table is that the two waste streams which exhibit the greatest increase; household and commercial/industrial are those which largely require incineration. The implications for accommodating increasing waste quantities at the energy from waste plant are discussed further in section 3.1.

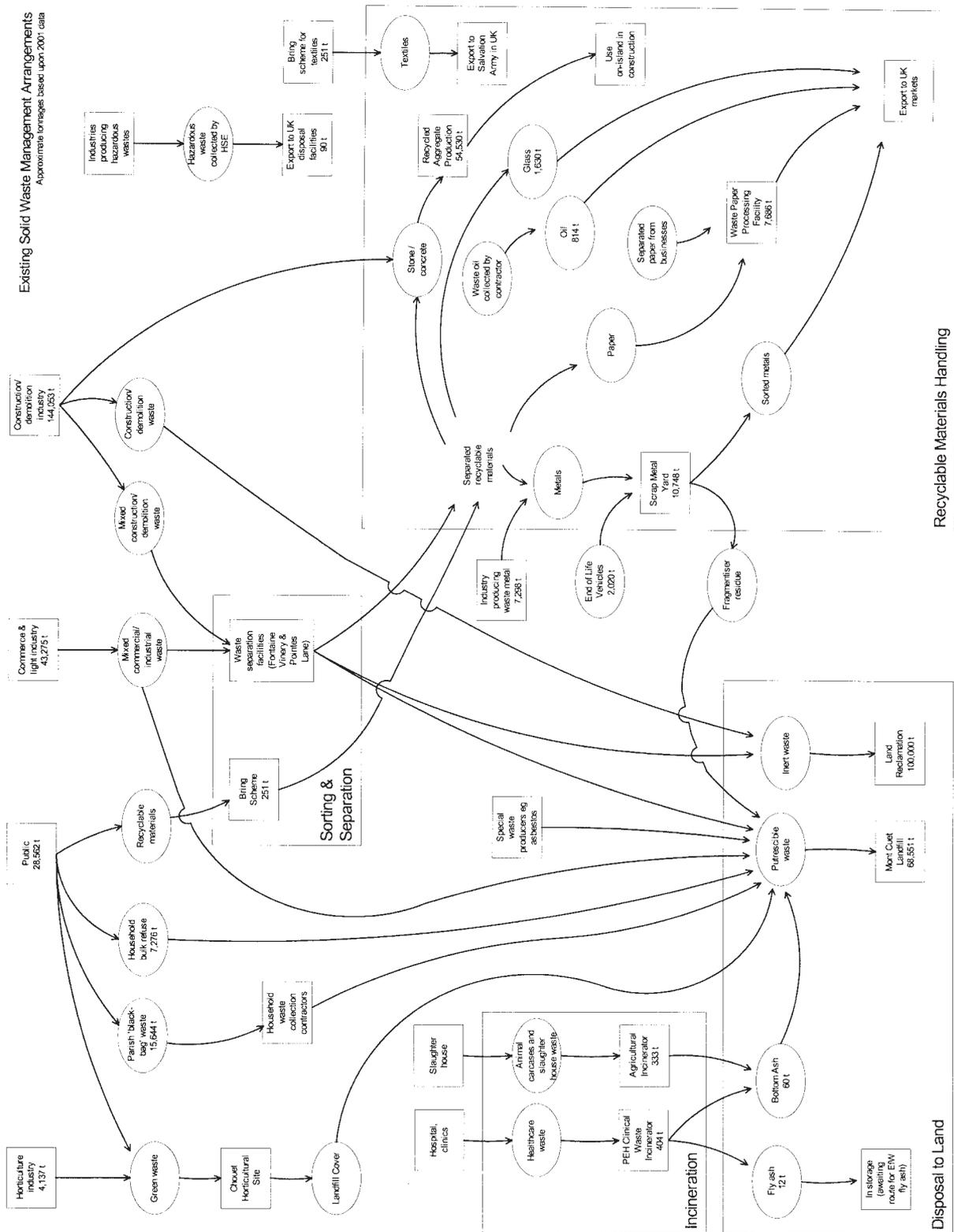
2.4 Existing Waste Management Facilities

Waste management facilities currently existing in Guernsey are described in **table 2.4** below:

Description	Location	Operator
Inert landfill	Longue Hougue	Public Services Dept
Putrescible landfill	Mont Cuet	Public Services Dept
Green waste composting	Chouet	Public Services Dept
Animal Carcass Incinerator	Longue Hougue	Commerce & Employment Dept
Healthcare Waste Incinerator	Princess Elizabeth Hospital	Dept of Health & Social Services
Hazardous Waste collection and disposal	Various	Commerce & Employment Dept
Waste Segregation Facility	Fontaine Vinery	States Works Department under contract to the Environment Department
Waste Segregation Facility	Pointes Lane	Island Waste Ltd
Recycling Activities		
Recycled aggregate production	Les Monmains	Ronez Ltd
Bring scheme for cans and glass	Various	Environment Department
Bring scheme for textiles	Various	Salvation Army
Sorting and dispatch of cans and glass from bring scheme	Bulwer Avenue	Environment Department
Metals (including end of life vehicles)	Bulwer Avenue	Guernsey Recycling (1996) Ltd
Non-ferrous metals only	North Side	St Peter Port Services Ltd
Oils	North Side	St Peter Port Services Ltd
Petrol	Bulwer Avenue	Fuel Supplies Ltd
Paper and cardboard	Leale's Yard	Mayside Reclamation
Tyres		Sarnia Autos
Waste Electrical and Electronic Equipment	Bulwer Avenue and Fontaine Vinery	Guernsey Recycling (1996) Ltd and Scrap-It
Batteries	North Side	St Peter Port Services Ltd

The entire system of solid waste management is shown schematically in figure 2 below.

Existing Solid Waste Management Arrangements
Approximate tonnages based upon 2001 data

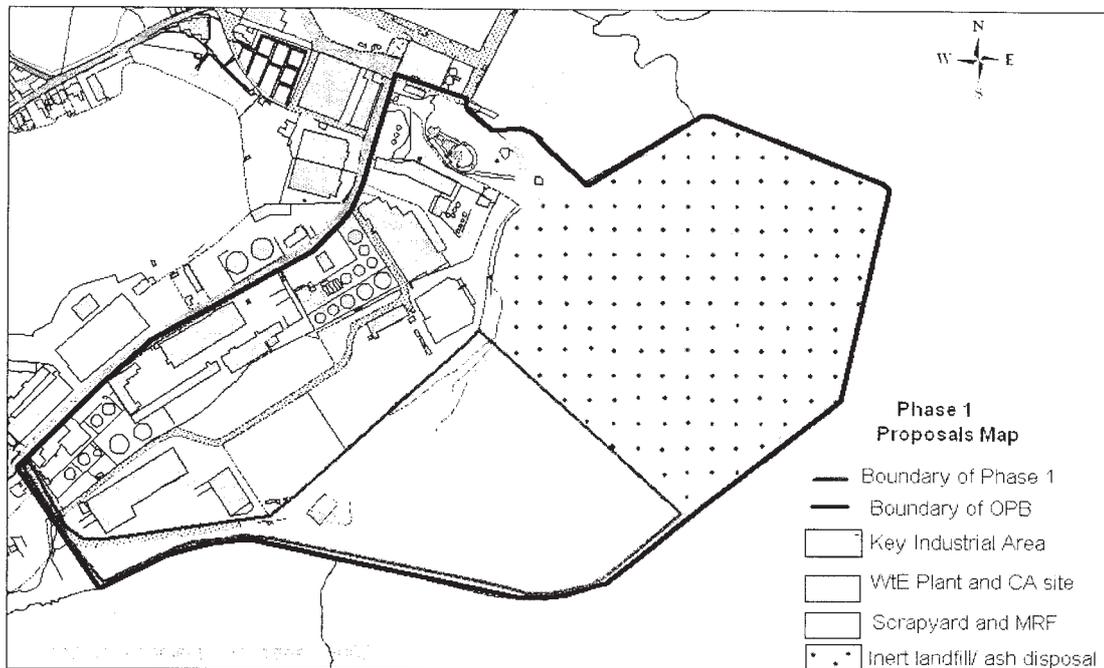


2.4 Currently Planned Future Facilities

A planning inquiry held in December 2001 resulted in the production of an Outline Planning Brief (OPB) for Longue Hougue. This designates an area for the provision of an Integrated Waste Management Facility (IWWMF) comprising:

- Energy from Waste Facility (EfW)
- Materials Recovery Facility (MRF)
- Civic Amenity Site
- Metal Recycling facility (scrapyard)

Further details of each of the above are given in section 5.0. Figure 2.2 shows a site plan which gives a preliminary indication of probable land requirements for each activity.



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Figure 2.2 Indicative land allocation within Longue Hougue, as determined by the Planning Inquiry into the Outline Planning Brief

3. INFLUENCES UPON THE WMP

3.1 Objectives and Targets

Four objectives have been set for the WMP, these provide a focus for the activities to be undertaken and they will also provide benchmarks against which performance can be measured in order to guide future revisions of the Plan (see section 7.0).

i. To reduce the input of waste to Mont Cuet

The Waste Strategy Assessment identified the lack of landfill capacity on the island as the core obstacle to achieving sustainable waste management. An integrated strategy comprising measures to minimise, reduce, recycle and treat by energy from waste (EfW) before final disposal to landfill is therefore necessary.

Having reduced the quantity of waste for disposal by minimisation and removal of materials for recycling, the residue will be treated in an EfW plant. The principal advantage of an EfW plant is that the input waste stream is reduced to a significantly smaller volume of ash. Furthermore, the bottom ash from the plant is relatively inert and may therefore be deposited in a wider range of locations. Consequently, the input to landfill will be restricted to a narrow group of wastes that are not suitable for incineration (eg asbestos).

Performance target: That Mont Cuet is filled at a rate such that it lasts for 70 years from the commissioning of the EfW plant and should therefore close around 2077.

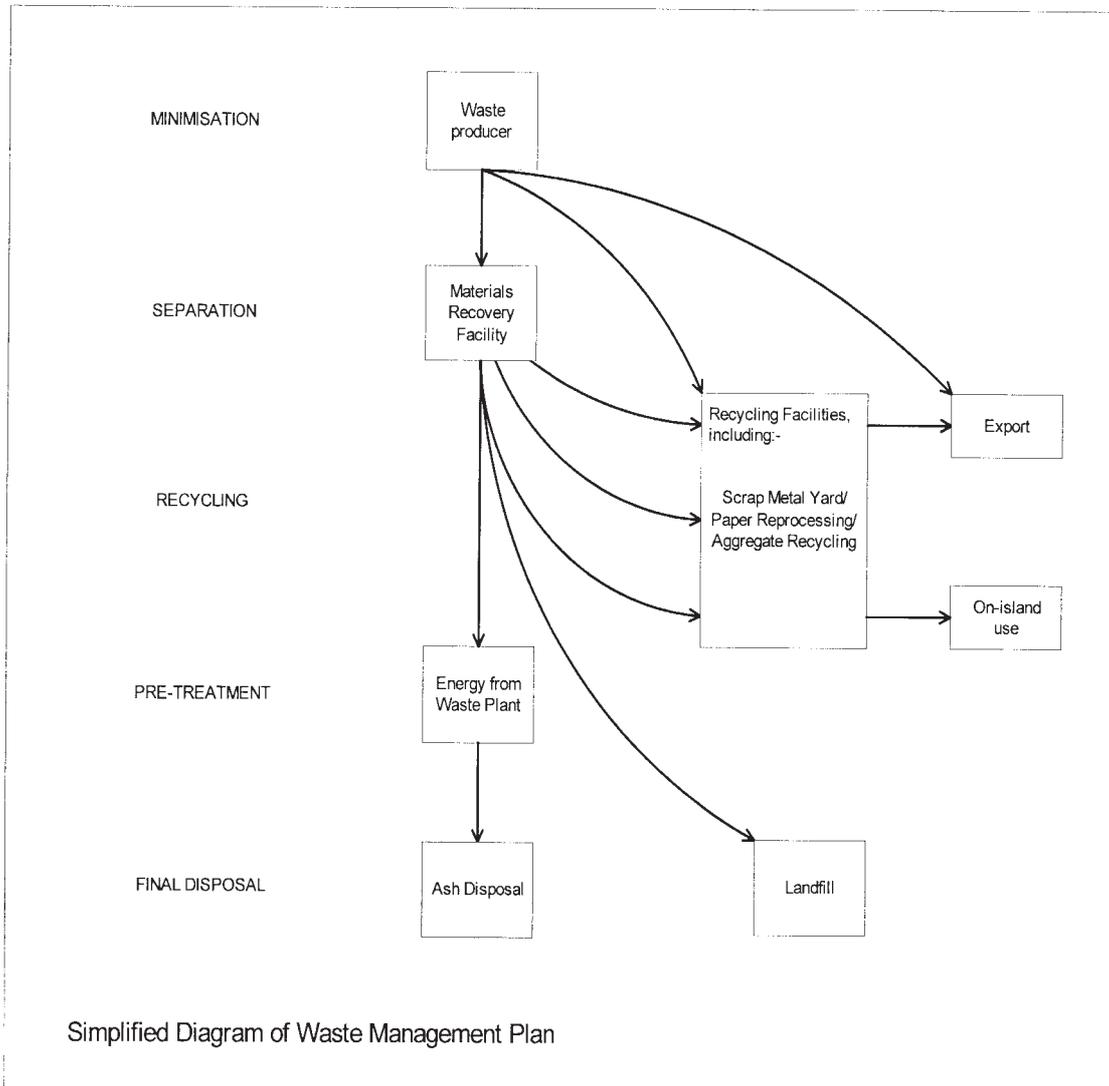
ii. To manage waste inputs to the EfW plant

The WMP places considerable emphasis on waste minimisation, segregation and recycling as methods of reducing the quantity of waste going to landfill, these activities are also important to the management of an EfW plant. Due to engineering reasons, the EfW plant has upper and lower limits to the throughput of waste. The plant design has a capacity range that will reflect current waste generation and accommodate an amount of future growth which still permits efficient operation. Provision has been made for the installation of extra incineration capacity, a 'second line', at some point in the future but this is an expensive option, as the second line is estimated to cost in the region of £30-35 million (at 2003 prices). Waste minimisation, segregation and recycling are therefore crucial to keeping waste inputs within the capacity of the first line, and to defer further expenditure for as long as possible.

Quantities of waste are forecast to increase proportionally with increases in population and economic growth. After allowing for the effect of waste minimisation initiatives, it is predicted that wastes arising from household and commercial/industrial sources (the sectors which generate the majority of wastes requiring incineration) will undergo long term growth of 2.75%pa. However, for quantities to stay within the capacity of the first line over the 25 year lifetime of the plant, annual growth would need to remain at around 1.4%. Restricting the annual growth of waste treated by the EfW to 1.4% will require segregation of around a further 750-800 tonnes per annum. Achievement of this target will require participation and involvement from all sectors of society.

The combined effect of the first and second objectives is to achieve a reduction in the volume of waste requiring final disposal by use of the energy from waste plant, and furthermore, that the capacity of the plant is conserved by minimisation and segregation measures. The diagram below gives a schematic view of waste how waste may be managed at several stages between the producer and final disposal.

Performance target: To limit the growth of waste requiring incineration to an average of 1.4% per annum over 25 years.



iii. To implement an integrated waste management system as described in this Plan.

The measures within this Plan present an integrated waste management system, whereby a range of complementary operational and policy measures are mutually supporting and focused towards common objectives. Therefore, the successful implementation of the Plan is dependent upon the availability of these measures at the appropriate time, as outlined in the implementation programme in section 7.1.

Performance target: The Plan will be implemented according to the programme detailed in section 7.1.

iv. To manage the utilisation of inert waste.

While other uses for inert waste exist on the island (principally land raising projects and enhanced aggregate recycling), the fourth objective aims to prioritise the utilisation of inert waste at Longue Hougue in order to ensure that sufficient land is created to enable the construction of the waste management facilities required to implement the WMP and thereafter to prioritise the use of inert waste as a resource. Inert waste disposal options are detailed in section 5.6.

The Outline Planning Brief for the development of Longue Hougue specifies a land area of 5.3 hectares (13 acres, 34.1 verges) for the IWMF, which to date has been partially reclaimed. During the construction of the EfW plant this entire area will be utilised for site offices and material storage. On commissioning of the EfW plant, the temporary works areas will be replaced by the Civic Amenity Site, Materials Recovery Facility and the Scrap Metal Yard.

Performance target: Creation of sufficient land for the phased provision of facilities required to implement the WMP.

The four objectives given above act as high-level drivers for a range of activities which bring about waste minimisation, re-use and recycling.

3.2 Strategic Issues & Constraints

The following factors specific to Guernsey, and mostly applicable to other small island communities, have been taken into account in determining the way change is to be delivered:

- Limited land availability and ribbon development pattern
- Isolated location thus requiring proven self-sufficiency and reliable techniques
- Tourism and promotion of the island
- Limited labour resources due to near full employment
- Lack of economies of scale make some processes unviable
- Lack of local markets for treated waste products
- Existing and planned legislative processes
- Affluent community tends towards waste production
- Limited scope for competitive procurement of services

3.3 Strategically essential facilities

Waste management facilities exist to safeguard public health and protect the environment. They must, therefore, operate reliably, in compliance with performance requirements and with an ability to cope with unexpected variations in needs. For various reasons described below, some facilities/services are considered to have a greater requirement for security than others and are termed ‘strategically essential’.

The Plan acknowledges that the private sector has a valuable role to play in the provision of waste management services and this is described in detail in section 7.0. However, with respect to strategically essential facilities, it follows that arrangements for their provision and operation should avoid conferring any potential to exploit monopoly power by an incumbent private sector service provider and ensure that, if necessary, the States is able to assume operational control of such facilities at very short notice.

While it is possible to incorporate provisions in the conditions of contract that would give the States the right to occupy and take over the running of facilities under certain stipulated circumstances, these are not a satisfactory substitute for ownership of the facilities by the States as they would represent a reactive, rather than proactive, form of control. The States will, therefore, continue to have a close involvement in the provision and operation of public waste management facilities and services and, in particular, will retain a high level of control over "strategically essential" facilities and services.

The following criteria for selection of strategically essential facilities/services have been applied:

- Facilities where there is limited scope to avoid a monopoly because the market size is restricted by availability of land, capital or expertise and hence they are likely to be unique to the island.
- Facilities that have potential to cause an environmental hazard for which the private sector would not or could not be held liable. For example, an existing landfill site would have pollution risks associated with waste deposited in the early part of its life that would interfere with attributing liability to any pollution arising from mismanagement after a change of ownership.
- Facilities where the need to have extreme reliability and/or security of service could put the community at risk of exploitation.
- Services that have to be managed under a long-term contract (eg 10 years) in order to attract private sector involvement may have a restricted ability to respond to unforeseen changes in, for example, waste generation and quality criteria for separated recyclable materials.

At present, the landfill sites, the MRF and the planned EfW facility are regarded as strategically essential. Furthermore, given the scarcity of land in Guernsey, sites for strategically essential waste management facilities will remain in public ownership. Implications for provision of waste management services are discussed further in section 6.

<p>Waste Prevention and Minimisation</p> <ul style="list-style-type: none"> • Information Provision and Dissemination on Waste Minimisation, Reuse and Recycling • Increase Disposal Charges to Long Run Marginal Cost • Modify States Procurement Policy • Introduce Economic Instruments • Producer Responsibility Groups (PRGs)
<p>Waste Segregation, Storage and Handling at Source</p> <ul style="list-style-type: none"> • Civic Amenity (CA) Sites to established for receipt of bulky and/or recyclable wastes from householders • Bulky Waste Collection Service
<p>Collection and Transport</p> <ul style="list-style-type: none"> • Investigate co-ordinated household waste collection contract(s) • Investigate introduction of suitably robust bags or other container for household refuse collection • Collection of Hazardous Household Wastes
<p>Reuse and Recycling</p> <ul style="list-style-type: none"> • Promotion of an online waste exchange, a repair centre and a schools resource centre and similar waste reuse facilities. • Paper and Cardboard: to be separated and shipped to UK for recycling. • Wood: seek opportunities to recycle or reuse wood that is known to be free from preservatives. • Plastic: trial recycling of heavy gauge polyethylene film. • Glass: opportunities for on-Island recycling to be sought. • Tyres: to be collected and shipped to UK for recycling • Oils: collection, treatment and shipment with option to utilise in the EFW plant. • Materials Recovery Facility (MRF) to be established for separating recyclable, inert and incinerable elements of selected waste streams. Including processing of Waste Electrical and Electronic Equipment (WEEE), according to outcome of current trial operation. Also, fluorescent tube collection, crushing and shipment to UK reproducers to be investigated. • Scrap Metal Processing Facility to be established at Longue Hougue IWMF. Scrap metal and predominantly metal items (eg white

<p>goods) will be processed prior to shipment to UK. Including partial depollution and processing of ELVs prior to export. Revenue to be raised from ELV Disposal Levy applied to imported vehicles. Also, extraction of CFCs from refrigerators, the units will be shredded prior to separation of the metal for recycling and incineration of the foam in the EFW.</p> <ul style="list-style-type: none"> • Waste paper collection and preparation for shipment to be undertaken by private sector operator under contractual arrangement.
<p>Processing and Treatment</p> <ul style="list-style-type: none"> • Energy-from-Waste (EFW) plant will receive appropriate wastes. • Pharmaceuticals and other healthcare wastes to be destroyed at the PEH incinerator. • Biocides and other hazardous wastes will be collected and disposed of by the HSE. • Establishment of an in-vessel composting system for green waste will be investigated. • Utilisation of bottom ash arising from the EFW plant will be investigated.
<p>Final Disposal</p> <ul style="list-style-type: none"> • Longue Hougue land reclamation will receive inert wastes. The gate fee will be adjusted primarily according to the demand for incoming material at the site. A follow-on site will be selected according to strategic requirements when Longue Hougue approaches completion. • Mont Cuët – the site will only receive residual waste which is unsuitable for recycling or incineration and will therefore have a lifespan considerably longer than under current operations. • Disposal of Special Waste - a Duly Motivated Request (DMR) will be prepared to permit movement of these wastes, this will require investigation of the establishment of a hazardous waste landfill site

Table 2.2: Summary table of activities and facilities

4. LEGISLATIVE AND INSTITUTIONAL ARRANGEMENTS

4.1 Legislation

The existence of sufficient legislation and effective institutions for its enforcement is fundamental for the development and operation of an environmentally sound and sustainable system of managing wastes. The existing legislative framework for managing and controlling wastes in Guernsey has long been recognised as inadequate. The Environmental Pollution (Guernsey) Law (approved by the States in March 2004) is designed to redress this situation and to establish a more comprehensive and unified legislative basis for managing and protecting the environment by ensuring that activities which may give rise to environmental pollution, such as waste management activities, are subject to proactive controls. In December 2003, the States resolved to approve the establishment of the Office of Director of Environmental Health and Pollution Regulation in order to carry out the functions, exercise the powers and perform the duties created or arising under this law.

The Environmental Pollution (Guernsey) Law is an enabling law which will allow the States to introduce environmental protection measures by Ordinance, as and when considered appropriate. The intention is to introduce a Waste Ordinance as soon as the law will allow which will provide the specific legislation required to regulate the management of waste on the island. For example, the Waste Ordinance will require persons carrying out 'prescribed operations' (i.e. those operations which, in the opinion of the States, may involve a risk of environmental pollution) to obtain a license and to carry out that operation in accordance with the conditions to which that license is subject. The Law states that the following operations may be prescribed by an Ordinance, irrespective of the nature or composition of the waste concerned:

- the collection, removal, transportation or handling of waste when carried out by way of business or as a public service;
- the sorting, processing, treating, storage or disposal of waste in any circumstances; and
- the provision or operation of any activity, plant or equipment for the sorting, treatment, processing or disposal of waste.

In the context of organisational and contractual issues, the licensing system will encourage a level playing field in terms of the standards to which companies operate.

The Environmental Pollution (Guernsey) Law requires the designation, by ordinance, of a Waste Disposal Authority, to be responsible for carrying out functions conferred on it by or under the Environmental Pollution (Guernsey) Law or any other enactment. These functions include:

- To make arrangements for and ensure the operation of Guernsey's public waste management system
- To monitor the creation of waste in Guernsey

- To keep under review the systems for collection, transportation, sorting and recycling of waste
- To identify the best practical environmental options for the disposal of waste
- To comply with the current waste disposal plan

The Environment Department will be Guernsey's Waste Disposal Authority.

The ability to control privately owned and operated facilities will remain somewhat limited until the new Waste Ordinance comes into effect and thus it is crucially important that it is brought into force as soon as possible.

A number of pieces of planning legislation and policy have an influence upon the WMP.

The 1966 Planning Law is the overarching law that gives rise to the Strategic and Corporate Plan, which in turn gives rise to the Strategic Land Use Policy (SLUP). The SLUP influences the three Detailed Development Plans (Urban Area and Rural Area Phases 1 and 2) and the WMP in dictating land use for waste management activities.

Policies EMP8 and WWM6 of the Urban Area Plan specifically require the submission of a Compliance Document to satisfy the Outline Planning Brief and Environmental Statement for the activities which are designated for the Integrated Waste Management Facility at Longue Hougue.

Policy MW1 of the Rural Area Plan (Phase 1) designates Creve Coeur and Mont Cuet as waste disposal sites. Policy MW2 requires that these sites are restored to a high standard on completion of their use. Policy MW3 requires that any future use of the headland to the west of Mont Cuet landfill must not compromise the future working of the area for stone extraction.

Policy RD1 of the Draft Written Statement (July 2003) of the Rural Area Plan recognises that new developments which are 'essential to the public interest, health, safety or security of the community' may be allowed in the Rural Area subject to conditions, including the absence of alternative suitable sites.

The 1966 and 1990 Island Planning (Guernsey) Law has been replaced by the Land Planning and Development (Guernsey) Law, 2003. The new law differs in that certain planning issues are no longer described in the spatial terms of the detailed development plans, rather a land usage approach is taken in the form of Subject Plans which are more suited to treating topics on an island wide basis. A dedicated Waste Subject Plan is to be produced and the content will be influenced by the WMP.

The Land Planning and Development (Guernsey) Law will also play a role in regulating waste management by prohibiting unsightly land use and similarly, the law will also

regulate against nuisance or loss of use arising from disposal of rubbish, abandonment of vehicles or items. In this sense, the planning laws are complementary to the waste licensing powers of the Environmental Pollution Law. The Planning Law maintains conformity with land use and aesthetic standards and the Environmental Pollution Law mitigates any adverse effect upon the environment and public health.

4.2 Institutional Arrangements

Under the Environment Pollution (Guernsey) Law, responsibility for licensing new and existing waste management activities lies with the Office of the Director of Environmental Health and Pollution Regulation.

Waste management activities will be undertaken by bodies within both the public and private sectors. Public sector roles will be divided between the Environment Department and Public Services Department, as follows:

Environment Department:

- Strategic planning and policy formulation in relation to solid and liquid waste (predominantly through revision and publication of future editions of the Waste Management Plan).
- Specification and administration of contracts for service provision by the private sector (see section 6.1).

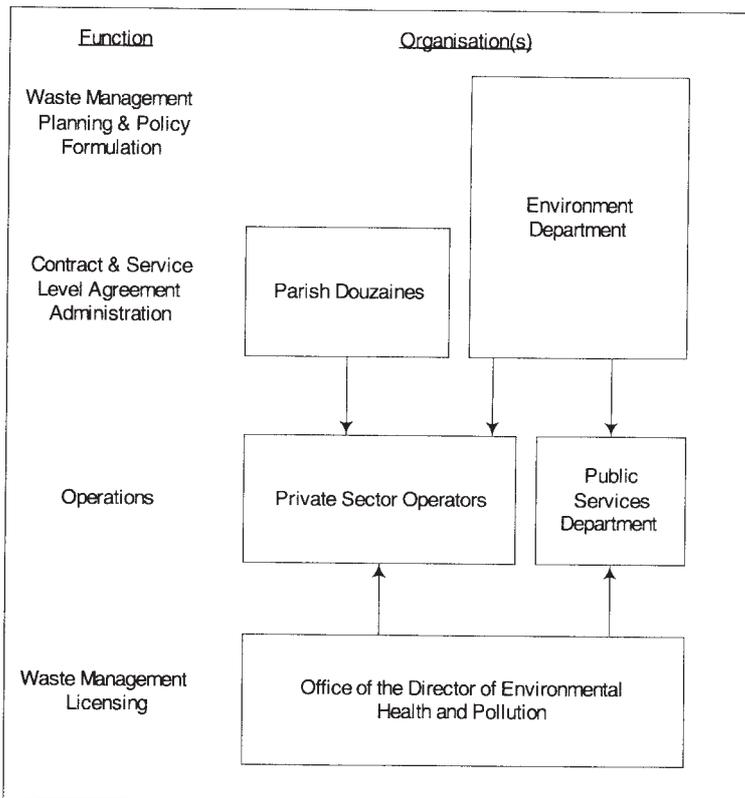
Public Services Department:

- Provision of staff and specialist resources for the operation of waste management facilities owned and operated by the public sector (see section 6.1).

The Parish Douzaines will remain responsible for the collection of household refuse.

Upon the satisfactory completion of the Initial Services period, A "Special Purpose Company" (SPC) will be formed to act as the client-side contracting party ("the Employer") on behalf of the States to let a contract to design, build and operate the Energy-from-Waste (EfW) facility for an initial period of two years (DB2O contract). The SPC will be wholly-owned by the States of Guernsey. The role of the private sector in relation to other service areas is discussed in section 6.1.

A certain minimum 'core' expertise and know-how with respect to the management and operation of strategically essential facilities will be retained within the public sector. This is necessary in order to ensure that such facilities and systems operate satisfactorily and reliably, to supervise and control the performance of private contractors effectively and to have the capability, at short notice, to assume direct operational control through the procurement of alternative services in the event of an emergency, serious default or other failure to perform as required.

Figure 4.1 Waste Management Institutional Arrangements

5. PLANNED TECHNICAL/OPERATIONAL ARRANGEMENTS

The following waste management options have been selected according to their ability to meet the objectives described earlier in the Plan.

5.1 Waste Prevention and Minimisation

5.1.1 Information Provision and Dissemination – Reducing waste quantities has a significant effect upon the environmental and financial burden of their management. Therefore a carefully structured communications programme directed at waste producers will be a vital element of the Waste Management Plan and will place specific emphasis on waste minimisation, reuse and recycling. For example, information may be targeted at individuals in order to promote initiatives such as re-usable nappies and the introduction of home composters for garden waste. In addition to portraying the environmental benefits, such schemes have had an appeal to commercial organisations owing to the savings realised by reducing disposal costs and also avoiding the purchase of materials that would otherwise become waste.

5.1.2 Increase Disposal Charges to Long Run Marginal Cost (i.e. the cost of disposing of wastes in the long term which will be the full cost of the EfW plant, including depreciation). This will encourage an awareness of waste reduction and recycling when making purchasing and disposal decisions, ultimately resulting in a

reduction in the amount of waste requiring disposal. A phased series of increases will commence in 2005 to increase the cost of disposal of putrescible waste from current levels up to the EfW gate fee coinciding with its commissioning. The current gate fee for an uncontaminated load is £33.25/tonne. It is planned that in 2005 and 2006 the gate fee will increase by inflation plus £25/tonne. This will require the enforcement of the Environmental Pollution (Guernsey) Law and Waste Ordinance in order to control any illegal dumping which may arise. This will have an immediate benefit in conserving capacity in Mont Cuet and the revenue raised will contribute towards repayment of capital for the EfW plant.

5.1.3 States Procurement Policy – As a major purchaser of goods and services, the States is in the position to introduce procurement policies which influence waste minimisation and recycling. These policies will include maximising the use of recycled materials and favouring suppliers who adopt environmentally-sound waste management practices. States procurement policy will be amended to take into account the objectives of the island’s waste management strategy.

5.1.4 Economic Instruments - It can be envisaged that taxes might be imposed on certain materials which present particular waste management difficulties. Such taxes would change the pricing structure so as to influence consumer or user behaviour in accordance with the objectives of the strategy. For example, import levies could be applied to pesticides in order to recover the cost of any specialist disposal requirements, or levies may be applied to imported peat in order to encourage usage of locally produced compost. Legislation is currently being introduced by the Customs and Immigration Department to permit such instruments to be introduced by ordinance.

5.1.5 Producer Responsibility Groups (PRGs) - With the increased cost of disposal arising from the higher gate fee of the EfW plant acting as a stimulus to waste producers, the potential for reducing the quantities of waste requiring disposal lies primarily in reviewing in-house policies and practices (for example purchasing policies) and changing in-house waste handling practices to maximise the segregation of potentially recyclable materials. PRGs provide a forum for collaboration on these issues. The ‘producer’, meaning collectively importers, distributors, retailers and users of products which give rise to the generation of wastes take responsibility for those wastes and seek ways of minimising their production. In the local context, the States will encourage the establishment of voluntary ‘Producer Responsibility Groups’ (PRGs) for, amongst others:

- the tourism sector
- suppliers of office stationery and equipment
- the financial sector
- suppliers of biocides
- horticulture sector

5.2 Waste Segregation, Storage and Handling at Source

Options for the containerisation of household waste (ie 'black bag' or 'parish' waste) are linked with the examination of different collection methods, and are therefore presented in section 5.3.

5.2.1 Civic Amenity (CA) Sites - A CA site provides facilities for members of the public to dispose of certain wastes free of charge. The CA site is intended to largely replace the function of the Bulk Refuse Removal Scheme and to also receive other waste types. Trade waste and use by businesses will be prohibited and the site will be manned in order to assist the users and ensure proper segregation of waste. It is envisaged that the CA site will receive green waste, general refuse, bulky waste, inert waste, metal, glass, oils, fluorescent tubes, paper, textiles, batteries and cardboard. The capital cost is estimated to be in the region of £350,000 and annual operating costs would be approximately £50,000pa excluding disposal.

The disposal cost for wastes brought to the site has been estimated on the following basis:

Material	Abundance at CA site	Facility	Gate fee (£/t)
Metals	8%	Scrap metal yard	£50
Paper & board	4%	Waste paper processor	£50
Wood	2%	EfW	£100
Green	25%	Compost	£25
Inert	16%	Longue Hougue	£5.10
Residue	45%	EfW	£100
		Average disposal cost (£/t)	£60.07

Given that around 8,400 tonnes per annum is expected at the site, the disposal cost will be in the region of £500,000.

Convenience and accessibility will determine how frequently the CA site is used and therefore it is intended to open the site at weekends. Furthermore, opportunities to establish sites at other locations (so-called secondary CA sites) will be investigated. Owing to the requirement to man these sites, it is likely that they will only be economically justifiable where other waste management activities are taking place. For this reason, the provision of additional CA sites at Mont Cuet and at the location of a composting plant (see section 5.2.3) will be considered.

Establishment of a CA site at Longue Hougue will be commenced to integrate with the commissioning of the EfW plant.

Identification of possible locations for secondary CA sites will be commenced at this time, the decision to construct such sites will be based upon a number of factors including usage at the Longue Hougue CA site.

5.2.2 Bulky Waste Collection Service - At the Civic Amenity (CA) site(s) members of the public will be able to dispose of bulky waste free of charge which should lead to a reduced demand on the Bulk Refuse Removal Scheme. However, the service will still be required, primarily for items that are too large to be transported by car. Once the CA site is available for use, a charge for the Bulk Refuse Removal Scheme will be introduced to be payable by all except those receiving States financial support. On the basis of current costs and anticipated demand, the charge will be in the region of £20 per collection.

5.3 Collection and Transport

5.3.1 Co-ordinated Household Waste Collection Contract(s) - Collection of household refuse is the responsibility of the Parishes, each of which awards a contract for collection to take place within their respective parish boundaries. Consequently, collection rounds are determined by parish boundaries rather than the optimal route for servicing properties. Research by the Board's consultants indicated that savings of around 17% could be achieved by re-allocating collection rounds into a co-ordinated contract without the constraint of operating within parish boundaries. **It is fully acknowledged that household refuse collection does not lie within the mandate of the Environment Department nor does the Department wish to intervene in the role of the Douzaines, however the findings are reported here with the intention of encouraging the Douzaines to *consider* the possibility for savings through co-operation and co-ordination with neighbouring parishes.** Secondly, should the introduction of kerbside collection of recyclable materials (see section 5.3.2) be considered necessary, it should be implemented in the most efficient manner i.e. with cross-boundary collection rounds. Under the present arrangements this would not readily integrate with the collection of residual waste by parish boundaries.

5.3.2 Kerbside Collection of Recyclables from Households - Experience in the UK and elsewhere has indicated that public participation in recycling is related to the convenience of access to recycling facilities. A considerable amount of research was undertaken to investigate various methods of kerbside collection as an alternative to the bring scheme ('bottle banks').

It is important to note that one of the main objectives of recycling in Guernsey will be to conserve capacity in the energy from waste plant by the cost-effective removal of wastes from the input to the plant. At present, the benefits of kerbside collection lie within the bounds of error for the financial model and hence there is no conclusive economic case for the adoption of kerbside recycling at this point in time.

Therefore, in the period prior to commissioning of the EfW plant, waste quantities and compositions will be further monitored to assess the scope for removing recyclable materials. Secondly, on commissioning the EfW plant, requirements to conserve capacity in the first line will be re-assessed. On that basis, a decision will be taken on whether to extract more recyclable material from household wastes with kerbside collection being the preferred method. Until that decision is taken, the existing bring scheme will be continued.

The assessment of alternative collection methods has also required a consideration of different containers for household waste. In particular, any scheme which includes separate collection of recyclables will involve adoption of special containers (whether they are boxes or bags).

Data on the extent of split bags/littering, no of complaints?

In the short term, there are some problems associated with the use of flimsy plastic bags. Inadequate closure of the bags and damage by vermin leads to refuse being scattered across streets. Dustbins with a secured lid present the ideal solution and their usage is encouraged, but it is recognised that they are not practical for every household. In households where bags are used, the Department wishes to improve cleanliness of streets by ensuring a bag of appropriate quality is used. The Refuse Disposal (amendment) Ordinance, 1963, currently specifies that, as an alternative to a dustbin, a stitched paper bag may be used but this is obviously now outdated.

The Department will therefore investigate measures to introduce a visibly branded plastic refuse bag for collection of household waste which will be of an appropriate strength and size to minimise the problems described above. These bags would be widely available from retail outlets and refuse contractors would only be required to collect branded bags. While the Department has sole authority, by amendment of the Refuse Order, to specify a thickness and quality of refuse bag, it clearly requires the support of the Douzaines, and the contractors employed by them, in order to effectively introduce such a system. Similarly, there will be an obligation on the part of the Police to prosecute householders who, by not using the recognised bag, cause refuse to be left on the streets.

It is recognised that this is a significant departure from current practice and therefore the Department will only pursue this with the full support of relevant parties.

5.3.3 Collection of Hazardous Household Wastes - Certain elements of household waste should receive special handling because of their potential risk to human health or the environment. Examples include oils, biocides (e.g. weed killers, insecticides) and fluorescent tubes (which contain mercury). While local facilities currently exist to receive these materials, they rely upon voluntary presentation of the wastes to the appropriate facility, therefore kerbside collection of these materials was investigated as a means of maximising their segregation from other household wastes. It was found that the very low volumes of these wastes and the special handling requirements would make collection prohibitively expensive.

The EfW plant is specified to provide an environmentally sound disposal route for these wastes and therefore segregation is not imperative. Where alternative disposal routes can be provided, the CA site(s) will receive those wastes when appropriate and its use will be promoted to the public. Other disposal routes, such as the collection scheme for hazardous wastes offered by the Department for Commerce and Employment, will also be promoted.

5.4 Reuse and Recycling

5.4.1 Reuse - this entails passing unwanted materials or items onto other members of the community who can put them to use. Activities such as an online waste exchange, a repair centre and a schools resource centre will be promoted as part of an awareness raising campaign and the private sector encouraged to undertake these activities.

5.4.2 Recycling Verses Incineration - One of the key issues raised by the construction of an EfW plant is whether to maximise waste throughput and thereby raise revenue from the gate fee and electricity sales which improve repayment of the capital, or alternatively to segregate recyclable materials from the input to the plant. Countries in the EU would not face this choice as they are obliged to achieve recycling targets specified by Directives, however Guernsey is in a position to take a course of action which most suits local considerations. One of the key tasks in preparation of the WMP has therefore been choosing whether to incinerate or recycle certain materials.

In Guernsey, there are no economically-viable opportunities to reprocess recyclable materials on the island (with the exception of glass which is discussed in more detail in section 5.4.7, and also the production of secondary aggregate from construction and demolition waste) and therefore segregation of recyclables implies exporting them to external markets.

Transport of glass, metals (excepting aluminium), paper and cardboard has a financial cost which outweighs the revenue from their sale to reprocessing facilities and hence the Board of Administration made a net annual loss of around £375,000 per annum on recycling. In addition to being financially unattractive, the environmental benefits of off-island recycling of materials compared to on-island energy recovery by incineration are questionable. In summary, this is the argument for only undertaking 'economically-justifiable recycling'.

In contrast to the uncertainties associated with the environmental issues described above, there is a very persuasive reason for recycling in the local context which is conservation of incineration capacity (see section 3.0). On this basis, recycling high calorific value wastes such as paper, plastic and cardboard can be justified in principle as a means of deferring the purchase of the second line for as long as possible.

Over the course of time, waste generation and composition, availability of incineration capacity and status of markets will be monitored and the balance between recycling and incineration may be reviewed on a periodic basis.

However, for this edition of the WMP the recycling strategy may be summarised as follows:

5.4.3 Paper and Cardboard - The short term economic implications favour incineration as long as spare capacity exists in the plant as revenue can be raised from the gate fee and the sale of energy, especially as paper and cardboard have a high calorific value (i.e. they release large amounts of heat during incineration). However, their high calorific value also places a large demand on the capacity of the plant;

incineration of all paper and cardboard instead of recycling would bring forward the requirement for a second line by 6 years. Therefore it is intended that transfer off-island for recycling will continue for these materials.

5.4.4 Wood - Opportunities to recycle waste wood (e.g. in composting) are limited by the widespread presence of preservatives, which pose an environmental risk in situations where the wood may come into contact with the water catchment. For the same reason, waste wood cannot be burnt without the appropriate emission controls as found on the EfW plant. Furthermore, the bulky nature of timber makes transfer to UK markets (e.g. for chipboard manufacture) relatively expensive. Therefore local opportunities to recycle or reuse wood that is known to be free from preservatives will be encouraged. For the majority of wood that contains preservatives, even after taking account of the effect upon purchasing the second incineration line, it is economically favourable to incinerate this waste.

5.4.5 Plastic - In the UK, plastics recycling occurs at domestic and commercial levels. The domestic sector concentrates upon recycling of bottles and due to the absence of a viable recycling route other plastic wastes such as food wrappers are not collected. The commercial sector is of more importance as offcuts from manufacturing and other bulk sources of unmixed waste plastic are available. Expansion of plastic recycling has two obstacles; firstly, reprocessing requires that different types of plastic are not mixed together yet it is often difficult to distinguish the varieties on appearance alone. Secondly, because waste plastics have a high calorific value there is a strong argument for energy recovery by incineration instead of recycling.

Local recycling of plastic bottles will not therefore be adopted owing to the limited number of reprocessing facilities and the low value of the commodity when presented as mixed plastics. However, heavy gauge polyethylene film, as used in agriculture, horticulture and for pallet wrapping, can be readily separated and has a value which favours shipment to the UK. Therefore trial recycling of heavy gauge polyethylene film will be investigated.

5.4.6 Glass - Waste glass has been used as a substitute for aggregate and sand in construction in a number of countries. Processing glass into a suitable form for this use could be achieved at a lower cost than shipment of the material to the UK, and the overall cost, including collection, is estimated to be in the same region as the gate fee for the EfW plant. On the basis that the environmental effects of transport to the UK would be avoided and there would not be a reliance upon external markets, on-island use of glass in construction materials will be jointly investigated by the public and private sector.

5.4.7 Tyres - There is an existing disposal route for tyres whereby a private contractor exports them to the UK. The quantity of tyres involved will not have a significant effect upon the capacity of the EfW plant were they to be incinerated if, for example, the contractor ceased operation. On the basis that the current arrangements work satisfactorily, no change is proposed.

5.4.8 Oils - There is an existing disposal route for waste oils, whereby a private contractor arranges collection, dewatering and shipment to the UK, where the oil is burnt for energy recovery. Collection of oils provides a valuable service for managing a waste which can present a pollution risk to the water catchment and the marine environment.

It is understood that exporting oil to the UK is not especially profitable and therefore commissioning of the EfW plant in Guernsey presents an opportunity to utilise the oil locally. However, as capacity in the EfW plant reduces, the argument in future may favour exportation of waste oil and, apart from the economic issues, retention of the existing facility for dewatering oils is also required for management of oil/water mixtures arising from accidental spillages.

Consequently, the policy is to retain flexibility to export oil or utilise in the EfW plant dependent upon available capacity. In the period prior to commissioning the EfW plant, a programme of improvements at the depot will be undertaken in order for the site to meet Environmental Health requirements.

5.4.8 Materials Recovery Facility (MRF) - A facility to separate inert material (stone, concrete etc) from the input to the EfW plant is a necessity to prevent excessive mechanical wear and tear. Also, recyclable materials will be separated at the MRF in order to conserve incineration capacity as described in section 5.4.3.

In essence, the concept is to construct an enclosed working area with appropriate controls for drainage, environmental protection and minimising nuisance. The MRF will receive wastes from construction, commercial and industrial sources.

Subject to experience gained at Fontaine Vinery and further investigation, the processes which are likely to be undertaken at the facility are:

- Segregation of inert wastes suitable for aggregate crushing;
- Segregation of inert wastes for disposal at Longue Hougue;
- Segregation of timber for reuse (where suitable) and also either for recycling or delivery to the EfW plant;
- Segregation of materials for recycling: e.g. metals, paper, cardboard, heavy gauge plastic film;
- Segregation and limited processing of Waste Electrical and Electronic Equipment if investigation proves it is warranted (see section 5.4.10);
- Segregation of items of architectural salvage (these might be stored on-site or elsewhere for sale or collection free of charge);
- Baling and storage of aluminium and steel cans collected under recycling scheme;
- If kerbside collection of recyclables is adopted, segregation of co-mingled materials (depending on the system adopted) and temporary storage of materials pending export;
- Baling of waste paper and cardboard if space is available.

The MRF will be sized to receive all of the mixed commercial/industrial and construction and demolition waste that may arise in the island. While this may be considered unnecessary as the island already has sorting facilities at Pointes Lane and Fontaine Vinery, it is important to note that the MRF has a strategically important role in protecting the EfW plant from wear and tear caused by the throughput of excessive quantities of inert waste and in conserving incineration capacity by the segregation of recyclable materials. Under the current arrangements, the Fontaine Vinery MRF is a temporary facility and the Pointes Lane facility is operated by the private sector in an area which is not suited to this activity. Consequently, without ownership of a MRF the States would not have control of a secure and long term means for waste sorting and controlling the input to the EfW plant.

On the basis that the MRF will be sized to receive all of the island's mixed waste, the terms under which it is operated require consideration to ensure that the facility does not duplicate or compete with the same function as is currently being performed by the private sector. The relationship between private and sector roles is discussed further in section 6.1.

The facility will occupy an area of 1 hectare (2.5 acres, 6.6 verges) at Longue Hougue, within which will be a building covering approximately 35m x 70m. There is a possibility to relocate and extend the existing building located at Fontaine Vinery. Within the building will be a range of fixed and mobile plant for handling and sorting wastes, operated by 10 staff. The total estimated capital cost of the MRF is £2-£2.5 million, although this is subject to the results of a full site investigation and the degree of architectural treatment required. Annual operating costs will be in the region of £400,000. Disposal costs will add around £3,400,000 to this figure, comprised as follows:

Waste type	Tonnage	Gate fee £/tonne (facility)	Total
Inert	24,495	£5.10 (Longue Hougue)	£124,925
Contaminated inert	6,561	£33.25 (Mont Cuet)	£218,153
Combustible & non-recyclable	26,523	£115.39 (EfW)	£3,060,489
		Total disposal cost	£3,403,567

5.4.9 Waste Electrical and Electronic Equipment (WEEE) - Growth in the generation of waste electrical and electronic equipment is expected to exceed the growth of most other waste streams. This is of particular concern because WEEE tends to contain components made from environmentally damaging substances such as heavy metals and halogenated compounds (e.g. CFCs and PVC). The EU intends to introduce a directive which will specify a depolluting process for the removal of hazardous components before disposal. Research into the cost of implementing collection, treatment and disposal measures necessary to comply with the WEEE Directive has indicated that the cost would be £130-150 per tonne. This is in excess of the gate fee for the EfW plant, which in any case has been specified with appropriate emission controls to receive this waste. Therefore, full compliance with the WEEE Directive is not

intended. However, certain aspects of the Directive, such as extracting recyclable metals, could be economically justifiable. At present, sufficient data on waste composition does not exist to make a decision and therefore information will be gathered from operations at Fontaine Vinery and the commercial/industrial MRF described above. Limited processing of WEEE will then be introduced on a gradual basis as warranted. A private sector operator has been involved in WEEE processing

5.4.10 Scrap Metal Processing Facility - A land requirement of 0.8 hectares (2 acres, 5.3 verges) for scrap metal processing has been identified in the Outline Planning Brief for Longue Hougue. The Department will lease this land to an operator, possibly under the terms of a service level agreement. Consideration will be given to proposals that present benefits from integration with the MRF.

5.4.11 Waste Paper Processing – As outlined above, paper recycling has a key role within the WMP. As this function is currently performed within the private sector there is no resource requirement other than to administer a contractual arrangement with the waste paper processor. However, the current facility at Leale's Yard is due to be re-developed and new premises need to be found. If space is available at the MRF, the Environment Department may seek to include waste paper processing at this facility and arrange a lease with an operator, as with the scrap metal facility above.

5.4.12 Fluorescent tubes - contain mercury which presents a pollution risk if it is not disposed of in the correct fashion. Should tubes enter the EfW plant, the mercury will be removed by the emissions cleaning equipment and deposited in the fly ash from the plant. Alternatively, disposal direct to a local hazardous landfill (see section 5.6.5) may offer the cheapest disposal route, if a site is available and once the gate fee of that site has been set.

Equipment exists which crushes the tubes under sealed conditions and, in addition to achieving volume reduction, enables the mercury component to be recycled. This option will also be assessed depending upon the scope for developing a local hazardous waste site.

5.4.13 Refrigerators and Compliance with EU Ozone Depleting Substances Regulation - CFCs are a chemical used in the insulating foam and cooling mechanism of refrigerators. They cause environmental concerns because they contribute to the degradation of ozone in the atmosphere. The EU has established the Ozone Depleting Substances (ODS) Regulation which requires that CFCs are extracted from refrigerators and destroyed by high temperature incineration. Extraction of CFCs from the cooling system prior to recycling has been performed in Guernsey for a number of years and this will continue.

The Regulation also requires removal of the insulating foam and recovery of the CFCs contained within. The capital cost of a plant to do this would be in the region of £3.5 million and for the small number of waste fridges in Guernsey this would never be economically justifiable.

Therefore, after extraction of CFCs from the cooling system, the units will be shredded prior to separation of the metal for recycling and incineration of the foam in the EfW. Although this is not in strict accordance with the EU Regulation, the cost of shipping whole fridges to the UK for specialist disposal is considered to outweigh the environmental benefits.

5.4.14 End of Life Vehicles (ELVs) and compliance with the EU ELV Directive - ELVs are already collected and sent for recycling after fragmentising. The procedure currently followed by the island's scrap metal processor, however, does not conform to the full requirements of the ELV Directive.

Further recycling of glass, plastics etc. in accordance with the EU ELV Directive will be considered in light of factors such as EfW capacity and the further development of the ELV Regulations 2003 which entered into force in England and Wales in November 2003 and the development of free 'take-back' schemes by vehicle manufacturers. When a scrap metal processing facility is provided at Longue Hougue and is subject to licensing requirements by the Office of the Director of Environmental Health and Pollution Regulation, the operator may be required under the terms of the license to meet certain depollution standards e.g. to undertake full liquid removal. At present, investigations undertaken on behalf of the Department suggest that the expense of full compliance with the ELV Directive would be disproportionately high in comparison with the environmental benefits.

5.4.15 ELV Disposal Levy - The Board of Administration previously indicated an intention to seek to impose a disposal levy on vehicle owners through the vehicle tax system, in order to finance the disposal of ELVs. Such a scheme fulfils the Polluter Pays Principle and is desirable from a waste management and environmental aspect. While a disposal charge levied on petrol was an option under consideration by the Advisory and Finance Committee (now the Treasury and Resource Department), the Department believes that such a charge should be transparent.

5.5 Processing and Treatment

5.5.1 Energy-from-Waste (EfW) plant - The EfW plant will be located on reclaimed land in the southeast corner of Longue Hougue. The plant will have a single incineration line and flue gas treatment will be of a standard to comply with the EU Directive on Incineration of Waste. Energy recovery will be accomplished by electricity generation from a steam turbine. The plant will accept suitable wastes from the following sources: household, industrial and commercial, construction and demolition.

The plant is designed to operate 24 hours a day, 7 days a week (excepting planned maintenance) over a 25-year lifespan. Waste will be delivered to the plant from Monday to Saturday. Automation will be used to restrict manpower requirements and the workforce is estimated to be 20-26 people on four shifts. The capital cost of the EfW is £72.8 million which will be repaid by revenue from a gate fee.

5.5.2 Treatment of hazardous household wastes - The hazardous household wastes for which segregation and collection were recommended are oils, pharmaceuticals,

biocides, fluorescent tubes and, dependent on future EU legislative developments, possibly batteries. Once separated, these will require treatment.

The treatment of waste oils is discussed in section 5.4. Pharmaceuticals are destroyed at the PEH incinerator. Fluorescent tubes have been addressed in section 5.4.13. Biocides, of which the quantities will be very small, can be disposed of together with those collected by the HSE. As noted above, the method of treatment of batteries will depend upon the development of legislation in the EU regarding the content of heavy metals in batteries. This area of legislation will be monitored and the Plan modified as necessary.

5.5.3 Green Waste Composting - Composting of green waste, excluding, at least initially, kitchen waste, has a role in the Waste Management Plan. Not only does it accord with the waste hierarchy and contribute to prolonging the life of Mont Cuet landfill site and the first line of the energy from waste plant, but it also produces an end product for which a market would appear to exist on island and presents whole life costs that are favourable when compared to incineration.

Green waste, such as grass, leaves and cuttings, etc from the horticultural industry and amateur and landscape gardeners is suitable for composting. Various composting methods have been investigated and an enclosed, mechanised process known as 'in-vessel' composting is preferred as it avoids the odour problems and variability in end-product of other techniques.

Output would be far in excess of the demand from growers and gardeners, however preliminary discussions with the main importer of peat and compost and technical staff from the Agriculture and Countryside Board indicated a demand for soil conditioner on agricultural land along with other uses by landscape gardeners. On the basis of providing the compost free of charge and including £5 per tonne for delivery, preliminary plant costs suggest the gate fee would be in the region of £25 per tonne, this is substantially lower than the gate fee for the EfW plant, which would be the only other disposal route.

A location for the plant has yet to be identified, although proximity to green waste suppliers and potential users would obviously be desirable, as would the scope for using the same land to host a secondary CA site.

Investigations will be commenced to identify a suitable location for a composting operation and, in conjunction with the existing peat and compost importer, potential long-term users of the product will also be identified. The timing of this option, as detailed in section 7.0 of the Plan, will take into account the previous direction of the then Advisory and Finance Committee in wishing to defer non-essential capital expenditure. Composting is considered to be a secondary priority part of the waste infrastructure in that an alternative disposal route is available for green waste.

5.5.4 Use of Bottom Ash - The EfW plant will produce two types of ash; bottom ash and fly ash. Fly ash contains heavy metals and other pollutants which are extracted by the emissions cleaning equipment and this will be handled as hazardous waste (see section 5.6.5). Bottom ash is the non-combustible residue from the incinerator grate. It

is a sterile, granular material that has been used elsewhere in construction products. The feasibility of using the bottom ash as a substitute for sand or aggregate will be investigated in light of analysis of the composition, demand for such a material and compliance with the Environmental Pollution Law. If the ash is not utilised in construction then it will be deposited either in Mont Cuet or above the height of high water within Longue Hougue.

5.6 Final Disposal

5.6.1 Longue Hougue Follow-on Site - The land reclamation project at Longue Hougue is designated to receive inert waste. Completion of the first phase (ie sufficient land to construct the IWMF) is anticipated to fall within the planning period of the WMP, therefore the following objectives for inert waste disposal have been identified:

Short term – reclaim sufficient land for the IWMF.

Short/medium term – prioritise diversion of inert waste to Longue Hougue and Airport runway end safety area (RESA).

Medium term – complete Longue Hougue and identify a follow-on site

Long term – move operations to follow-on site.

5.6.2 Inert Waste Disposal – Diversion by Pricing Mechanism - The life of the island's inert waste disposal facilities could be extended by minimising or reusing some of this material. Although Ronez operate an aggregate crushing plant at a gate fee lower than Longue Hougue, there is evidence that re-usable inert wastes have historically entered Longue Hougue. Increasing the gate fee at the inert waste disposal site would encourage diversion of this material to sorting/re-use facilities but it may also encourage fly-tipping. On the basis that the Environmental Pollution (Guernsey) Law will have powers to enforce against fly-tipping, the gate fee will be set as necessary to either encourage filling of the site or to prolong it's life by diversion of material to aggregate crushing. At the time of writing, the site does not appear to be receiving re-usable material and there is also an immediate requirement to reclaim land for the IWMF (see above), consequently the gate fee will not be increased.

5.6.3 Mont Cuet - Diversion by Pricing - The EfW plant will have a gate fee which is higher than the current charge at Mont Cuet, and it is anticipated this will encourage waste minimisation and diversion of wastes to recycling. In order to avoid a sudden change in waste disposal costs when the EfW plant is commissioned and to encourage diversion of waste from Mont Cuet the gate fee at Mont Cuet will be gradually increased to the long run marginal cost i.e. the EfW gate fee. Revenue from price increases will be used to fund capital repayment of the EfW plant.

5.6.4 Mont Cuet – Future Operation - Once commissioned, the EfW plant will produce fly ash which will require disposal in a hazardous waste landfill site. If such a site can be created on the island (see section 5.6.5), certain wastes such as asbestos and contaminated soil, will be diverted from Mont Cuet to this site.

Irrespective of whether a separate hazardous landfill is constructed, the rate of infilling at Mont Cuet will be greatly reduced with an annual tonnage in the region of one tenth of current levels. Inputs will consist of 'contaminated inert' wastes ie they will be non-combustible, non-recyclable and have properties that in some way that prevent their disposal at Longue Hougue or other inert waste disposal site.

If there were no change in waste management arrangements, Mont Cuet landfill site will be full circa 2013. By implementing the measures described in the Waste Management Plan, it is predicted that the site closure will be deferred for approximately 70 years.

While Mont Cuet has appropriate controls for the management of leachate and gas, it is not envisaged that the site will comply with the technical requirements of the EU Landfill Directive.

5.6.5 Disposal of Special Waste - Guernsey currently exports a relatively small amount of hazardous wastes, however the EfW plant will produce around 240 tonnes of fly ash per annum which will also be classified as hazardous. Unnecessary exportation of hazardous waste is contrary to the Basel Convention (to which Guernsey is a signatory) which dictates that wastes should be managed in the territory of their origin. Consequently, the UK (or French) authorities would only accept hazardous wastes from Guernsey if it could be demonstrated that no disposal method existed (or could technically be established) on the island.

Investigations are currently underway to determine whether a site could be developed locally which would be suitable for this purpose. These investigations will continue and the outcome used to either commence preparation of the site, or to put forward a Duly Motivated Request (DMR) to the UK authorities for authorisation to export hazardous waste to the UK for specialist disposal.

Irrespective of whether a hazardous waste landfill is established on the island, there will be hazardous wastes that can only be disposed of by high temperature incineration. These specialised plants are prohibitively expensive for construction in Guernsey and transport routes favour export to facilities in the UK. A DMR will be prepared to permit movement of these wastes.

As with other waste streams, the quantity and composition of hazardous waste arisings is expected to fluctuate during the lifetime of the Plan. Therefore revision of the WMP (see section 7.2) and preparation of future DMRs (required every 2-3 years) will be closely coordinated to ensure that appropriate disposal routes exist for the hazardous wastes arising at the time.

The actions and facilities in the above section are summarised in the schematic diagram 5.1 overleaf:

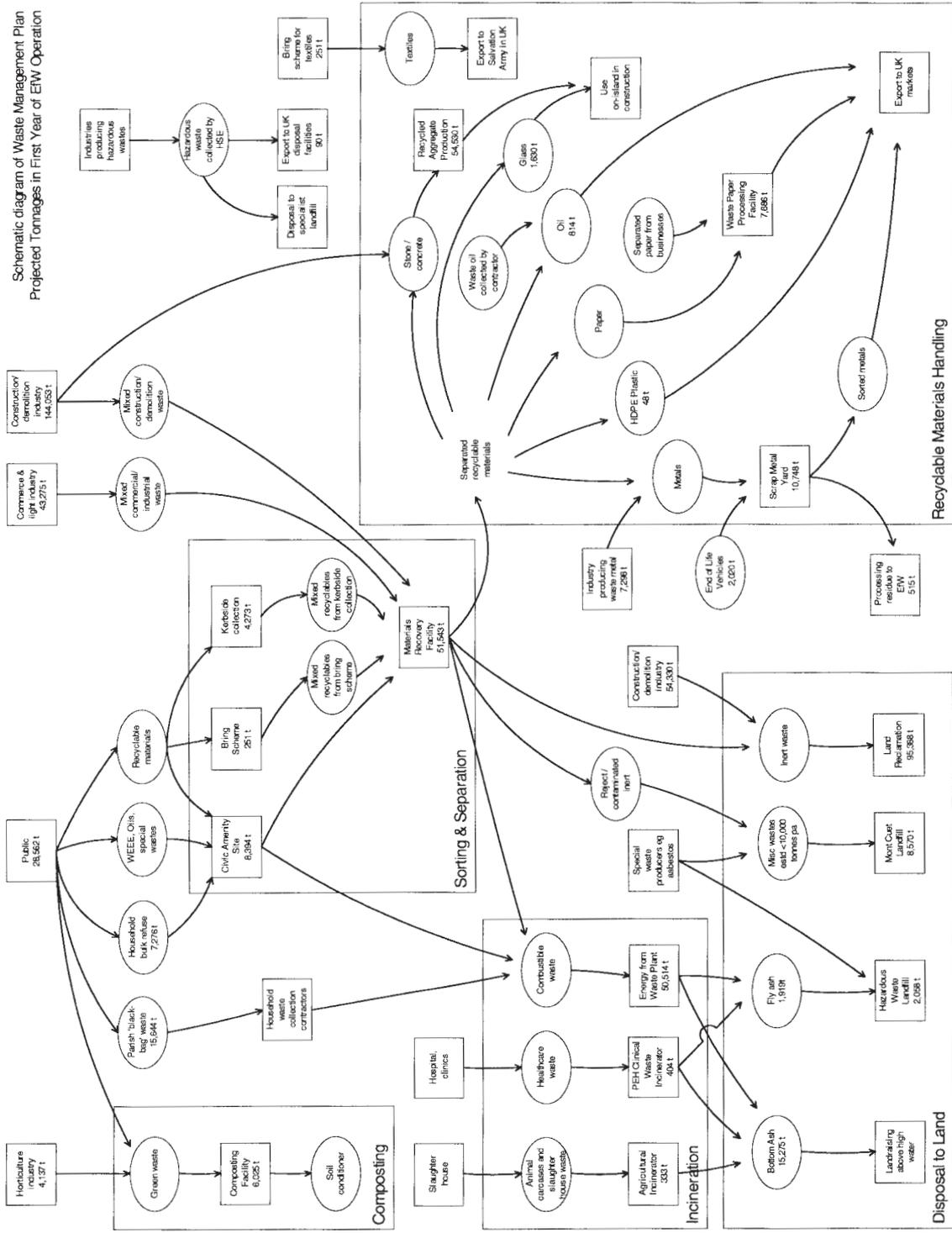


Figure 5.1. Schematic view of WMP activities and facilities. Note that kerbside collection and in-vessel composting are included for illustrative purposes when it is anticipated they will not be operational at an early stage in the planning period.

Focussing upon household waste, the management of this category is summarised in the figure 5.2 below:

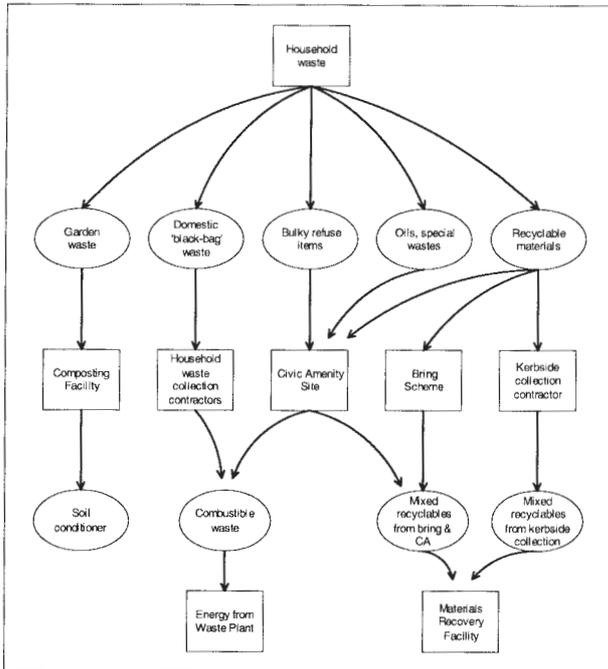


Figure 5.2. Household waste disposal routes. Note that kerbside collection and in-vessel composting are included for illustrative purposes when it is anticipated they will not be operational at an early stage in the planning period.

A similar diagram for skip hauliers is as follows:

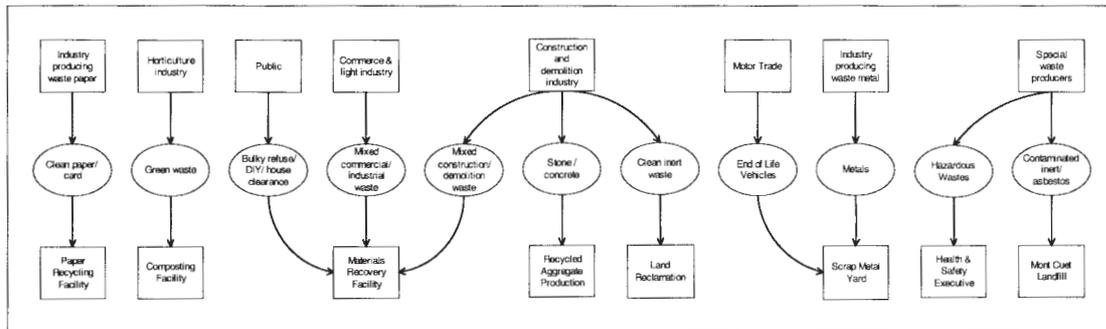


Figure 5.3. Disposal routes for wastes collected by skip hauliers. Note that in-vessel composting is included for illustrative purposes as it is not anticipated to be operational at an early stage in the planning period.

6. RESOURCE AND FINANCIAL IMPLICATIONS

The preceding section describes the activities comprising the island's integrated waste management system. This section describes which bodies will provide the infrastructure and services.

6.1 Provision & Operation

The States of Guernsey wishes to obtain best value for the tax payer by:

- Reducing costs
- Guaranteeing continuity of service
- Providing a high standard of service
- Retaining flexibility in order to respond to changing needs and circumstances

The overall policy of the WMP for achieving the above is to procure services by competitive tender from the private sector on the basis of introducing innovative working methods and efficient use of resources born out of a competitive environment.

Private sector involvement is particularly relevant where any of the following circumstances exist:

- The service or facility cannot be provided with the financial resources or expertise of the public sector alone.
- Involving the private sector is likely to increase the quality or level of service from that which the public sector is able to provide on its own.
- Private sector involvement would enable the service or project to be implemented sooner than if only the public sector is involved.
- There is support from the users of the service for the involvement of the private sector.
- There is scope for effective competition among prospective private sector service providers.
- There are no regulatory or legislative obstacles to involving the private sector in the provision of a facility or services.
- The output of the service can be measured and priced easily.
- The cost of providing the service or facility can be largely or fully recovered through the implementation of user fees.
- The facility or service offers scope for innovation.
- There is a track record of partnerships between government and the private sector.

However another requirement is that the States must retain a high level of control over strategically essential facilities such as the EfW plant and the landfill sites (as discussed in section 3). These facilities are of crucial importance to the island either because they are extremely costly, they are irreplaceable or their mis-management could result in severe consequences. Long term pollution and associated liability arising from the

landfill sites are of particular concern, as it is unlikely that a private sector operator could effectively be held accountable.

Consequently, the public sector will have either direct involvement in the operation of such sites or an ability to 'step-in' to a contractual arrangement with a private sector operator and assume control. In order to do so, and to manage service delivery from contractors, the Environment Department and the Public Services Department shall be closely involved in the operation of strategically essential facilities and oversee services provided by the private sector.

In addition to the strategically-essential issues described above, there are other constraints and considerations which arise because of Guernsey's geographic setting that encourage or necessitate the involvement of government.

- Small market size constrains scope for effective competition
- Absence of alternatives demands that essential facilities and services must be secure and reliable
- Self-sufficiency requires an ability to respond flexibly to unforeseen circumstances
- Limited availability of sites for construction of new essential facilities
- Restricted ability to develop and retain specialist expertise

These issues restrict the size of market and therefore the number of competitors, they also restrict the opportunity for any operator, whether in the public or private sector, to make efficiency gains.

Allocation of private and public sector roles

Waste Minimisation

Service/facility	Role of government	Role of private sector
Producer responsibility groups	Sponsor and chair initial meetings	Participation and promotion
Communications programme	Seek tenders and administer contract.	Specialist drafting of publicity/information materials.

Waste Collection

Service/facility	Role of government	Role of private sector
Commercial refuse collection	None	Provision of vehicles and staff.
Parish refuse collection	Parishes seek tenders and administer contract.	Provision of vehicles and staff.
Kerbside collection of recyclable materials (if adopted).	In conjunction with parishes seek tenders and administer contract.	Provision of vehicles and staff.
Free bulk refuse collection (for appropriate households).	Seek tenders and administer contract.	Provision of vehicles and staff.
Chargeable bulk refuse collection	None – although may be tendered as part of the above.	Provision of vehicles and staff.
Collection/processing/transport of waste oil	Seek tenders and administer contract.	Provision of vehicles and staff.
<i>(Waste oil storage facilities are located on States-owned land. As this land is unlikely to be sold, use of the facilities can only be managed under contract.)</i>	Provision of premises for waste oil storage under contract.	Provision of vehicles and staff.
Civic Amenity (CA) site <i>(The CA site may be operated without levying a gate fee and may also be operated by private sector staff.)</i>	Funding and ownership.	Possible provision of staff.

Waste Segregation and Processing

Service/facility	Role of government	Role of private sector
Sorting and segregation of waste at materials recovery facility (MRF) at Longue Hougue		
<p><i>(The capital intensive nature of this facility favours use of public funding by a treasury loan. Furthermore, the location at Longue Hougue precludes sale of the MRF. However, operational expertise is more likely to reside in the private sector from where it can be obtained at a competitive cost. The duration of the service provision contract should be sufficiently long to cover amortisation of plant. A considerable level of contract administration from the States will be required in order to ensure operational standards are maintained.)</i></p>	<p>Funding and provision of building. Seek tenders for provision of plant and operation. Administer contract and oversee.</p>	<p>Provision of staff and plant, duration of contract to be determined but likely to be in the region of 10 years.</p>
Processing and export of scrap metal including ELVs.		
<p><i>(The capital intensive nature of this building favours use of public funding by a treasury loan, which would need to be repaid through income from the lease. The ideal arrangement for procurement of operations would be to tender out plant and staff in order to allow tenderers to offer their preferred working practices and skills, however if there is doubt over the ability of the local market to offer enough tenderers, provision of staff only may be sought. This would have the disadvantage of requiring the States to expend capital on plant but it may represent the only viable method of introducing competition.)</i></p>	<p>Funding and provision of premises. Seek tenders for provision of plant and operation. Administer contract and oversee operation.</p>	<p>Provision of plant and staff, duration of contract to be determined but likely to be in the region of 10 years.</p>

Processing of construction and demolition waste (aggregate crushing).		
<i>(There is an existing private sector operation which receives clean inert material and crushes it to produce an aggregate substitute. The WMP supports this activity as a form of on-island recycling.)</i>	None.	Provision of premises, plant and staff.
In-vessel composting		
<i>(The capital involved in this facility is not considerable and may therefore be sought from the private sector, however, subject to market testing, it is likely to be located on States-owned land and therefore the funding and ownership should remain within the public sector. Furthermore, the ability to generate revenue from this operation is not certain and will therefore further diminish interest from the private sector.)</i>	Dependent upon results of testing market but funding and provision of plant is probable. Seek tenders for operation and oversee.	Provision of staff for operation, duration of contract to be determined but likely to be in the region of 10 years.

Waste Disposal

Service/facility	Role of government	Role of private sector
Landfilling (Mont Cuet, Longue Hougue and any future sites)		
<i>The landfill sites are considered strategically essential and therefore ownership and operation should remain within the public sector. Long term pollution liability issues of these sites also favour public sector ownership and operation</i>	Funding, ownership, provision of plant and staff.	None.

Energy from waste plant		
<i>The EfW plant is considered strategically essential and therefore ownership should remain within the public sector, along with a high degree of control over operation. The initial 2 year period of operation will be undertaken by the private sector, the arrangement beyond this time is under consideration.</i>	Funding and ownership of plant.	Initial two year operation period – long term involvement to be reviewed at a later date but duration of contract likely to be in the region of a 10 years.

6.2 Resource Requirements

With numerous factors influencing the types and quantities of wastes generated for processing, recycling or disposal it is not possible to predict with certainty the exact future resourcing requirements. Nonetheless, estimated waste arisings and costs have been used in an economic model in order to prepare the following requirements. A ‘theoretical’ gate fee has been quoted which would allow each facility to be self-financing based upon projected throughput, this figure is indicative only and the determination of gate fees is discussed in more detail in section 6.3.

Activity	Capital Cost (£ ,000)	Operating Cost/annum (£ ,000)	Theoretical fee (£/tonne)	Gate	Staffing (Number)	Land (Hectares, acres/vergees)
Civic Amenity Site	350	50	70.00 ¹		2 ²	0.4 1.0/2.6
Materials Recovery Facility	2,500	3,800	55.00 ¹		10	1 2.5/6.6
Composting	700	150	35 ³		2	0.4 1/2.6
Energy from Waste Plant	72,800 ⁴	4,800	100 ⁵		25	2.5 6.25/16.4

Table 6.?

Table footnotes:

¹ Gate fees include cost of disposal for materials collected and separated.

² Health and safety requirements require a minimum of 2 staff, whereas 1 staff member could accomplish the necessary duties. In practice, efficient staffing may be accomplished by pairing the CA site(s) with other low-labour activities such as composting.

³ This gate fee is set at the upper limit and is based upon free transport of the end product to agricultural land (for use as a soil improver) ie that the gate fee is the only revenue for the composting process.

⁴ An additional £30-35 million would be required to fund purchase of additional incineration capacity, should it be required.

⁵ This value does not incorporate repayment of capital for purchase of additional incineration capacity at some point in the life of the plant. If this proves necessary then the gate fee would increase to £115, depending upon when exactly the second line is purchased.

6.3. Financing & Cost Recovery

Preference will be given to financing the various capital investments required to provide major waste management facilities in Guernsey by long term borrowing, with the States acting as the investment financier. In order to maintain adequate public sector control, security and flexibility with respect to public waste management services, private finance provided or arranged by suppliers of waste management infrastructure / services will be avoided. If this is not possible, then other options for arranging long-term finance will be investigated, in particular bank finance, bond finance, lease-purchase of new facilities, and sale and lease-back of existing facilities.

One of the key principles enshrined within the WMP is the 'Polluter Pays Principle' whereby those responsible for creating waste pay for its treatment and disposal. It is considered that the alternative scenario, whereby General Revenue (i.e. taxation) could be used to 'subsidise' disposal facility gate fees, would not support a sustainable waste strategy because ultimately the user would still pay but by hiding the true cost of waste disposal, the incentive to minimise, reuse and recycle waste would be lost.

However, it is recognised that fiscal policies and charging structures must support the overall strategy and must be capable of flexibility to meet changing circumstances. For example, once strategically important land has been reclaimed, the gate fee for inert waste disposal may need to be increased in order to encourage the diversion of suitable inert waste to aggregate recycling.

Charging structures must also be carefully balanced to ensure that costs do not prohibit the use of a particular facility or service to the detriment of the strategy as a whole. This will be a difficult balance to strike and may involve a process of 'trial and error' when the key elements of infrastructure are commissioned.

Until actual costs have been established in the course of constructing new waste management infrastructure, it is not possible to detail the specific charges that will be levied for the various elements of the Waste Management Plan beyond those figures

given in section 6.2. Nonetheless the following guiding principles will be taken into account when setting charging structures and considering the implementation of fiscal measures:

- Waste management costs should be met by direct charging whereby the customer is charged according to the level of usage of the service - the so-called 'Polluter Pays Principle';
- The responsibility for billing and collecting charges for the use of public waste management facilities and services will remain with the States, or a specialised States entity.
- Waste disposal charges should accurately reflect the true cost of providing the service including capital and operational costs, depreciation of infrastructure and equipment and the full allocation of overheads;
- Where an increase above current charges will be necessary to achieve full cost recovery, the charges will be progressively increased;
- Unless there are exceptional social or economic reasons for not doing so, the costs of waste management services currently provided free of charge will be fully recovered either through user charges or alternatively (and where necessary and / or appropriate) by means of an earmarked charge or tax on selected products;
- The method of recovering the cost of disposal should not act to deter those recovery and recycling activities which result in real and significant environmental benefits;
- Differential pricing will continue to be used as an incentive for users to support objectives of the Plan;
- The cost of waste disposal should be transparent. Hidden costs undermine any attempt to encourage waste producers to behave in a manner which minimises waste production;
- Recycling should be considered as a part of waste management and the related costs should, therefore, ideally be recovered from waste producers;
- The introduction of import levies on particular goods or materials should be considered in specific circumstances when in support of the overall strategy. Such levies could be applied, for example, in order to recover the cost of any special recycling or disposal measures or to discourage the use of a particular product in favour of an alternative which supports part of the strategy. For example, import levies could be applied to pesticides in order to cover the cost of export to the UK for specialist disposal or to peat in order to encourage the use of locally produced compost.
- As a possible alternative to import levies, the introduction of surcharges on the purchase price of certain goods should be considered. This so-called Disposal Levy has been applied elsewhere to batteries and pesticides.
- Penalty charging should be considered in respect of waste disposal practices that do not conform with the approved strategy. For example, loads contaminated with inert or recyclable waste could attract penalty charges to encourage effective segregation of waste.
- Consideration should be given to subsidising waste disposal costs in respect of individual services only when this is considered absolutely necessary in support

of the wider strategy. This might apply to recycling, waste segregation and composting costs.

- The costs of applying such subsidies should be met through cross-subsidisation within the waste services sector where possible.
- Subsidising gate fees from general revenue should only be adopted when absolutely necessary in support of the overall strategy.
- The differential structure of user charges / tariffs will be reviewed regularly to ensure that, as new facilities are brought on stream, this continues to support the States' overall waste management policies and objectives.

Taking the above principles into account, the following gate fees will be levied:

Activity	Provisional User Charge (£/tonne)
Civic Amenity Site	None – but restricted to household refuse. ¹
Bring Scheme	None – but restricted to household refuse. ¹
Bulk Refuse Collection	£20 per collection
Materials Recovery Facility	£75 for mixed commercial/industrial and construction and demolition waste
In-vessel Composting	£35
Energy from Waste Plant	£100
Mont Cuet Landfill	£100 ²

¹ The bring scheme and bulk refuse collection scheme are currently funded by general revenue. These services may be funded by an increase in refuse rate, which would be in keeping with the principle of recovering costs from within the waste sector. Introduction of a gate fee for these facilities is not preferred as it would be contrary to the objectives of the Plan in terms of encouraging segregation of recyclable materials and reducing the incentive for fly-tipping.

² Refer to section 5.1.2 regarding the increase of Mont Cuet gate fee to the Long Run Marginal Cost.

If, in the future, an integrated and island-wide system for the separate collection of non-recyclable and recyclable household refuse is introduced, then consideration should be given by the Douzaines to introducing direct charging for household waste collection services. Charging households in proportion to the amount of refuse they present for disposal would be especially relevant as a means to encourage participation in kerbside collection of separated recyclable materials, were that to be introduced.

7.0 PLAN IMPLEMENTATION, MONITORING AND REVIEW

7.1 Programme and Responsibilities for Implementing Planned Actions

Start and finish dates to be updated

Action	To be undertaken by:	Start date:	Duration:	Target completion date:
Activities concerning policy issues, to be commenced immediately				
1 Enact Environmental Pollution (Guernsey) Law				
1.1 Assess existing waste management processes and operators. Ensure compliance with appropriate standards prior to issuing licences.	Office of the Director of Environmental Health and Pollution Regulation		Ongoing	
1.2 Ongoing monitoring of compliance with licences	Office of the Director of Environmental Health and Pollution Regulation			
2 Establishment of States body for provision of waste management services				
2.1 Undertake planning, service procurement from private sector and issue directions to Public Services Department to undertake public sector operations.	Environment Department		Ongoing	n/a
2.2 Operate landfills and other publicly-operated facilities as determined by the States and future	Public Services Department		Ongoing	n/a

	revisions of the WMP.					
3	Communication programme	Environment Department				
3.1	Prepare specification for programme in accordance with objectives of the WMP and appoint specialist advisors			8w		
3.2	Monitor service delivery and quantify effect of programme			Ongoing – probable 4 year appointment		
4	Modify States procurement policy					
4.1	Identify opportunities to support products and services that are compatible with sound waste management practices and promote their usage to appropriate departments	Treasury and Resources Department, Environment Department		Ongoing		
5	Phased increase in landfill gate fee	Public Services Department				
5.1	Devise structure for gate fee increases			4w		
5.2	Promote rationale for increase in conjunction with Communication Programme and introduce			2.5 years (or until EFW commissioned)		
6	Trial segregation of plastic film	Environment Department				
6.1	Investigate acceptance criteria, prices and transport routes to reproprocessors to determine feasibility			4w		

6.2	Approach bulk producers of waste film to assess quantities and scope for separation at source eg horticulture, agriculture, supermarkets, wholesalers			4w	
6.3	If 6.1 and 6.2 indicate a favourable outcome, promote availability of recycling route to encourage participation			52w	
6.4	Commence trial separation and export			52w	
6.5	Review outcome of trial and determine long term policy.				
7	Introduce legislation for imposition of disposal levies	Treasury and Resources Department, Home Department		Ongoing	
7.1	Prepare legislation and States debate			Ongoing	
8	Proposals for inert waste disposal strategy	Environment Department			
8.1	Periodically review land reclamation and land raising projects and prioritise usage of inert waste			8w	
9	Energy from Waste plant construction	Environment Department			
9.1	Ongoing project				
10	Hazardous waste landfill construction	Environment Department			
10.1	Site selection, detailed investigation and costing		Ongoing	16w	

	to determine feasibility				
10.2	Environmental Impact Assessment & Planning Inquiry			52w	
10.3	Tendering process			12w	
10.4	Preparation of policy letter and debate			12w	
10.5	Construction			32w	
10.6	Commence operations				To coincide with EFW commissioning
11	Materials Recovery Facility	Environment Department			
	Assessment of sorting operations to be undertaken based upon waste compositional analysis, disposal and/or recycling routes and consultation with local waste management operators.			12w	
	Seek expressions of interest for construction of facility.			8w	
	Seek expressions of interest for operation of facility.			8w	
11.1	Site investigation and detailed design, including coordination with other activities at the Integrated Waste Management Facility			12w	
11.2	Select procurement and operation methods			16w	
11.3	Undertake investigations as necessary to comply with planning, health and safety and waste licensing requirements.			52w	
11.4	Tendering process for construction			16w	
11.5	Tendering process for operation				

11.6	Preparation of policy letter and debate				12 w	
11.7	Construction of building and installation of plant.			Earliest start 3 months after commissioning EFW plant	16w	
11.8	Commence operations					
12	Scrap Metal Yard					
12.1	Assessment of operations to be undertaken based upon waste compositional analysis, disposal and/or recycling routes and consultation with local waste management operators.				12w	
12.2	Seek expressions of interest for construction of facility.				8w	
12.3	Seek expressions of interest for operation of facility.				8w	
12.4	Site investigation and detailed design, including coordination with other activities at the Integrated Waste Management Facility				12w	
12.5	Select procurement and operation methods				16w	
12.6	Undertake investigations as necessary to comply with planning, health and safety and waste licensing requirements.				52w	
12.7	Tendering process for construction				16w	
12.8	Tendering process for operation					
13	Civic Amenity Site					
13.1	Assessment of wastes to be separated based	Environment Department			12w	

	upon usage of bulk refuse scheme, household waste composition analysis, disposal and/or recycling routes.				
13.2	Review user charging policy			4w	
13.3	Review opportunity for private sector operation and prepare tenders if appropriate.			4w	
13.4	Site investigation and detailed design, including coordination with other activities at Integrated Waste Management Facility			12w	
13.5	Undertake investigations as necessary to comply with planning, health and safety and waste licensing requirements.			52w	
13.6	Tendering process for construction			16w	
13.7	Tendering process for operation if required.				
13.8	Preparation of policy letter and debate			12w	
13.9	Construction		3 months after commissioning EFW plant	24w	
13.10	Commence operations				
13.11	Identify locations for secondary CA sites according to land use and accessibility issues, also possible integration with composting operation			12w	
14	Composting	Environment Dept			
14.1	Undertake a green waste audit at the Chouet composting site and the Mont Cuet landfill site to establish likely feedstock quantity and quality.			8w	
14.2	Further investigate potential on-island markets for the compost product.			4w	

14.3	Investigate the likely market value of the compost product.			4w	
14.4	Seek expressions of interest from the industry for the design and construction of an in-vessel composting facility with an initial capacity of 6,000 tonnes of green waste per annum.			8w	
14.5	Undertake an Environmental Impact Assessment to determine the most appropriate location for a composting facility and satellite civic amenity site in the rural area, to predict the impacts of the facility on the environment and to specify appropriate mitigation measures.			52w	
14.6	Undertake further investigations as necessary to comply with health and safety and waste licensing requirements.			24w	
14.7	Seek expressions of interest locally to operate the composting facility and satellite civic amenity site.			8w	
14.8	Select procurement and operation arrangement			16w	
14.9	Reassess waste arisings following commissioning of the energy from waste facility in order that the impacts of that facility can be better taken into account.			24w	
14.10	Tendering process			12w	

14.11	Preparation of policy letter and debate			12w	
14.12	Construction			25w	
14.13	Commence operations				
	<i>Note: a timescale for implementation of composting will depend upon the extent of private sector financing, identified in task 14.3.</i>				

	Topics for further investigations	To be undertaken by:	Start date:	Duration:	Target completion date:
1	Incineration of waste oil in ETW	Environment Department			
2	Reorganisation of household refuse collection	Parish Douzaines with assistance of Environment Department			
2.1	Consideration of effects of coordinating collection rounds across parish boundaries		As determined by douzaines	As determined by douzaines	
3	Local fluorescent tube processing	Environment Department			
3.1	Assess equipment for crushing tubes			8w	
3.2	Assess routes to reproprocessors for intact and crushed tubes			8w	

4	Use of separated glass and bottom ash in construction products	Environment Department			
4.1	Examine specifications for products containing recycled materials			8w	
4.2	Consult local construction product manufacturers to prepare business case			8w	
5	Pilot separation of waste electrical and electronic equipment (WEEE)	Environment Department			
5.1	Ongoing trial being undertaken by private sector		Ongoing		
5.2	Assess results and determine scope for expanded operation				
6	Investigate kerbside collection of recyclable materials	Environment Department			
6.1	Monitor performance against targets for conservation of EFW 1 st line capacity		EFW commissioning	Ongoing	
6.2	As incineration capacity dwindles determine scope for introduction of kerbside recycling to prolong life of 1 st line.				
6.3	Review costs for collection by use of alternating rounds of residual and recyclable wastes by existing collection vehicles				
7	Investigate introduction of robust containers for household refuse collection	Environment Department			

7.2 Plan Monitoring and Revision

Waste generation and composition will be determined by population and economic trends over forthcoming years. As the Plan is intended to remain valid over the next 25 years, it is highly probable that the projections made now will require revision and, in turn, the waste management infrastructure will also have to respond to these changes. Furthermore, emergence of new waste treatment technologies and legislative standards will render obsolete some actions identified in the first edition of the Plan.

To ensure that the WMP remains appropriate to the island's needs, a review will be undertaken every five years. The review will take into account the same factors as used to compile this first edition, insight gained from experience and performance monitored against the targets specified in section 3.1 of the Plan and measurable policy objectives specified within the Sustainable Guernsey report.

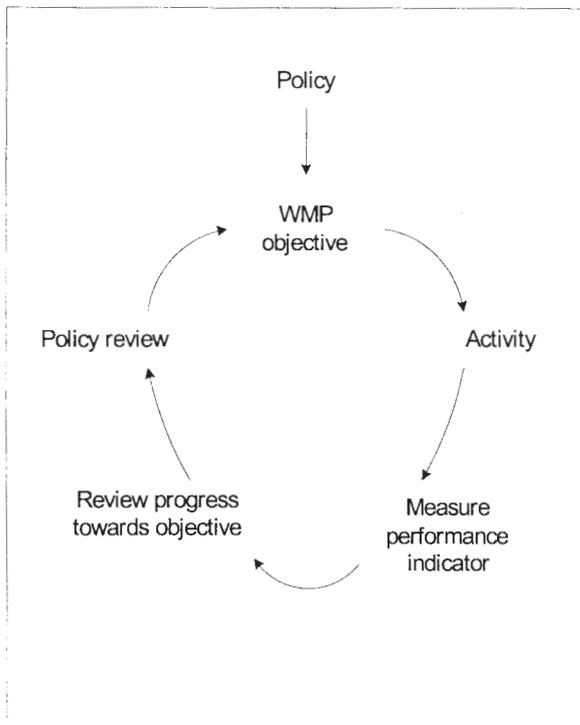


Figure 7.1 Five year cycle of WMP review and revision

GLOSSARY OF TERMS

Basel Convention

The Basel Convention on the Transboundary Movement of Hazardous Wastes, to which Guernsey is a signatory, seeks to protect human health and the environment by the effective management of hazardous wastes. It requires that quantities of hazardous waste are minimised and disposed of close to their point of origin whenever possible.

Best Practical Environmental Option (BPEO)

This term was coined by the Royal Commission on Environmental Pollution. It describes a method for assessing the suitability of processes in terms of their effect upon the whole environment (emissions to land, water and air) and it also takes account of the costs of processes. The objective is to identify the process which causes the least environmental damage at an acceptable cost.

Civic Amenity Site

A facility where members of the public can bring items of waste which would not be acceptable in their normal household waste collection service. Various types of waste may be accepted at these facilities, for example, bulky refuse (such as old furniture), special wastes (such as engine oil or batteries) or large quantities of unmixed wastes (such as off-cuts of timber).

Collection

The process of picking up wastes from residences, businesses, or a collection point, loading them into a vehicle, and transporting them to a processing site, transfer station or landfill.

Direct Charging

A charging system whereby the user of a waste management service is charged in direct proportion to the extent to which they use that service. For example, landfill disposal is charged according to a gate fee for every tonne of waste that is brought to the site. Direct charging is one method of applying the "Polluter Pays" principle.

Disposal

The final placement of waste into a permanent location, possibly after recycling, treatment or other process.

Energy from waste plant

A facility that recovers energy released from the treatment of waste. In Guernsey, the plant will incinerate (burn) refuse in order to release heat energy and the waste will be reduced in volume to an ash. The heat will be used to make steam to drive a turbine which, in turn, will generate electricity. Emissions from the burning process will be treated to meet, or exceed, standards specified in EU legislation.

End of Life Vehicle (ELV)

A motor vehicle which will not be resold and therefore requires disposal.

European Union (EU) legislation

The European Union has issued legislation (known as Directives) on a wide range of environmental issues which have considerable implications for the member states of the EU. Failure to comply can result in financial penalties for the respective governments. In the context of waste management in Guernsey, the island is not obliged to follow any of these laws but they do represent contemporary standards.

Gross Domestic Product (GDP)

The community's total output of goods and services. GDP is a reflection of affluence, and hence consumption of resources which in turn influence the generation of waste.

Hazardous waste

Materials which have an increased potential to cause harm or pollution when compared to other wastes. For example, healthcare waste, pesticides and oils are considered to be hazardous.

Incinerable wastes

Those wastes which are suitable for passing through the energy-from-waste plant. This excludes materials which are not combustible (e.g. stone, glass) and also those wastes which may present operational problems (e.g. very large items, hazardous wastes).

Incineration

Burning waste by means of a specialist facility (see Energy from waste plant).

Inert waste

Waste which does not rot (e.g. stone, hardcore, granite, brick, concrete, glass, soil, etc) and may therefore be suitable for depositing in a marine land reclamation scheme such as Longue Hougue.

Initial Services Period

An early stage in the procurement of the EfW plant when the preferred tenderer develops the detailed specification of the plant in order that planning and environmental permissions may be secured prior to signing of the contract and the subsequent start of construction.

Integrated Waste Management

Addressing and interrelating all environmental, legislative, organisational, economic, social and technical issues for all solid waste streams

Integrated Waste Management Facility

An area at Longue Hougue land reclamation site which has been designated for waste management activities and associated facilities. In addition to the energy from waste plant, designated uses for this area include a civic amenity site and a scrap metal yard.

Landfilling

The final placement of waste at a site with engineered features to protect the surroundings from gas and leachate emissions.

Materials Recovery Facility (MRF)

A site to which mixed waste is delivered and, within an enclosure, subjected to a number of mechanical and manual processes to separate elements of the waste depending upon their value as recyclable materials or other properties. The resulting components are then directed to the appropriate facility or prepared for transfer to recyclable material markets.

Ozone depleting substances (ODS)

Chemicals which, when released into the atmosphere, break down ozone. This gives cause for concern as ozone absorbs potentially harmful ultraviolet radiation in sunlight. The EU has set limits on the emissions of ozone depleting substances which will have implications for the disposal of refrigeration equipment.

Pre-treatment

A process applied to wastes that renders them more suitable for disposal or extracts some value. E.g. incineration with energy recovery yields heat energy and converts the waste to ash. Composting allows green waste to be utilised as a soil improver.

Proximity Principle

The requirement to treat wastes close to where they are produced, the objective being to prevent problems and pollutants being transferred to another jurisdiction. This principle is embodied in waste management law which restricts the movement of wastes between communities.

Putrescible waste

Waste which rots (e.g. household scraps, vegetation, timber, paper, etc). This classification is primarily applied to wastes in order to denote them as unsuitable for placement in a marine land reclamation scheme such as Longue Hougue (see Inert waste).

Recycling

The process of taking waste and treating it in a manner to manufacture a new product. E.g. crushing glass bottles to produce a sand substitute for use in construction.

Reduction

Taking measures to cut down the quantity of waste generated by an individual, a group or organisation. E.g. purchasing re-usable rather than disposable products.

Re-use

Putting an item to the same, or a similar, use rather than disposing of it. E.g. food packaging such as jam jars can often be re-used.

Second incineration line

The Guernsey energy from waste plant is specified to operate within a certain capacity of waste. If the quantities of incinerable wastes exceed this capacity then provision has been made in the design of the plant to accommodate another complete incineration, energy recovery and emission control process. This additional capacity is collectively referred to as the second line.

Segregation

Also referred to as separation. Removal of elements from a mixed waste according to value or property. May occur in a Materials Recovery Facility or can be undertaken by the waste producer.

Waste Disposal Authority

In Guernsey, the Public Services Department is considered to be the Waste Disposal Authority as it is mandated to provide an appropriate means of disposal for refuse. This role has expanded beyond disposal to encompass responsibility for some waste recycling activities.

Waste Electrical and Electronic Equipment (WEEE)

The EU has proposed that WEEE is given special consideration as a waste type and that it should be subject to special requirements for management and disposal. This has come about due to the prevalence of polluting compounds (such as heavy metals) in this waste. The establishment of targets for recovery and recycling of WEEE is intended to minimise the environmental impact of this waste when it is landfilled or treated in an energy from waste plant.

Waste Regulator

The Public Services Department undertakes waste management operations under a voluntary licensing system whereby a number of requirements are set by the Office of the Director of Environmental Health and Pollution Regulation, which has the role of Waste Regulator. These requirements ensure that operations meet contemporary standards for health and safety and environmental protection



Curriculum Vitae of Consultants for the Waste Management Plan

MICHAEL BETTS
CURRICULUM VITAE

PERSONAL INFORMATION

Nationality	British
Year of Birth	1949
Education	Westminster City School, 1961 - 68. B.Sc. Industrial Economics, University of London, 1971.
Professional Affiliations	Chartered Waste Manager, Chartered Institution of Wastes Management Member, Institute of Directors
Languages	English (mother tongue), German (fluent), French (working knowledge)
Computing Skills	Personal computer and notebook user. Familiar with all of the main PC-based business, graphics, communications and project management software packages.
Country Working Experience	Australia, Austria, Bahrain, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Chile, Denmark, Egypt, Estonia, France, Germany, Ghana, Guinea, Guatemala, Hong Kong, Hungary, India, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Latvia, Lithuania, Malaysia, Malta, Netherlands, Nepal, Oman, Philippines, Peru, Poland, Qatar, Russian Federation, Saudi Arabia, Sierra Leone, Singapore, Slovakia, Slovenia, Spain, Sudan, Sweden, Thailand, Trinidad, Turkey, Ukraine, United Arab Emirates, UK, USA.
Other Relevant Information	Presented with the 'Arthur J. Martin Award', UK Institution of Public Health Engineers, March 1982. Vice-Chairman, WHO/UNEP Working Party on Hazardous Wastes Management, 1981. Vice-Chairman, UNEP Working Party on the Control of Environmental Pollution in Urban Areas of Developing Countries, 1983



AREAS OF PARTICULAR EXPERIENCE

- Development / implementation of policies and legislation on waste management.
- Planning, organisation and management of major waste management projects. Development of integrated wastes management strategies and implementation plans at national, regional and local levels.
- Financial / economic appraisal of waste management plans / projects, including the development and application of computer-based operational / financial models.
- Development and implementation of organisational structures and contractual arrangements for private sector participation in the provision / operation of public waste management infrastructure and services.
- Preparation of performance specifications and tender / contract documents for the procurement of wastes management facilities and services.
- Formulation of policies for cost recovery / tariff structures. Preparation of business / financing plans for environmental investments / projects.
- Design and application of economic instruments to support policy objectives in the waste management sector.
- Planning and preparation of Technical / Financial Assistance programmes, particularly with respect to the strengthening of environmental institutions and the provision, operation and financing of waste management facilities and services.
- Planning and delivery of training programmes on different aspects of waste management.

CAREER SUMMARY

1993 to date Director - Integrated Skills Limited

A company formed in September 1993 to provide high quality technical skills and commercial expertise for the planning, development and implementation of major projects worldwide, particularly in the fields of wastes management and environmental protection. Since formation, the Company has undertaken projects in over 50 countries.

1988-93 Managing Director - Environmental Management Limited (EML)

A company within the Watson Hawksley Group (now MWH Inc.), a long-established group of consulting engineers specialising in environmental and public health engineering. The company was created to focus and co-ordinate the Group's environmental activities and services. Primary responsibility for business development and marketing, and project management with particular emphasis on water, wastewater and wastes management projects and services.

1987-88 Freelance Consultant

Operating independently, providing consulting and project management services.

1975-87 Executive Director - Resource Management International Group (RMI) Managing Director - RMI Developments Limited (RMID)



Integrated Skills Limited

Specialists in Environmental Management

Executive Director - Environmental Resources Limited (ERL, now Environmental Resources Management ERM)

Joined ERL, as a consultant, at an early stage in the company's development. During the subsequent twelve years, the company grew from a small (three professional staff) specialist consultancy into an international consulting and management services group in the fields of environmental planning, wastes management, pollution control and public health. At the time of leaving the group employed around 100 staff worldwide.

As one of four Executive Directors and a major shareholder, played a key role in the development and expansion of the business with particular responsibility for:

- All waste management activities
- RMID, the contract management services subsidiary
- Group sales and marketing in the Middle East region

Howard Humphreys & Partners, a subsidiary of Mitchell Cotts PLC, acquired the whole of the equity of the group in December 1985. Resigned all directorships in December 1986 and reached an amicable arrangement for terminating his Service Agreement in February 1987.

1973-74 Industrial Development Officer, United Nations Industrial Development Organisation (UNIDO), Vienna, Austria.

At the time, the youngest professional officer to have been appointed within the United Nations Secretariat. Worked within a small group handling multi-sectoral projects related to industrial development, with particular responsibility for environmental issues. Planned and co-ordinated a series of joint projects with the recently established United Nations Environment Programme (UNEP), concerned with pollution control in various industrial sectors of developing countries. Organised several international workshops on pollution control for specific industries such as Iron & Steel, Cement, Petrochemicals, Leather Tanning, Aluminium Smelting and Textile Dyeing.

1972-73 Corporate Analyst, European Operations, Chrysler International S.A., London.

Member of a team of three which progressively undertook organisational reviews/audits of Chrysler's European manufacturing plants and marketing subsidiaries, and developed new management structures in consultation with local line management.

1971-72 Project Personnel Recruitment Analyst, Personnel Administration Division, United Nations Industrial Development Organisation (UNIDO), Vienna, Austria.

Member of a section that identified, assessed, recruited and administered field personnel for a wide range of projects in developing countries. Principal duties were concerned with finding and evaluating suitably qualified and experienced professional staff, and arranging for their recruitment and posting.



SELECTED PROJECT EXPERIENCE

2004-5 Assessment of Options for Recycling Revenue from Landfill Tax Increases back to Business, for Invest Northern Ireland (UK).

Team Leader for an assessment of different policy options and financial disbursement mechanisms for utilising part of the revenues from future increases in landfill tax in ways that will encourage improvements in business waste management practices and reduce the volume of waste sent to landfill in the Province of Northern Ireland.

2004-5 Strategy for EU Environmental Law Approximation in Croatia, for the Croatian Ministry of Environmental Protection, Physical Planning and Construction (MEPPPC) with funding from the European Commission.

Environmental Approximation Process Expert for a project to assist the Government of Croatia in developing an overall strategy and programme for transposing and implementing the EU environmental *acquis*, and to prepare an integrated National Waste Management Strategy.

2004 Best Practicable Environmental Option for the Management of Commercial & Industrial Wastes in Devon, UK, for Devon County Council in association with AEA Technology.

Project Manager for a study to assess and recommend the Best Practicable Environmental Option for the management of commercial & industrial wastes in Devon County.

2004 Review of Options for Private Sector Participation in Public Waste Management Services, for the Municipality of Sharjah, United Arab Emirates, in association with Birkhahn & Nolte GmbH.

A review and assessment of the potential benefits and risks of different options for private sector participation in the provision of public waste management facilities and services in Sharjah, taking account of local conditions and constraints.

2002-4 Preparation of Tender / Contract Documents for the Provision and Operation of Waste Management Services in Malta, for the Government of Malta (Ministry for Resources and Infrastructure).

Project Manager for the preparation of tender / contract documentation and performance specifications for two major waste management services contracts, and terms of reference for conducting site investigations and risk assessments, and developing remediation and restoration plans for three existing landfill sites. The services contracts encompassed the provision and operation of two new long-term landfill sites (for stabilised hazardous and non-hazardous wastes respectively), hazardous waste storage and treatment facilities, composting and materials recovery facilities, and a waste transfer station. Detailed technical and financial evaluation of tenders received, and provision of recommendations and advice on the awarding of contracts.

2003 Panevezys Regional Waste Management System Development Project, for the Lithuanian ISPA Implementing Agency in association with Jacobs-GIBB and Vilnius Consult.

Member of a team that prepared a waste management feasibility study and plan for the Panevezys region, Lithuania, together with an EC Cohesion Fund grant application. The plan included detailed proposals for introducing new municipal waste recycling systems and for significantly increasing private sector participation in the provision of new infrastructure and service delivery.



Integrated Skills Limited

Specialists in Environmental Management

- 2003** **Assessment of Options for Recycling Revenue from Landfill Tax Increases back to Business**, for HM Treasury (UK).
- Team Leader for a study of options for recycling revenue arising from planned increases in the UK landfill tax from 2005-6 back to business, in order to tackle market failures and reduce the volume of waste landfilled. The study assessed the potential costs and benefits of different policy options, and identified the most effective mechanisms for delivering each option taking account of existing institutional arrangements and delivery mechanisms.
- 2003** **Regulatory Impact Assessment of Proposed Changes to the Packaging Regulations**, for the UK Department for Environment, Food and Rural Affairs (DEFRA) in association with AEA Technology.
- Member of a team that undertook a cost / benefit assessment of options for implementing proposals to amend the recovery and recycling targets contained within the EC Directive on Packaging and Packaging Wastes. Providing input to the development of a computer-based economic model for analysing and comparing different options for achieving compliance with the revised targets.
- 2003** **Review and Analysis of Policy Options for Waste Management**, for the States of Guernsey Board of Administration.
- Project Manager for a review and analysis of policy options in relation to the provision and operation of public waste management facilities and services in Guernsey, particularly institutional / organisational arrangements; private sector participation and contractual relationships; financing and cost recovery.
- 2002** **Preparation of a "Project Description Statement" for the Development of New Waste Management Facilities in Malta**, for the Government of Malta (Ministry for Resources and Infrastructure).
- Project Manager for the preparation of a "Project Description Statement" (application for a development permit) for the development of new waste management facilities, including a non-hazardous waste landfill site, hazardous waste landfill site and hazardous waste pre-treatment plant.
- 2001-2** **National Waste Management Plan for the Czech Republic**, for the Czech Ministry of Environment / European Commission in association with AEA Technology.
- Project Manager for the development of a draft National Waste Management Plan for the Czech Republic. This was a follow-on project from a previous project to develop implementation / investment strategies for achieving compliance with EU Waste Directives (see below).
- 2001** **Preparation of a Tender for Municipal Waste Management Services in Bahrain**, for a private sector Client.
- Leader of a team that prepared a comprehensive tender for a 7-year contract to provide municipal solid waste collection and road cleansing services in the State of Bahrain.
- 2001** **Evaluation of Tenders for the Provision and Operation of an Integrated Solid Waste Management System for Malta**, for the Government of Malta (Ministry for the Environment).
- Expert appointed to assist the Tender Adjudication Board to carry out a technical appraisal and financial evaluation of bids received in response to a "Call for Proposals" for the provision and operation of an integrated solid wastes management system for the Maltese Islands.



Integrated Skills Limited

Specialists in Environmental Management

- 2001** **Multi-Year Waste Management Plan for Latvia**, for the Latvian Ministry of Environmental Protection and Regional Development / European Commission in association with AEA Technology.
Financial and legal expert for the development of a National Waste Management Plan for Latvia.
- 2001** **Development of a Hazardous Waste Management System in Azerbaijan**, for the World Bank in association with Gibb Limited.
Financial Advisor for the development of a hazardous waste management system and associated capacity building in Azerbaijan.
- 2000-1** **Implementation / Investment Strategies for Achieving Compliance with EU Waste Directives**, for the European Commission (Phare) and the Czech Ministry of Environment.
Senior Economic and Financial Advisor for the development of implementation / investment strategies for achieving compliance with EC waste directives.
- 2000-1** **Integrated Solid Waste Management Strategy for the Maltese Islands**, for the European Commission (DG Environment) and the Government of Malta.
Project Manager for the development of an integrated solid waste management strategy and outline implementation plan for the Maltese Islands. The Strategy was approved by the Government and published in October 2001.
- 2000** **Integrated Wastes Management Strategy for the Province of Yalova, Turkey**, for the British Earthquake Consortium for Turkey (BECT)/ UK Department of the Environment, Transport and the Regions (DETR).
Project Manager for the development of an integrated solid waste management strategy and outline implementation plan for the Province of Yalova, Turkey.
- 2000** **Private Financing of Waste Management Facilities on the Island of Cyprus**, for the Government of Cyprus, under sub-contract to International Capital Partnerships (UK).
Provision of advice on the potential scope and requirements for using private finance to develop and operate new facilities for the recycling, processing and disposal of hazardous wastes and municipal solid wastes in Cyprus.
- 2000** **Assessment of Solid Waste Management in the Maltese Islands**, for the European Commission (DG Environment), under sub-contract to Environmental Development Consultants Limited (Ireland).
Leader of a 4-person team that undertook a preliminary assessment of the current status and likely requirements to enable Malta to achieve compliance with EU policies and legislation in the waste management sector. The assessment considered legal, institutional, technical, environmental, social and financial requirements and constraints.
- 2000** **Preparation of Tender & Contract Documentation for Road Cleansing Services**, for the States of Guernsey, Public Thoroughfares Committee, UK.
Specialist member of a team preparing tender and contract documents for the provision of road cleansing and related services in Guernsey. Primarily responsible for dealing with the contractual and commercial aspects.



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Specialists in Environmental Management

- 1999 Widening the EAP to the New Independent States and Mongolia**, for the European Commission (Tacis), under sub-contract to Halcrow-BCEOM-Tebodin Consortium.
- Course lecturer for Training Module 5 - Development and Implementation of Solid Waste Management Plans - held in Kyiv, Ukraine and Almaty, Kazakhstan in November and December 1999. Responsible for preparing and presenting training materials for 4 course lectures covering a range of methodologies / techniques for developing integrated strategies and implementation plans for managing solid wastes in the New Independent States.
- 1999 Options for the Procurement of a Waste-to-Energy Facility**, for the States of Guernsey, Department of Engineering, UK.
- Preparation of a report on the options potentially available to the Government of Guernsey for procurement of a new Waste-to-Energy Facility for the future processing of solid wastes on the Island.
- 1999 Development and Preparation of Tender Proposals for the Design, Construction and Operation of a Waste Transfer Station in Hong Kong** - client confidential.
- Member of a multi-disciplinary team which provided technical inputs and support, and commercial advice, for the preparation of detailed tender proposals relating to the design, construction and long-term operation of a road-based waste transfer station (1,200 tonnes/day) to serve the North West New Territories of Hong Kong.
- 1998-9 Development of a Handbook for Implementation of EU Environment Legislation**, for the European Commission (Phare DISAE Facility), under sub-contract to Halcrow Group Limited.
- Specialist member of a team that developed a Handbook for Implementation of EU Environment Legislation to assist the Candidate Countries to meet the requirements of EU environmental legislation. Specifically responsible for preparing the sections on waste management planning, investment financing mechanisms and the use of economic instruments.
- 1998-9 Provision of Technical Assistance in the Approximation of Waste Management Legislation in the Slovak Republic**, for the European Commission (Phare DISAE Facility), under sub-contract to Halcrow Group Limited.
- Member of a team that advised the Slovak Government on the legislative, economic and financial implications of achieving compliance with EU policies and legislation relating to wastes management. Responsible for advising on wastes management issues generally, for the financial planning aspects, and for formulating proposals for introducing new economic instruments aimed at supporting Slovakia's strategic objectives in the waste sector.
- 1998 Assessment of Birdstrike Risks at Kathmandu Airport, Nepal**, for the German Agency for Technical Co-operation (GTZ).
- Leader of a team undertaking a detailed study and assessment of the risks of birdstrike at Kathmandu International Airport, in relation to the development and operation of landfill sites in the Kathmandu Valley
- 1997-8 Development of a Strategic Business Plan**, for the States of Guernsey, Public Thoroughfares Committee, UK.
- Manager of a project to develop a strategic business and financing plan for the future provision and maintenance of road infrastructure, and wastewater/surface water management facilities and services throughout the Island of Guernsey.



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Specialists in Environmental Management

- 1997** **Review of Charging & Operational Management Practices for Solid Waste Management Services**, for the States of Guernsey, Department of Engineering, UK.
- Specialist member of a team that carried out a review of charging and operational management practices for solid waste management services on the Island of Guernsey, and formulated proposals for improvement. Specifically responsible for reviewing and evaluating operational management systems and procedures.
- 1997** **Investigation and Assessment of Solid Waste Management Options**, for the States of Guernsey, Department of Engineering, UK.
- Project Director for an investigation and detailed assessment of options for the future management, recovery, recycling, treatment and disposal of all solid and hazardous wastes generated on the Island of Guernsey.
- 1996** **Analysis of Options for Organising and Financing a Proposed Municipal Solid Waste Transfer-Loading / Materials Recovery Facility**, for the Vale of Glamorgan Council, UK.
- Project Manager for a study to identify and assess the options available to the Council for organising and financing a proposed facility for processing, recovering and transfer-loading municipal solid waste.
- 1996** **Study to Identify and Evaluate Strategic Policy Options for Waste Minimisation**, for the States of Guernsey, Department of Engineering, UK.
- Project Manager for a study of the options for minimising the production of wastes, being undertaken as part of a major programme to develop a sustainable waste management strategy for the Island of Guernsey.
- 1996** **Technical Review and Economic Assessment of an Anaerobic Digestion System, UK**, client confidential.
- Project Manager and economist for a technical review and economic assessment of a novel anaerobic digestion system for processing and recovering mixed municipal solid waste and sewage sludge. Undertaken on behalf of a potential investor in the company that developed the system.
- 1996** **Feasibility Study for a Proposed Municipal Waste Recycling Facility in Saudi Arabia**, client confidential.
- Team Leader and economist for a study to evaluate the technical and economic feasibility of developing a 450/tonnes per day municipal waste processing and recycling facility in the Eastern Province of Saudi Arabia.
- 1996** **Implementation of the Latvian Hazardous Waste Management Strategy**, for the Latvian Ministry of the Environment / European Commission (Phare).
- Leader of a team providing technical assistance and advice for implementing the Latvian Hazardous Waste Management Strategy.
- 1996** **Independent Technical and Financial Review of a Planned Materials Reclamation/Composting Facility, UK**, for ERI (Berkshire) Limited.
- Undertaken in connection with the process of finalising long-term project financing for a Materials Reclamation/Composting Facility to be built under a long-term contract with Berkshire County Council, UK.



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Specialists in Environmental Management

- 1996** **Fact-Finding and Appraisal Mission on Solid Waste Management in Nepal**, for the German Agency for Technical Co-operation (GTZ).
Member of a two-man Mission appointed to investigate the current status and problems relating to solid waste management in Nepal, and to prepare detailed recommendations and formulate proposals for a DM 3 million programme of Technical Assistance to be supported by GTZ and other potential donors.
- 1995** **Preparation of a Tender for the Highland Sewerage Private Finance Initiative, Scotland, UK**, for the North West Water-Morrison-Bechtel Consortium.
Provision of advice and assistance on the environmental, planning and commercial aspects of a tender for designing, constructing and operating sewerage and sewage treatment schemes for the towns of Inverness and Fort William, Scotland, under a 'Build-Own-Operate' (BOO) contract.
- 1995** **Development and Preparation of Tender Proposals for the Design, Construction and Operation of Two Waste Transfer Stations in Hong Kong** - client confidential.
Leader of a multi-disciplinary team providing technical inputs and support, and commercial advice, for the preparation of detailed tender proposals relating to the design, construction and long-term operation of two marine transfer stations (2,400 tonnes/day and 1,200 tonnes/day) to serve the West Kowloon and North Lantau areas of Hong Kong.
- 1994-5** **Development of a Waste Management Strategy, for the Municipality of Piotrków Trybunalski, Poland.**
Team Leader for the development of a long-term strategy for managing municipal and industrial wastes in the province of Piotrków Trybunalski.
- 1994** **Development of a Concept and Programme for Privatisation of Municipal Solid Waste Management Services throughout Malaysia** - client confidential.
Provision of high level advice and assistance on developing a concept and programme, including financial proposals, for the progressive privatisation of all municipal solid waste management services and facilities in Malaysia.
- 1993-4** **Development of a Waste Management Strategy for the New Hong Kong Airport**, for the Provisional Airport Authority.
Key specialist and team leader for the development of a comprehensive waste management strategy for the new airport at Chek Lap Kok, Hong Kong, in association with Montgomery Watson (Hong Kong) Limited.
- 1993** **Development of a Sludge Management Strategy for Grampian Region, Scotland** for the Grampian Regional Council.
Project Director for the preparation of a comprehensive study and development of a regional strategy and plan for the management and disposal of sewage sludge for the region of Strathclyde, Scotland.
- 1993** **Development of a Sludge Management Strategy for Strathclyde Region, Scotland** for the Strathclyde Regional Council.
Project Director for the preparation of a comprehensive study and development of a regional strategy and plan for the management and disposal of sewage sludge for the region of Strathclyde, Scotland. This project included detailed EIAs of both the existing and proposed sludge disposal systems.



Integrated Skills Limited

Specialists in Environmental Management

- 1992-4 National Waste Management Strategy and Master Plan for the Czech and Slovak Republics** for the Czech and Slovak Ministries of Environment/European Commission (Phare).
Project Director of a major project to develop a national waste management strategy and Master Plan for the Czech and Slovak Republics, including a fully functional waste management/geographical information system. Personally responsible for all economic and financial aspects of the project, including the development of detailed proposals for financing implementation of the strategy. Funded under the EU Phare Programme
- 1992 Preparation of a Corporate Environmental Policy** for Devon Waste Management, UK.
Preparation of a comprehensive Environmental Policy for Devon Waste Management, a newly-formed Local Authority Waste Disposal Company (LAWDAC), including specific objectives and targets covering the Company's entire operations.
- 1991-2 Development of a Sludge Management Strategy for Inverness and Environs, Scotland** for the Highland Regional Council.
Project Director for the preparation of a comprehensive study and development of a strategy and plan for the management and disposal of sewage sludge for the town of Inverness and surrounding communities. The study included a detailed technical assessment and cost-benefit analysis and comparison of different strategic options for managing and disposing of sludge.
- 1990-1 Technical Advice and Assistance on Process Design** for the modernisation of Cringle Dock Waste Transfer Station, UK.
Project Director, providing specialist advice to Norwest Holst Project Services Ltd (the main contractor) on the design, planning and execution of measures to upgrade a waste transfer station, including particularly increasing its capacity and installing new refuse handling and compacting plant.
- 1988 Feasibility Study for a sewage sludge incineration plant** for a UK Regional Water Authority.
Project Director of a team advising on a proposed sludge incineration plant, with particular regard to air emissions.
- 1988 Private Sector Participation in the Delivery of Waste Management Facilities and Services in Greater Freetown, Sierra Leone**, for the German Bank for Reconstruction (Kreditanstalt für Wiederaufbau - KfW).
An assessment of the options and requirements for introducing private sector participation in the delivery of waste management facilities and services in Greater Freetown, followed by the preparation of tender / contract documents and performance specifications for a 5-year waste management services contract. This was one of the first successful attempts to privatise municipal waste management services in an African developing country.
- 1988 Designs and Tender Documents** for a 700-tonnes/day municipal solid waste composting plant for the Kuwait Industrial Investment Company.
Director of a small team advising on the selection of appropriate technology, and preparation of designs, specifications, tender and contract documents for a 700 tonnes/day composting facility for municipal solid wastes, to be built in Kuwait.



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- 1987 Evaluation of the Kathmandu Solid Wastes Management Project, Nepal**, for the German Agency for Technical Co-operation (GTZ).
- Member of a two-man team appointed to evaluate, and make recommendations for the future development of, an existing solid wastes management project in the Kathmandu Valley, Nepal, supported by the Federal German Government. Primarily responsible for assessing the institutional, management and organisational aspects of the project and for preparing analyses of current/future costs and proposals for further financing.
- 1987 Evaluation of the Greater Freetown Sanitation Project, Sierra Leone** for the Federal German Ministry of Economic Co-operation (BMZ)/Kreditanstalt für Wiederaufbau (KfW).
- Member of a two-man team appointed to evaluate, and make recommendations for the future development of, an existing urban sanitation project in Greater Freetown supported by the Federal German Government. Primarily responsible for assessing the institutional, management and organisational aspects of the project and for preparing analyses of current/future costs and proposals for further financing.
- 1986-7 Contract Management Services for City Cleansing and Waste Disposal** for the Central Municipal Council, State of Bahrain.
- Project Director - personally responsible for negotiating, mobilising and directing a two-year management services contract to completely re-organise all municipal cleansing and waste disposal services throughout Bahrain. Resources under management included a workforce of 3,500, a fleet of 250 vehicles and heavy plant, central workshop, two-stream pulveriser plant and a landfill site.
- 1981-6 Contract Management Services for City Cleansing and Waste Disposal** for Doha and Rayyan Municipalities, State of Qatar.
- Project Director for the provision of management services to re-organise and operate municipal cleansing and waste disposal services on behalf of two municipalities, including Doha, the capital of Qatar.
- 1985-6 Feasibility Study, Planning and Outline Designs for the Disposal of Toxic Wastes in Bahrain** for the State Environmental Protection Committee.
- Project Director for this project, undertaken jointly with Watson Hawksley, consulting engineers. Comprised a detailed waste survey, site investigation, technical/economic assessment, outline designs for a waste pre-treatment / disposal facility, and proposals for the control and management of potentially toxic or hazardous wastes.
- 1985-6 National Master Plan for the Control of Solid Wastes and Water Pollution in Qatar** for the State Environment Protection Committee.
- Project Director for a baseline pollution survey and development of a national pollution control strategy/plan.
- 1984-5 Feasibility Study and Plan for the Re-use, Treatment and Disposal of Solid Wastes in the Shuaiba Industrial Area** for the Shuaiba Area Authority/Kuwait Institute for Scientific Research.
- Project Director for a comprehensive study of waste arisings, evaluation of handling options, advice on management and control, development of a tariff and manifest system, outline engineering designs, and preparation of an implementation programme.



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- 1983-4 Solid Waste Management for the City of Jubail, Kingdom of Saudi Arabia** for the Royal Commission for Jubail and Yanbu.
- Project Director for ERL as sub-contractor to Watson Hawksley. Major planning and engineering project for solid and liquid wastes management. Development of Master Plan. Feasibility studies of refuse composting, metal scrap recovery and incineration of hazardous wastes. Engineering designs and contract packages for a large landfill site, workshops and truck depot. Specifications for all vehicles and other mobile plant.
- 1983 Policy Guidelines for the Control of Environmental Pollution in Urban Areas of Developing Countries**, for the United Nations Environment Programme (UNEP), Nairobi.
- Vice-Chairman and Rapporteur of a Working Group established by UNEP. The Terms of Reference of the Working Group covered the full spectrum of urban environmental pollution issues and problems.
- 1982 Solid Waste Handling and Disposal at a Car Production Plant** for British Leyland, UK.
- Project Director for a detailed study of the handling and disposal of solid wastes produced by the Cowley manufacturing complex.
- 1982 Evaluation of Solid Waste Management in the Kathmandu Valley, Nepal** for the Federal German Ministry of Economic Co-operation (BMZ).
- Member of a team appointed to evaluate, and make recommendations for the future development of, an existing urban cleansing and waste disposal project in the Kathmandu Valley supported by the Federal German Government. Primarily responsible for assessing the institutional, management and organisational aspects of the project and for preparing analyses of current/future costs and proposals for further financing.
- 1981 Refuse Disposal System for the City of Doha, Qatar** for the Municipality of Doha. Project Director for ERL as sub-contractor to BC Berlin Consult GmbH.
- Survey and assessment of future refuse transport and disposal requirements, preparation of designs and tender documents for a 200 tonnes/day transfer-loading station and associated vehicles and equipment plus a new sanitary landfill site, evaluation of tenders and advice on selection of the contractor.
- 1981 Guidelines for the Control of Toxic and Other Hazardous Chemical Waste**, for the World Health Organisation, Regional Office for Europe.
- Vice-Chairman of a Working Group established jointly by the World Health Organisation (WHO) and the United Nations Environment Programme (UNEP). Later published as WHO Regional Publication No. 14.
- 1980 Technical and Economic Assessment of the Potential for Waste-Derived Fuels in Europe**, for PLM Sweden.
- Project Manager for a European market survey and techno-economic assessment of the potential for substituting Waste-Derived Fuels for solid fossil fuels in industrial furnaces and cement kilns.
- 1980-1 Solid Waste Management Master Plan for the Province of Valencia, Spain** for the Provincial Government of Valencia.
- ERL. Project Director. Undertaken jointly with Aquaplan SA, consulting engineers. Comprehensive survey and strategic plan for solid wastes management in the Province.



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1979-80 Solid Waste Management Master Plan for the Amman Urban Region, Jordan for the National Planning Council/ Municipality of Amman.

Undertaken jointly with Watson Hawksley. Project Director. Feasibility studies, preparation of detailed Master Plan, engineering designs and specifications for transfer stations/workshop/pilot composting plant/vehicles and equipment, organisation and management systems, financing proposals, training programmes, and drafting of legislation.

1979 Solid Waste Management Study and Master Plan for the Kingston Metropolitan Region, Jamaica for the National Planning Agency/Inter-American Development Bank.

Project Manager. Similar in scope and content to the Amman project described above.

1978-82 Regional Seminars on Solid Waste Management in Developing Countries, held in Thailand, Jordan and Sierra Leone for Carl Duisberg Gesellschaft/Federal German Government.

Responsible for the preparation of seminar materials for, and running, a series of regional training seminars on solid wastes management for participants from a wide range of developing countries.

1977-8 Product Planning, for the Commission of the European Communities.

Project Economist for a major policy research study of the relationship between product characteristics and their environmental impacts. The objective of the study was to investigate how actions taken at the product planning stage can reduce the environmental impacts associated with the manufacture, use and disposal of a range of industrial and consumer products. The study report was later published.

1977-8 The Economics of Recycling, for the Commission of the European Communities.

Project Economist for a wide-ranging investigation of existing waste recycling practices in the member countries of the European Community, and the development of a Community-wide policy to encourage further recycling of wastes. The investigation covered all major sources and types of municipal, industrial, agricultural and mining wastes. The study report was later published.



SELECTED PUBLICATIONS / CONFERENCE PAPERS

Resource Recovery in Europe. Paper presented at the Conservation Society, Stoneleigh, Warwickshire, UK, 1976.

Resource Recovery Developments in Germany. Materials Reclamation Weekly, 1976.

Product Planning - The Relationship Between Product Planning and Environmental Impact. With R. Bidwell and S. Mason, Published by Graham and Trotman for the Commission of the European Communities, 1978.

The Economics of Recycling. With R. Bidwell and S. Mason, Published by Graham and Trotman for the Commission of the European Communities, 1978.

Trends and Future Developments in Waste Treatment, Recovery and Disposal. Paper presented at the 'Environment '78' Seminar, US Trade Centre, London, April 1978.

Die Herstellung von Brennstoffen aus kommunalen Abfällen anhand von Beispielen aus dem Vereinigten Königreich. Paper presented at a Colloquium in Stuttgart on thermal waste management technologies, Published in 'Müll und Abfall', October 1978.

Operational Factors in Waste Management Planning. Paper presented to the Solid Waste Management Seminar, AIT, Bangkok, September 1978.

The Role of Resource Recovery in Waste Management. Paper presented to the Solid Waste Management Seminar, AIT, Bangkok, September 1978.

Current Trends in Waste Management in Developing Countries. Paper presented at a Conference organised by the Institute of Public Health Engineers and the Institute of Solid Waste Management, November 1979. Published in 'The Public Health Engineer', April 1980.

The Analysis and Forecasting of Solid Waste Quantities and Composition. Paper presented at a Seminar on Solid Waste Management, AIT, Bangkok, December 1979.

Demolition Waste. With R. Johnson and G. Tomlins. Published by the Construction Press for the Commission of the European Communities, 1980.

Recent Developments in Wastes Management in the Federal Republic of Germany. Published in the 'Wastes Management Bulletin', January 1989.

The Role, Costs and Benefits of Composting Techniques in Waste Management. Paper presented at the First Annual Waste Management Conference, October 1993, Dubai, United Arab Emirates.

Industrial Environmental Challenges in Thailand : Problems, Lessons and Solutions for the Philippines. Paper presented at a Seminar organised by the Philippine-German Business Cooperation Office, Manila, December 1993.

Developing a Hazardous Waste Management Strategy - Essential Principles, Choices and Decisions. With P.N.O. Crick. Paper presented at the Second Annual Conference on Hazardous Waste Management, June 1994, Dubai, United Arab Emirates.

Establishing Cost-Effective Waste Management Systems in the Middle East. Paper presented at the 3rd Annual Middle East Convention on Waste Management and Waste Minimisation, April 1995, Dubai, United Arab Emirates.

Waste Management on Islands - Collection and Transportation. Paper presented at a seminar on waste management on islands, organised by the European Commission, DG XI, Santa Cruz de Tenerife, Canary Islands, Spain, June 1995.

The Future for Wastes Management. Article published in >Contact=, the house magazine of the Guernsey Chamber of Commerce, December 1996.

Integrated Waste Management Planning. Paper presented at a seminar on waste management planning by local and regional authorities, organised by the European Commission, DG XI, Estoril, Portugal, January 1997.

Development of an Integrated Wastes Management Strategy for Malta – Approach and Current Status. Paper presented to the 7th Malta Industry Environment Conference, St Julians, Malta, February 2001.

Waste Management: Strategic Planning, Conceptions, Knowledge Networking. Paper presented at a TAIEX workshop on legal, organisational and economic aspects of waste management, Siauliai, Lithuania, November 2003.



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Specialists in Environmental Management

CONTACT DETAILS

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Email mbetts@integrated-skills.com

www.integrated-skills.com



P. NICHOLAS O. CRICK

CURRICULUM VITAE

PERSONAL INFORMATION

Nationality	British
Year of Birth	1941
Education	MA, University of Cambridge, 1968. MBA, 2-year programme, Stanford Graduate School of Business, California, 1966-68. BA, Chemistry/Economics, University of Cambridge, 1962 Cranleigh School, 1954-59.
Professional Affiliations	Fellow – Chartered Institution of Wastes Management (UK). Member – Institute of Waste Management (South Africa).
Languages	English (mother tongue), French (fairly good), Spanish (fairly good), German (basic working knowledge), Russian, Polish, Slovak (limited working knowledge).
Computing Skills	Windows, MS Office, Corel WordPerfect Suite, ARC View 3.2, FORTRAN, Visual Basic, LISP, MS Project.
Country working experience	Azerbaijan, Bahrain, Belgium, Botswana, Czech Republic, Falkland Islands, France, Germany, Greece, The Gambia, Hong Kong, Ireland, Kenya, Lithuania, Malawi, Malaysia, Malta, Mauritius, Nigeria, Poland, Portugal, Russian Federation, Seychelles, Slovak Republic, South Africa, Spain, Tanzania, Turkey, Ukraine, USA, Zambia, Zimbabwe.

AREAS OF PARTICULAR EXPERIENCE

- Planning and management of major solid wastes projects, including hazardous wastes.
- Wide experience of the waste management and related environmental industries, including technical, operational, financial, commercial and political aspects.
- Waste management contract specification and preparation.
- Institutional development and strengthening.
- Development of training programmes.
- Waste management legislation.
- Waste information systems.
- Financial and operational modelling.
- Identification of investment opportunities within the environmental services sector.
- Bid preparation and contract negotiation, particularly for Market and Strategic Analysis and Environmental Management Systems contracts.



Integrated Skills Limited

Specialists in Environmental Management

CAREER SUMMARY

Current Director, Integrated Skills Limited (ISL)

ISL is a company formed in September 1993 to provide high quality technical skills and commercial expertise for the marketing, development and implementation of major projects worldwide, particularly in the fields of wastes management and environmental protection. During this period, projects have been undertaken in more than 50 countries worldwide, including Central and Eastern Europe, Africa, the Far East and the Caribbean, as well as in the UK. He was elected a Fellow of the Institute of Wastes Management in June, 2000.

1992-3 Associate Director, Environmental Management Limited

Project Manager for the development of an Integrated National Waste Management Strategy and Master Plan together with a Waste Information System for the Czech and Slovak Republics.

1991-2 Freelance Consultant

Assignments included environmental, market and strategic policy analyses and the identification of investment opportunities in the UK, most EC countries and Eastern Europe. He also provided specific marketing and technical advice in the waste management field on such issues as hazardous waste management, landfill and transfer station development, landfill gas utilisation, trans-frontier waste shipments and recycling processes. Projects were undertaken in Germany, France, Belgium and Portugal as well as the UK.

1973-91 Cleanaway Limited, Brentwood, Essex

Cleanaway Limited is a major international waste management services company operating throughout Europe and Australasia. The company owns and operates a wide range of waste transport, treatment and disposal facilities, including landfill sites, transfer stations, incinerators and hazardous waste treatment plants.

European Development Manager:

Responsible for leading Cleanaway's expansion into Europe. Analysed the Spanish, French and German markets and negotiated on a number of acquisition and joint venture projects.

Corporate Marketing Manager:

Responsible for new business development and public affairs. Raised profile of public affairs. Established a Corporate Environmental Policy which was the first in the industry. Developed Government Relations from ministerial to local level.

Organised and evaluated technical research into recycling ventures. Developed and evaluated several major acquisition and joint venture projects.

Corporate Development Manager:

Developed strategic plan for growth of the business. Implemented acquisition of 30 businesses, influencing market conditions. Managed successful integration of largest acquisition - in the Republic of Ireland - for nine months. Led entry into new market sector, which became 10% of turnover.

Resources Manager

Responsible for effective utilisation of capital resources and the evaluation and implementation of major capital projects. Controlled property, engineering, purchasing, landfill acquisition and



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vehicle utilisation departments. Developed modus operandi for evaluating landfill acquisitions and an innovative method of payment for landfill airspace – now the industry standard.

Acquired eight landfill sites and four businesses. Renegotiated major disposal contract with the Greater London Council to provide the customer with secure long term disposal and the company with substantially increased profitability.

1971-73 Business Planning Analyst, IBM (UK) Limited, London

Responsible for the design and implementation of computer systems for business planning and forecasting.

1968-71 Facilities Planning Manager, United Bakeries Limited, London

Responsible for planning and implementing the rationalisation of bakery production facilities, taking account of demographic and market factors together with technological change and capabilities

1964-68 Management Accountant, Elliott-Automation Limited, London and Paris

Responsible for the design of systems and the preparation and interpretation of management accounts, both in the UK and for the company's European subsidiaries, the head office of which was in Paris. Elliott-Automation sponsored attendance on the two year MBA course at Stanford.

1962-64 Investment Analyst, Hoare & Co, Stockbrokers, London

Undertook investment analysis in gilt-edge and equity markets.

SELECTED PROJECT EXPERIENCE

Financial / Commercial Analysis

- 2005** Team leader for **Partnering Adur and Worthing Services – joint collections**, a project to review the practical options for merging the collection systems of these two local authorities. For the UK Department of Environment, Food and Rural Affairs (Defra) Local Authority Support Unit (LASU), in association with AEA Technology Limited.
- 2005** Team leader for **Evaluation of Future Collection Systems in Herefordshire & Worcestershire and Preparation of Implementation Plan**, for the Waste & Resources Action Programme (WRAP).
- 2005** Team member for **Review of Targets for Recycling and Composting of Household Waste and their Interaction with other Targets**, for the UK Department of Environment, Food and Rural Affairs (Defra), in association with AEA Technology Limited.
- 2004-5** Team member for **Sustainable Communities – Construction Waste Scenarios**, a project to forecast arisings of hazardous and non-hazardous construction wastes arising in the South East of England and determine the challenges faced for the provision of treatment and disposal facilities, for the UK Environment Agency, in association with Halcrow Group and Jacobs- Babbie.
- 2004/5** Team member responsible for waste flow and cost modelling for a project entitled **Strategy for EU Environmental Law Approximation**. In association with Project Management Limited.



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- 2004** Team member for **Identification of methods for simplification of data provision requirements for smaller companies under the Packaging Regulations**, for the UK Department of Environment, Food and Rural Affairs. Developed models to test the range of options. In association with AEA Technology Limited.
- 2004** Peer review of a **waste management flow and cost model** used by the UK Department of Environment, Food and Rural Affairs.
- 2004** Project Manager for the use of **RouteSmart® computer application for the routing of refuse and recyclables collection fleet** for Colchester Borough Council, UK.
- 2004** **Bid manager** for the preparation of a tender for a major **total waste management contract** for a British Water company (value ~£15 million p.a.) on behalf of a UK waste management company
- 2004** **Evaluation of financial offers for major waste management services tender** for the Government of Malta.
- 2003** Provision of input to the design of a revised **waste management materials flow and costing model** for the UK Department of Environment Food and Rural Affairs. In association with AEA Technology.
- 2003** **Development of a complex model to compute the cost of implementation of an integrated waste management strategy** for Panevezys County, Lithuania. This model calculates the waste flows and both capital and operating costs for a number of different strategic scenarios and covers landfill operation, collection of recyclables and residual waste, transfer stations and green waste composting. In association with Jacobs-GIBB Limited.
- 2003** **Evaluator for Europaid tender for Developing Capacity in Implementation and Enforcement of Environmental Legislation in Turkey Through the IMPEL Network** at Ministry of Environment, Turkey. In association with Harress-Pickel Consulting AG.
- 2003** Key team member for a study of options for **recycling revenue arising from planned increases in the UK landfill tax back to business**, in order to tackle market failures and reduce the volume of waste landfilled. The study assessed the potential costs and benefits of different policy options, and identified the most effective mechanisms for delivering each option taking account of existing institutional arrangements and delivery mechanisms. For HM Treasury.
- 2003** **Regulatory Impact Assessment of Proposed Changes to the Packaging Regulations**, for the UK Department for Environment, Food and Rural Affairs (DEFRA) in association with AEA Technology. Member of a team undertaking a cost / benefit assessment of options for implementing proposals to amend the recovery and recycling targets contained within the EC Directive on Packaging and Packaging Wastes. Responsible for design and development of the computer-based economic model for analysing and comparing different options for achieving compliance with the revised targets.
- 2002/3** Development of a **financial model to evaluate the impact of economies of scale of waste management facilities and the corresponding transport costs** for a range of different waste management scenarios. For the Palestine Authority.
- 2002** **Preparation of Tender / Contract Documents for the Provision and Operation of Solid Waste Management Services in Malta**, for the Government of Malta (Ministry for Resources and Infrastructure). Provision of waste management and commercial advice for the preparation of contract documentation and performance specifications for two major waste management services contracts for inert and non-inert landfills, composting plant, materials recovery facility and hazardous waste collection, transfer and treatment.



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- 2002 Estimation and **comparison of the costs of various collection methodologies** for recyclable materials and residual waste – by means of a financial model. For Colchester Borough Council.
- 2001 Preparation of **costing model** for a tender for **refuse collection and street cleansing** in Bahrain.
- 2001 Preparation of **specification and tender documentation** for a **municipal refuse collection contract, together with tender evaluation** for West Wiltshire District Council.
- 2001 Preparation of **economic model** for the **costs of compliance with EU waste management legislation** for Latvia.
- 2001 Preparation of **economic model** for the **costs of compliance with EU waste management legislation** for the Czech Republic.
- 2000-1 **Waste management specialist and financial/economic modelling analyst** for the preparation of a **waste management strategy** for the Republic of Malta, in order to comply with the requirements of EU legislation. Also provided of advice on development of Maltese waste management legislation. For the Malta Ministry of Environment and the European Commission under sub-contract to Carl Bro International.
- 2000 Design and preparation of a Request for Quotation for a national waste management services contract for a major UK manufacturing company. **The new contract was tendered and awarded, saving about £0.75 million from the previous waste management cost.**
- 1999 Institutional development and financial team leader for a **solid waste management pre-feasibility study** in Kharkiv, Ukraine, for the UK Department for International Development (DFID) on behalf of the European bank for reconstruction and development (EBRD). **Major elements of the project were the projection of costs by complex financial modelling and recommendations for the establishment of a system of service charges for waste management and the setting of tariff levels.** Under sub-contract to Sir William Halcrow & Partners.
- 1999 Waste management expert for the provision of technical assistance in the **approximation of waste management legislation and estimation of the costs of compliance** in the Slovak Republic, a project funded by the PHARE programme under the Development of Implementation Strategies for Approximation in Environment facility (DISAE). Under sub-contract to Sir William Halcrow & Partners.
- 1999 Review and commentary on proposals for a **high waste diversion strategy** put forward by consultants to the Consortium of Essex Waste Collection Authorities, for Colchester Borough Council, UK.
- 1997 Leader of a team carrying out a **review of charging and operational management practices for solid waste management services** on the Island of Guernsey, and formulating proposals for improvement. Specifically responsible for reviewing and evaluating financial management systems and charging methods/tariffs. For the **States of Guernsey, Department of Engineering, UK.**
- 1996 Analysis of options for the organisation and financing of new waste management facilities for the **Vale of Glamorgan Council, Wales, in the light of existing and pending EU and Government legislation and policy** on waste management and recycling.
- 1996 Development of an **organisational procedure for licensing of waste management facilities** and a **fee structure for the pricing of a major landfill site**, together with an analysis of the **cost structure of MSW collection, transport, composting and landfill disposal.** For the **Government of Mauritius**, funded by the EU and under sub-contract to Scott Wilson Kirkpatrick.



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- 1996 Financial analyst for a technical review and economic **assessment of an anaerobic digestion system** for processing and recovering mixed municipal solid waste, UK (client confidential).
- 1995-6 Member of a team that developed and implemented a **Waste Management Pilot Project for the City of Katowice, Poland**. Specifically responsible for strengthening the municipal waste management department on **management, organisational, legislative and financial** aspects of the project. Undertaken through **Consulting Engineers Salzgitter GmbH**, with funding provided under the Phare programme.
- 1994-6 Member of a team developing a **waste management strategy and master plan for the City of Piotrkow Trybunalski, Poland**. Responsible particularly for institutional strengthening through organisational, economic and **financial** aspects.
- 1994 Member of a team that prepared detailed technical, organisational and financial proposals and programmes for the **National Privatisation of Solid Waste Management in Malaysia**. Specifically responsible for preparing **organisational and contractual proposals** and developing **financial models and forecasts**. Client confidential.
- 1991-2 Analysis and valuation of three large and one small waste management companies.
- 1992 Review of the market and opportunities for **aerobic composting of Municipal Solid Waste** and preparation of a business plan for the development of a composting business.
- 1992 Construction of computer models for economic modelling and sensitivity analyses relating to landfill operation and waste collection systems.
- 1992 Construction of a computer model for evaluating the benefit to local authorities of using home composting systems to reduce collection requirements for Municipal Solid Waste.
- 1992 Analysis of the opportunities for practical development of environmentally-sound clinical waste management in Belgium.
- 1991 Evaluation of the practical alternatives available for developing the hazardous waste infrastructure in a European country, together with the commercial implications.
- 1991 Analysis of the German (West and East) waste management market with special emphasis on hazardous waste.
- 1990 Analysis of the French waste management market and the legislative, physical, technical and economic factors affecting it. The purposes of this and the next mentioned project were to identify opportunities for investing in existing waste management businesses.
- 1989 Analysis of the Spanish hazardous waste market and the legislative, physical and technical factors affecting it. The objective of this project was to identify commercial opportunities for development of a viable business in Spain, with particular reference to hazardous waste incineration.
- 1988 Review of the market for hazardous waste incineration in the UK.



Master Planning/Strategy Development

- 2004-5** Team leader for **Covering of Agricultural Drains in Rural Areas of Egypt**, a project which focusses principally on provision of affordable systems for solid and liquid waste management in order to protect the agricultural drains.
- 2003** Team member for preparation of waste management strategy for Ascension Island.
- 2003** Key team member for the preparation of an updated **waste management master plan** for the Seychelles. In association with Scott Wilson Kirkpatrick.
- 2002-3** Team leader for preparation of a **waste management plan** for the Telsiai region in Lithuania, together with an ISPA grant application, in association with Jacobs-GIBB. For the Lithuanian ISPA Implementing Agency.
- 2002** Team leader for development of a **waste management plan** for the States of Guernsey.
- 2000-1** **Waste management specialist and financial/economic modelling analyst** for the preparation of a **waste management strategy** for the Republic of Malta, in order to comply with the requirements of EU legislation. Also provided of advice on development of Maltese waste management legislation. For the Malta Ministry of Environment and the European Commission under sub-contract to Carl Bro International.
- 2001** **Preparation of Terms of Reference** for the solid waste management component of an Urban Master Plan for the City of Diyarbakir, Turkey, under sub-contract to Hyder Consulting.
- 2000** Key member of a rapid response team to prepare a **strategy for solid waste management and identification of bankable projects** in the Yalova Region of Turkey damaged by the 1999 earthquake. For the British Earthquake Consortium for Turkey (BECT).
- 2000-1** Technical team leader for the **development of a hazardous waste management system** and the associated **capacity building** for Azerbaijan, including an integrated strategy, design and implementation of inventory, consignment notes, licensing regulations and standards, Basel Convention procedures, raising of public awareness and the provision of training. On-going. For the World Bank, in association with GIBB Ltd.
- 1998** Project manager for **review of waste minimisation and recycling** and preparation of **statutory recycling plan** for the Borough of Colchester, UK.
- 1997** Senior waste management specialist for the preparation of an **integrated waste management strategy, including a review of requirements for new legislation**, for the **Falkland Islands Government**, under sub-contract to Sir William Halcrow & Partners. This project involved not only advice on technical matters but also **institutional strengthening** by means of training and proposals for the establishment of an organisation to implement the recommendations.
- 1997** Project Manager for an investigation and detailed assessment of options for the future management, recovery, recycling, treatment and disposal of all solid and hazardous wastes generated on the Island of Guernsey, **including a review of legislative issues and particularly EU legislative requirements**. For the **States of Guernsey, Department of Engineering, UK**.
- 1997** Senior waste management specialist for the provision of training and **institutional support** in advising on the methods of preparation of an **integrated waste management strategy, including a review of current legislation** for the city of **Rostov-on-Don, Russian Federation**. For the **UK Environmental Know-How Fund**, under sub-contract to Sir William Halcrow and Partners.



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- 1996 Member of a team which developed and produced a **National Waste Management Strategy for the Government of Botswana** on behalf of the **German Agency for Technical Cooperation (GTZ)**.
- 1995 Development and presentation of **strategic options for waste management to Gloucestershire County Council**, undertaken through Sir William Halcrow and Partners.
- 1994-6 Member of a team developing a **waste management strategy and master plan for the City of Piotrkow Trybunalski, Poland**. Responsible particularly for institutional strengthening through organisational, economic and financial aspects.
- 1992-4 **Project Manager** for the development of a **national waste management strategy and master plan** for municipal, industrial and hazardous waste, and the development of a **waste information system**, for the **Czech and Slovak Republics**. This project included advice and training to the existing institutional structure and a review of current waste management legislation and its detailed comparison with that of the EU. Funded under the EU PHARE programme.

Institutional Strengthening and Legislation

- 2003 **Regulatory Impact Assessment of Proposed Changes to the Packaging Regulations**, for the UK Department for Environment, Food and Rural Affairs (DEFRA) in association with AEA Technology. Member of a team undertaking a cost / benefit assessment of options for implementing proposals to amend the recovery and recycling targets contained within the EC Directive on Packaging and Packaging Wastes. Responsible for design and development of a computer-based economic model for analysing and comparing different options for achieving compliance with the revised targets.
- 2003 Design and drafting of proposals for **waste management legislation for the new Palestinian state**. For the Palestine Authority, funded by DFID.
- 2001-2 **Hazardous waste management specialist** advising on the establishment of a Basel Convention Regional Training and Technology Transfer Centre for English-speaking Africa. This project, financed by DANIDA, has resulted directly from the feasibility study carried out in 1996 (q.v.). Developed and delivered majority of technical content at two four day training courses for representatives from 16 African countries.
- 2001 Preparation of a project proposal for EU assistance for **Establishing Institutional Capacity in the Environment Sector in Malta**. For the European Commission, in association with Carl Bro Global Environmental Consortium.
- 2000-1 Waste management specialist and financial/economic modelling analyst for the preparation of a waste management strategy for the Republic of Malta, in order to comply with the requirements of EU legislation. Also **provided of advice on development of Maltese waste management legislation**, which has been incorporated into the latest draft regulations. For the Malta Ministry of Environment and the European Commission under sub-contract to Carl Bro International.
- 2001 **Hazardous waste management specialist** advising on the establishment of a Basel Convention Regional Training and Technology Transfer Centre for English-speaking Africa. This project, financed by DANIDA, has resulted directly from the feasibility study carried out in 1996 (q.v.).



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- 2000-1** Technical team leader for the **development of a hazardous waste management system** and the associated **capacity building** for Azerbaijan, including preparing an integrated strategy, **design and implementation of legislation and regulations** for inventory, consignment notes, waste management facility licensing and technical standards, Basel Convention procedures, together with the raising of public awareness and the provision of training. On-going. For the World Bank, in association with GIBB Ltd.
- 1999** Institutional development and financial team leader for a **solid waste management pre-feasibility study** in Kharkiv, Ukraine, for the UK Department for International Development (DFID) on behalf of the European bank for reconstruction and development (EBRD). On-going. Under sub-contract to Sir William Halcrow & Partners.
- 1999** Waste management expert for the provision of technical assistance in the **approximation of waste management legislation and estimation of the costs of compliance** in the Slovak Republic, a project funded by the PHARE programme under the Development of Implementation Strategies for Approximation in Environment facility (DISAE). Under sub-contract to Sir William Halcrow & Partners.
- 1998-9** Hazardous waste management expert responsible for training needs assessment and the development of manuals and guidelines for the regulation and control of hazardous waste management by the **Malaysian Department of the Environment**. Under sub-contract to Carl Bro International.
- 1999** Waste management and institutional expert for a project to **design and develop a low-cost waste incinerator** for low-income countries for the UK Department for International Development (DFID). In joint venture with Intermediate Technology Consultants Limited. On-going.
- 1998** Preparation of the waste management section of a **Handbook for Implementation of EU Environmental Legislation** to assist the Associated Countries to meet the requirements of EU environment legislation under the PHARE DISAE programme (see below). Under sub-contract to Sir William Halcrow & Partners.
- 1998** Institutional strengthening expert for an **Integrated Approach for Industrial Pollution Prevention and Control in Poland**, a project funded by the PHARE programme under the Development of Implementation Strategies for Approximation in Environment facility (DISAE). Under sub-contract to Sir William Halcrow & Partners.
- 1997-8** Support and **institutional strengthening** for the Government of Botswana for **Legal, Administrative and Economic Issues**. Following a project to draft proposed Waste Management Legislation in 1994, which has now become law, this project is aimed at providing the detailed support by **analysing and developing the necessary organisational structure and procedures** for implementation, together with **procedural advice** on the preparation of national and regional plans and the **drafting of the necessary regulations**. In association with PLANCO GmbH. Project funded by the German Agency for Technical Cooperation (GTZ).
- 1997** Senior specialist for the preparation of an integrated waste management strategy, including a review of **requirements for new legislation**, for the Falkland Islands Government, under sub-contract to Sir William Halcrow & Partners. This project involved not only providing advice on technical matters but also **institutional strengthening** by means of proposals for the **design and implementation of legislation**, waste management **training** and the **establishment of an organisation to implement the recommendations**.
- 1997** Senior specialist for the provision of training and **institutional support** in advising on the methods of preparation of an integrated waste management strategy, including a review of **current legislation** for the city of **Rostov-on-Don, Russian Federation**. For the UK Environmental Know-How Fund, under sub-contract to Sir William Halcrow and Partners.



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- 1996** Team leader for a feasibility study for establishing a Regional Hazardous Waste Management **Information and Training Centre** to serve the English-speaking African countries. This included recommendations for the **institutional structure and training methods and the review of hazardous waste management legislation** in 13 African countries. For the Secretariat for the Basel Convention/the German Agency for Technical Cooperation (GTZ).
- 1996** **Identification of specific needs and preparation of Terms of Reference** for a project to **train the existing institutional structure** to prepare a Waste Management Plan for a Major Russian City. For the UK Environmental Know-How Fund (Overseas Development Administration), under sub-contract to Sir William Halcrow and Partners.
- 1995-6** Member of a team that developed and implemented a Waste Management Pilot Project for the City of Katowice, Poland. Specifically responsible for **strengthening the municipal waste management department on management, organisational, legislative** and financial aspects of the project. Undertaken through Consulting Engineers Salzgitter GmbH, with funding provided under the Phare programme.
- 1994-6** Member of a team developing a waste management strategy and master plan for the City of Piotrkow Trybunalski, Poland. Responsible particularly for **institutional strengthening through organisational, economic and financial aspects**.
- 1994** Leader of a team that provided advice and assistance to the Government of Botswana through institutional strengthening on the re-organisation and modernisation of waste management practices, including **drafting of proposed legislation and proposing an institutional structure**. Undertaken through Fresenius Consult GmbH on behalf of the German Agency for Technical Cooperation (GTZ).
- 1992-4** Project Manager for the development of a national waste management strategy and master plan for municipal, industrial and hazardous waste, and the development of a **waste information system**, for the Czech and Slovak Republics. This project included **advice and training to the existing institutional structure** and a review of current waste management legislation and its detailed comparison with that of the EU. Funded under the EU PHARE programme.

Technical/Miscellaneous

- 2001-2** **Hazardous waste management specialist** advising on the establishment of a Basel Convention Regional Training and Technology Transfer Centre for English-speaking Africa. This project, financed by DANIDA, has resulted directly from the feasibility study carried out in 1996 (q.v.). Developed and delivered majority of technical content at two four day training courses for representatives from 16 African countries.
- 2001** **Development of new concept for a UK Waste Classification Scheme**, together with production of a detailed draft mapped to the European Waste Catalogue. For the UK Environment Agency, under sub-contract to Halcrow Group Limited.
- 2000** **Waste management specialist** in a team preparing an outline for **the DANCED five-year environmental assistance programme for Malaysia** on behalf of the Malaysian Economic Planning Unit. Under subcontract to PEMConsult.
- 2000** **Waste management specialist** for **monitoring of the impact of a project** on solid management in two cities of Bulgaria for the UK Department for International Development (DFID).
- 1999** Core Waste Management Team leader for the **implementation and review of pilot trials of the proposed new UK Waste Classification System and determination of waste densities for different waste types** for the UK Environment Agency. Under sub-contract to Sir William Halcrow & Partners. On-going



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- 1999 Waste management and institutional expert for a project to **design and develop a low-cost waste incinerator** for low-income countries for the UK Department for International Development (DFID). In joint venture with Intermediate Technology Consultants Limited. On-going.
- 1995 Leader of a team preparing **comprehensive guidelines for the design, development and operation of landfill sites** for the **Government of Botswana**. Undertaken through **Fresenius Consult GmbH** on behalf of the **German Agency for Technical Cooperation (GTZ)**.
- 1995 Leader of a team providing advice and assistance to the **Government of Botswana** on the **development of a national strategy and code of practice for managing hospital and other health-care wastes**. Undertaken through **Fresenius Consult GmbH** on behalf of the **German Agency for Technical Cooperation (GTZ)**.
- 1994 Provision of advice on a **planning application for a new landfill site** being proposed by a private UK company.
- 1993-4 Key member of a specialist team that developed a **waste management strategy for the New Hong Kong Airport**, dealing specifically with the organisational and contractual aspects of wastes management services at the airport. For the Provisional Airport Authority.
- 1992 Preparation of **environmental and health & safety policies** for a UK local authority waste disposal company
- 1992 Review of landfill practices, legislation and policy in France, Germany, Belgium and Holland.
- 1991 A review of UK landfill sites to identify opportunities to generate electricity from landfill gas.
- 1991 Evaluation of opportunities to destroy PCB wastes by hydro-cracking.
- 1990 Analysis of hazardous waste management markets in France and Germany, with special emphasis on PCB disposal.
- 1985-9 Analysis of markets for high temperature incineration of hazardous wastes in the UK, with special emphasis on PCBs.
- 1989 Analysis of the Spanish market for high temperature incineration of hazardous wastes, including PCBs.

PUBLICATIONS / CONFERENCE PAPERS

Planning Landfill Operations - A Management View, *Practical Waste Management*, ed. J R Holmes, John Wiley 1983.

Packaging and Municipal Solid Waste, Paper presented to the Industry Committee for Packaging and the Environment AGM, 1989.

Waste Must be Managed, Paper presented to the Institute for Public Relations/ CBI conference, 1990.

European Environmental Legislation, Paper presented to several business groups in Essex, 1992

The PHARE Waste Sector Study, Paper presented to a Conference on Environmental Impact Assessment organised by the Czech Ministry of Environment and Czech Association of Civil Engineers, Czech Technical University, Prague, 1993.

Concept for a Regional Centre for Physico-chemical treatment, Paper presented to conference, "ODPADY 1993", Prague, November 1993.

Projekt PHARE "Waste Sector Study" k regionálním problémům odpadového hospodářství - důležitá výsledky, Paper presented in conjunction with Dr Jan Mikolajczyk, at conference at Most, Czech Republic, entitled "Ecologically Acceptable Methods of Waste Management in the Black Triangle".



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Waste Management in Eastern Europe, Paper presented to the Institute of Water and Environmental Management, February 1994.

Project PHARE EC\WAS\05 - Waste Sector Study, Paper presented in conjunction with Dr V @imkovicov< to "ODPADY 94" conference, Prague, June 1994.

Developing a Hazardous Waste Management Strategy - Essential Principles, Choices and Decisions. With Michael Betts. Paper presented at the Second Annual Conference on Hazardous Waste Management, June 1994, Dubai, United Arab Emirates.

Organisational Aspects of Waste Management on Islands. Paper presented to a seminar organised by DGXI, European Commission, on "Codes of Practice for Waste Management on Islands", Santa Cruz de Tenerife, Canary Islands, Spain, June 1995.

Aspects of Hazardous Waste Management - colloquium presented to Malaysian Ministry of Environment, November 1998.

Clinical Waste Management in Botswana. Paper presented to the First International Waste Management Symposium, Francistown, Botswana, July 1995.

Landfill Guidelines for Developing Countries: Case Study on Botswana. Proceedings of the Institute of Wastes Management, July 1996.

Feasibility Study for the Establishment of a Regional Training Centre for the English-Speaking Countries in Africa. Paper presented to the Meeting to Promote the Ratification of the Basel Convention and Establishment of Regional Centres for Training and Technology Transfer, July 1996, Brits, South Africa.

Hazardous Waste Management in the Middle East (on behalf of John O'Grady, Environmental Engineering Manager, National Environmental Preservation Company of Saudi Arabia). Paper presented to the 6th International Symposium: Hazardous Waste Management - A Global Perspective, Odense, Denmark, September 1996.

Healthcare Waste Management Planning. Paper presented to a seminar organised by DG XI, European Commission, on Waste Management Planning, Estoril, Portugal, January 1997.

Financing of Municipal Waste Management Projects. Paper presented to a seminar organised by the World Bank as part of the Greater Rostov Environmental Strategic Action Plan. Azov, Russian Federation, May 1997.

Waste Management in the Greater Rostov Region. Organiser, presenter and moderator of a two day seminar on the strategic issues in waste management for senior waste managers and regulators in the Greater Rostov Region, Russian federation, September 1997.

Healthcare Waste Management in Botswana. *Wastes Management*, (monthly journal of the Institute of Wastes Management), March 1998.

Waste Management in the Falkland Islands. *Wastes Management*, April 1998.

Aspects of Hazardous Waste Management - colloquium presented to Malaysian Ministry of Environment, November 1998.

Waste Management in Medium and Low Income Countries – paper presented to Environmental Services Association training course, *Practical Waste Management*, September 1999

The Costs of Achieving Compliance with EU Waste Management Legislation – paper presented to the 7th Malta Industry Environment Conference, St Julians, Malta, February 2001.

Hazardous Waste Management, a 5 day interactive workshop – design and presentation of main technical sessions, Pretoria, Republic of South Africa, November 2001 and March 2002.

Hazardous Waste Management, a 3-day technical workshop – design of all technical material and presentation several sessions, of Baku, Azerbaijan, April 2002.

Route Optimisation in Refuse Collection – A new tool to improve productivity. Paper presented to workshop at CIWM Torbay Conference, June 2003.



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CONTACT DETAILS

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MATTHEW POLSON
CURRICULUM VITAE

PERSONAL INFORMATION

Nationality	British
Year of Birth	1971
Education	St Sampson Secondary School, Guernsey, 1982 - 87. Guernsey Grammar School, 1987 - 89. M.Eng. Civil Engineering, University of Portsmouth, UK, 1989 - 93. Diplôme D'Ingénieur, Civil Engineering, École Nationale Des Ingénieurs de St. Etienne (ENISE), France, 1992 - 93. M.Sc. Environmental Engineering, Colorado State University, USA, 1993 - 94. (pending final technical paper)
Professional Affiliations	Chartered Waste Manager, Chartered Institution of Wastes Management Chartered Environmentalist, Society for the Environment Member, Association des Ingénieurs ENISE
Languages	English (mother tongue), French (fluent) and German (basic).
Computing Skills	Personal computer and notebook user. Familiar with all of the main PC-based business, graphics, communications and project management software packages. Trained and experienced user of ArcGIS software.
Country working experience	Ascension Island, Azerbaijan, Bahrain, Egypt, France, Guernsey, Hong Kong, Malta, Seychelles, Turkey, UK, USA.
Other Relevant Information	1997 winner of the Institution of Civil Engineers/Balfour Beatty MERIT competition (management simulation exercise). Council member of the Guernsey Chamber of Commerce. President of Guernsey's Young Business Group. Shortlisted for Guernsey's Entrepreneur of the Year Award (2003). Council member of the Rotary Club of Guernsey.

AREAS OF PARTICULAR EXPERIENCE

- Project management of environmental/waste management projects.
- Waste management strategy development.
- Process options for the treatment of liquid and solid waste streams.



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- Preparation of tender and contract documents for environmental/waste projects.
- Environmental engineering solutions for islands.
- Project management of information technology solutions.

CAREER SUMMARY

Current **Director - Integrated Skills Limited**
 Managing Director - Integrated Skills (Guernsey) Limited
 Director - Trafficworx Limited

In addition to international consultancy duties, responsible for managing and developing Integrated Skills (Guernsey) Limited, which has now reached an annual turnover in excess of £350,000 p.a. within an island of 65,000 people.

1998-99 **Consultant - Integrated Skills Limited, UK**

Provision of a range of consultancy services relating to wastewater and solid wastes management, particularly to the States of Guernsey. Manager of the Guernsey local office.

1995-97 **Research Engineer - Department of Engineering, States of Guernsey**

One of a small team assembled to carry out a Waste Strategy Assessment (WSa) for the Advisory and Finance Committee of the States of Guernsey. Extensive consultation with local experts and a number of leading UK consultants formed the basis of two major reports; 'Liquid Waste - Current Status and Future Strategy Options', and 'Solid Waste - Current Status and Proposals for a Solid Waste Management Plan'.

1993 **Junior Research Engineer (student) - Unimétal Recherche, France**

Member of a team of researchers specialised in the properties of steel and its production. This project formed my final thesis for the Diplôme D'Ingénieur.

1992 **Junior Engineer (student) - Nord France Constructions, France**

Work with Nord France Constructions formed the work experience module of his University of Portsmouth Master of Engineering degree, and an opportunity to transfer to the École Nationale Des Ingénieurs de St. Etienne to study for a Diplôme D'Ingénieur.

1991 **Junior Engineer (student) - Miller & Baird (C.I.) Ltd, Guernsey**

Junior member of a civil engineering contractor's staff. Mainly involved with on site work including surveying and supervision of a small workforce.

1990 **Junior Engineer (student) - Société d'Entreprises du Sud-Ouest, France**

Junior member of a team of civil engineers based on site in Toulouse, France. Provided first experience of working abroad, and an opportunity to learn French.

1990 **Junior Engineer (student) - Miller & Baird (C.I.) Ltd, Guernsey**

Junior member of a civil engineering contractor's staff. Mainly involved with on site work including surveying and supervision of a small workforce.



SELECTED PROJECT EXPERIENCE

- 2005** Deputy Team leader for **Covering of Agricultural Drains in Rural Areas of Egypt**, a project which focuses principally on provision of affordable systems for solid and liquid waste management in order to protect the agricultural drains.
- 2005** Project manager for the specification, development and implementation of a web based information system for road works embargoes for the Public Services Department, States of Guernsey.
- 2004-05** Team Leader for the creation and marketing of Trafficworx Limited. Trafficworx is a joint venture between Integrated Skills Limited (ISL) and Digimap Limited, a specialist GIS company, to provide a **web-based managed service for planning and coordinating road works**. Trafficworx Limited provides all necessary specialist IT capabilities, hardware, software and GIS, together with training for the users and other service support.
- 2003-04** Development of a **waste management strategy** for Ascension Island. Responsible for **preparing and presenting a training seminar** for a range of methodologies/techniques for developing integrated strategies and implementation plans for managing solid wastes. For the Ascension Island Government.
- 2003** Updating of the **Solid Waste Master Plan** for the Seychelles. For the Government of the Seychelles in association with Scott Wilson.
- 2003** Assistance in the preparation of an evidence-based assessment of the full range of **options for recycling revenue from the landfill tax** increases to business including the organisation of a problem analysis workshop. For HM Treasury, UK Government.
- 2003** **Project management** of a study to assess and prioritise Guernsey's **sewer extension** programme.
- 2002-03** **Project management** of the Results Service for the 2003 Island Games in Guernsey. This involved coordinating all of the requirements for 16 sports and over 3000 competitors/organisers from 23 island nations. The project delivered a real time results service that was published on the internet receiving 4 million hits during the week of the Games.
- 2002-04** Development of a **Waste Management Plan** for the Board of Administration, States of Guernsey.
- 2002-03** Project manager for the **specification, design, development and implementation of software** for co-ordination of all applications for road closures and/or excavations, using **workflow, GIS and database software**, for the States Traffic Committee, States of Guernsey.
- 2002** Project manager for a **health & safety review of all waste management operations** carried out by the Board of Administration, States of Guernsey. This included risk assessments and a review of existing procedures and documentation for the putrescible landfill site, land reclamation site (inert wastes), recycling depot and monitoring activities.
- 2002** Development of **guidelines and standards for the management of hazardous waste in Azerbaijan**. For the World Bank, in association with GIBB Ltd.
- 2002** Project management of a review of all **transfer of waste by sea** options for the States of Alderney. This included a review of all containerisation and baling options and the consideration of financial, legal, environmental and public perception implications.
- 2002** Scoping **study of the business process requirements** with particular emphasis on the automated production of letters and production of management information and the



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functionality offered by E.Work workflow software for the Housing Authority, States of Guernsey.

- 2002** **Preparation of bid documents for a tender for the remediation of contaminated land** by means of biopiling, a proprietary thermal process and solidification in **Hong Kong**, Client confidential.
- 2002** Development of a **Waste Segregation Facility for Construction and Demolition wastes** for the Board of Administration, States of Guernsey. This involved the specification and project management of the entire facility.
- 2002** **Preparation of tender and contract documents for construction and demolition waste management activities.** This was the first of three separate contracts for the management of wastes in Malta. For the Ministry for the Environment, **Government of Malta**.
- 2001-02** Development of **ArcView GIS layers** for the Public Thoroughfares Committee, States of Guernsey. This was part of a project to assist the client in prioritising the extension of the local sewerage network and also to highlight areas most at risk of ground and surface water pollution.
- 2001** **Preparation of a bid for refuse collection, street cleansing and septic tank emptying.** Acted as a team member in researching key information and preparing resource recommendations for the North and South Regions of **Bahrain**. Client Confidential.
- 2001** Evaluation of **“E.Work” work-flow software as an e-government tool** providing a web-enabled system for the efficient processing, management and co-ordination of all applications for road closures and/or excavations, for the Public Thoroughfares Committee, States of Guernsey.
- 2001** Assistance with the **contract preparation and procurement** for the design, construction, commission and operation of a **waste-to-energy plant**. For the States of Guernsey, Board of Administration under sub-contract to Rambøll.
- 2000** Assistance in the formulation of a **solid waste management strategy** including the organisation of a **problem analysis workshop** for all relevant government departments. Responsible for gathering and analysing data on waste sources, types and quantities (particularly industrial wastes), and preparing long-term forecasts. This included an **investigation of local and offshore market outlets and prices for recyclable materials**. For the Ministry for the Environment, Government of **Malta** under sub-contract to Carl Bro International.
- 2000** Team member of rapid response team responsible for preparing a **solid waste management strategy and identification of bankable projects** for the Turkish earthquake region of Yalova province. For the British Earthquake Consortium for **Turkey** (BECT).
- 2000-01** Organisation of technical visits to 7 waste-to-energy plants in France, including **interpretation and translation of documents on the subject of waste management**. For the States of Guernsey, Department of Engineering.
- 2000** Project manager for the preparation of **tender and contract documents for road cleansing** and other associated services (such as landscaping activities). For the States of Guernsey, Public Thoroughfares Committee.
- 1999-2001** Project manager for the revision of the current 'Code of Practice Relating to the Opening and Reinstatement of Roads and Footpaths'. A thorough program of consultation is currently ensuring that issues such as application procedures, cost recovery, technical reinstatement details, and legislation are comprehensively examined. For the States of Guernsey, Public Thoroughfares Committee.



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- 1999** Development of Colchester Borough Council's bid to Essex County Council to carry out a **high waste diversion trial**. For Colchester Borough Council.
- 1998-2001** Project Manager for the development and implementation of five annually revised **Service Level Agreements (SLA's)** for road cleansing services and maintenance of the sewerage network, surface water network, sewage tankers, and pumping stations. Performance specifications, inspection and reporting procedures for the delivery of these services were established. This included the development of a relational database linked to a Geographical Information System, to aid the monitoring and supervision of service delivery. For the States of Guernsey, Public Thoroughfares Committee.
- 1998** Provision of technical assistance in the **approximation of waste management legislation** in the Slovak Republic. Analysis of policy tools and instruments for supporting and regulating an effective national waste management policy. This included a **review of legal, economic, and communicative instruments**, currently in use by EU Member States. For the European Commission (Phare DISAE Facility), under sub-contract to Halcrow Group Limited.
- 1998** Evaluation of practical, economic and environmentally friendly options for increasing levels of **waste minimisation and recycling** in the Borough of Colchester, thus meeting or exceeding Government targets. This included identification of the potential sources of funding for expansion of waste minimisation and recycling. For Colchester Borough Council.
- 1998** **Life Cycle Assessment study** for the disposal of the Island of Guernsey's wastepaper. The study focused upon **recycling and waste-to-energy options**. For the States of Guernsey, Department of Engineering.
- 1998** Critical review and assessment of the States of Guernsey's draft reports for reducing the effects of **pollution from agricultural and horticultural sources**. For the States of Guernsey, Department of Engineering.
- 1997-98** Assistance in the **development of a strategic business and financing plan** for the future provision and maintenance of road infrastructure, and wastewater/surface water management facilities and services throughout the Island of Guernsey. For the States of Guernsey, Public Thoroughfares Committee.
- 1995-98** **Development of a Solid Waste Management Strategy.**
- This involved several individual studies which were developed into an overall report on integrated solid wastes management for the Island of Guernsey. Initial planning phase included **the production of tender specification documents** for each study and the review of submitted tenders.
- Assisted AEA Neteen in carrying out a **solid wastes audit**, and managed the development of an **imports audit** for the Island.
- Co-ordinated the work of successful tenderers. Liaison between appointed UK consultants and relevant members of the States of Guernsey for the following studies:
- **Landfill Techniques** - Scott Wilson Kirkpatrick - Investigation of recent innovations in landfill technology as they affect site management, operations and aftercare.
 - **Investigation & Assessment of Solid Waste Management Options** - Integrated Skills Ltd. - Review of existing waste management practices in Guernsey, and an assessment of possible options for the future.
 - **Review of Charging & Operational Management Practices for Solid Waste Management Services** - Integrated Skills Ltd. - Review of existing cost recovery practices



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and organisation in Guernsey, and an assessment of possible options for the future.

Decision analysis techniques used to develop solid waste management systems. Included extensive consultation process, with workshops, in order to identify integrated and sustainable options for future management of solid wastes. Production of a Final Report for the Advisory and Finance Committee of the States of Guernsey.

Review of waste-to-energy plants in Europe. Collated information on plant manufacturers, technology developments, and related issues such as ash disposal, legislation, *etc.*

For the States of Guernsey, Department of Engineering.

1995-97 **Development of a Liquid Waste Strategy.**

This was the first stage in the development of an integrated waste management plan for all wastes on the Island of Guernsey. Extensive **project planning** involved consultation meetings with all local groups/individuals with a vested interest in liquid waste management. Production of a 'Principles to be Adopted' document, and all the required tender documents for areas of the study requiring specialist inputs.

Development of a computerised map of Guernsey, using Macromedia Freehand. A system of multiple layers each showing relevant waste management information (*i.e.* water catchment, sewerage network, farms, streams, *etc.*) was used to highlight areas of high pollution potential.

Assessment of the water resources in Guernsey, especially with respect to the quality and quantity available, sources of contamination and adequacy of existing legislation.

Review of agricultural practices relating to waste management in conjunction with ADAS consultants. Study focused on nutrient and bacterial pollution resulting from intensive farming.

Comparative review of international, EU, UK and Guernsey **legislation & standards** relating to liquid waste. Comparative review of Guernsey's competing **tourist resort standards**, and of visitor expectations from those countries targeted by Guernsey tourism marketing, with respect to wastewater treatment.

Review of existing sewerage and treatment processes in Guernsey. Assessment of potential pollution resulting from leaking cesspools and septic tanks. **Development of options for preliminary, primary, secondary and tertiary treatment of Guernsey's waste waters.**

Production of Final Report for the Advisory and Finance Committee of the States of Guernsey defining strategic options for wastewater treatment and making recommendations concerning all other issues relating to liquid waste in Guernsey. Preparation of presentations for local politicians and members of the public.

For the States of Guernsey, Department of Engineering.

1994 **Review of existing wastewater treatment** at Le Creux Mahie including sampling of wastewater flows, survey of available land, and a review of Guernsey, UK and EU legislation. **Assessment of possible future treatment options** for Le Creux Mahie, and detailed planning of a marine tracer study to establish dispersion characteristics of wastewater discharges from an existing outfall. For the States of Guernsey, Department of Engineering.

1993 Research into adherence between concrete and steel reinforcement bars. The objective being to develop a new laboratory test to gauge the performance of steel reinforcement bars in concrete that would overcome inaccuracies known to compromise existing tests. For Unimétal Recherche, France.



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- 1992** Construction of a commercial factory in Senlis, France. One month spent at the head office, planning the logistics for the concrete shuttering and tower crane location. Five months on site as junior engineer, organising labour and materials. Co-ordinated the work of subcontractors for the laying of all utility pipe networks. Client confidential.
- 1991** Construction of a new electricity power station. Surveying and setting out for all excavation and foundation work. Monitoring of blasting during the use of explosives for excavation in granite. Organisation and checking of heavy steel reinforcement for generator bed foundations. For States of Guernsey, Guernsey Electricity.
- 1990** Construction of post-tensioned bridge in Toulouse, France. Surveying and setting out of steel reinforcement, and supervision of concrete placement and compaction. Client confidential.
- 1990** Surveying and setting out of a new hangar for Aerospatiale at Toulouse Airport, France.
- 1990** Surveying of levels required for the installation of two pontoons and the construction of a sewage pumping station for the States of Guernsey, Public Thoroughfares Committee.

PUBLICATIONS / CONFERENCE PAPERS

Waste Management on the Island of Guernsey, Warner Bulletin (Journal of the World Resource Foundation), January 1999.

Roadworks Management Systems using GIS and Workflow software. Paper presented at the Channel Island GIS User Conference, November 2003, Guernsey.

An Introduction to Waste Management. Author and presenter of a training seminar on Waste Management, organised for stakeholders from both the public and private sectors, November 2003, Ascension Island.

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Appendix 2

THE FUTURE OF SOLID WASTE DISPOSAL IN GUERNSEY

REPORT OF THE PANEL OF INQUIRY

Advocate Roger Dadd
Mr Richard Eales
Dr Marian Kelly
Mr Steve Lee
Mr David Purchon



**Government Business Unit
25 January 2005**

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CHAIRMAN'S INTRODUCTION

This introduction provides an overview of the terms of reference, tasks performed and information gathered by the Panel of Inquiry ("Panel"), which was formed following a Resolution of the States of Deliberation of the Island of Guernsey ("States") dated 1st July 2004:

"After consideration of the Requête, dated the 28th May, 2004, signed by Deputy S J Ogier and seven other Members of the States:-

- 1) *To direct the Policy Council to establish an independent panel of inquiry, comprising five suitably qualified and experienced members, whose mandate shall be:

 - a. *to inquire in such a manner as it deems appropriate into the future of solid waste disposal in Guernsey, which inquiry shall include, but not be limited to, the Resolutions of the States on Billet d'Etat XX of 2003;*
 - b. *to receive representations from interested parties; and*
 - c. *to report its findings to the Policy Council and the Environment Department as soon as possible, but not later than 31st December 2004.**
- 2) *To direct the Environment Department, within two months of its receipt to submit the panel's report and that Department's comments thereon to the Policy Council for publication in a Billet d'Etat together with such recommendations as that Department may consider appropriate.*
- 3) *To direct the Policy Council to meet the cost of the independent inquiry and to provide such secretarial and other support as may be necessary.*
- 4) *To direct the Environment Department to defer contractually committing the States pursuant to Resolution 4 on Billet d'Etat No. XX of 2003 (by which the Department, either directly or through its special purpose company, was authorised, following completion of the Initial Services period, to contract with Lurgi for the construction of an energy from waste facility) until that review and report has been considered by the States."*

Membership of the Panel was chosen by the Policy Council and comprises specialists from the waste industry: Dr Marian Kelly of the Environmental Services Association¹, Mr Steve Lee, Chief Executive of the Chartered Institution of Wastes Management², and Mr David Purchon, a Chartered Environmental Health Practitioner, nominated by the Chartered Institute of Environmental Health³, together with Richard Eales, a Director of the National Audit Office⁴, and myself, as Chairman. The Panel is completely independent.

We set ourselves the following terms of reference:-

- 1) Review whether mass burn technology in the form of the proposed on-island energy from waste plant is the most appropriate waste management solution for Guernsey's needs.
- 2) Review whether there are practicable alternatives to on-island mass burn technology, which could cost-effectively meet Guernsey's needs. Options to be investigated may include waste reduction and recycling initiatives, off-island solutions, alternative technologies and interim solutions or a combination of these.
- 3) If on-island mass burn technology proves to be the only practicable option, review whether the proposed energy from waste plant at Longue Hougue is of an appropriate scale and whether Longue Hougue is the best location for the plant.
- 4) Review the contract procedures followed in the decision to select Lurgi as the preferred tenderer for the contract.
- 5) The Panel may vary its terms of reference in the light of the evidence it receives during the course of the inquiry.⁵

We approached our task by following a pre-determined analysis of the issues, which we established at an early stage of our task, as set out at Appendix 1.

There follows an Executive Summary, a section setting out the Panel's conclusions and recommendations, four main Parts of the Report dealing with each of the areas identified in the issue analysis, and supporting Appendices. The report is designed to be balanced, fair and easy to read.

In the interests of openness we have published the majority of representations received and this Report on our website at www.gov.gg. In some cases industry presentations have not been included for reasons of commercial confidentiality.

¹ www.esauk.org

² www.ciwm.co.uk

³ www.cieh.org

⁴ www.nao.gov.uk

⁵ The Panel did not find it necessary to vary its terms of reference.

During the period between late August 2004 and January 2005 the full Panel met on 12 occasions and hosted one public meeting. Members of the Panel visited incineration, landfill, composting, waste collection, recycling and other sites in Guernsey, Jersey, the Isle of Man, France and England and held more than 20 meetings with representatives of a variety of organisations. The Panel published well over 200 submissions from members of the public, organisations and States Members on its website and received a considerable amount of further information, some of it commercially sensitive, from more than 30 government, commercial and other organisations. Full details are at Appendix 2.

Given the complexity of the issues that beset Guernsey with respect to its present and future management of solid wastes, the Panel has been faced with a formidable task in the time available. I believe the selection of our members was inspired. It has been a privilege to work with each of them. Our conclusions and recommendations were reached after careful consideration and are agreed by us all.

We have been greatly assisted by George Marsh, Head of Government Business, his Executive Assistant Louise Le Pelley and other members of his staff, for which I record our grateful thanks. I also extend our thanks to the very many people and organisations who have so kindly assisted us in our work.

Roger Dadd
Chairman
25 January 2005

EXECUTIVE SUMMARY

1. In 1998 Guernsey's Board of Administration decided [Correction - A&F's Solid Waste Strategy Report the States directed the BoA to investigate the feasibility of commissioning an EfW plant] upon the procurement of a waste incinerator as the most appropriate means of dealing with solid disposable waste. The States agreed in principle to such a project with a projected cost of £14.5 million⁶, after consideration of a report from the States and Finance Committee on the Waste Strategy Assessment. Over the project definition and procurement stages the cost of the project rose to a point of £102 million in 2003 when tenders were first received⁷. Following tender negotiations and changes in the proposed design of the plant, a contractor was selected to design, build and operate such a plant for two years, at an agreed cost of £80.3 million, of which £7.5 million is for the operational phase.
2. During the procurement phase, a narrow set of contractual parameters was decided upon for the design, build and initial operation of the incinerator over a two-year period. [Comment - To obtain competitive tenders a defined specification is necessary] As a consequence, the professional waste management industry was presented with a closely defined solution to the problem. The usual approach would have been to present the industry with the problem of managing the Island's waste arisings and to invite proposed solutions in the context of aspects of an overall waste management plan.
3. More generally, we should like to see a much closer partnership between the public and private sectors in the management of the Island's waste. We consider that the public sector should only be involved in the operation and management activities if those activities have been independently managed by the private sector and public sector operation has been shown to be at least as efficient as private sector operation. [Comment - Independent advice in preparing the Waste Management Plan stressed that strategically essential island facilities should remain in public control]
4. There can be no doubt that officers have been diligent in seeking to implement the agreed policy. They have painstakingly pursued the option of a waste incinerator on the basis of its operation by the supplier's nominated contractor for an initial period of two years and subsequent handover to an independent contractor operator. However, this narrow focus on one solution has had a number of unfortunate consequences. Waste minimisation and recycling initiatives have been put on hold, [Comment - Economically justifiable recycling is contrary to the States direction] alternative solutions have not been given due consideration and alternative contractual options have not been fully explored. Moreover, one remaining landfill site, has rapidly filled up when greater action is

⁶ Billet d'Etat XII 1998, Wednesday, 24th June 1998, p667, para 4.4.3

⁷ Billet d'Etat XX 2003, Wednesday, 24th September 2003, p1798, para 8.4

been taken some years ago to conserve its capacity. [Comment – Conservation of landfill was at the heart of decisions made in 1998]

5. Although the decision in the late 1990s to seek to procure an energy from waste plant may have been right at the time, we believe that the proposed plant is no longer appropriate for Guernsey's needs. **We therefore consider that Guernsey should not proceed with the contract for the proposed energy from waste plant at Longue Hogue.**
6. We conclude that:
 - There are too many disadvantages and uncertainties in proceeding with the proposed energy from waste plant to make it the right choice for Guernsey (Part 1 of the Report).
 - Much more should be done to encourage the reduction, re-use and recycling of waste. This would help to reduce the disposal problem but it would not solve it (Part 2 of the Report).
 - Promising alternatives to the proposed plant should be explored which may provide a solution in the longer term (Part 3 of the Report).
 - An interim solution will be needed until a long term solution becomes available (Part 4 of the Report).

There are too many disadvantages and uncertainties to justify proceeding with the proposed plant

7. We recognise that there would be some advantages in going ahead with the proposed plant. The contract is ready to be signed now and the plant could be operational within two years. The plant would be capable of dealing with Guernsey's waste stream. It is based on tried and tested technology. It has been designed to meet current best practice as regards emission standards and there is no appreciable risk to public health. Amounts of residual waste would be low.
8. However, we consider that the disadvantages and uncertainties associated with the proposed plant considerably outweigh the benefits of proceeding. Five main factors have led us to this conclusion:
 - (1) **We have considerable doubts about the waste forecasts on which the proposed plant is based.**

We fear that the capacity of the proposed plant is too large and that there will not be sufficient waste to keep it operating efficiently. The growth assumptions in the waste forecasts are doubtful and the impact of a three-fold increase in the gate fee from £33 to around £100 per tonne has not been included. [Comment – The impact of such a rise was included in the

forecasts prepared by ISL and supplied to the Dadd Panel] It seems likely that a big increase in the gate fee will result in a large reduction in commercial waste for disposal. Better waste minimisation and recycling measures are also likely to reduce waste for disposal even further. The less waste there is for the incinerator the more the economic viability of the plant must be called into question.

(2) The visual impact of the proposed plant would be huge.

The proposed plant would be very unsightly for islanders and visitors alike. There is no such thing as a small mass burn incinerator and it is difficult to ameliorate or screen the visual impact except at large cost. Condensing water vapour from the plume would also be highly visible in certain weather conditions. [Comment - only at low air temperatures] Although there would be no health risk from the plume, it would be an unattractive feature.

(3) The risk of the plant failing has been increased by the simplified design.

The single stream design is risky [Comment - The reliability of the chosen plant is well documented and is based on proven technology with contractual guarantees provided] because there is no alternative stream available during unintended outages. To save costs bunker capacity has been reduced from 15 days to 5 days, thereby reducing the time available to store waste whenever the plant is out of action. There is also no backup in the event of failure and waste would have to be baled and stored [Comment – A baling system was incorporated in the planned design because of our island situation] until the problem was resolved.

(4) The proposed plant is considerably more expensive than similar plants elsewhere.

The proposed plant is very expensive and has risen way above the original estimates. The cost of building incinerators has increased significantly in recent years as the supply market has consolidated. The proposed plant is also more costly than plants elsewhere for a number of largely unavoidable reasons: because of the higher building costs in Guernsey; because of the particular civil engineering requirements of Longue Hougue being a land reclamation site; and because of the flue gas treatment designed to meet the latest emission standards.

(5) The contract was too tightly specified too early in the contract process and it is not clear that the resulting draft contract represents best value for money.

The market was presented with just one procurement option: an unusual “design, build and operate for two years” contract. Other more common types of contract such as design, build and operate over 25 years were ruled out without proper testing or consideration [Comment - they were fully

discussed and debated by A&F and BoA]. The chosen procurement route involves negotiating two separate contracts: one for the design, build and operation of the plant for two years; and another later contract to cover the operation of the plant for its remaining life. This is likely to be a much more expensive [Comment – this assumption has not been substantiated] approach than agreeing one contract to cover the design, build and operation of the plant over its whole life. There was also a lack of competitive pressure in the tendering process: just two bids were received, only one of which was compliant. We therefore have no assurance that the draft contract is good value for money even though a sensible draft contract has been agreed with good safeguards.

Much more should be done to encourage the reduction, re-use and recycling of waste

9. It is accepted best practice to reduce the amount of waste requiring disposal by means of reduction, re-use and recycling. We consider that there are a number of actions that could be taken to improve the uptake of such measures on the island. Guernsey should without delay set itself challenging targets for the minimisation and recycling of waste. Landfill prices at Mont Cuet should be substantially increased as part of a pre-planned, and advertised programme. Materials which have alternative recycling or recovery outlets, such as inert construction waste, soil, metals, glass, paper, cardboard and textiles, should be banned [Comment - How is this proposed to be done with a mixed putrescible waste stream? Significant capital investment in infrastructure would be required before such a ban could be implemented.] from Mont Cuet.
10. A number of initiatives should be also taken to encourage the minimisation and recycling of waste:
 - Measures should be introduced to engage public support for waste prevention and recycling.
 - Commercial recycling organisations should be provided with more investment certainty - on planning, licensing and the availability of sites.
 - There should be more help for the non-profit sector, including subsidies where appropriate.
 - The availability of public recycling facilities, such as bring banks and civic amenity sites, should be significantly expanded.
 - Greater use should be made of composting. Household with gardens should be encouraged to home compost. A green waste composting plant to meet local demand should also be commissioned.

- The household waste collection service needs to be revised to encourage the minimisation and separation of waste at source. Options for a separated kerbside collection service for all households should be assessed and an incentive-based charging system should be introduced.
- The collection service for bulky household waste should be continued.

[Comment – All of the above were proposed either in the Waste Strategy Assessment or the draft Waste Management Plan or both]

11. We consider that fiscal measures should only be used if increases in gate fees and other measures do not succeed in reducing waste. Possible fiscal measures used elsewhere include taxes on landfill, virgin aggregates and plastic bags. However, such measures can be costly to introduce and administer and should therefore be kept in reserve in the event that the other options do not work.

Promising alternatives to the proposed plant should be explored which may provide a solution in the longer term

12. Joining with Jersey is a possible alternative solution which needs to be considered immediately if the opportunity is not to be lost. Jersey is planning to commission its own waste disposal plant and it may be possible for Guernsey to participate in this project. Exporting waste to Jersey is legally possible [Correction. At present export to Jersey is NOT legally possible. Jersey must first have the UK's signature to the Basel convention extended to that island or Guernsey must amend its primary legislation]. However, there are a number of risks in joining with Jersey. The cost of joining with Jersey is likely to be less than Guernsey's proposed energy from waste plant at Longue Hougue. The Panel has encouraged the governments of both Islands to commission a feasibility study from Ramboll/Babtie Fichtner, [Correction. Guernsey commissioned this report of their own accord] which will review the technical and financial aspects of a joint Channel Island solution. That report is expected to be available shortly.
13. There are a number of alternative technologies, such as gasification, pyrolysis and volume reduction by pre-treatment (autoclaving or mechanical and biological treatment) that are in or close to commercial operation. None are yet fully proven for Guernsey's type of waste, however. The UK's Department for Environment Food and Rural Affairs (DEFRA) is pump priming a series of demonstrator projects to evaluate alternative technologies. DEFRA's aim is to have five demonstration plants in operation by the end of 2005 and a further five by the end of 2006. If joining with Jersey proves not to be a practicable option, we consider that Guernsey should await the outcome of the demonstrator projects before finalising its own long term solution.
14. When the demonstrator projects have been evaluated - and if joining with Jersey is not practicable - Guernsey should go to the market for a long term solution to its own waste needs using an output-based specification. Such a specification would

set out the objectives to be reached rather than the specific means to achieve them. Expressions of interest should be invited in respect of all viable alternative technologies as well as mass burn incineration. Multi-solution options involving more than one type of plant or technology should not be ruled out. All different forms of contracting should be permissible [Comment. Evaluation of such a wide ranging, open ended approach would be problematical].

15. Exporting Guernsey's waste to EU countries appears to be legally possible but the issues are not clear cut. The opportunity exists to export waste to certain countries, particularly France and possibly Germany. The cost of exporting waste to EU countries may be less [Comment. Costs established by the Department indicate that export costs will be higher than on island costs] than the cost of an on-island solution. However, exporting waste as a long term strategy has risks attached [Comment. Due to the required capital investment, short term export also carries significant risks] .

An interim solution will be needed until a long term solution becomes available

16. Except for inert waste, landfill is not a long-term solution to Guernsey's solid waste disposal needs. Mont Cuet does not meet accepted landfill standards. On current assumptions Mont Cuet has a remaining life of only 8 years. There are no alternative landfill sites available for non-inert waste which could meet accepted environmental health standards.
17. We consider that a minimum of five years' landfill life must be maintained at Mont Cuet until a long term solution becomes available. We estimate that, through immediate pricing, waste minimisation and recycling measures, the life of Mont Cuet could be extended by a number of years. [Comment – Yes but no evidence or calculation offered to quantify extension of site life]
18. Guernsey should take immediate steps to ensure that it is in a position to export waste as a short-term interim measure should this be necessary to maintain a minimum five year life at Mont Cuet. Residual waste for possible export needs to be reduced to a minimum through waste minimisation, recycling and possibly pre-treatment measures. The risks in exporting waste are very much less as a short term measure compared with export as a long term strategy.

CONCLUSIONS AND RECOMMENDATIONS

This section details the recommendations in each Part of the Report linked to the Report's main conclusions.

Key Conclusion: Guernsey should not proceed with the contract for the proposed energy from waste plant at Longue Hougue.

Main conclusion (Part 1): Although there would be some advantages in going ahead with the proposed plant, there are too many disadvantages and uncertainties to make it the right choice for Guernsey.

Recommendation 1.1: Given the uncertainties about the impact of a substantial hike in the gate fee, a thorough assessment of likely future waste arisings needs to be carried out as soon as possible after the gate fee has been increased to not less than £100 per tonne. Whatever disposal option is ultimately chosen it is crucial that forecasts are accurate in order to determine the size of the disposal operation. The Environment Department should make use of the economic and business expertise within the Commerce and Employment Department in carrying out this work (paragraph 1.26).

Recommendation 1.2: If and when a new procurement is begun, all procurement options should be independently tested in the market to determine which is likely to provide the best value for money (paragraph 1.77). [Comment. If this recommendation is to hold true for all infrastructure, including any export transfer station, significant time will be added to the procurement phase delaying the introduction of interim measures]

Recommendation 1.3: More generally, there should be a much closer partnership between the public and private sectors in the management of the Island's waste. We consider that the public sector should only be involved in the operation of waste management activities if those activities have been independently market tested and public sector operation has been shown to be at least as efficient as that of the private sector (paragraph 1.79). [Comment. This assumes that privately owned and operated, monopoly provision of essential waste facilities is acceptable to Guernsey]

Main conclusion (Part 2): Much more needs to be done to encourage the reduction, re-use and recycling of waste. This would help to reduce the disposal problem but it would not solve it.

Recommendation 2.1: Appropriate short, medium and long-term targets should be identified for waste management (paragraph 2.10).

Recommendation 2.2: The gate fee at Mont Cuét should be raised as soon as possible to not less than £100 a tonne (paragraph 2.18).

Recommendation 2.3: All materials which could be recycled should be banned from Mont Cuét (paragraph 2.22). [Comment. Regardless of cost?]

Recommendation 2.4: The three arms of government directly involved in the disposal of solid waste (the Environment Department, the Public Services Department and the Health and Social Services Department) must work closely together and with the commercial organisations. Government needs to build trust and establish a common sense of purpose with the private sector so that commercial recycling organisations have the investment certainty they need to be able to play a full part in the waste strategy for Guernsey (paragraph 2.35).

Recommendation 2.5: The Environment Department should be tasked to carry out an in-depth review of possible sites for recycling and other waste management facilities (paragraph 2.39). [Comment. This was primarily achieved through the EIA and Planning Inquiry for Longue Hougue]

Recommendation 2.6: Facilities should be urgently developed in suitable locations to which the public can bring a range of household wastes for re-use or recycling (paragraph 2.49). [Comment. The bring banks provide the basis of this facility. Civic Amenity sites are planned for Mont Cuet and Longue Hougue as detailed in the draft WMP]

Recommendation 2.7: The Environment Department should encourage householders with gardens to compost garden and kitchen waste, and also commission a composting facility to take green wastes collected at the civic amenity site or to meet other local demand (paragraph 2.55). [Comment. This is detailed in the draft WMP]

Recommendation 2.8: The States should specify the use of such composted material as an alternative to peat or soil-based composts in their own works or contracts (paragraph 2.55). [Comment. This is detailed in the draft WMP “green procurement”]

Recommendation 2.9: The options for providing a kerbside collection of source separated materials should be assessed (paragraph 2.65). [Comment. This is detailed in the draft WMP]

Recommendation 2.10: The collection service for bulky household waste should continue and should not be charged for (paragraph 2.66).

Main conclusion (Part 3): There are a number of promising alternatives to the proposed plant that are worth exploring and which may provide a solution in the longer term.

Recommendation 3.1: The possibility of working with Jersey should be explored immediately by the relevant authorities in the two islands if the report of Ramboll/Babtie Fichtner confirms that there are economic and environmental reasons for so doing (paragraph 3.15).

Recommendation 3.2: If joining with Jersey is not practicable, Guernsey should finalise its own long term solution for residual wastes once the outcome of the DEFRA New Technologies Demonstrator Programme is known (paragraph 3.27).

Recommendation 3.3: The search for the right long term solution for Guernsey's waste management needs should be underpinned by a thorough analysis of strategic options for waste management for the island. This would involve comparison of a number of technologies and combinations of technologies, supported by an analysis of the environmental costs and benefits of the alternatives (paragraph 3.31).

Recommendation 3.4: When Guernsey is ready to go to the market for a long term solution, expressions of interest should be invited in respect of all viable technologies. Expressions of interest should be sought in terms of an outcome based specification, ie the objectives to be reached rather than the specific means to achieve them (paragraph 3.32).

Recommendation 3.5: Multi-solution options involving more than one type of plant or technology should not be ruled out (paragraph 3.34).

Recommendation 3.6: All different forms of contracting should be permissible. To test the market thoroughly, contractors should be allowed the freedom to propose their own choice of contract structure (paragraph 3.35).

Main conclusion (Part 4): An interim solution to Guernsey's waste needs will be required until a long term solution becomes available.

Recommendation 4.1: Through pricing, waste minimisation, enforcement and other measures, Guernsey should seek to maintain a minimum of five years' landfill capacity at Mont Cuet (paragraph 4.6). Recommendation 4.2: To maintain a minimum five year life at Mont Cuet, Guernsey should take immediate steps to ensure that it is in a position to export waste as a short term interim measure should this be necessary (paragraph 4.11).

PART 1: THE PROPOSED ENERGY FROM WASTE PLANT AT LONGUE HOUGUE

- 1.1 This Part of the Report considers the advantages and disadvantages of proceeding with the proposed energy from waste plant at Longue Hougue. **We conclude that, although there would be some advantages in going ahead with the proposed plant, there are too many disadvantages and uncertainties to make it the right choice for Guernsey.**

Proceeding with the proposed energy from waste plant would have some advantages

- 1.2 The main advantage of pressing ahead with the proposed plant is that a great deal of time, money and effort has already been invested in the proposal and the project is “ready to go”. Following a decision to proceed with the agreed contract, the plant could be commissioned and running within two years (2007).
- 1.3 Some £5 million of expenditure⁸ has been irrevocably committed to plant design and site preparation and this would be lost if the decision were to be taken not to proceed. The capital investment in the Longue Hougue reclamation site itself would not be wasted, however, as the site would be suitable for any alternative development sanctioned in accordance with the original plans for the site. The land currently being claimed from the sea is a valuable asset because of the strong and persistent demand for industrial and commercial sites and premises on the island. The originally perceived need to cluster “bad neighbour” industrial and trade land uses away from residential and visitor land uses remains. From such a “zoning” perspective the purpose and location of the plant are sound.
- 1.4 A second advantage of going ahead with the proposal is that the Panel is satisfied that, subject to sufficient waste arising for final disposal, the plant offered “will do the job”. The plant should be capable of dealing with all combustible waste generated on the island. Island communities such as the Isle of Man and the Shetland Islands have invested in energy from waste technology for similar reasons to those promoted over the years by the authorities in Guernsey.
- 1.5 We are also satisfied that the plant should give the waste volume reductions projected (90 per cent) and that the remaining bottom ash/clinker should be reasonably suitable for disposal to Longue Hougue or, preferably, for use in construction on island. Relatively small quantities of flue gas treatment residues will need to be exported for disposal as hazardous wastes. It would be unreasonable for a small island community to be expected to deal with every specialist aspect of hazardous waste disposal.

⁸ as estimated by Ramboll, the Environment Department’s engineering consultants.

- 1.6 The plant is based on tried and tested technology. However, our confidence in the technology does not make the plant proof against failure and operational difficulties during its lifetime. Lurgi has guaranteed that, for the initial two years of operation, it will achieve availability of 88.5 per cent and meet agreed performance standards. We note that down time and outage days for annual repairs and maintenance have been taken into account in the availability standards.
- 1.7 A third advantage of pressing on with the proposal is that the plant has been designed to meet current and foreseeable best practice as regards air quality emission standards and that there would be no perceptible risk to public health from its operation. The proposed 60 metre high chimney stack will disperse the low levels of air pollutants not removed by the flue gas clean up system (Figure 1). The plant is designed to control the noise, odour and dust inevitably associated with waste handling. The health and safety of staff and visitors to the site has also been considered in consultation with specialist officers. We also draw attention to a review of the environmental and health effects of waste management published in May 2004 by DEFRA⁹. This concluded that there was no evidence to suggest that the current generation of municipal solid waste incinerators would be likely to have an adverse effect on human health. A study in 2000 by the Isle of Man reached similar conclusions.¹⁰

⁹ Review of Environmental and Health Effects of Waste Management (Appendix 7 to Billet XI 2004)

¹⁰ Report to Tynwald on the Health Implications of Human Exposure to Dioxins and other Toxic Chemical Components

Figure 1: Compliance with Criteria, Thresholds and Tolerance Limits set by the Environmental Impact Assessment

Air Quality		
Abatement Technology and sufficient effective stack height should be used to ensure that emissions meet standards set in the following guidance and legislation:		
The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, January 2000		
EC Directive 85/203/EEC		
EC Directive 1999/30/EC		
World Health Organisation Guidelines (revised)		
The current most stringent values from these various sources are as follows:		
NO₂	I hour mean	105 ppb (not to be exceeded more than 18 times per calendar year)
	Annual mean	21 ppb
	Calendar mean 98%ile of hourly means	70.6 ppb
	Calendar mean 50%ile of hourly means	26.2 ppm
SO₂	24 hour mean	47 ppb
	Annual mean	8 ppb
	10 minute mean	175 ppb
Benzene	Running annual mean	5 $\mu\text{g m}^{-3}$
PM₁₀	Daily mean	50 $\mu\text{g m}^{-3}$ (not to be exceeded more than 35 times per calendar year)
	Annual mean	40 $\mu\text{g m}^{-3}$
CO	Running 8 hour mean	10 ppm
	I hour mean	25 ppm
	30 minute mean	50 ppm
	15 minute mean	90 ppm

Source: Former Board of Administration Compliance Document ref 0210BA9.

However, there are too many disadvantages and uncertainties to make the proposed energy from waste plant the right choice for Guernsey

1.8 We have concluded that Guernsey should not go ahead with the proposed energy from waste plant at Longue Hougue on five main counts:

- (i) We have considerable doubts about the waste forecasts on which the proposed plant is based. [Comment – Independent forecasts have been made by both Ramboll and ISL.]
- (ii) The visual impact of the proposed plant would be huge.
- (iii) The risk of the plant failing has been increased by the simplified design. [Comment – There has been no design simplification which increases the risk of plant failure.]
- (iv) The proposed plant is considerably more expensive than similar plants elsewhere.
- (v) The contract was too tightly specified too early in the contract process and it is not clear that the resulting draft contract represents best value for money. [Comment - To obtain fair bids a clear contract and level playing field are required – States tendering procedure]

(i) We have considerable doubts about the waste forecasts on which the proposed plant is based

1.9 The proposed energy from waste plant has been specified to have an operating capacity of between 50,000 and 70,000 tonnes per annum. The capacity of the plant was based on an assessment in 2001 by the consultants Ramboll for the former Board of Administration. Using data from the year 2000, Ramboll estimated that total waste arisings were then 73,000 tonnes per annum, of which 48,000 tonnes per annum were incinerable. Ramboll forecast that incinerable waste arisings would rise to 50,000 tonnes per annum by the time the energy from waste plant was commissioned in 2005

1.10 The calorific value of the waste was estimated by Ramboll at 11 Mega Joules (MJ) per kilogram. We have received indications that this may be at the higher end of the scale and a more conservative estimate of between 9 and 10 MJ per kilogram may be more appropriate. This would accord more closely with the calorific value for waste being incinerated in Jersey. We also note that the calorific value for 2004 for the 56,000 tonne capacity North East Lincs Cyclerval plant was 8.5 MJ per kilogram and that the plant had been designed for a higher calorific value.

1.11 Ramboll also forecast the likely growth in waste arisings over the life of the proposed plant. Ramboll's estimates were based on:

- an average increase in the Guernsey population of 0.27 per cent per year from 2000 to 2025;
- economic growth of between 1 and 3 per cent;
- initiatives to encourage recycling and waste segregation which would be likely to counter some of the increased waste arisings from economic growth.

1.12 Taking these factors into account, Ramboll predicted an average increase in the waste arisings of approximately 1.3 per cent per annum over the plant's lifetime. Ramboll concluded that the plant would need to be able to deal with a maximum of 65,000 tonnes per annum of incinerable waste towards the end of its life. To this figure needed to be added quantities of sewage sludge from a proposed new sewage treatment plant. These were expected to be 4,400 tonnes per year at a dried solids content of 25 per cent or 1,375 tonnes per year at a dried solids content of 80 per cent. Based on these figures the Board of Administration decided that the design of the plant should allow for future waste arisings increasing to 70,000 tonnes per annum towards the end of the plant's life. [Comment. These waste arisings were independently verified by ISL]

The growth assumptions in the waste forecasts are doubtful

1.13 In September 2004 the Commerce & Employment Department carried out an economic impact assessment of the proposed energy from waste plant, which cast doubt on a number of the assumptions used by Ramboll in assessing the design capacity of the plant. Although the Environment Department told us that they considered the assessment to be flawed, we found the economic impact assessment to be well-argued. We consider that it throws new light on a complex subject and should not be lightly discounted. [The project teams response to the Commerce and Employments Department's report is provided as an appendix to the States Report]

The link between waste and economic growth

1.14 The economic impact assessment considered that Ramboll had failed to take account of the changing nature of Guernsey commerce and industry and the impact that this would have on the waste stream. Over the period to 2025, some of the industries which generate large amounts of waste - such as construction, horticulture, manufacturing and tourism - are not expected to grow and could actually decline in volume terms. By contrast, the types of industries and economic sectors that are expected to take growth forward in the Guernsey economy – such as financial services, management and supply businesses – are expected to generate relatively little additional waste. [Comment - in developed countries, waste growth is usually correlated with GDP. The type of industry or

commerce is not the main driver of waste – people are – and as the GDP per capita increases, so does consumption and waste.] The economic impact assessment concluded that Ramboll’s assumption that waste requiring final disposal would increase by 1.3 per cent a year was incorrect. We also note that, in most European Union countries, the aim is to de-couple waste arisings from economic growth, although experience shows that this is difficult to achieve. The Environment Department considered, however, that there was no evidence that growth in waste requiring final disposal would differ significantly from that forecast by Ramboll. [Comment - The 1.3% target is well below historical levels of 3% pa growth and of itself represents a stiff reduction/recycling challenge]

Population growth

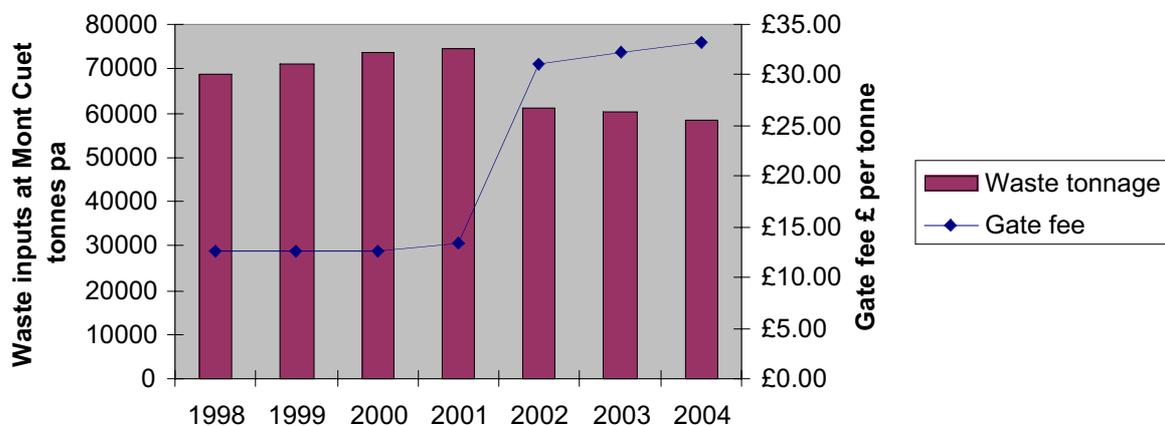
- 1.15 The Ramboll population projections were based on the 1996 census. Ramboll predicted that Guernsey’s population would rise from 60,900 in 2005 to 64,400 in 2025. The economic impact assessment used the latest government actuarial figures from the more recent 2001 census. These figures show that, compared with the Ramboll projection, the Guernsey population is expected to be lower both at the start year for the plant and in the final year of its projected operating life, rising from 59,900 in 2005 to 63,600 in 2025. The Environment Department considered that these changes would have little impact on forecast waste arisings and that, more significantly, Guernsey is now taking Alderney’s waste (population 2,300). We note, however, that the export of Alderney’s waste to Guernsey may be only a temporary solution, whilst Alderney considers its long-term strategy. We consider that these differences in population projections are likely to have only a marginal effect on growth forecasts of waste requiring final disposal.

The likely impact of the increased gate fee on waste production has not been included in the forecasts

- 1.16 Ramboll’s assessment in 2001 did not include any specific consideration of the likely impact of increasing the gate fee on future waste arisings. The Commerce & Employment Department economic impact assessment in 2004 considered that the proposed increase in gate fee from £33 per tonne to around £100 per tonne would focus business minds on the economics of waste disposal. Businesses would then be more likely to make decisions to minimise the cost increase by increased sorting and recycling.
- 1.17 The Environment Department told us that it did not agree that increasing the gate fee to around £100 per tonne would significantly reduce combustible waste arisings. It considered that the vast majority of waste that could be diverted from Mont Cuet by the waste generators and haulage companies had already been diverted and that the scope for further segregation was very limited. The Department felt that a greater level of recycling would be stimulated, in part, by an increase in disposal charges, but a threshold would be reached whereby the cost of further recycling would exceed the gate fee and further recycling would not be adopted.

- 1.18 Our discussions with recycling companies in Guernsey and elsewhere indicate, however, that there is considerable scope for further recycling by industry and commerce in Guernsey. A substantial increase in the waste disposal gate fee would be likely to provide a big boost to this recycling effort. We also note the position in the Isle of Man where there was a large increase in the landfill gate fee from £10 per tonne to £100 tonne¹¹ some two years before the island's new energy from waste plant opened in August 2004. This increase led to a big take-up in recycling by the commercial sector and a dramatic reduction in commercial waste going to landfill. As a result, the operator of the Isle of Man plant is currently struggling to achieve its desired tonnage of combustible waste for the incinerator, although there are no current plans to import waste to make up the shortfall.
- 1.19 Figure 2 shows waste inputs at Mont Cuet from 1998 to 2004. After rising to a peak of 74,800 tonnes in 2001, there was a big drop in 2002 to 61,300 tonnes and there has been a steady decline since then. The drop in 2002 coincided with a substantial increase in the gate fee from £13.30 to £31.00.

**Figure 2: Waste inputs and gate fee at Mont Cuet
1998 to 2004**



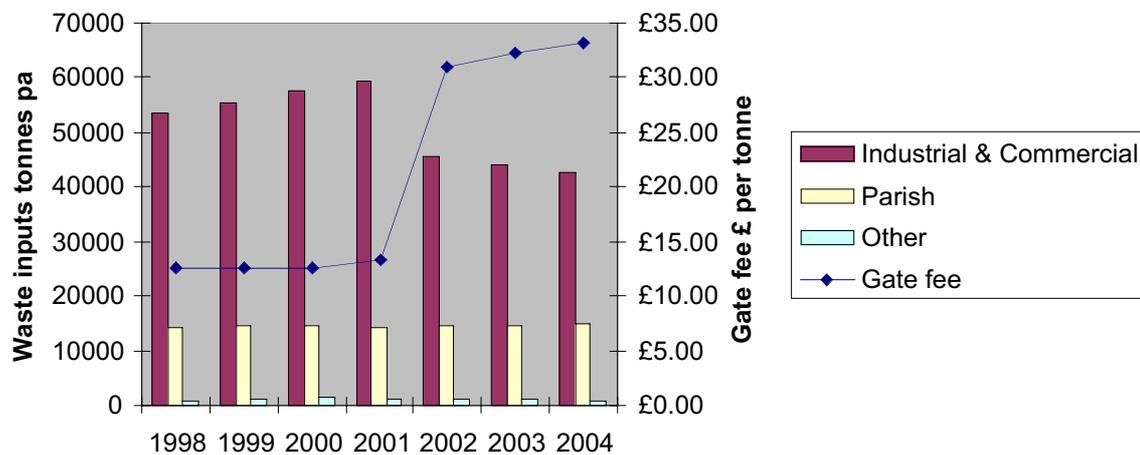
Notes: (i) 1998 and 2004 waste tonnage figures are based upon an extrapolation of 6 and 10 months of weighbridge records respectively; (ii) the gate fee shown is the standard rate for commercial hauliers.

Source: Guernsey Technical Services

¹¹ this increase did not apply to household waste collected by the local authorities.

1.20 Figure 3 shows waste entering Mont Cuet split between industrial and commercial, parish and other categories. The amount of parish waste has been fairly constant at between 14,200 and 14,800 tonnes per annum. However, the amount of industrial and commercial waste entering Mont Cuet landfill dropped by nearly 25 per cent between 2001 and 2002, from 59,400 tonnes to 45,500 tonnes, when the gate fee increased from £13.30 to £31.00. This suggests that a further increase in the gate fee to around £100 per tonne could have a similar effect on the amount of industrial and commercial waste entering Mont Cuet. [Comment – The graph can also be interpreted as demonstrating that the main elements of waste that can be segregated at source have been and that diminishing returns are now being experienced with most of the economically justifiable commercial separation already being done]

**Figure 3: Waste entering Mont Cuet by category
1998 to 2004**



Notes: (i) 1998 and 2004 waste tonnage figures are based upon an extrapolation of 6 and 10 months of weighbridge records respectively; (ii) the gate fee shown is the standard rate for commercial hauliers.

Source: Guernsey Technical Services

Better waste minimisation and recycling measures are likely to reduce waste for disposal even further

1.21 The Commerce and Employment Department economic impact assessment suggested that there is an increasing environmental awareness across sectors of the industry. The increase in gate fee should give a positive stimulus to the recycling industries. With improved services for waste collection and stimulation of the export market through the recycling companies, the commercial sector could make a significant switch away from the supply of material for an energy from waste plant and into greater sorting and recycling of waste. Much would depend on the relative economics of recycling versus incineration.

Lower waste forecasts would call into question the economic viability of the plant

1.22 The economic impact assessment concluded there might be no increase in waste arisings over the life of the proposed plant and that a plant with a capacity of 50,000 tonnes per annum might be more appropriate. [Comment – The proposed plant is designed to operate anywhere within the range from 50,000 to 70,000 tonnes per annum] The assessment also concluded that the proposed plant, with a capacity of 70,000 tonnes per annum, was oversized. This would have a number of potentially serious consequences:

- The proposed plant would be more expensive than it needs to be, although any savings from a smaller capacity plant would be relatively modest (a few million pounds on a capital cost of around £70 million). [Comment - a too-big plant will always cope; a too-small plant never will]
- An energy from waste plant requires a continuous stream of waste material and is most efficient if operating near to its maximum capacity.
- A gate fee significantly higher than £100 per tonne would be required to balance operating costs and revenues (see below), which could threaten the plant's economic viability.

1.23 The Environment Department has calculated that an initial gate fee of £102 per tonne (and then rising by 4 per cent each year) would be needed for the plant to break even over its proposed 25 year life. The financial model used to calculate the gate fee makes the following assumptions:

- capital cost of £74 million, financed by borrowing from the Treasury;
- Treasury loan rate of 4.7 per cent;
- amortisation of capital over 25 years;
- initial waste input of 50,000 tonnes rising steadily to 70,000 tonnes per annum after 25 years;
- fixed annual operating costs of £1.5 million;
- variable operating costs of £20.22 per tonne;
- electricity revenue of £13 per tonne;
- inflation rate of 4 per cent.

1.24 The calculation of the gate fee very much depends on the assumptions used. For example, Ramboll has projected a cost of £155 per tonne based on Guernsey's

waste arisings averaging 60,000 tonnes per annum over a 20 year period and with an interest rate of 5.5 per cent.¹²

- 1.25 The Panel used the Environment Department financial model referred to in paragraph 1.23 above to assess the impact on the projected gate fee of varying the forecast waste inputs (Figure 4). The Panel noted that, if waste inputs were higher than forecast, the gate fee could be set at less than £100 per tonne to enable the plant to break even. However, if the waste input remained steady at 50,000 tonnes over the life of the plant (based on the Commerce and Employment Department projections), the initial gate fee would need to be set at £121 per tonne. If the waste input dropped to 40,000 tonnes because of the increase in gate fee and other measures and then remained steady at this level, the gate fee would need to be set at nearly £150 per tonne. The more that a higher gate fee reduced waste inputs, the more the gate fee would need to be increased to compensate. A position might then be reached where the proposed gate fees were too high to be acceptable and the plant would not be economically viable. [Comment. This situation could only be expected to occur if the separation and recycling costs for each additional tonne of waste extracted from the waste stream were less than the EfW gate fee. No evidence has been presented to substantiate this assumption]

Figure 4: Projected gate fee based on various waste input assumptions

Forecast waste input (tonnes per annum)		Projected gate fee (£ per tonne)
At start	After 25 years	
70,000	70,000	91
60,000	70,000	95
60,000	60,000	102
50,000	70,000	102
50,000	60,000	111
50,000	50,000	121
40,000	60,000	121
40,000	50,000	134
40,000	40,000	150

Source: Environment Department financial model.

- 1.26 The economic impact assessment carried out by the Commerce and Employment Department casts considerable doubts over the forecasts of waste arisings used in deciding the design capacity of the proposed plant. [Comment – The C&E report relies entirely upon statements from a variety of parties with vested interests in Guernsey’s waste management. No investigation of ISL’s forecasting was made] The forecasts were based on assumptions about population and economic growth but did not take into account the likely impact on waste arisings of the proposed three-fold increase in gate fee to £100 per tonne. **Given the uncertainties about**

¹² Letter dated 11.11.04 from Ramboll to Guernsey Technical Services.

the impact of a substantial hike in the gate fee, we recommend that a thorough assessment of likely future waste arisings is carried out as soon as possible after the gate fee has been increased to not less than £100 per tonne.

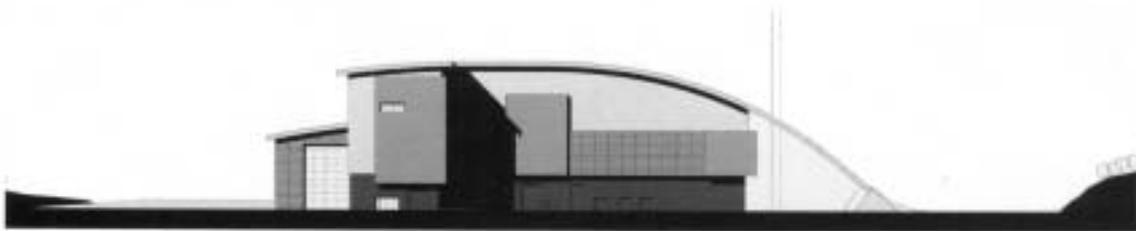
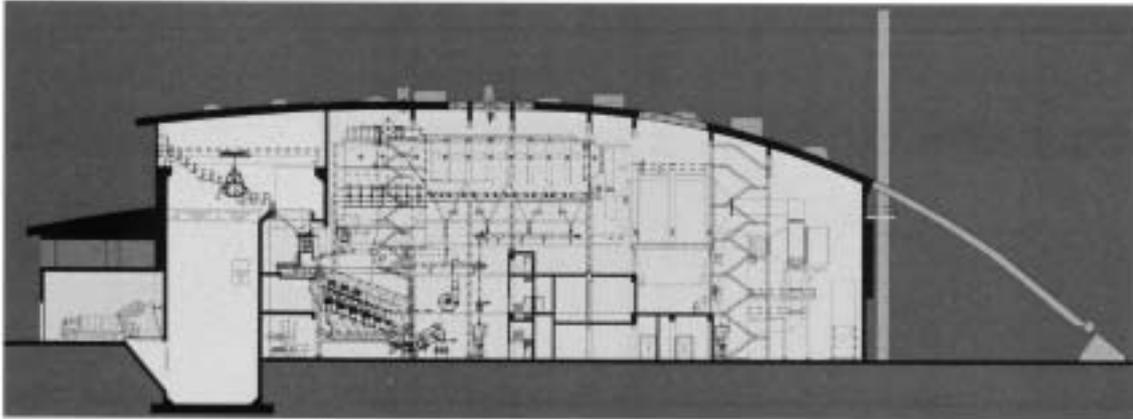
Whatever disposal option is ultimately chosen it is crucial that forecasts are accurate in order to determine the size of the disposal operation. The Environment Department should make use of the economic and business expertise within the Commerce and Employment Department in carrying out this work[Comment – No evidence exists that C&E are better able than waste industry specialist advisers to carry out such forecasts]

(ii) The visual impact of the proposed plant would be huge

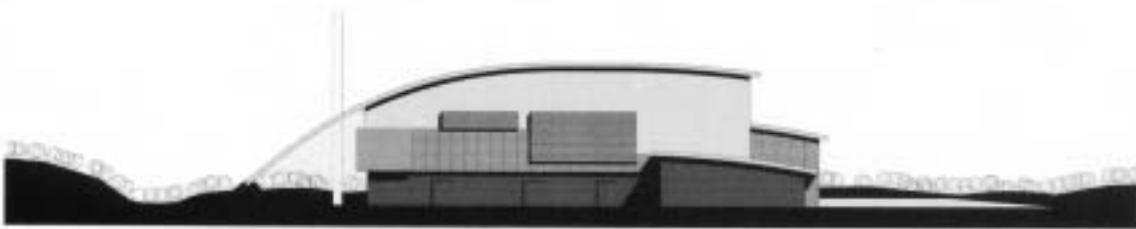
1.27 It is a fact of life that there is no such thing as a small mass burn incinerator. The plant is “heavy engineering and materials handling”: receiving, storing and mechanically handling tonnes of difficult and variable material; burning tonnes of that same material at very high temperature; using the furnace heat in a water tube boiler to generate steam; and using that steam in high-speed turbines to generate electricity. The flue gas pollution abatement is a complex process involving high temperature gas handling and chemical treatment. Disposal of residues is also complex, using a range of chemicals in spray wash water. There is a plant for separating ferrous and non-ferrous metals for recycling and baling them for transportation. Lastly there is electrical switchgear to transmit the power generated to the grid.

1.28 Figure 5 shows an impression of the proposed plant at Longue Hougue.

Figure 5: The Proposed Plant at Longue Hougue



South Elevation



North Elevation

- 1.29 This heavy engineering leads to the need for a site of some 2 hectares, a very large building some 35 metres high and a chimney some 60 metres high. We note that cost reductions required after receipt of initial tenders have raised the planned visible height of the building by some 6 metres. [Comment. This sentence may be misconstrued, the proposed building height is 35, not 41 metres (35 +6). Proposals to sink the plant below ground level in the Longue Hougue site were aborted because the civil engineering difficulties of building below high tide levels would have added nearly £20 million to the cost of the plant.
- 1.30 The proposed building will be much larger than any now on Guernsey. The power station nearby at St Sampson's is the biggest complex already on the island and is undoubtedly visually intrusive. The energy from waste plant would be built on an even more prominent site where in our view it would be impossible to screen it. Having visited the site of the Isle of Man incinerator (Figure 6) we know how enormous such a building is and how it could dominate the landscape in Guernsey.

Figure 6: Picture of the Isle of Man plant opened in 2004



- 1.31 The only alternative to screening is to create a landmark building through skilled architectural design, which would substantially increase costs. In our view the building will be clearly industrial in character and the sketches in the Compliance Document are misleading. We do not believe the maritime location would support anything like the tree growth illustrated. We doubt that creation of an attractive landmark building is possible, even if it proves affordable, although we recognise that for some people big industrial buildings signify progress and modernisation. The panel notes the overwhelmingly adverse public comment it has received that the visual impact is most undesirable on an attractive tourist destination island.
- 1.32 Since the Panel commenced its work the Environment Department has engaged Lurgi to produce further architectural designs with the object of cladding the incinerator in such a way that it takes on the appearance of a “Landmark Building”. At the time of concluding our Report we were not able to obtain an estimate of the additional costs of these works, which are likely to be substantial. [The costs are provided in the Department’s States Report. Contrary to The Panel’s assumption they are not substantial]. The Panel appreciates that any such proposal is likely to be the subject of considerable public debate.
- 1.33 Selection of the Longue Hougue site for the incinerator was made through a conceptual Environmental Impact Assessment. The proposal to site the incinerator on reclaimed land was originally seen in a positive light since it would enable the plant to be built partly below ground level. In the event, engineering difficulties and consequent costs turned this perceived “strength” at the concept stage into an unaffordable cost when tenders were received. The Planning Inspector, having heard objections to the choice of Longue Hougue, was not able to identify a more suitable site on the island for such a plant and none has been suggested to us.
- 1.34 We note that the Mont Cuet area was the second favourite site when all possible sites were evaluated and the ground conditions there are different and better for construction of a large plant. However, this is also a prominent site on the coast where effective screening of such a large plant would not be feasible. Mont Cuet is undeveloped land where mineral extraction has taken place but there are amenity considerations for coastal walkers and others seeking to enjoy the open space. We accept the view that from a planning and land use zoning viewpoint Longue Hougue was the preferable site, as it is already home to a number of industrial site uses where road traffic is already heavy.
- 1.35 A further concern about visual appearance is the likelihood, in certain weather conditions, of a highly visible plume of water vapour from the 60 metre high chimney. [Comment - only at low air temperatures] Although there would be no health risk from the plume, some people would inevitably regard the visible plume of water vapour as “smoke”. We fear that it would be much more visible than the brown smoke from the heavy oil fuel fired plant at the Power Station.

(iii) The risk of the plant failing has been increased by the simplified design

The single stream design is risky because there is no alternative stream available during unintended outages

- 1.36 In terms of availability, landfill has proven to be the most reliable waste management option. Most landfills are capable of operating 365 days a year, generally because the technologies used are simple and robust. More complex waste management processes have to be shut down from time to time both for planned maintenance and because of unplanned stoppages, incidences of which will vary over the life of the plant. Typically, a modern energy from waste plant can be expected to experience between 5 and 10 per cent of downtime in any period.
- 1.37 The Environment Agency has assessed downtime for other technologies. It reports 14 per cent downtime for a pyrolysis technology plant; and greater than 85 per cent availability and between 81.6 and 92.3 availability for two gasification technology plants, figures which the Agency considers to be “high” (ie they offer relatively good performance with relatively little down-time). No complex technology is capable of the almost permanent availability offered by landfill.
- 1.38 Any failure to maintain an energy from waste plant at its minimum capacity increases the risk of unexpected failures due to the variation in temperature cycles. These plants operate best over time with steady state burning conditions rather than stop-start conditions. This is a particular risk for the proposed plant in Guernsey, as the waste stream may well be insufficient to sustain the plant. [Comment – This statement is based on the questionable conclusions of the C&E report] The Isle of Man, with a population of 76,000, has found it difficult to achieve 50,000 tonnes of combustible waste per annum; [Comment. The Isle of Man has indicated that any drop off in waste arisings from that forecast is as a result of private landfill sites legally accepting waste rather than through waste reduction or increases in recycling] and the problem could get worse as disposal subsidies for household waste diminish.
- 1.39 Many waste management plants work by having duplicate or multiple waste treatment streams. The likelihood of simultaneous breakdown of both or all streams is low and it is possible to manage the waste from the unavailable stream during downtime. The design of the proposed energy from waste plant at Longue Hougue has only one stream. When it is not available - either for planned maintenance or for other reasons - treatment of waste at the site would stop. [Comment – The reason why baling is included in the process]
- 1.40 A number of alternative technologies offer a multi-stream capacity which permits planned maintenance whilst the plant remains in operation or allows for continuing operation, perhaps at a temporarily reduced level, during periods of unserviceability. [Comment – As acknowledged by The Panel, no alternative

technology as yet offers a robust or reliable solution to Guernsey's waste] The size of some alternative technologies would allow for a multi-option solution to waste disposal (see Part 3 of our Report). Having more than one type of treatment would provide additional flexibility during both planned maintenance and unplanned shutdowns.

1.41 The Environment Department told us that Ramboll had recommended a single stream solution for the Guernsey energy from waste facility for the following main reasons:

- It would be difficult to attract key market players to supply twin stream units as the individual units would be too small.
- Because of the small size of the plant, one stream would be more efficient than two streams in dealing with large elements in the waste, handling variations in calorific value, achieving uniform combustion, ensuring that emission standards can be met, and in producing power.
- A single stream solution would be £10.6 million less expensive on capital cost and £0.4 million less expensive in annual operational costs than a twin stream solution.

Measures in the contract to mitigate the risks from relying on a single stream include stocks of strategic spare parts, a waste baler and an emergency plan to use Mont Cuet for the storage of baled waste. Lurgi had also guaranteed, on pain of damages, that it would achieve an availability of 88.5 per cent for the two years that it would be responsible for the operation of the plant. Although this would provide financial compensation it would not avoid having to deal with the problem of waste that could not be disposed of.

1.42 We note that the reasons given for choosing a single stream all relate to the fact that - on efficiency and financial grounds - the proposed plant is too small to have more than one stream. This reinforces our view that Guernsey's residual waste now and in the future may not support efficient mass burn incineration in the plant proposed.

1.43 We believe that there would continue to be a substantial risk in relying on a single stream despite the mitigating measures proposed. Re-design of the proposed energy from waste plant to incorporate two waste streams would increase the size of the building to house them and would greatly increase capital and operational costs. Such a plant would be unlikely to be either financially or operationally sustainable.

The capacity of the waste reception bunker has been reduced to five days

1.44 The rate of waste production on Guernsey is not easy to change. Businesses can hold waste for a few days longer than would be normal for them, but municipal waste depends on regular (once or twice a week) collection from every household.

- 1.45 Because of the unexpectedly high costs of the proposed energy from waste plant, the waste reception bunker at the front end was reduced in size during post-tender negotiations. The revised design of the bunker has a 5 day capacity, compared with 15 days in the original design.
- 1.46 The bunker allows some flexibility over the rate of waste delivery to the plant – such as no deliveries at night, on a Sunday or bank holidays – without waste processing having to stop. This is helpful as an energy from waste plant works more efficiently if allowed to operate continuously. The reception bunker also allows waste to be delivered when the plant is not working. With good operational practice the amount of waste in the reception bunker could be kept to the minimum needed to support continuous working. At any one time the bunker could therefore be assumed to have 3 or 4 days additional waste capacity after weekend build-up.
- 1.47 Nevertheless, 3 to 4 days capacity does not allow much margin for error. We are concerned that the reduced bunker capacity increases the risks from unplanned outages. We note that the energy from waste plant in the Isle of Man has been designed with a 16-day bunker capacity despite the availability of several landfill sites as back-up. [Comment. The industry norm is for much smaller bunker capacity than 16 days. Indeed attempting to store waste in a bunker for 16 days presents many additional environmental and safety problems. These factors were also part of the consideration for reducing the proposed bunker capacity]

There is no back-up in the event of failure and waste may have to be stored until the problem is resolved. [Comment. Baling and storage of waste was the preferred back up option and has been approved by the regulator]

- 1.48 Any downtime for the proposed plant of less than 3 days is unlikely to need any changes to the rate of waste delivery. The additional waste in the reception bunker could gradually be processed over the following few days unless the plant was already operating at maximum capacity. This would be unlikely, however, as the Panel believes that waste arisings for the plant are overestimated.
- 1.49 Alternative arrangements would be needed to cope with any plant downtime of more than 3 days. The Panel has not been able to procure an estimate of the likelihood of stoppages less than or greater than 3 days. However, in an extreme case where a year's downtime of 5 per cent was experienced in one event, an expected throughput of 50,000 tonnes per year (140 tonnes per day) would require some 15 days waste delivery, amounting to over 2,000 tonnes of waste, to be diverted away from the site.
- 1.50 For anything other than the shortest periods, storage of this waste in sealed containers would be prohibitively expensive, both in terms of the cost of the containers themselves and the equipment needed to fill and store them. One day's waste delivery would fill something like 15 ISO containers. We are concerned that the baling and temporary storage provision in the proposed design do not

appear to be adequate in the event of extended downtime. [Comment - the baling system proposed does not need secondary containment]

- 1.51 In such circumstances the Environment Department is considering using the Mont Cuet landfill for storage purposes. Long-term breakdown would rapidly consume the landfill capacity at Mont Cuet and alternatives would need to be explored including export off-island. The Environment Department told us that Mont Cuet currently has the capacity to store 26 weeks of baled waste. [Comment – Baled waste would only be temporarily stored at Mont Cuet until it could be incinerated]
- 1.52 Guernsey’s policy for its waste strategy has been centred around mass burn incineration as the most reliable technology. However, basing the proposed plant on a single waste processing stream with reduced bunker capacity increases the risks considerably. There is a much greater likelihood of having to implement “coping” strategies at times of breakdown, either on-island landfill or export. In the panel’s view, the simplified design flies in the face of one of the main advantages of choosing mass burn incineration over alternative options: that it is the least risky technological option.

(iv) The proposed plant is considerably more expensive than similar plants elsewhere

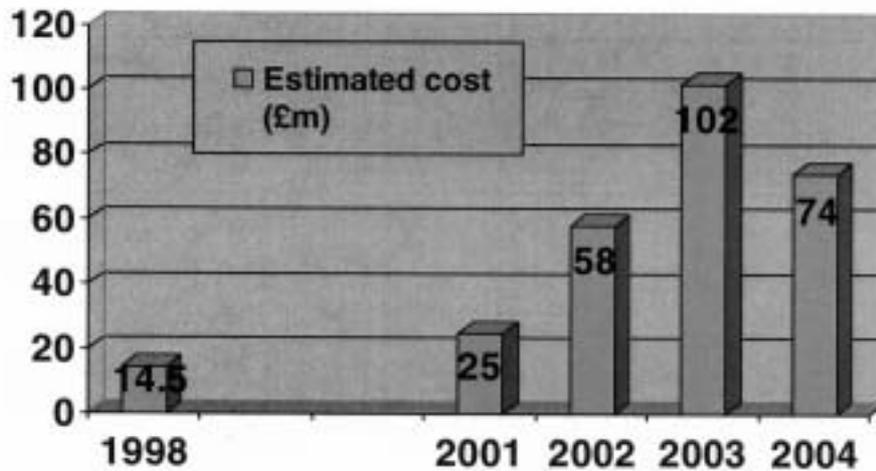
- 1.53 The cost of the proposed facility has risen way above the original estimates (Figure 7). In 1998 the indicative capital estimate was £14.5 million for the construction of a plant capable of burning 25,000 tonnes a year.¹³ In its budget for 2001 the former Board of Administration identified a sum of £25 million for the facility. In 2002 the pre-tender estimate for the proposed facility was £58 million¹⁴, although this did not include any estimate for the cost of bonds or other forms of protection or for the costs during the operational period. Bids then came in at between £93 million (Martin) and £102 million (Lurgi) in early 2003.¹⁵ Cost savings were subsequently achieved by reducing the specification to arrive at a capital cost of around £74 million.

¹³ Billet d’Etat XX 2003, para 3.3

¹⁴ *ibid*, para 3.2

¹⁵ *ibid*, para 1.8

Figure 7: The increasing estimated cost of the proposed



1.54 Emission standards and building costs have risen significantly since the plant was envisaged and there are other factors which have contributed to the rising cost. There have been significant changes in the energy from waste market between the preparation of the pre-tender estimate and the receipt of tenders. The number of suppliers has reduced because of insolvencies, mergers and companies withdrawing from the marketplace. Even taking these factors into account, however, the continuing increases in estimated costs compared with budgets notified to the States are a matter of considerable concern. We are surprised that these periodic hikes in cost estimates had not led to a fundamental review of the project long before now.

1.55 The cost of the proposed plant is very high compared with similar plants elsewhere. The Isle of Man incinerator cost £45 million when the contract was awarded in October 2000, although this cost would probably be significantly more if tenders were sought now. The Isle of Man plant became operational in August 2004 and has a second stream for animal and hazardous wastes. An incinerator at Le Havre in France, which opened in July 2004, cost 80 million euros (£55 million at an exchange rate of 1.45) [Comment - 2001 prices] and has a capacity of 24 tonnes per hour (more than twice that of Guernsey's proposed plant). A 2002 survey of incineration costs on the UK mainland undertaken by the UK Cabinet Office¹⁶ calculated an average cost of £55 per tonne [Comment - not current data], compared with a figure of over £100 per tonne for the proposed plant in Guernsey.

1.56 We asked the Environment Department whether the cost of the proposed Guernsey plant had been benchmarked against the cost of similar plants elsewhere. The Department said that this was not a straightforward exercise as

¹⁶ Cabinet Office report, "Waste Not, Want Not", 2002 (Annex F)

project specifications, contract terms and risk apportionment varied greatly between projects. A cost comparison had been made with the Isle of Man plant (Figure 8). The comparison took into account inflation, exchange rates, Guernsey building costs, site conditions, market conditions and varying plant specifications. After making appropriate adjustments to the Isle of Man base price for each of these factors, the assessment suggested that the cost differential between the two projects was of the order of £4.7 million. The Panel’s own enquiries of the Isle of Man Government confirmed the value of the secondary incinerator (for dealing with animal waste) as being £3.5 million. The cost comparisons at Figure 8 below should therefore be treated with caution. [Comment – The comparison was done by the same advisers to both the Isle of Man and Guernsey projects]

Figure 8: Cost comparisons between the Isle of Man and Guernsey plants

	Isle of Man £m	Guernsey £m
Base price	45.13	72.7
Additions to price		
Inflation	3.47	
Exchange rate	3.63	
Guernsey building cost	3.8	
Site conditions	4.0	
Flue gas treatment	2.0	
Market conditions	6.77	
Boiler protection	0.2	
Deductions from price		
Secondary incinerator	(1.0)	
Total	68.0	72.7
Difference		+4.7

Source: Environment Department

- 1.57 There is no doubt that the cost of building incinerators has increased significantly in recent years. The supply market has consolidated dramatically. The number of potential suppliers for a “bespoke” energy from waste plant is small as a result of the limited number of orders for such plants throughout the world. The protracted and specialised design and contracting procedures also raise costs and reduce market competition. Europe has the highest emission standards in the world, which should give a stimulus to innovation. However, the high level of “green awareness” in Northern Europe means that all proponents of energy from waste

developments face opposition, sometimes fierce, which limits the number of orders placed and often delays those orders as controversy rages. When competition is weak, tender prices can be expected to be high. Timing is also an issue as companies in the market claim to have lost money on recently completed plants. This makes it difficult to compare the costs of recent contracts.

1.58 There are also a number of Guernsey factors which make the proposed plant very expensive:

- Building and construction materials and labour prices are more expensive than in the UK. Guernsey costs are more than 48 per cent higher than the UK average¹⁷, but some areas of the UK such as London and parts of the South are also significantly higher than the UK average. These extra costs are inevitably reflected in tender prices.
- The civil engineering requirements of the proposed plant at Longue Hougue are exceptionally costly. The site is “made ground” and subject to tidal infiltration. The plant is very heavy and the foundations must both hold it up on the bedrock and hold it down to stop it floating like a boat. Post tender, considerable savings were secured by reducing the depth of the waste bunker originally specified and by lowering the height of the water tube boiler by specifying a horizontal rather than a vertical configuration. [Comment - it was always a horizontal tail-end boiler. There has been no change] Nevertheless, site-engineering costs for such a plant are very high and unavoidable at Longue Hougue. In our view even a re-design to process a smaller tonnage would have little or no effect on the plant size or foundation design. If the only other site available, Mont Cuet, were to be used civil engineering would be less difficult. Other land at St Sampson’s considered as a possible site for the plant is also “made ground” and subject to sea water infiltration. If a smaller lighter technology were selected, site engineering would be much less problematic.

1.59 The other significant cost element is the flue gas emission treatment designed to meet current and foreseeable emission standards. We consider that standards will continue to tighten. In our view Guernsey should aim to meet the EU Waste Incineration Directive standards with whichever technology it selects and we could not recommend any savings in this regard. [Comment - the requirement by the Environmental Regulator to meet better than WID requirements adds cost to the project] The Panel applauds the States decision to achieve the highest possible standards of gas clean up for the proposed plant.

¹⁷ Commerce and Employment Department

(v) The contract was too tightly specified too early in the contract process and it is not clear that the resulting draft contract represents best value for money

1.60 The former Board of Administration was directed by the States in 1998 to investigate the feasibility of commissioning an energy from waste plant. Following a competitive tendering process, Lurgi was selected to design, build and operate such a plant for two years, at an agreed price of £80.3 million, of which £7.5 million is for the operational phase. Selected steps in the contracting process are set out at Appendix 3.

1.61 Some of the reasons for the high cost of the proposed plant – such as the island environment, the civil engineering requirements and the flue gas treatment - are referred to earlier in this report. However, even taking these factors into account, the way that the proposed plant has been procured does not give us confidence that best value for money has been achieved.

Alternative technologies to mass burn incineration were ruled out, although this was probably right at the time

1.62 Companies proposing alternative technologies such as gasification or pyrolysis were ruled out when the shortlist of companies to be interviewed was prepared in late 2000. Juniper Consultancy was subsequently commissioned in April 2002 and again in April 2003 to review emerging technologies to determine whether they had developed sufficiently to be a suitable waste management option for Guernsey. In each case Juniper concluded that incineration with energy recovery was the most appropriate option. The Board of Administration therefore continued to rule out alternatives to mass burn grate incineration. We consider that this was probably the right decision at the time, although market conditions are now starting to change (see Part 3 of our Report). [Comment – It was claimed, in 2002 and 2003, that market conditions were changing, to date the developments have been insufficient to generate the required confidence]

Alternative contractual options were not properly evaluated

1.63 Prior to tendering, the Board of Administration considered two principal options for the procurement of an energy from waste facility:

- (i) A Design and Build (DB) turnkey contract with a separate Operate and Maintain contract. The Design and Build element would be provided through a single contract and the client would take possession of the completed facility.
- (ii) A Design Build Finance and Operate (DBFO) contract. This would be a single contract for the procurement of the plant and its subsequent operation and maintenance. Plant, equipment, staff and all other costs would be recovered by service based charges made during the contract period. The

operation period of the contract would have to be sufficient to allow recovery of the capital investment.

The market was presented with a DB2O contract as the only option

- 1.64 The Board of Administration's [Comment - and A&F's] preferred strategy was a variation of option (i) above: to procure the energy from waste facility through a design, build and two year operate contract (DB2O). The Board considered that there would be advantages to be gained from placing responsibility for operating the energy from waste facility with the design and build contractor for a period equating to the end of the warranty period, that is two years after successful commissioning and testing of the plant. The contractor would thus maintain full responsibility for the plant during the period when 'teething problems' might occur and modifications might be needed. The Board considered that letting a short operating contract would allow time for a decision on how to manage the operation of the plant in the long term, ie whether the States should operate the plant itself, the operation of the plant alone should be let to a contractor or the operation of the plant and all waste activities should be let to one operator. [Comment. A number of other limiting factors were highly relevant. These are set out in the Department's States Report]
- 1.65 The DB2O contract was the only procurement option put to the market. This ruled out of contention all those specialist waste management companies that specify, sometimes finance, and operate waste disposal plants and often recycle, compost and collect waste too.

The DBFO option was ruled out without proper testing or evaluation

- 1.66 The Board rejected option (ii) above - a Design Build Finance and Operate (DBFO) contract - on the grounds that such a contract would need to include as much of the waste management function as possible if total costs were to be reduced and effective control of the waste stream ensured. The DBFO route therefore presented problems in that the States had not at that time (and still has not) debated the issues surrounding the future long-term strategy for the integrated management of waste collection, treatment and disposal. [Correction – Waste Strategy Assessment was debated in 1997. There has been extensive consultation before during and since including preparation of a draft Waste Management Plan. What the States has not debated is the desire or otherwise to place strategically essential infrastructure into private ownership under a probable monopoly situation]
- 1.67 The Advisory and Finance Committee considered that best value for the sustainable long term provision of waste services could only be achieved if the design of all waste facilities, including the energy from waste plant, fully accounted for long term operational considerations. The Committee's strong preference was for tenders to be sought for the provision of integrated waste services and the Committee asked the Board of Administration to invite tenderers

to put forward a DBFO tender if they so wished. [Comment. Regretfully this represented a change in view of the Committee which only took place after the project specification had been drawn up and consultants and lawyers appointed under the DBO brief. The Committee also acknowledged the other limiting factors to a DBFO contract, referred to above and set out in the Department's States Report]. The Board of Administration considered, however, that it would be inappropriate to pursue a DBFO contract since it would result in unacceptable programme delays and would not result in financial benefits. We consider that this was a poor decision.

- 1.68 We consider it unfortunate that the waste management strategy had not been sufficiently developed to allow this option to be pursued further. A DBFO contract might well have been a good fit for an integrated waste management approach since it would have provided opportunities for total service delivery by a private sector partner, including the provision of high value capital investment, significant scope for technological innovation and attendant risk transfer. The DBFO option was not put to the market even though it is likely that a number of firms would have been interested in this option.

Negotiating two separate contracts (for DB2O and separate operation) may well be more expensive over the life of the plant [Comment - no evidence provided]

- 1.69 The strategy was agreed in June 2001 to procure the energy from waste facility through a design, build and two year operate turnkey contract (DB2O) followed by a finance and 25 year operate contract (FO25). As the Board of Administration noted, this strategy was fraught with problems as it was essential that the DB2O contract should contain sufficient clauses to enable the future letting of the FO25 contract as part of an integrated waste management contract which may include operation and maintenance of landfill and other waste disposal facilities on the island. It would therefore be necessary to identify all the interlinks between the two contracts and hence to draft the framework of both contracts before the detail of the DB2O contract. We were told, however, that no work has yet been done on the FO25 contract. [Comment. The key interlinks were addressed by the DC2O contract and by the procurement strategy with contract signing by a Special Purpose Company. All guarantees and collateral warranties belong to the company and can therefore pass to any future owner without the States becoming embroiled in third party litigation. All designs and data etc belong to the SPC ensuring the ability to sell the plant on. The SPC can, through share transfer, be converted to a States Trading Company, a Joint Venture Company or can be privatised.]

- 1.70 In view of the potential risks and associated costs of negotiating two separate contracts, it would have made sense to compare the whole-life costs of this option with other options, such as one contract to cover both the design and build phase and the operational phase (either DBO or DBFO). However, no comparison was made of the relative whole-life costs of the various options and it is impossible to know whether the chosen option is likely to provide the best value for money.

We consider that the DB2O contract option is particularly high risk. When operating periods are short - in this case just two years - contractors may not have a strong interest in maximising the long term operating efficiency of the plant. [Comment - the contract terms are such that handover tests have to be passed and guarantees have to be met at the end of the two years to prove the plant is of high commercial standard]

There was a lack of competitive pressure in the tendering process

- 1.71 Competition is a fundamental requirement for getting good value from procurement. A procuring body needs to survey the market to establish how many companies would be interested in the project and to assess whether its proposals are likely to be attractive to potential bidders. If too few bidders are interested there may be problems with the design of the project and the body should think again. Competition is essential if value for money is to be achieved. The receipt of just one compliant bid may indicate, for example, that the proposed project has been poorly designed. In such circumstances, the body should consider redesigning the project and starting the procurement again.

Only two bids were received

- 1.72 As a result of deciding to adopt the DB2O route, a number of operators withdrew their interest. Following expressions of interest, a shortlist of four preferred bidders was selected. Two of these dropped out, however, and the Board of Administration was left with only two bidders - Lurgi (UK) Ltd and Martin Engineering Systems Ltd.
- 1.73 The two remaining bidders submitted bids at £93 million (Martin) and £102 million (Lurgi) which were not considered viable. The Board of Administration held post tender negotiations with both tenderers with a view to establishing the scope for significant cost reductions and to identify a preferred partner for the construction of the plant. The original tender specification was amended and Lurgi and Martin then both submitted tenders at around the £80 million mark for design, build and two year operation.

Only one of the two bids was compliant

- 1.74 The Martin tender was submitted on the basis of a Limited Liability Partnership (LLP). A LLP structure limits the liability of its members to the amount of capital – usually a just a nominal sum – that they contribute. The law firm CMS Cameron McKenna was commissioned to give an independent opinion on the risks associated with contracting with a LLP. Both CMS Cameron McKenna and Tods Murray (the Board of Administration’s legal advisers) concluded that the LLP structure would expose the States of Guernsey to a far greater degree of risk than was normal in a turnkey contract.

- 1.75 There was very little to choose between Lurgi and Martin on cost and technical issues. However, the Martin bid was considered to be non-compliant because of its LLP structure. Following consideration of the tender appraisal report, the Board of Administration therefore identified Lurgi as its preferred tenderer and commenced a series of detailed negotiations and clarification meetings with Lurgi.

Although costly, a sensible draft contract has been agreed with good safeguards that seek to minimise the risk of failure through performance penalties and bonds

- 1.76 Although, as noted above, we have serious concerns about the chosen procurement strategy and whether it will deliver value for money, we are satisfied that the draft contract negotiated with Lurgi is sound. It contains a number of safeguards, including the following:

- on-demand payment, performance and retention bonds;
- contractor guarantees on emission and residue standards;
- a parent company guarantee by Lurgi's parent.

We note that Tods Murray confirmed to the Board of Administration that the extent of overall security provided by the draft contract was in excess of that which would normally be achieved in similar projects in the UK. Tods Murray told us that the safeguards were probably more in line with those used in Europe. We note, however, that such security comes at a considerable cost.

- 1.77 We are concerned that a DB2O (design, build and operate for two years) contract was committed to from the outset. Alternative options were dismissed without proper evaluation, on the grounds that changes to the approach would inevitably result in significant delays. This is a perhaps understandable reaction when so much time and effort has been invested in one particular approach but it is not conducive to securing best value for money. **We recommend that, if and when a new procurement is begun, all procurement options are independently tested in the market to determine which is likely to provide the best value for money.**

- 1.78 There should be a presumption that, of all the available options for the States to contract for the design, build and operation of a plant, an arrangement which leaves responsibility with the designer/builder for the on-going operation of the plant throughout its life, is likely to be best for Guernsey. The contract by which Lurgi would operate the plant for a period of only two years was unlikely to be value for money. A new operator coming to the project at the end of this period would so heavily qualify its responsibilities as to leave the States with risks it need not otherwise bear. In an isolated location, with but one plant and with no historical expertise, it would not be prudent for the island to run its own operation. Leaving the on-going management to the designer/builder under an appropriate

long-term operating contract would ensure that all these elements are managed with minimum risk or involvement on the part of the States. A competent operator would have recourse to expertise, manpower, backup and management which would not be available to the States. Given its lack of operational experience, the decision of the Isle of Man to let a contract for a twenty-five year operating period, in the terms it did, is likely to prove advantageous for that island.

- 1.79 More generally, **we recommend that there should be a much closer partnership between the public and private sectors in the management of the Island's waste.** We are concerned at the lack of expertise in integrated waste management in Guernsey and are conscious that this may be limiting the range of management options properly considered. There appears to be an assumption that change needs to be minimal or at least incremental whereas in our view there is a need for new and radical approaches. We would go so far as to say that the public sector should only be involved in the operation of waste management activities if those activities have been independently market tested and public sector operation has been shown to be at least as efficient as that of the private sector.

PART 2: WASTE MINIMISATION AND RECYCLING

- 2.1 This Part of the Report considers the progress that Guernsey has made in limiting waste for disposal through recycling and other measures. **We conclude that much more needs to be done to encourage the reduction, re-use and recycling of waste. This would help to reduce the disposal problem but it would not solve it.**
- 2.2 Guernsey has traditionally depended on landfill to manage its waste. Land availability and existing operational standards have made landfill a relatively cheap method of disposing of waste. However, capacity at Mont Cuet is limited and the design and operation of the landfill is unsatisfactory for a modern landfill site. [Comment These views are challenged by the operator and regulator] There is no realistic possibility of developing alternative compliant landfill sites for the reception of putrescible waste on the Island because of the wide extent of the water catchment area and the proximity of dwellings to potential sites.
- 2.3 There remains no alternative but to adopt new options for managing the Island's household, commercial and industrial waste. Guernsey is limited in the number and scale of waste management facilities it can support. As an island, Guernsey's waste management plan must ensure that outlets exist for all streams of waste generated, whether on-island (wherever possible), or through export of certain waste streams. The plan must also examine what scope exists to minimise residual waste by reducing existing waste arisings and re-using and recycling waste. [Comment – This is addressed in the Draft Waste Management Plan]
- 2.4 We consider that there are a number of actions that would increase the level of waste reduction on the island:
- (i) Guernsey should without delay set itself challenging targets for the minimisation and recycling of waste.
 - (ii) Landfill prices at Mont Cuet should be substantially increased as part of a pre-planned and advertised programme.
 - (iii) Materials which have alternative recycling or recovery outlets should be banned from Mont Cuet
 - (iv) A number of initiatives should be taken to encourage the minimisation and recycling of waste.
 - (v) Fiscal measures should only be used if increases in gate fees and other measures do not succeed in reducing waste.

[Comment – All of the above are in the Draft Waste Management Plan]

(i) Guernsey should without delay set itself challenging targets for the minimisation and recycling of waste

- 2.5 The Environment Department is preparing a waste management plan for submission to the States after the Panel has reported. If this plan is to be successful, targets will need to be set against which progress can be measured and a timetable drawn up for the development of an appropriate waste management infrastructure. We note that a number of broad and long-term targets have been defined in the draft waste management plan. Whilst there is merit in setting long term targets, success in meeting such targets - for as far ahead as 2077 - will only be achieved if the States can accurately measure trends in waste management activity in the meantime. Targets therefore need to be set for the short and medium term, say over the next 10 to 20 years. [Comment – Targets are defined in the draft WMP]
- 2.6 European Member States measure progress towards sustainable waste management by a variety of targets, some of which are outlined in Figure 9.

Figure 9: English and European waste targets

English waste management targets	European waste targets
<p>Household waste recycling (incremental targets rising to 33 per cent by 2015)</p> <p>Municipal waste recovery (incremental targets rising to 67 per cent by 2015)</p> <p>Industrial and commercial waste landfill diversion targets (Reduction in the amount of industrial and commercial waste sent to landfill to 85 per cent of that landfilled in 1998 by 2005)</p>	<p>Increasing reduction of volumes of biodegradable municipal waste sent to landfill (Landfill Directive) (75 per cent of total produced in 1995 by 2006, 50 per cent of total produced in 1995 by 2009 and 35 per cent of total produced in 1995 by 2016) [The UK has a four year derogation from these targets]</p> <p>To recover value from 70 per cent of packaging waste in 2008 (Packaging Directive)</p> <p>To recycle between 50 to 75 per cent of waste electrical and electronic equipment by 2006 (WEEE Directive)</p> <p>To re-use, recycle or recover 85 per cent of materials from end of life vehicles (ELV Directive)</p>

- 2.7 Targets, when accompanied with appropriate incentives and penalties, can stimulate recycling and recovery activities. Member States which miss European

Union targets and local authorities which miss English waste management targets could be subject to significant penalties (the proposed fine for a local authority missing its biodegradable waste landfill target is set at £200 a tonne). Local authorities in England have moved close to delivering 2003-04 household waste recycling targets of 17 per cent, partly due to the threat of such strict penalties which would result if these targets are missed.

- 2.8 Setting appropriate targets will not be easy, especially if these are to be coupled with incentives and penalties to stimulate recycling and recovery activities. Despite the difficulties, however, the setting of challenging but realistic targets is something that Guernsey should now address as a matter of urgency. Guernsey would not be tied to any UK or EU model, but would be free to respond to its own requirements under the provisions of the Environmental Pollution (Guernsey) Law 2004 once the Law comes into being. The Island would be able to select those elements of European and UK practice which would suit it best. For example, Guernsey might choose not to recycle certain materials because it would be uneconomic or environmentally unjustifiable to do so. [Comment – This policy has been established since 1995/6]
- 2.9 As well as setting numerical targets, Guernsey should set strategic targets for building up its infrastructure for the minimisation and recycling of waste. An example of the sort of target we have in mind is as follows:

“By no later than ...2005 there will be two civic amenity sites operating - one at Longue Hougue, the other at Each will be open daily from 8 am to 6 pm, Monday to Sunday and will accept from the public at least the following wastes The sites are to be operated by a commercial undertaking, following the letting of a contract of not less than ...years duration, on terms commonly applicable to the operation of such sites in the UK or France. The costs of operating the sites will be met by the States. Charges will not be levied on the public for bringing waste to the sites”.

- 2.10 **We therefore recommend that Guernsey should identify appropriate short, medium and long-term targets for waste management.** These should include:

- household waste recycling targets;
- targets for diversion of household, industrial and commercial waste from final disposal;
- targets for material, such as glass, to be recycled and used on-island;
- strategic targets for the dates by which waste minimisation and recycling infrastructure will be in place.

- 2.11 We note that the Environment Department’s draft waste management plan proposes a performance target to limit the growth of waste¹⁸ to an average of 1.4

¹⁸ requiring incineration

per cent per annum over 25 years. We consider that this is too modest a target for limiting the growth in Guernsey's waste. As noted in Part 1 of this Report, most European Union countries aim to de-couple waste arisings from economic growth, although experience shows that this is difficult to achieve. [Comment. And few to date have achieved waste growth below 1.4% per annum]

(ii) Landfill prices at Mont Cuët should be substantially increased as part of a pre-planned and advertised programme

2.12 Landfill is currently the cheapest method of disposing of waste in Guernsey (Figure 10). To encourage waste minimisation and recycling, the cost of landfill needs to be raised to make it more expensive than alternative disposal methods. It should be noted, however, that the price for recyclable material can go significantly up and down according to market conditions. [Comment. The table below may be misleading. In the context of encouraging waste minimisation and recycling the cost at the gate i.e the gate fee is key. To the producer recycling paper and glass/cans is free (not £63 and £180 respectively) through the bring banks. Landfill has risen to £59.60 per tonne. As such there is already a huge financial incentive to the public to recycle]

Figure 10: Cost of waste management in Guernsey

Disposal method	Cost per tonne
Mont Cuët (general waste)	£33.25
Longue Hougue (inert waste)	£5.55
Proposed energy from waste plant	£102
Recycling paper	£63 ¹⁹
Recycling glass and cans	~£180 ²⁰
Recycling plastic bottles	~£180

Source: Environment Department

2.13 Experience in other countries has clearly shown that diversion of waste from landfill can be achieved by pricing changes. The different methods used include landfill taxes (Denmark, the Netherlands, Sweden, and the UK), and charging for residual waste (Switzerland and Ireland). Both approaches have led to significant

¹⁹ The collection and export of paper for recycling is carried out by Mayside Reclamation Ltd.

²⁰ The collection of glass and cans for recycling is carried out by the States. Recycling companies in Guernsey told us that they could undertake this work significantly cheaper than the States.

reductions in the volume of waste being sent to landfill. However, the increase in the gate fee must be high enough to effect a change. The UK is currently increasing landfill tax by £3 a year, which many in the waste management sector consider to be too small to have any marked effect, although eventually the landfill tax will reach £35 per tonne. [Comment. The price incentive in Guernsey is as high as £59.60 per tonne]

- 2.14 In the Netherlands an increase in landfill tax on non-hazardous combustible waste from £11.30 per tonne in 1995 to £38.70 per tonne in 2000, coupled with implementation of other waste management policies, led to a reduction from 53 per cent to 13 per cent in the amount of household waste sent to landfill. [Comment. A similar price hike in Guernsey in 2001 had virtually no impact on household waste sent to landfill, see graph at Fig 3]. Increases in landfill tax in Denmark have contributed towards an impressive 80 per cent recycling rate for building and construction waste. A large increase in the landfill gate fee from £10 per tonne to £100 tonne in the Isle of Man led to a dramatic reduction in commercial waste going to landfill. [Comment. The Isle of Man has advised that the commercial waste continues to go to landfill but has been diverted to private cheaper landfill rather than Government landfill as such the drop in tonnage is apparent rather than actual] Guernsey also experienced a significant decrease in the volume of industrial and commercial waste being deposited at Mont Cuet following the more than doubling of the gate fee in 2002 (see Figure 3 above). [Comment. A further price hike in 2005 from £33.25 to £59.60 has achieved, in the first two months, an average reduction of no more than 5.8%. this further demonstrates the law of diminishing returns]
- 2.15 As the operator of the only landfill accepting mixed waste on Guernsey, the States have the power to increase landfill gate fees without, for example, the need to introduce primary legislation. This gives the States considerable flexibility in deciding how to introduce a new charging regime.
- 2.16 The standard rate for waste disposal at Mont Cuet was £33.25 per tonne in 2004. It is intended to increase this charge by £25 per tonne plus RPI over the years 2005 to 2007. In line with this decision, the gate fee rose to £59.80 per tonne from 2005 and is expected to rise further to around £87 per tonne in 2006 and around £115 per tonne in 2007. The aim is to have the same or similar gate fees for landfill and the proposed energy from waste plant. Clearly, recycling of some materials would become more commercially viable if Mont Cuet's landfill gate fee was not less than £100 per tonne.
- 2.17 A phased increase in the cost of waste disposal has certain advantages. It allows waste producers to investigate alternative options for managing waste; and it gives waste managers time to plan and invest for business growth. Significant increases in the cost of waste disposal also need to be clearly indicated and communicated to the public and private sector to promote the development of recycling services and infrastructure.

2.18 However, given the imperative of promptly and substantially reducing the rate at which Mont Cuet is being filled, a phased introduction of increased charges is not really a serious option. In any case operators are generally extremely well attuned to the opportunities for alternative treatment of waste and recyclates which present themselves as the gate fee gets higher. In Guernsey's present circumstances, **we recommend that the gate fee at Mont Cuet should be raised as soon as possible to not less than £100 a tonne.**

(iii) Materials which have alternative recycling or recovery outlets should be banned from Mont Cuet

2.19 There are currently no outright bans on landfilling particular materials at Mont Cuet. The Environment Department [Correction. The former Board of Administration] has chosen to manage waste activity by means of gate fees that are specific to particular materials. In 2004 the flat rate gate fee at Mont Cuet was £33.25 per tonne. Contaminated waste²¹ was charged at between £41.55 and £49.90 per tonne and loads of inert waste were charged at £66.50 per tonne. Landfill of inert waste cost £5.55 per tonne at Longue Hogue. The system is somewhat arbitrary and may be open to abuse. [Comment – The only limitations of this system relate to the ability of the weighbridge operator to spot contamination before tipping. This limitation would apply equally to the system proposed by the panel. In any event, inappropriate materials are removed from the tipping face where practicable and do not remain on site.]

2.20 Figure 11 below shows the tonnage of industrial and commercial waste materials going to Mont Cuet in 2000, 2002 and 2004 for which alternative recycling or recovery outlets are currently available. [Comment – This table is quoted out of context. It is based upon audit figures that do not take into account the contamination of recyclable materials or the practicality of separating these materials. The tonnages below must therefore be considered as upper, if not unachievable, limits.]

Figure 11: Waste materials going to Mont Cuet (industrial and commercial)

	Mont Cuet 2000 (tonnes)	Mont Cuet 2002 (tonnes)	Mont Cuet 2004 (tonnes)	Alternative outlets
Glass	903	307	312	Commercial Recycling Bring sites
Metals *	8,695	260	2,305	Commercial Recycling

²¹ a mix of putrescible and inert or other unacceptable waste such as oil or metal.

Cardboard*	1,666	814	1,149	Commercial Recycling
Paper	1,193	615	174	Commercial Recycling Bring sites
Fines/soil	11,796	2,389	3,481	Longue Hougue

Source: Guernsey Technical Services Waste Audit (2004)

* In 2002 55 tonnes of cardboard and 80 tonnes of metals were extracted from waste sent to Mont Cuet and were sent for recycling. It is estimated that 74 tonnes of cardboard and 114 tonnes of metals will be extracted in 2004.

2.21 The significant differential between gate fees for contaminated and non-contaminated material resulted in an immediate decrease in the amount of commercial and industrial waste sent to landfill at Mont Cuet. Significant reductions were seen in a range of materials suitable for recycling, including glass, metals, cardboard, paper and inert material. This effect was most pronounced for non-combustible material, such as inert materials, metals and glass. It is estimated that 1,149 tonnes of cardboard and 174 tonnes of paper are currently being landfilled, probably because contamination has made these wastes difficult to recycle. A better method of collecting recyclable materials at source would reduce contamination significantly.

2.22 **We recommend that all materials which could be recycled should be banned from Mont Cuet.** This would include inert construction waste, soil, metals, glass, paper and cardboard capable of being recycled, and textiles. Outlets for some of these materials currently exist on island and we see potential for diverting substantial further amounts of material from Mont Cuet.

(iv) A number of initiatives should be taken to encourage the minimisation and recycling of waste

2.23 Current on-island facilities for recycling household waste include bring banks for glass, cans and paper and a small Civic Amenity site, open for limited hours, at Mont Cuet. The Longue Hougue reclamation site accepts inert building waste. Other recyclable industrial and commercial wastes (glass, metal, plastics, paper and cardboard, waste electrical and electronic equipment, end-of-life vehicles, tyres, petrol, oils and batteries) are segregated at Fontaine Vinery or are collected and treated by private recycling companies. Fontaine Vinery recycles around 20 per cent of the waste it receives and the remainder goes to Mont Cuet. Some 19 per cent of household waste was recycled in 2003.

2.24 Given the demographics of the Island and the interest which the Panel has found in recycling, there is likely to be a generally positive response to initiatives which encourage waste minimisation and recycling. The effectiveness of these measures is likely to be directly related to the quality of the services introduced and the

professionalism by which the public is made aware of these services and the benefits of using them.

- 2.25 The best evidence suggests that the UK is some way behind leading European countries in its commitment to recycling and waste minimisation, but has been making better progress in the recent past. Guernsey has, on its doorstep, examples of best European practice in France. The Panel has explored this practice in some depth and points to benefits which could derive from working with, for example, the community of Granville (see Figure 12), to develop specific elements of a recycling strategy which are probably at the leading edge of current best practice.

Figure 12: Recycling in Granville, France



This is a reproduction of the cover of a 10 page public information brochure “A practical guide to sorting” issued to the community of Granville, illustrating part of the Bring Bank System for the collection of papers, magazines, brochures, cartons (blue), bottles, glass and cans (green), plastic bottles and containers, tins, aerosols and aluminium containers (yellow).

The system involves weighing each container upon emptying. A computer-controlled collection schedule adjusts the frequency of emptying particular waste streams at each Bring Bank, dependant upon the rate at which capacity is used.

One vehicle services the Bring Banks on a cycle which sees blue bins emptied on one day and yellow another. The ratio of Banks to population is higher than would be required for Guernsey, being set at one per 500 head of population. The design, appearance and functionality of this system is considerably better than the present systems employed in Guernsey and is a practical illustration of the scope for development which is available. We understand that the contractor concerned with the Granville scheme is currently working with Jersey to provide proposals for an island-wide operation, which may also prove of interest to Guernsey.

2.26 In the light of the Panel's research, we suggest that the Environment Department examines the following initiatives:

- (a) engaging public support more effectively;
- (b) creating greater certainty for commercial waste management organisations;
- (c) encouraging the non-profit sector;
- (d) enhancing public recycling facilities;
- (e) encouraging composting;
- (f) improving household waste collection.

(a) Measures should be introduced to engage public support for waste prevention and recycling

2.27 Successful implementation of a waste management strategy will rely on support and buy-in from the public as well as commercial and industrial interests on the island. The States must engage householders, commerce and industry at all stages of implementing the waste management strategy.

2.28 Initiatives used by other waste management communications programmes, both in France and the UK, include the provision of clear and accessible information – leaflets and web site, the promotion of schemes by waste collection crews, and coverage by local media. Local networks such as business groups, schools, clubs and voluntary groups, can also disseminate information to the public and private sectors. Experience elsewhere has shown that helplines and assistance are particularly important when waste collection systems are changing.

2.29 There are a number of 'good practice guides' to waste management communication initiatives. The cost of issuing such guides is estimated to be £1 to £1.20 per household per annum. Customer care support – such as helplines and other assistance - is an additional cost.

2.30 The Environment Department's draft waste management plan makes proposals to develop a carefully structured communications programme directed at waste producers. This would highlight the cost savings that could be realised by reducing disposal costs and avoiding the unnecessary purchase of materials which might become waste. The environmental benefits of minimisation, re-use and recycling would also be emphasised. The Department could also work with island businesses and the States itself to introduce voluntary waste reduction and recycling initiatives to tackle specific waste streams.

2.31 Adequate resources would need to be allocated to these initiatives if the public information programme is to be effective. There is a considerable body of

expertise available in county and regional authorities, such as Kent and Granville, and specialist organisations such as WRAP.²²

(b) Commercial recycling organisations should be provided with more investment certainty

- 2.32 Although not high profile, there are a number of commercial businesses handling recyclable materials on Guernsey. There has been considerable investment in plant and equipment. Some of the businesses are part of more substantial organisations based elsewhere and have resources and expertise which belie their relatively small presence on the Island.
- 2.33 Almost without exception, these undertakings suffer from a lack of commercial certainty. Their premises do not offer long term security; planning constraints prevent them from developing their present facilities; and future licensing requirements may make their operations untenable. At present there is no clearly defined strategy for dealing with the island's waste and no policy which makes it clear to what extent, if any, the public sector wishes to engage directly in the business as opposed to contracting with the private sector. [Comment. The fundamental consideration is the extent to which the States would wish to let an integrated contract to a single operator and the extent to which the States would be willing for the infrastructure associated with that contract to be privately owned and financed i.e. the extent to which the States supports a monopoly situation.] We nevertheless believe that the States do recognise that an effective partnership between private and public sector is essential if the waste strategy for the island is to succeed.
- 2.34 Introduction of higher gates fees should result in recycling operations becoming more commercially viable. Bans on land-filling certain materials would increase the rate of supply of material appropriate for recycling. However, regulatory, planning and operational uncertainties undermine the businesses that the States should be encouraging and make it difficult for them to plan for the future.
- 2.35 To build an effective partnership between the public and private sectors, ways must be found to give the private sector the necessary confidence to invest in the future requirements of the solid waste strategy. **We recommend that the three arms of government directly involved in the disposal of solid waste (the Environment Department, the Public Services Department and the Health and Social Services Department) must work closely together and with the commercial organisations. Government needs to build trust and establish a common sense of purpose with the private sector so that commercial recycling organisations have the investment certainty they need to be able to play a full part in the waste strategy for Guernsey.** [Comment. The Department's States Report explains again why investment in infrastructure for recycling etc. can only take place once agreement has been reached on the long-term disposal technology. Prior to this decision it is not possible to provide the

²² www.wrap.org.uk

relatively small local private sector waste industry with the confidence it requires] We do not believe that any arm of government – whether planning, licensing or operations – should be permitted to work in isolation or be able to thwart the overall objectives of clearly defined States policy.

- 2.36 The Phase Two Site at Longue Hougue has been identified as the preferred site for creating waste management facilities. Co-locating an Energy from Waste plant (of whatever type), metal recycling, other sorting, baling, recycling facilities and a civic amenity site would be advantageous. Some elements of these facilities have large footprints but light loads in terms of the civil engineering work required, for example, a Materials Recovery Facility should it be required. Other facilities would have requirements for more complex civil engineering works. [Comment. Again a decision on the form of development at Longue Hougue including the long-term disposal technology must be taken before any certainty can be achieved on the nature of the other facilities at Longue Hougue. Hence the need or otherwise for private waste management infrastructure located elsewhere remains uncertain and the private sector can not be given the assurances and confidence required]
- 2.37 Any alternative to an incinerator would be likely to have a smaller footprint and require less civil engineering works. [Comment. Not necessarily true] It might therefore be appropriate for certain elements of the overall facilities to be located somewhere other than at Longue Hougue Phase 2. The adjacent site, Longue Hougue Phase 1, has limitations, as refuse was included in the infill material. Other sites may have disadvantages in terms of their neighbours, location and accessibility. If civil engineering considerations permitted, locating the lighter elements at Longue Hougue Phase 1 would have obvious benefits.
- 2.38 Any expansion of the waste facilities at Longue Hougue will have to take account of the possibly competing demands of the proposed harbour development. Some 75 per cent of Longue Hougue Phase II is earmarked for harbour development. However, the plans for extending the harbour - scheduled for 2020 - are somewhat tentative and it is possible that enough land will be available to accommodate both developments. Requirements and specifications will need to be kept under review, including any proposal that Longue Hougue should also be the site of a sewage treatment works.
- 2.39 It will be necessary to plan and implement a strategy for re-locating or co-locating existing and additional waste management facilities as soon as possible and most probably in advance of any plant which might be adopted for the final disposal of waste. [Comment. As indicated above this is not the appropriate way forward. If, for example, the Long-term disposal solution adopted was based around Mechanical and Biological Treatment, there may be little justification in operating expensive kerbside collection schemes as such a Materials Recovery facility to handle kerbside collected waste would not be required. Similarly if an integrated contract is to be let and if the contract type and procurement route is to be left open to market testing as recommended by The Panel then it is not possible to specify and let any of the elements of the contract before a decision on the Long-

term disposal technology is made.] The Environment Department, the Public Services Department and the Health and Social Services Department must work in close co-operation with each other and the private waste management industry in Guernsey, and elsewhere, to develop and implement a strategy for the location of solid waste management facilities. As part of this process, **we recommend that the Environment Department should be tasked to carry out an in-depth review of possible sites for recycling and other waste management facilities.**

(c) There should be more help for the non-profit sector, including subsidies where appropriate

2.40 Many local authorities across the UK work closely with voluntary bodies to promote solid waste management, particularly textile recycling. The States should continue to support such organisations and provide further support where appropriate. The non-profit sector can play an important role in diverting certain wastes from landfill. Island voluntary bodies such as Oxfam, the Salvation Army, Les Bourgs Hospice and the Red Cross are currently involved in material re-use as well as textile recycling.

(d) The availability of public recycling facilities should be significantly expanded

2.41 The amount of waste recycled on Guernsey has doubled since 1996 and now stands at 19 per cent. This recycling rate compares well with England, where the average municipal waste recycling rate was 15.6 per cent in 2002-03 and only eleven local authorities recycled more than 20 per cent. Yet there are one or two areas where recycling rates achieve levels comparable with best practice in Europe. In South Cambridgeshire, for example, a rate of 53 per cent has been achieved (including green waste for composting).

2.42 Materials collected for recycling include paper, glass, ferrous and non-ferrous cans, cardboard, textiles and metals. These materials are collected at bring banks or specific facilities or extracted from material deposited at Mont Cuet. The cost to the States of the 'bring scheme' and recycling of plate glass was £415,000 in 2003. During the course of the Panel's inquiry, substantial public support was expressed for the expansion of existing recycling schemes. The significant rates of recycling already achieved through the existing bring schemes demonstrates the active support that recycling enjoys among the public.

2.43 Civic amenity facilities play a useful role in collecting material which cannot be viably collected at either bring banks or in kerbside collections. Although increasing proportions of material are recycled by separate collection, some 65 per cent of household material collected for recycling in England continues to be brought to civic amenity and bring sites. English waste management statistics show that, of the household materials collected for recycling, 81 per cent of glass, 84 per cent of compost and 95 per cent of scrap metal were collected at civic amenity sites. Of all the materials collected, paper and card were the only ones

for which more than half the total tonnage was collected through kerbside collection schemes. Even then, 40 per cent of all paper and card collected came from civic amenity and bring sites.

- 2.44 Experience in the UK has shown that recycling rates for materials collected at civic amenity sites can be as high as 80 per cent. Guernsey might find it difficult to achieve such high rates as the market for material for recycling is limited on-island and the cost of shipping material off-island to be recycled would be more expensive. However, significant amounts of waste might be diverted from final disposal by providing facilities to which the public could bring a range of household wastes for reuse or recycling.
- 2.45 The effectiveness of public recycling will depend to a large extent on the quality of civic amenity sites and bring banks. Those in Guernsey presently operate at the most basic level. The Panel believes that the French approach - in terms of the design of bins, control of collection, use of specialised vehicles and community involvement - has much to commend it. The States of Jersey are also considering the installation of much more attractive bring banks and a system of recycling and collection which could be implemented by an appointed contractor. Such an operation could be extended to embrace civic amenity sites. We also note the experience of UK local authorities, most of whom contract operations of this nature to private undertakings who are able to provide the necessary manning and achieve levels of recycling and recovery which could probably not be delivered by the public sector for the same price.
- 2.46 The existing 'civic amenity' site at Mont Cuet collects a limited range of materials including green waste and paper. In the 1998 Waste Strategy Assessment, the former Advisory and Finance Committee identified the need to expand this facility and to augment it by providing another facility in a different part of the island. It is also proposed to develop a materials recovery facility, a civic amenity site and a metal recycling site at Longue Hogue. However, none of these proposals has yet been implemented. We understand that suitable sites have not even been reviewed at this stage let alone identified for development. [Correction. These facilities were all included as part of the Longue Hogue Planning Inquiry, they form part of the integrated facility previously approved by the States. However, development can not proceed until sufficient land is reclaimed.]
- 2.47 The temporary waste segregation facility at La Fontaine Vinery is inefficient because it is poorly sited, operates for limited hours and can only handle certain materials. The function could advantageously be transferred to Longue Hogue, where it could then be expanded to form part of the overall waste management strategy. [Comment. This is the intention and is described in the in the Draft WMP] The cost of creating the site at La Fontaine was £508,000 but the building itself (being 13,225 square feet in area) could be relocated, together with some other elements of the present site.
- 2.48 The Environment Department has estimated that around 8,400 tonnes of waste would be managed at Civic Amenity sites annually and that the annual cost would

be about £500,000. This estimate and the assumptions underlying it need to be tested and consideration needs to be given to alternative arrangements which might arise by involving the private sector.

- 2.49 **We recommend that Guernsey urgently develops facilities in suitable locations to which the public can bring a range of household wastes for re-use or recycling.** Evidence in the UK suggests that a high level of recycling can be achieved when civic amenity sites are professionally run. We suggest that suitable opening hours, design and operator support are established to cater for the needs of the public. There should be potential to expand and improve the existing bring bank collection scheme. Studies in the UK, for example in Brighton and Hove, have shown how bring bank density can be optimised.

(e) Greater use should be made of composting

- 2.50 There has been a significant growth in composting activity across the UK and Europe over the past 5 years. The amount of waste composted in the UK (80 per cent of which was green waste) doubled between 1999-2000 and 2001-02. Restrictions imposed by the EU Animal By-Products Regulation has limited commercial composting of kitchen waste in the UK and a number of local authorities are encouraging householders to compost kitchen and garden waste at home.
- 2.51 The Panel visited a fully licensed site in the UK which treats household biodegradable waste, including animal/food waste, using in vessel composting. This process raises the temperature of the material to 60°C and thereby eliminates the micro-organisms which would otherwise give rise to the risk of infection. The site is subject to regular monitoring by the Environment Agency. [Comment. DEFRA has confirmed that such plants are not guaranteed to remove the BSE Prion]
- 2.52 Of the estimated total 6,000 tonnes of green garden and horticultural waste generated in Guernsey each year, over 5,000 tonnes is deposited at Chouet Horticultural Site. Green waste compost is also used as landfill cover at Mont Cuet. Green and biodegradable waste is also present in the mixed parish and household waste going into Mont Cuet.
- 2.53 The former Board of Administration proposed the development of an in-vessel composting facility for green waste (capacity 6,000 tonnes) at Longue Hougue. Initial costs of producing the compost were estimated to be in the region of £25 to £35 per tonne. It is likely, however, that output from the facility would exceed commercial demand for the compost produced. The compost could therefore be provided free of charge to anyone who wants it to encourage its use.
- 2.54 It has been estimated that 20 per cent of household waste in Guernsey is biodegradable kitchen waste. Diversion of this waste from the parish waste collection system could reduce overall household waste for disposal. A number of local authorities in the UK have included home composting schemes in their

waste management strategy. However, the contribution of these schemes towards a reduction in household waste arisings has proved very difficult to quantify. Nonetheless, many local authorities in the UK feel that home composting has a role to play in waste management. Experience indicates that households are more likely to compost at home when they are provided with appropriate equipment, information and a contact for advice. The Isle of Man and many local authorities in the UK provide home composting bins at reduced prices, usually between £5 and £20 a bin.

- 2.55 The efficient treatment of green waste should form part of a comprehensive waste management strategy. The process of installing and operating a composting system, probably at Mont Cuët for reasons of space and odour, would be relatively inexpensive. **We recommend that the Environment Department should encourage householders with gardens to compost garden and kitchen waste, and also commission a composting facility to take green wastes collected at the civic amenity site or to meet other local demand.** We recognise that if compost is to be used for beneficial purposes it must be of a high quality and the plant or system adopted must meet a quality specification. The Composting Association in the UK has an agreed “Publicly Available Standard” (PAS 100) for high quality compost and is about to launch an operational code of practice in February 2005 for composting operations. We commend both to the Environment Department as guidance for composting in Guernsey. **We recommend that the States should specify the use of such composted material as an alternative to peat or soil-based composts in their own works or contracts.** [This is already identified with the Draft WMP]

(f) The waste collection service needs to be revised to encourage the minimisation and separation of waste at source

- 2.56 Collection of mixed domestic refuse is currently the responsibility of the Parishes, each of which awards a contract for collection to take place within their parish boundary. Research by consultants contracted by the former Board of Administration indicated that cost savings of around 17 per cent could be achieved by structuring collection rounds on optimal collection routes rather than within the limitations of parish boundaries.
- 2.57 The law relating to the collection of household waste is summarised in Figure 13 below.

Figure 13: The Law (a simplified summary)

The collection and disposal of refuse from dwelling houses is governed by the provisions of The Parochial Collection of Refuse (Guernsey) Law 2001 (IX 2002).

Responsibility rests with the officials of each of the ten Parishes to make arrangements for the collection and disposal of refuse from dwelling houses and tenements, but not businesses, within each Parish.

The costs are raised by way of an annual rate (“the refuse rate”), which is set by approval at a meeting of Parishioners.

The Constables of each Parish then make application to the Royal Court to apply the rate. A person subject to the rate may appear and object.

The Environmental Pollution (Guernsey) Law 2004, (“the New Law”), will shortly be enacted. Schedule 2 of the New Law provides for the repeal or amendment of earlier legislation by Ordinance, including the Parochial Collection of Refuse (Guernsey) Law 2001.

Section 29 of the New Law provides for the designation of “a person or a Committee of the States, (other than the Health and Social Services Department), as the Waste Disposal Authority”. It will be a function of the Waste Disposal Authority to make arrangements for and ensure the operation of Guernsey’s public waste management system and to fulfil other responsibilities ascribed to it by Section 30 of the New Law, which may include both the means of charging and the collection of those charges, for dealing with waste.

2.58 We consider that at least two changes, which are provided for under the new law, may be required:

- 1) Arrangements for collection and disposal should not be confined to the separate Parishes. Existing anomalies could be removed with advantage and the collection of recyclables might need to be other than Parish based.
- 2) The present method of charging does not sit squarely with the objective of reducing the quantity of waste for disposal. Nor is it consistent with the present policy that the polluter pays. To encourage waste reduction, the basis of charging needs to be related to the volume and/or weight of the waste collected. This could be achieved, for example, by collecting waste presented only in special pre-paid disposal sacks or by kerbside weighing/charging. [Comment. As the cost to the States of recycling exceeds that of disposal, the success of such a scheme relies on not charging the recycling costs to the Parish or producer]

- 2.59 The Douzaines told us that they were best placed to manage local collections of household waste and that the present system was efficient, cost-effective and popular with parishioners. Nevertheless, there is a willingness on the part of the Douzaines to work collectively in rationalising the areas covered by different contractors and on other waste management matters. Should an island-wide scheme for kerbside recycling be introduced, the Douzaines may also be willing to work with contractors to collect recyclables from doorsteps. A more detailed note of the Panel's dialogue with the Douzaines is at Appendix 4.
- 2.60 As with business waste, the main incentive to minimise household waste arisings is cost. A scheme that charged householders according to the level of residual waste requiring collection would encourage them to reduce the volume of waste requiring disposal. [Comment. Provided recycling was offered free of charge or heavily subsidised.] The main charging options being used elsewhere include:
- Pay by weight – wheelie bins are weighed at the collection point by the waste operator and the householder is billed for the amount of refuse collected.
 - Pay by tag – wheelie bins, when full and ready for collection, are tagged with pre-purchased tags by the householder.
 - Pay by bag – refuse bags are tagged for collection with pre-purchased tags by the householder.
- 2.61 Some waste collection authorities set a flat rate fee and an additional weight based charge for residual (ie non-recyclable) waste left for collection. Some sell different coloured bags for different wastes and will not collect any others. The Panel recognises that there may be a resistance to the proliferation of “wheelie bins” on the Island.
- 2.62 There are three principal ways by which recyclable materials could be diverted: through kerbside collection programmes, bring schemes or civic amenity sites. The possible contribution of bring banks and civic amenity sites has already been discussed above. Kerbside collection of materials for recycling – through co-mingled collection of mixed recyclables or collection of source-separated material - could also divert significant amounts of waste away from final disposal. Although public participation rates are generally higher for co-mingled collection, collection of source-separated material generates higher quality material for recycling.
- 2.63 The proportion of households served by kerbside collection schemes in England increased from 58 per cent in 2001-02 to 67 per cent in 2002-03. This increase led to a 22 per cent rise in the amount of paper and card collected in kerbside schemes. The amounts of compost and glass collected both increased by over 40 per cent over the same period. In total, 34 per cent of recycled municipal material was collected by kerbside collection schemes in 2002-03, up from 31 per cent in 2001-02.

- 2.64 A practical illustration would be the requirement that all bottles, glass and cans from business, particularly the Hotel and Catering Industry, be kept separate from the mixed refuse stream. At present, even if separated by the undertaking concerned, it is likely that the contracted waste collector will include it in the general refuse, for eventual disposal at Mont Cuet.
- 2.65 **We recommend that the options for providing a kerbside collection of source separated materials should be assessed.** In particular, the options for collecting glass, metal, cans, paper and cardboard, and possibly plastic should be examined. The assessment should include an evaluation of the sort of service contractors, both on and off-island, could deliver. [Comment – this has been done in the Draft WMP]
- 2.66 In the view of the Panel, removal of the bulk refuse service or the introduction of a charge per load for bulk refuse would increase the risk of fly-tipping and could disadvantage people who live in flats or have no means of transport. **We therefore recommend that the collection service for bulky household waste should continue and that it should not be charged for.**

(v) Fiscal measures should only be used if increases in gate fees and other measures do not succeed in reducing waste

- 2.67 As noted above, management of waste is driven by price. We have recommended that the gate fee at Mont Cuet should be increased to at least £100 per tonne and that variable charging (weight or volume related) should be introduced for residual household waste.
- 2.68 Other fiscal measures have been successfully introduced in other countries to direct specific wastes towards or away from certain waste management options. A £1.60 per tonne levy on virgin aggregates (sand, gravel and rock) was introduced in the UK in 2002 to encourage increased use of secondary materials. Ireland introduced a levy on plastic bags in March 2002 (€0.09 per plastic carrier bag) and this resulted in a 90 per cent drop in use. The ‘plastic bag tax’ also resulted in a heightened awareness of waste management issues amongst the public. Incoming European Union legislation, such as the Waste Electrical and Electronic Equipment Directive and the End of Life Vehicle Directive, will place responsibility on the producer rather than the consumer for ensuring that an appropriate infrastructure exists for disposal. These Directives, coupled with strict recycling and recovery targets, will direct waste materials away from final disposal such as landfill.
- 2.69 These measures have successfully influenced waste management practices in other countries and, in some cases, have put the spotlight on resource inefficient practices. However, some measures can be costly to introduce and to administer, particularly on a small island such as Guernsey. The Panel believes that the initiatives suggested elsewhere in this report, such as the increase in landfill gate fee, the banning of certain materials from Mont Cuet and the provision of

appropriate recycling facilities, provide the best and simplest means of controlling the flow of waste. But the States may wish to consider the introduction of other fiscal measures in the light of experience once a fully integrated waste strategy has been implemented.

- 2.70 The Panel notes the introduction in Guernsey of a £10 per annum tax on vehicles, collected through the registration process, to provide for the cost of the eventual disposal of vehicles at the end of their lives. The cost to the States of dealing with such end-of-life vehicles forms a major element of the bulk refuse collection service. The introduction of this tax, without the requirement for an onerous administrative burden, illustrates that such fiscal measures can be effectively brought in, where appropriate.

PART 3: ALTERNATIVES TO THE PROPOSED ENERGY FROM WASTE PLANT

- 3.1 This Part of the Report considers the long-term alternatives to proceeding with the proposed energy from waste plant at Longue Hougue. **We conclude that there are a number of promising alternatives to the proposed plant that are worth exploring and which may provide a solution in the longer term.**
- 3.2 The possible long term solutions we examined were as follows:
- 1) Joining with Jersey to find a common solution to the two islands' waste needs.
 - 2) Other on-island solutions involving alternative technologies.
 - 3) Export of Guernsey's waste to another European country.
- 3.3 We consider that Guernsey should explore the option of joining with Jersey as its first priority because this option will only be available until mid 2005. If joining with Jersey is not practicable, Guernsey should pursue an on-island solution for its long term residual waste needs, most probably using alternative technologies when they are available. We do not believe that export to another European country, although possible, is likely to be a suitable long-term option but it may provide an interim solution to Guernsey's needs.

(1) Joining with Jersey on a common waste disposal solution needs to be considered immediately if the opportunity is not to be lost

- 3.4 The first alternative option we examined was whether there was a common Channel Island solution to the problem of waste disposal. We found that:
- (a) the opportunity exists to join with Jersey in a common waste disposal solution;
 - (b) exporting waste to Jersey is legally possible [Correction. Not without a change to Guernsey's primary legislation or until Jersey has the UK's signatory to the Basle Convention extended to that island];
 - (c) there are a number of associated risks in joining with Jersey;
 - (d) the cost of joining with Jersey is likely to be less than Guernsey's proposed energy from waste plant at Longue Hougue. [Comment. The report commissioned by Jersey and Guernsey indicates that the cost to Guernsey will be more]

(a) The opportunity exists to join with Jersey in a common waste disposal solution

- 3.5 Historically, levels of co-operation between the Islands of Jersey and Guernsey have not been as high as the respective Governments now envisage. As regards future waste management, there has been a difference in the time lines of each island. The delay in settling a solution in Guernsey has, however, brought the schedules closer together. The way may now be open for the two islands to find a joint solution to the problems of solid waste disposal.
- 3.6 Since 1979 Jersey has incinerated solid waste at its Belle Ozanne plant. This plant is now approaching the end of its useful life and an alternative means of disposal is required by 2008-2009, when it is expected that the present plant will be de-commissioned. The Public Services and Environment Committee of the States of Jersey intends to bring forward plans for its preferred option in the first half of 2005.
- 3.7 The Shadow Scrutiny Committee of the States of Jersey is also closely involved with finding a solution for dealing with Jersey's solid waste. The Committee expects to report its findings to the States of Jersey early in 2005, before the matter is brought before the States of Jersey by the Public Services and Environment Committee.
- 3.8 The Public Services and Environment Committee and the Shadow Scrutiny Committee of the States of Jersey will be considering a range of options for their new waste strategy. The Panel understands that co-operation with Guernsey will be among the options considered and might feature in specific proposals for on-island or off-island solutions. Shipping solid waste from Guernsey to a new disposal facility in Jersey could be one possibility. Shipping waste from both islands to an existing disposal facility in France could be another.
- 3.9 The Panel has encouraged the governments of both Islands to commission a feasibility study of a joint Channel Island energy from waste solution. [Comment. Guernsey commissioned this report of its own accord.] This study is being carried out by Ramboll/Babtie Fichtner with assistance from Guernsey Technical Services and Jersey's Public Services Department. Ramboll/Babtie Fichtner's report, which is expected to be available shortly, will address this option in greater depth than the Panel has been able to do.

(b) Exporting waste to Jersey is legally possible

- 3.10 There need be no legal bar either to the transshipment of solid waste from Guernsey to Jersey for disposal in an energy from waste plant or to the returning of bottom ash from Jersey to Guernsey (some 10 per cent by volume of waste sent for disposal). These arrangements would require the co-operation of both Governments and an appropriate legislative framework for licensing. Such a framework already exists in Guernsey in the form of The Environmental Pollution

(Guernsey) Law 2004 (presently awaiting commencement). The equivalent Jersey Law is older and fragmented. Shipments between the islands would not be regarded as trans-boundary shipments within the European Union and DEFRA has confirmed that the British Government would view them as a matter for the insular authorities. [Comment. At present such shipment would contravene Guernsey law]

(c) There are a number of associated risks in joining with Jersey

3.11 Joining with Jersey would entail a number of risks for Guernsey, which would need to be carefully considered before taking this option forward. We assess these risks as being:

- With landfill capacity at Mont Cuet declining fast, Guernsey has only a finite time to agree a long-term solution for dealing with its solid waste. It would therefore have to avoid getting into long drawn-out negotiations with Jersey that put achievement of its waste disposal strategy at risk.
- Jersey has a means of disposing of its waste for as long as it is able to run its incinerator. But the plant at Belle Ozanne is not able to accept waste from Guernsey. Any extension of Jersey's time-frame might therefore result in Guernsey not being able to dispose of its own waste, particularly if Mont Cuet had little remaining capacity.
- The Jersey plant might not go ahead, for political or other reasons.
- The Jersey plant might go ahead, but politicians in Jersey or the Jersey electorate might object to disposing of Guernsey's waste.
- The potential site of a joint plant at La Colette in Jersey may not be available.
- It might prove difficult to agree contractual terms that safeguarded Guernsey's right to dispose of its waste in Jersey over the long-term.
- It might prove difficult to agree other contractual terms, such as the apportionment of risk or costs between the respective Islands.

(d) The cost of joining with Jersey is likely to be less than Guernsey's proposed energy from waste plant at Longue Hogue

3.12 As noted above, Ramboll/Babtie Fichtner has been undertaking a feasibility study of a joint Channel Island energy from waste solution. As part of this work, Ramboll/Babtie Fichtner has costed two options: a split solution whereby Guernsey and Jersey commission their own separate energy from waste plants; and a joint solution whereby one plant is built on Jersey and Guernsey ships its waste there. The main costs of the split option are the capital and operating costs of the two plants. The main costs of the joint solution are: the capital and

operating costs of a waste transfer station in Guernsey (where waste could be baled or could be transferred from small containers or collection vehicles to large containers); the cost of shipping Guernsey's waste to Jersey (including transport to and from the harbour at each end); and the capital and operating costs of the plant in Jersey.

- 3.13 The Panel has met Ramboll/Babtie Fichtner to discuss the consultants' preliminary findings. The Panel expressed various concerns and was reassured that Ramboll/Babtie Fichtner's report would address the issues brought to their attention by the Panel. In particular, the Panel noted that the initial costings were based on the forecasts of waste arisings estimated by Ramboll in 2001, which as indicated in Part 1 of this report are contentious. We were also concerned that projected costs for the construction and operation of a waste transfer station in Guernsey exceeded, by a considerable margin, those costs which separate industry sources had indicated to us would be appropriate. We also considered that the estimated costs for transportation were also too high, although these have now been revised downwards. We note that in the event that a vessel were taken on time charter there could be considerable cost savings in moving recyclates from either island for processing. We have therefore asked Ramboll/Babtie Fichtner to validate these costs and to conduct some additional sensitivity analysis based on waste arisings at a lower level than estimated by Ramboll in 2001.
- 3.14 We understand that a conclusion which points to the joint solution with Jersey having lower overall costs is likely. [Comment. But higher costs for Guernsey] There may also be other benefits which make the option of joining with Jersey worth pursuing. For example, the islands would have the visual impact of only one energy from waste plant and not two. The costs and benefits of joining with Jersey will need to be weighed against the risks referred to above.
- 3.15 Final disposal of Guernsey's waste at an energy from waste plant situated on Jersey would provide a combined solution for treating the waste for disposal, arising from a total community of 148,000 people. If Guernsey wishes to pursue the option of joining with Jersey in a joint waste strategy, a decision will almost certainly be required by mid 2005. **We therefore recommend that the possibility of working with Jersey should be explored immediately by the relevant authorities in the two islands if the report of Ramboll/Babtie Fichtner confirms that there are economic and/or environmental reasons for so doing.**

(2) Other on-island solutions involving alternative technologies should be carefully evaluated

- 3.16 The Panel examined the state of play as regards alternative technologies to traditional energy from waste "mass burn" incineration. We found that:
- (a) There are a number of alternative technologies in or close to commercial operation, but none is yet fully proven for Guernsey's types of waste.

- (b) If joining with Jersey is not practicable, Guernsey should await the outcome of the DEFRA New Technologies Demonstrator Programme before finalising its own long-term solution for residual wastes.
- (c) When the demonstrator projects have been evaluated, Guernsey should go to the market for a long term solution to its own waste needs using an outcome based specification.

(a) There are a number of alternative technologies in or close to commercial operation, but none is yet fully proven for Guernsey's types of waste

3.17 The requirement of the EU Landfill Directive for Member States to reduce biodegradable and hazardous landfill, has renewed UK interest in alternative technologies to traditional energy from waste plants. These technologies, many of which have been used in Europe and beyond, include:

- Composting: breakdown of biodegradable wastes by micro-organisms in the presence of air - in an enclosed vessel or in open "windrows".
- Anaerobic Digestion: breakdown by micro-organisms with no air. Works in-vessel and produces bio-gas and a sludge/liquid "digestate".
- Mechanical and Biological Treatment (MBT): combines a number of simple waste separation and treatment techniques, usually involving composting and/or refuse derived fuel production.
- Pyrolysis: medium/high temperature (500°C), low oxygen breakdown of organic wastes producing gas or oil fuel and a high carbon "char" which may need to be landfilled. The plant often runs on pre-sorted waste or refuse derived fuel output from another technology.
- Gasification: high temperature (1000+°C) low oxygen partial combustion to produce a gas fuel. Often uses pre sorted waste or refuse derived fuel.
- Autoclaving: steam treatment, often of unsorted wastes - facilitates removal of recyclables and produces a fibrous refuse derived fuel and residues for landfill.

3.18 Many of these technologies are believed to offer advantages in terms of cost, size, quality of recyclates or emissions (see Appendix 5)²³. They are reported to have been working successfully, particularly in Scandinavia and around the Pacific rim. We were given an insight into these technologies by the Environment Agency and there are indications that many are providing practical solutions to community

²³ The Panel advises caution in taking reported performance or costings to be directly applicable to Guernsey's circumstances. In any evaluation of a particular technology as a possible means of dealing with solid waste in Guernsey a site specific analysis and costing would be essential.

waste disposal. However, the Panel was not in a position to evaluate these alternative technologies in depth.

- 3.19 Only some of them have performance and reliability proven to the satisfaction of investors or operators. There is too little objective and comparable information available to allow a full and considered appraisal of the options available. The claims of plant and equipment vendors have not been fully tested and some may be exaggerated.
- 3.20 The Environment Department has quite properly maintained a review of the technology alternatives to the proposed energy from waste plant. In April 2002 the former Board of Administration engaged Juniper, acknowledged experts in this field, to undertake a review of the several developing technologies. The analyses were thorough and Juniper's report concluded that the energy from waste technology was then the most dependable for Guernsey. In April 2003 Juniper provided an update report and concluded that there had been little progress in the commercial development of the alternatives to incineration since its last report.
- 3.21 Juniper's conclusions must be seen in the light of the continued development of alternative technologies. Delays in agreeing and building Guernsey's residual waste treatment plant have meant that there is now a greater body of knowledge and experience of these technologies. Matters are now close to the point where decisions about whether and when to adopt alternative technologies can be made with far greater confidence. The work now being undertaken by DEFRA should reinforce such decisions.

(b) If joining with Jersey is not practicable, Guernsey should await the outcome of the DEFRA New Technologies Demonstrator Programme before finalising its own long-term solution for residual wastes

- 3.22 DEFRA has set up a £30 million "New Technologies Demonstrator Programme" in England to establish pilot plants to assess the commercial and environmental viabilities of a range of technologies. First round bids closed in October 2004, with seven preferred bidders encompassing the following technologies:
- Gasification;
 - Pyrolysis;
 - Anaerobic digestion;
 - Mechanical and Biological Treatment;
 - In-vessel composting;
 - Various combinations of these technologies.

- 3.23 The second round of bidding closes in March 2005. The objective is to have five plants in operation by the end of 2005 and ten by the end of 2006. The pilot plants will run for two years and should yield valuable information by 2007-08. The outputs should increase investor, local authority and operator confidence, although it is unlikely that all pilot plants will prove fully successful.
- 3.24 The Environment Agency in England and Wales is also undertaking an assessment of waste technologies in use across Europe. Preliminary findings are included and regularly updated on the Agency's website [www.environment-agency.gov.uk].
- 3.25 Alternative waste treatments often suffer either from a poorly understood or demonstrated technology or unproven combinations of technologies. A report by Fichtner in March 2004 for the Environmental Services Training and Education Trust concluded that:
- “commercial application of gasification and pyrolysis technologies [for residual solid municipal wastes] is not widespread in the UK or Europe. Only a few plants operate at a commercial scale. The risks associated with using less well developed technologies for the treatment of waste are considered to be higher than for more established technologies”, and that “..the majority of plants [in the report] are either very small, operate on refuse derived fuel rather than for residual solid municipal wastes, [are] incomplete or [have] closed down”.*
- 3.26 The DEFRA and Environment Agency projects are designed to overcome this lack of objective information and shared experience of using alternative and combined technologies.
- 3.27 The former Board of Administration's decision to pursue tried and tested energy from waste technology was almost certainly right at the time. Now the technology market is changing and within two to three years there should be increased confidence in identifying the right technology for treating Guernsey's wastes. It should be noted, however, that the best solution for the island at that stage need not rule out incineration. For example, the Panel visited a reciprocating kiln incinerator on South Humberside, designed and operating in France in smaller communities and which appeared to meet all the Island's requirements matching those of the currently proposed plant at a significantly smaller scale and capital cost. What is needed now is a better informed decision, and time to allow more information to become available. **We recommend that, if joining with Jersey is not practicable, Guernsey should finalise its own long term solution for residual wastes once the outcome of the DEFRA New Technologies Demonstrator Programme is known.**
- 3.28 One option the Panel has considered is for Guernsey to host its own proving trial working in partnership with a technology supplier and operator along similar lines to the DEFRA demonstrator programme. The trial could be done over a period of

two years, perhaps on 25 per cent of the island's municipal solid waste. The Panel has received specific indications from suppliers and operators of alternative technology plants that they would be willing to partner the States during the introductory stage of a local reference plant to treat a proportion of the Island's waste. However, the Panel did not consider it to be part of its role to enquire into the commercial merits or opportunities of these proposals, reserving this to the States. [Comment. Such a trial would act as a strong driver towards that particular technology and supplier. There would be a very real incentive to continue with the trial over the longer-term utilising and expanding the structure and facilities built for the trial. Such an approach does not accord with the other recommendations of The Panel concerning open market contract and procurement route testing.]

3.29 Engaging in a proving trial would undoubtedly entail a degree of risk for both parties. The nature and extent of the risks would depend on the form of any agreement and the security each party could bring to the project. Although hosting a proving trial in Guernsey could be a useful step forward in finding a long term solution for the Island's waste disposal needs, Guernsey may prefer to await the outcome of the DEFRA trials.

(c) When the DEFRA demonstrator projects have been evaluated, Guernsey should go to the market for a long term solution to its own waste needs using an outcome based specification

3.30 Guernsey should re-examine what the market can offer in 2007 or 2008 when the state of knowledge should have advanced. However, a decision regarding the long term solution for the island's residual wastes cannot be deferred indefinitely and a firm decision would be needed at that stage.

3.31 **We recommend that the search for the right long term solution for Guernsey's waste management needs should be underpinned by a thorough analysis of strategic options for waste management for the island.** This would involve comparison of a number of technologies and combinations of technologies, supported by an analysis of the environmental costs and benefits of the alternatives. Such a "Best Practicable Environmental Option Appraisal" has just been completed in Hull and the East Riding of Yorkshire (see Appendix 6). The appraisal was triggered by the failure to secure planning permission for an energy from waste plant to serve the area and changes to the law regarding composting. It has taken ten months from start to finish.

3.32 When Guernsey is ready to go to the market for a long term solution, **we recommend that expressions of interest should be invited in respect of all viable technologies.** Expressions of interest should be sought in terms of an outcome based specification, ie the objectives to be reached rather than the specific means to achieve them. This should encourage the private sector to be innovative and explore the full range of options to address Guernsey's waste management needs in the long term.

- 3.33 The assessment of expressions of interest will have to take full account of the specific conditions relating to the island. This will include the ease of access to off-island recycle markets, the extent of on-island recycle markets, the pre-treatment requirements of some technologies or plants and the need for capacity to treat rejects, process outputs and the management of wastes during plant down-times.
- 3.34 **We recommend that multi-solution options involving more than one type of plant or technology should not be ruled out.** Guernsey should include consideration of a strategy and contracts based on a range of technologies, possibly at different sites. Experience to date shows that:
- Some technologies will manage only specific parts of the waste, for example, composting or anaerobic digestion.
 - Local (smaller scale) residual waste treatments may be possible using a single technology at a number of sites.
 - Some technology vendors are likely to propose several different combinations of technologies at the same site, for example, Mechanical and Biological Treatment, Pyrolysis and Gasification.
- 3.35 As discussed in Part 1, **we recommend that all different forms of contracting should be permissible.** To test the market thoroughly, contractors should be allowed the freedom to propose their own choice of contract structure. Although this will make tender evaluation more complex and time consuming, it should leave the private sector greater room to propose more flexible, cost-effective and innovative solutions.

(3) Exporting Guernsey's waste to EU countries is a possible option but has risks attached

- 3.36 A third possible option we examined was the export of Guernsey's waste to other European countries. We found that:
- (a) Exporting waste to EU countries appears to be legally possible but the issues are not clear cut.
 - (b) The opportunity exists to export waste to certain countries.
 - (c) The cost of exporting waste to EU countries may be less than the cost of an on-island solution.
 - (d) Exporting waste as a long-term strategy has risks attached.

(a) Exporting waste to EU countries appears to be legally possible but the issues are not clear cut

- 3.37 There is a possibility that Guernsey might be able to export its waste to a European country. The legal issues are complex, involving both international and domestic law. Thus, in a shipment between Guernsey and France, three separate suites of legislation²⁴ might come into play. Legal opinion suggests that the relevant EU law does not apply to Guernsey but could be mirrored by “adoption”. [Comment. The domestic legislation has mirrored the EU law]
- 3.38 The former Board of Administration had believed that trans-boundary shipment of waste was not possible. Legal opinion subsequently provided to the Environment Department indicates that there is considerably more scope for the movement of waste under the relevant laws than had previously been thought. The Panel considers that the advice provided to the Environment Department was comprehensive and well founded, although it is accepted that more research might be required. It is not therefore sensible to discount the possibility of transporting waste to an EU country on purely legal grounds, although shipment to some countries might be more problematic than others.
- 3.39 In all cases the competent authorities dispatching and receiving the waste must classify it as being for disposal or recovery. The legislative framework aims not so much to define the characteristics of waste as to secure protection of the environment. The principle of proximity seeks to discourage over-long shipments and the principle of sustainability evaluates the options within a State to deal with its own waste in a realistic way. [Comment. The principle of self sufficiency as implemented in European Union law requires the importing jurisdiction to satisfy itself that the exporting jurisdiction does not have and can not obtain the means for dealing with its own waste]
- 3.40 Trans-boundary movements of waste occur for both recovery and disposal. Recovery involves at least an element of energy production, whilst preserving natural resources. The better view may be that untreated waste sent for incineration in an energy from waste plant is treated as being for disposal.
- 3.41 By convention waste is colour coded as in Figure 14.

²⁴ Legislation affecting Guernsey and the UK, French legislation and EU legislation.

Figure 14: Colour coding of waste for trans-boundary movement

Colour	Type of waste	Extent of movement allowed
Green	Recyclables	Free movement
Orange	Household / Industrial and Bottom Ash	Subject to an agreement between authority of dispatch and destination
Red	Hazardous waste	Requires a duly motivated request pursuant to the Basle Convention

3.42 Different States take different positions in the way they interpret the law. In Germany and France there is a willingness to accept waste on the part of waste treatment plants, who contend that the relevant authorisations are obtainable from the appropriate authorities. However, this view would need to be tested by way of an application originating from Guernsey, supported by the receiving plant.

(b) The opportunity exists to export waste to certain countries

3.43 In Billet XIII of 2002 (page 1103), the former Board of Administration advised the States that enquiries of 24 plants situated in England and France indicated that between these facilities only 20,000 tonnes of spare capacity was then available. This would not have been enough to have treated even half of Guernsey's solid waste. Visits by the Panel to various plants and approaches to it from waste disposal companies indicate that the suggestion that there is insufficient overseas capacity to accept waste from Guernsey is no longer correct.

3.44 The Panel believes there to be a strong possibility of shipping waste to France (see below). It may also be possible to ship waste to Germany. For example, Stadtreinigung Hamburg of Germany has indicated a willingness to accept Guernsey's waste. However, save for hazardous wastes, where special arrangements apply, it is unlikely that waste could be shipped to England because of the lack of available capacity, an expectation by the Competent Authority that Guernsey should be in a position to make adequate arrangements to manage its own non-hazardous wastes, and the likely extent of public resistance.

3.45 Perhaps the most likely opportunity - on capacity, proximity and cost grounds - exists at the plant operated by the contractor at Le Havre. It has substantial unused capacity of some 30,000 tonnes a year within its two waste streams. Spare capacity also exists at other energy from waste plants in France operated by the same contractor. These are at Valorelle (Chartre), with spare capacity of 40,000 tonnes a year, and Arcante (Tours), with spare capacity of 15,000 tonnes a year. The combined capacity of 85,000 tonnes a year at the three plants could, in conjunction with effective recycling, handle a very substantial proportion of the

residual waste of both Guernsey and Jersey. [Comment. The Le Havre potential is discussed in the Department's States Report]

- 3.46 Jersey has stronger links with Normandy than Guernsey. However, it would be open to Guernsey to forge a similar relationship, perhaps in concert with Jersey. Our research leads us to believe that there is a desire on the part of the regional government of Normandy to create stronger economic and commercial ties with the islands. This objective may be driven by the investment which central government is believed to be making in positioning the port of Cherbourg as the future premiere port of Europe, the creation of a substantial new port at Granville by 2010 and the construction of a motorway infrastructure and improved rail links to serve the planned regional expansion. Opportunities to respond to such initiatives offer the possibility for dealing with the production of energy from waste and the treatment of recyclates, together with associated shipping movements. We understand that Jersey has already initiated the process of obtaining the necessary permissions through the government of the United Kingdom.
- 3.47 The possibility also exists for the islands to enter agreements which would see all their waste management activities brought together under the umbrella of a single contract. The arrangement could include the collection of recyclables, the operation of bring banks and civic amenity sites, the processing of waste and recyclates on-island, and the shipping for re-processing or disposal of residual wastes. Certain elements could be sub-contracted on-island as required. This type of arrangement may prove of interest to one or both islands as part of implementing an overall waste strategy.

(c) The cost of exporting waste to EU countries may be less than the cost of an on-island solution

- 3.48 The costs of exporting waste to EU countries could compare favourably with the costs that would be incurred under the proposed contract with Lurgi. To illustrate the sorts of costs involved, a case study of the possible use by both Guernsey and Jersey of the Le Havre facility is shown at Figure 15 below. [Comment. The Le Havre potential is discussed in the Department's States Report. The conclusion is that costs do not compare favourably.]

Figure 15: Case study of the possible use by Guernsey and Jersey of the Le Havre energy from waste facility²⁵

<p>The energy from waste incinerator at Le Havre was opened in July 2004. It has a capacity of 12 tonnes an hour on each of its two lines. The capability for a third line was part of the original structure; the boiler would be added when required and could take up to 15 tonnes an hour. The Le Havre facility serves a population of 370,000.</p> <p>It may be possible for both Guernsey and Jersey to use the Le Havre facility. It would then be economic to open a third stream at the plant if both islands were to consider shipment to France as a long term solution. For this to be possible both islands would probably have to join the present “syndicate” which provides feedstock for the plant. This would involve negotiations with the regional authorities, through the office of the Mayor of Le Havre, and require the successful negotiation of a robust long-term agreement, with a cancellation period of not less than five years.</p> <p>The addition of the third boiler within the existing structure would be likely to form part of any “entry fee” on the part of the Channel Islands to the “syndicate”. There may also be a requirement to contribute to the cost of the existing plant as, for example, the gas treatment from the third stream would join that of the first and second in the single process for gas treatment.</p> <p>By way of illustration the contractor has assisted Jersey in compiling the following average costs for an interim pan Channel Island solution, to which must be added the costs of on-island collection and baling. There would be a difference in the required payment between the short-term “non-syndicated” gate fee at 90 € per tonne and a syndicated fee, where an element of capital had been invested, at 60 € per tonne.</p>		
	Non-syndicated cost per tonne (Guernsey’s waste spread amongst the three plants – see para 3.49)	Syndicated cost per tonne (opening a third stream at Le Havre)
Shipping	50.00 €	50.00 €
French Transport	22.00 € (average cost for the three plants)	2.12 €
Treating Waste	90.00 €	60.00 €
Taxes	21.00 €	12.18 €
Total	183.00 € (£126)*	124.30 € (£86) *

* Exchange rate of 1.45€ to £1 used

²⁵ The figures in this case study are indicative and would need to be confirmed with the relevant sources before this option was pursued further. [Comment – The capital and operation costs, c. £30 per tonne, of the necessary Guernsey waste transfer station have been left out of the above table]

(d) Exporting waste as a long-term strategy has risks attached

3.49 Exporting waste has risks attached, especially in the longer term:

- The principle of sustainability will be more difficult to maintain once alternative solutions have been proven [Comment – If they are proven] as part of the DEFRA Programme referred to earlier. [Comment – A proven sustainable solution in the form of EfW has already been proposed]
- Unless a binding agreement is concluded, the present capacity at Le Havre or other plants in France might not remain available over a long period of time.
- Future laws or court decisions might make the long-term export of waste more difficult or even impossible.
- Except for the adjacent plants in France accessed through the ports of Le Havre, Cherbourg or Granville, shipping waste to more distant plants overseas would run counter to the proximity principle.
- Pressure groups within the EU country of destination might derail the import of Guernsey’s waste. [Comment. This may be true for short-term export as well]
- It might be difficult to agree contractual terms that safeguard the disposal of Guernsey’s waste over the long term, particularly in light of the above risks.

3.50 These risks could possibly be mitigated if Guernsey pre-treated its waste so that it left the island as a Refuse Derived Fuel. [Comment. Not all of the waste could be treated in this way. MBT plant manufacturers quote that upto 30% of waste from the plant is diverted to landfill.] A Refuse Derived Fuel facility would need to be built on island with associated capital and operating costs. The export of the Refuse Derived Fuel would then be treated as “green waste” for recovery rather than waste for disposal. However, the markets for Refuse Derived Fuels are tentative at present. In the longer term, and given the increasing demand for a finite stock of fossil fuel, the market might become more sustainable, although the receivers would probably be in a number of different locations. This solution would not solve all Guernsey’s problems as residual wastes would need to be dealt with on-island. [Comment. It is known that some plants continue to landfill RDF due to lack of markets]

PART 4: AN INTERIM SOLUTION

- 4.1 This Part of the Report considers what Guernsey should do as an interim solution until long-term alternatives to the proposed energy from waste plant at Longue Hougue become available. **We conclude that an interim solution to Guernsey's waste needs will be required until a long term solution becomes available.** The interim solutions we examined were: extending the life of the Mont Cuet landfill; and export as an interim measure.
- 4.2 We consider that:
- (1) Except for inert waste, landfill is not a long-term solution to Guernsey's solid waste disposal needs.
 - (2) A minimum of five years' landfill life should be maintained at Mont Cuet until a long term solution becomes available. [Comment. Available for procurement or fully commissioned on island?]
 - (3) Immediate steps should be taken to secure the export of waste as a short-term interim measure so as to maintain a minimum five year life at Mont Cuet.

(1) Except for inert waste, landfill is not a long-term solution to Guernsey's solid waste disposal needs

- 4.3 The Panel is concerned that Mont Cuet does not and cannot meet accepted standards of landfill (Figure 16 below). By modern standards Mont Cuet is suitable only for the deposit of inert waste. [Comment. This view is not supported by the regulator]. Nevertheless, we recognise that Mont Cuet is the only solid waste disposal option currently available and there is no suitable alternative site for the deposit of mixed waste to landfill on the island. It is unfortunate that the authorities in Guernsey should not previously have planned any alternative or taken the steps necessary to raise the standard of landfill management. The Health and Social Services Department told us, however, that Mont Cuet had been given environmental safeguards at the request of the waste regulator.
- 4.4 On current assumptions, the Environment Department has estimated that Mont Cuet has a void space/life of up to 8 years. We accept that assessment. We note, however, that progress in implementing the 1998 Solid Waste Strategy has been very limited. We believe much more could have been done in the past and should be done now to limit deposits at Mont Cuet.
- 4.5 There is ample capacity over the long term for the deposit of inert waste at Longue Hougue. We welcome the steps that have been taken to divert suitable fill material to reclamation purposes.

Figure 16: Comments on the Establishment and Operation of Mont Cuet Landfill

1. The site was a worked out stone quarry and was never prepared for landfilling as would be required by site licensing regimes in the EU.
2. The site is inherently unsuitable as it is infiltrated by both ground water and sea water. It was not practicable to line the site with either a butyl liner or clay, both of which would have had to be imported. Anchoring a liner would have been a major difficulty.
3. The infrastructure provided on the site is limited because of the size and limitations of the site. The site has a weighbridge but apart from measuring the weight of material delivered there appears to be insufficient monitoring of waste types received and limited capacity to divert inappropriate materials spotted.
4. There does not appear to be any formal approved working plan of the site including the recording of where particular wastes are deposited.
5. Although the site is fenced, wind-blown litter will be an increasing problem as the quarry is filled.
6. Management of landfill gas has not yet begun.
7. Management of leachate is not really practicable due to the influx of ground, surface and sea water, although some attempt is made to pump out and aerate leachate.
8. There needs to be formal management and monitoring of wastes deposited, landfill gas, odour, dust, noise, surface water, ground water and leachate.
9. For the monitoring and management to be meaningful, there need to be environmental baselines, a routine monitoring and sampling plan and the regular publication of results and trends.
10. The best waste management operations now tend to seek third party accreditation of their operations through a quality management scheme such as BS9000, BS14000 or EMAS (Eco-Management and Audit Scheme).

[Comment – These points have been refuted and/or explained in a response from Public Services Department]

(2) A minimum of five years' landfill life should be maintained at Mont Cuet until a long term solution becomes available

- 4.6 The Panel is uneasy about Mont Cuet's continued use as it is unlikely ever to meet EU landfill requirements: the site is not fully fit for purpose and is not managed according to best modern practice. However, there is no alternative waste disposal option readily available and Guernsey has to make the best of what it has. The remaining disposal capacity at Mont Cuet therefore needs to be carefully protected. **We recommend that, through pricing, waste minimisation, enforcement and other measures, Guernsey seeks to maintain a minimum of five years' landfill capacity at Mont Cuet.** A margin of five years would allow Guernsey the flexibility to determine [Comment. Determine or determine and commission?] the right long term solution for the island.
- 4.7 The panel estimates that the pricing changes it recommends, coupled with waste minimisation and improved recycling measures, could extend the life of Mont Cuet by a number of years. [Comment. An analysis of the potential extension of Mont Cuet is provided in the Department's States Report]. This would only be achieved, however, if the States and Parishes adopt a rigorous and determined approach towards waste minimisation and recycling.
- 4.8 We note that it would be technically possible to extend landfill capacity further by treating waste to reduce its volume and water content. But we do not consider that this option would be worthwhile because the infiltration of water at Mont Cuet would lead to the dried waste absorbing ground and sea water and it would swell until it became saturated. In this connection it should be noted that sea water slows bacterial growth and activity, which means that the landfill would take longer to stabilise.

(3) Immediate steps should be taken to secure the export of waste as a short-term interim measure so as to maintain a minimum five year life at Mont Cuet

- 4.9 The measures suggested by the panel - including pricing, enforcement, waste minimisation and recycling initiatives - should go some way to extending the life of Mont Cuet. However, at some stage - and most probably before a long-term waste disposal solution is operational - landfill capacity will get close to having a remaining life of only five years. An interim disposal method will then need to be brought into play.
- 4.10 We consider that the only viable interim measure is export of waste to a neighbouring jurisdiction. As discussed in Part 3 of this Report, the opportunity exists to export waste to certain EU countries, most notably France. The risks in

exporting waste are very much less as a short term measure compared with export as a long term strategy.

- 4.11 However, it will take time to set up the necessary arrangements. Action to set up an interim export facility cannot therefore wait until it is needed. It needs to be set up straight away so that the option can be used as soon as it becomes necessary. **We therefore recommend that, in order to maintain a minimum five year life at Mont Cuet, Guernsey should take immediate steps to ensure that it is in a position to export waste as a short term interim measure should this be necessary.**
- 4.12 In the short-term, Guernsey can argue that it requires a temporary off-island solution because its on-island resources (Mont Cuet) are not sustainable and there is currently no suitable long-term disposal option available. A short-term solution is also appropriate in the light of DEFRA's work under its "New Technology Demonstration Programme", with alternative technologies likely to become proven over the next few years. The short-term solution would be required whilst the technology was being established for a long-term, on-island solution to the disposal of Guernsey's residual waste. It would be open to the States to consider the option of Guernsey hosting its own proving trial, as referred to in paragraph 3.28.
- 4.13 The arrangements for the interim export process should be commenced by the States entering commercial negotiations with its preferred receiver of waste. In conjunction with that organisation, and either directly or through the government of the United Kingdom, the States should make such formal requests as may be required to secure the necessary approval or permission for the export of waste for a short-term period. Residual waste for export will need to be reduced to a minimum through waste minimisation, recycling and possible pre-treatment measures.
- 4.14 It is essential that the States should decide by no later than 2008 what its main disposal route is to be for the long term. The implementation of that strategy must be in place and operating effectively by no later than 2011. These imperatives require that temporary solutions are fully effective in reducing the amount of waste going to Mont Cuet to the levels required.
- 4.15 If these waste reduction methods are fully effective exporting waste might not be necessary or only be required for a short period. However, the arrangements for such export should now be put in hand.

APPENDIX 1: ISSUE ANALYSIS

In September 2004, the Panel developed the following issue analysis to scope its work:

Key Question: Is mass burn technology in the form of an on-island energy from waste plant the most appropriate waste disposal solution for Guernsey's needs?

Issue 1: Are there practicable alternatives to on-island mass burn technology which could cost-effectively meet Guernsey's needs?

- (a) Have the authorities taken all reasonable steps to encourage the reduction, re-use and recycling of waste?
 - Reduction (prevent and minimise)?
 - Re-use?
 - Recycling and composting?
- (b) Are there practicable off-island solutions for disposing of Guernsey's waste?
 - Jersey, including joint arrangements?
 - UK?
 - Elsewhere in Europe?
- (c) If off-island solutions are not available, are there practicable alternatives to mass burn technology available at the present time?
 - Biological (aerobic)?
 - Biological (anaerobic)?
 - Gasification?
 - Incineration (excl mass burn)?
 - Pyrolysis?
 - Physical (autoclaving)?
 - Landfill?
 - Mont Cuet?
 - Les Vardes?
 - Elsewhere on island?
- (d) If practicable alternatives to mass burn technology are not yet available, are there interim solutions which could bridge the gap until practicable alternatives become available?
 - Landfill on island?
 - Export?

Issue 2: If on-island mass burn technology is the only practicable option, is the proposed energy from waste plant at Longue Hougue the most appropriate solution?

- (a) Have Guernsey's needs been adequately identified?
 - Has Guernsey's current waste production been identified (types and volumes), inc hazardous wastes?
 - Has the likely growth in waste production been accurately estimated as far as possible?
 - Has the scope for a reduction in waste for disposal as a result of recycling and other initiatives been properly assessed?
- (b) Is the scale of the proposed plant appropriate for Guernsey's needs?
 - Is the scale of the proposed plant in line with Guernsey's forecast waste production?
 - Would the proposed plant still be appropriate if actual waste production proves to be significantly different from that forecast?
 - Is the proposed plant consistent with Guernsey's solid waste management strategy (being developed)?
 - Would the proposed plant integrate effectively with Guernsey's current waste management infrastructure?
 - Is the scale of the proposed plant in line with experience elsewhere, including the Isle of Man and Jersey?
 - Would the proposed plant allow (ie not stifle) the potential for future expansion in areas such as recycling and composting?
 - Is the design of the proposed plant appropriate for what is required?
- (c) Is Longue Hougue the best location for a plant of this size and scale?
 - i. Is Longue Hougue suitable on health, environmental and access grounds?
 - ii. Would any other locations be more suitable than Longue Hougue?
- (d) Were appropriate contract procedures followed in the decision to select Lurgi as the preferred tenderer?
 - i. Was a sensible procurement strategy adopted?
 - ii. Was the tender process conducted properly?
- (e) Is the proposed contract a good deal for Guernsey?
 - i. Has the bid offering the best value for money been chosen?
 - ii. Has the cost been benchmarked against the cost of similar plants elsewhere?

APPENDIX 2: PROCEDURAL MATTERS

This appendix summarises the activities of the Panel since the appointment of Members was completed in late August 2004.

1. Meetings of the Panel

The Panel met on the following dates:

2004

27 August	in Guernsey
16 September	in Guernsey
17 September	in Guernsey
29 September	in Guernsey
30 September	in Guernsey
7 October	in London
8 October	in London
2 November	in London
4 November	in London
11 November	in London
29 November	in London

2005

14 January	in London
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2. Individuals/Organisations with which Meetings were held

a. Formal Meetings of the Panel

In two separate meetings held on 16 September the Panel met representatives of the following organisations:

- Association of Guernsey Compliance Officers
- Guernsey Chamber of Commerce
- Confederation of Guernsey Industry
- GHATA
- Institute of Bankers
- Institute of Directors

- Friends of the Earth
- Guernsey Litter Forum
- La Société Guernesiate
- The National Trust
- Town Centre Partnership
- Waste Action Group Guernsey

Also on 16 September the Panel individually met:

- Deputy Scott Ogier, the lead signatory of the Requête
- Deputy Charles Parkinson, who proposed the successful amendment to the Requête

On 17 September the Panel visited Mont Cuet and Longue Hougue landfill sites.

On 29 September the Panel held a public meeting.

On 30 September the Panel met Deputy B M Flouquet, Environment Minister and Mr Steve Smith, Chief Officer, Environment Department, together with other staff of the Environment Department and Guernsey Technical services.

On 7 October the Panel met:

- Dr Frank Hardwick - Manager, Waste Technology Data Centre, Environment Agency
- the following representatives of Lurgi:

David Porter -	Director –Lurgi (UK) Ltd
Mike Wilkins -	MD – Lurgi (UK) Ltd
Gerhard Lohe -	Sales Director Lurgi Lentjes AG
Richard Adams -	Legal Counsel
- Chris Davey - Manager of Local Authority Relations, Wrap (Waste and Resources Action Programme)

On 2 November the Panel met Mr John Acton, Chairman of Compact Power Ltd.

b. With Members of the Panel

On 21 and 22 September David Purchon and Richard Eales met Dr David Jeffs, Director of Public Health, and Mr John Cook, Chief Environmental Health Officer (the regulator), and Mr S Smith, Chief Officer, and other staff of the Environment Department and Guernsey Technical Services

Between 3 and 5 October the Chairman accompanied representatives of the States of Jersey Shadow Scrutiny Committee on a fact finding visit to Le Havre, Granville and Isigny in France.

On 8 October the Chairman, Richard Eales, David Purchon and the Head of Government Business met the following representatives of Mayside Recycling

Brian Perry

Paul Deakin

On 12 October the Chairman, Richard Eales and the Head of Government Business visited Jersey and met representatives of the States of Jersey Environment and Public Services Committee including Senator Phillip Ozouf, President, and Mr John Richardson, Chief Executive.

On 15 October the Chairman attended a session of the States of Jersey Shadow Scrutiny Committee when it received a presentation.

On 28 October the Chairman and the Head of Government Business met the Island Douzaine Council's working party comprising:

Douzenier W Le R Robilliard (Torteval) (Chairman, IDC)
 Douzenier R H H Barneby (Senior Constable St Peter Port)
 Douzenier M Levrier (St Sampson)
 Douzenier M Cleal (Vale)
 S Langlois (Junior Constable St Pierre du Bois)

On 29 October the Chairman and Richard Eales visited the following operations in Guernsey:

Mayside Reclamation
 Island Waste
 Guernsey Recycling
 La Fontaine Vinery

On 9 November the Chairman and the Head of Government Business met the Island Douzaine Council.

On 16 November the Chairman, Richard Eales and the Head of Government Business met Dr Haden Taylor of ReCycled Refuse International Ltd.

On 17 November the Chairman and David Purchon, accompanied by a representative from Guernsey Technical Services, visited the sites identified in the Environment Impact Assessment.

On 18 November David Purchon met representatives of the Environmental Health and Planning departments.

On 19 November the Chairman, Richard Eales and the Head of Government Business met the following representatives of Nehlsen & Co (Guernsey) Ltd:

Mr R J A Brown
 Mr David Archer
 Mr Charles Hinde
 Mr Jens Bruns

Mr Bernd Gabriel

On 24 November the Chairman, Richard Eales and the Head of Government Business met Mr Alan Crowe of Guernsey Recycling Ltd.

On 30 November the Chairman, Richard Eales and the Head of Government Business met the following representatives of CNIM/R G Falla/SPIE:

Andy Hall
Andrew Woolcock

On 1 December the Chairman, Richard Eales, David Purchon and the Head of Government Business met representatives of the Isle of Man Department of Local Government and the Environment. On 2 December the Chairman, Richard Eales and the Head of Government Business toured the new Isle of Man incinerator.

On 15 December the Chairman, Richard Eales and David Purchon visited the Donarbon waste management site at Waterbeach Cambridgeshire with representatives of Verno Ltd.

On 21 December the Chairman, Richard Eales and the Head of Government Business met representatives of the Environment Department.

On 6 January the Chairman met the States of Jersey Shadow Scrutiny Committee.

On 6 January David Purchon visited the Cyclerval plant of Newlincs Development Ltd at Stallingborough, North East Lincolnshire.

On 7 January the Chairman, Richard Eales and the Head of Government Business met Mr John Cook, Chief Environmental Health Officer, and Mr Simon Welsh and, separately, Mr John Ogier from the Commerce and Employment Department.

On 12 January the Chairman, Richard Eales and the Head of Government Business met Dr John Weatherby of Bactie Fichtner and Mr Klaus Jacob Jensen of Ramboll.

3 Submissions Published on States of Guernsey Website

a. Individual submissions

Adams, Julie	Batiste, Mrs I F
Addison, Edward	Battye, Bob
André	Bean, P J H
Andrews, Tim	Bihet, Molly & André
Ashworth, Muir	Bisson, Andrew
	Bisson, Roy
Bailey, Lesley & Andrew	Blanchford, Gary
Barber, Gresham	Blondin, A L
Barnes, Dominic	Bodman, Mrs L
Barnes, John & Marybell	Bowditch, Anna
Barnes, Marcus & Blaise	Bowker, Caroline

Bradshaw, Rosie
 Brazier-Creagh, Victoria
 Brook, R & S
 Brown, Chris
 Brown, Richard J A
 Buchanan, John

Callaway, J E
 Cameron-Singleton, Barry & Linda
 Campbell, Laurence
 Campelli, Z
 Carey, Mrs S
 Carré, Andy, Julie, Esmee & Henry
 Cariou, Marcel
 Casbolt, Trevor & Trudy
 Cataroche, Sheila
 Ciotti, Della
 Clark, Joan E
 Clavadescher, Elizabeth
 Cocks, J R & family
 Collenette, Zoe
 Cooper, Hayley
 Cooper, M F
 Cotterill, M

Davis, Gill
 De' Ath, Mervyn
 De Guerin, Lynne
 De La Mare, Dave
 De La Mare, Richard & Sandra
 De La Rue, Nigel & Clair
 De La Rue, Pierre
 De La Rue, S
 De La Rue, Simon
 De Putron, Susan
 Dodd, Colin & Andrea
 Dorey, Rosie
 Dorey, Rupert
 Dudley-Owen, Mr D & Mrs G
 Duncan, Jenny

Edge, Patrick
 Edwards, David & Jackie

Falla, Michael
 Falla, Peter J
 Farnham, George & Jean
 Fox, Richard & Sally
 Fuller, Dave & Andie

Gallienne, Ian
 Garbut, Karen

Gaudion, B J
 Gilbey, Harry
 Godfrey, David
 Gold, Nicholas
 Greening, Jennifer
 Gregson, Ed
 Gregson, Norah
 Gregson, Rob
 Grimshaw, David R
 Grimshaw, Jocelyn
 Groves, Errol
 Harrison, Mrs G
 Harty, Selena
 Hazlewood, Marion
 Head, Liz
 Hearse, Andy & Claire
 Heighton-Jacjson, Andrew
 Henderson, Tim
 Hewins, Mr & Mrs D
 Hewlett, Brian
 Heyworth, Adrian & Penny
 Higgs, John
 Higgs, Roger
 Hodge, R W
 Hubert, Laura

Iles, Janet

Jehan, S W J

Keneally, Mr P
 King, Gemma
 Knapp, Mr & Mrs D
 Krebs, Patricia

Le Breton, Kevin & Georgina
 Leach, John & Marguerite
 Le Cocq, Mark
 Leech, Dennis & Patricia
 Lees, Mrs S J
 Le Maitre, Maria
 Lenfestey, Mrs C M
 Le Tissier, Chantelle
 Le Tissier, Owen & Fiona
 Lovell, Martin & Barbara
 Loveridge, T A

Macdougall, Suzette
 Mahy, Geoff & Pauline
 Maindonald, Mr & Mrs D E
 Marsh, Sam

Marson, Geoffrey & Lorraine
 Mason family
 Mauger, Lee
 McClean, Ethan
 McDada, A J
 Meacock, Richard
 Meecham, Mrs B L
 Merjojam, Carolyn
 Moore, Terry
 Morris, Mrs J M

Nash, D W
 Nicolle, Michael
 Northey, Roy

Oliver, Stephen
 Ozanne, Sally

Packer, Mrs J V
 Partridge, Caroline
 Paul, Michael
 Pearce, Emma
 Phillipe, H
 Pill, David
 Platts, Robert
 Potter, Deborah
 Proudlove-Gains, Helen

Rebollo, Francisco
 Rebollo, Sheila
 Reeve, K & P
 Richardson, Mrs A
 Ritchie, A
 Ritchie, Renate
 Robinson, Chris
 Rouillard, John

b. Organisations

Allied Coasters Ltd
 Aqua Star Ltd
 CNIM International Operations/
 R J Falla Ltd
 Commerce & Employment Department
 Confederation of Guernsey Industry
 Construction Industry Forum
 Energos
 Estech Europe Ltd
 Friends of the Earth Guernsey
 GHATA
 Guernsey Chamber of Commerce
 Guernsey Conservation Society

Round, Andrew
 Rousse, James
 Russell, Renwick S

Sandwith, Anne
 Schute, John
 Searle, Martin
 Sebire, Ray
 Short, Andy
 Skillet, Joy
 Smith, Alan & Norma
 Tasker, Mrs J M
 Thompson, David
 Thompson, Katherine
 Thompson, John & Caroline
 Torode, Marilyn
 Trubill, J W

Vaudin, Joan

Warlow, J
 Warr, Sarah (& Mr & Mrs Rex)
 Webb, Brenda
 Webber, Mrs B K
 Webber, G T
 Wenman, Vivienne
 White, Julia
 Wilding, Karen
 Wills, Helen
 Wills, Jill
 Wills, John
 Wills, Tony
 Winsall, Sarah
 Winter, Fleur
 Wisher, Pat

Guernsey Recycling Ltd
 IET Energy
 Institute of Directors
 Island Waste Ltd
 La Société Guernesiaise
 Mayside Reclamation
 National Trust
 Planet Advantage Ltd
 Recycled Refuse International Ltd
 TEG Environmental plc
 THIDE Environment
 Verno Ltd
 WAGG

c. States Members

Barry Brehaut
 A H Brouard
 Mike Burbridge
 Chris Brock
 David de Lisle
 Graham Guille
 Jack Honeybill
 D Jones
 R J Le Moignan
 T M Le Pelly
 Jonathon Le Tocq

G H Mahy
 Sam Maindonald
 Rhoderick Matthews
 Carla McNulty Bauer
 Scott Ogier
 Charles Parkinson
 Peter Roffey
 Peter Sirett
 Duncan Staples
 L S Trott

4. Documentation Received – Not on the Website

a. Guernsey Government

Commerce and Employment Department	Economic Impact Assessment – Waste Disposal through an Energy from Waste Plant Information about animal incinerator
Environment Department (including Guernsey Technical Services)	Detailed background information on the development of the Waste Strategy Assessment (Solid and Liquid Waste), then draft Waste Management Plan and the seeking, assessing and presenting to the States of Deliberation of tenders for the proposed Energy from Waste Plant Information on waste arisings, costs of solid waste disposal, recycling activities, the export of waste (legal background and costings), contractual arrangements with Lurgi (Access was also provided to the Department's files)
Health and Social Services Department	Information about clinical waste incinerator Draft Environmental Pollution Law

Home Department – Police	Information about fly-tipping Information about fixed penalties for littering offences
Public Services Department	Information about the operation of Mont Cuet and Longue Hougue landfill sites Information about plans for the use of Longue Hougue for harbour operations
States Works	Information on waste recycling

Local Government -

Island Douzaine Council	Views on future arrangements for the collection of domestic waste, including charging and recycling
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b. Jersey Government

States of Jersey Shadow Scrutiny Committee	Information on the Jersey Waste Strategy Papers produced by Professor Chris Coggins
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c. Isle of Man Government

Isle of Man Department of Local Government and the Environment	Information on waste strategy including implementation of decision on new incinerator, recycling and regulation Information on the specification for the new incinerator Information on health impact of incinerator Information on the value of a second stream
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d. Commercial Organisations

Advanced Recycling Technology Ltd	Information on the company's plant producing high performance briquette fuel
Allied Coasters Ltd	Information on transport arrangements and costs for waste export

Bio Bubble	Information on the company's sequencing batch reactor for waste water and sludge treatment
CIVIC Environmental Systems	Information on the company's MSW processing and materials recovery plant
CNIM/Falla/SPIE	Information on the group's unsuccessful compliant and alternative tenders submitted to the former Board of Administration
Compact Power Ltd	Information on the company's pyrolysis and gasification process and the company's Avonmouth plant Indication of interest in possible demonstration plant in Guernsey
ENER-G	Information on two-stage thermal treatment process incorporating gasification and high temperature oxidation
EnviroArc Technologies AS	Information on the company's gasification/plasma technology
UK Environment Agency	An overview from the Waste Technology Data Centre of processes including incineration, gasification, pyrolysis, anaerobic digestion/ BT/BMT, autoclaving and composting
Entech Ltd/ IET Energy	Information on the company's third generation combustion technology known as pyrolytic gasification Indication of interest in possible demonstration plant in Guernsey
Estech Europe Ltd	Information on the company's autoclaving and post separation process
Fernwood Waste Ltd	Information on the company's process involving autoclaving, sorting of recyclates and possible electricity generation
Herhof Environmental UK	Information on the company's mechanical biological treatment process
Island Waste Ltd	Information on current and future recycling activities in Guernsey

IWI (UK) Plc	Information on the company's MBT system producing refuse derived fuel
Lurgi Ltd	Information on the preferred tender submitted to the States of Guernsey and post tender negotiations
Mayside Reclamation Ltd	Information on current and future recycling activities in Guernsey, transportation costs for the export of recyclates and kerbside collection arrangements
Nehlsen & Co (Guernsey) Ltd	Information concerning the company's MBT process
Planet Advantage Ltd	Information on the company's gasification process Indication of interest in possible demonstration plant in Guernsey
ReCycled Refuse International Ltd	Information concerning the company's thermal treatment process to produce a refuse derived fuel
Ronez Ltd	Information on the company's aggregate production process
Stradtreinigung Hamburg/ Mindest SA	Information about the export of waste to Germany
St Peter Port Services Ltd	Information on current recycling activities in Guernsey
TEG Ltd	Information on the company's thermophilic aerobic composting process
Thide Environment	Information concerning the company's thermolysis treatment process
Verno Ltd	Information on the company's plasma gasification process Indication of interest in possible demonstration plant in Guernsey
WRAP	Information on the aims and activities of the UK Waste Resources Action Programme

APPENDIX 3: SELECTED STEPS IN THE CONTRACTING PROCESS

Date	Action / Event
Jun 1998	The States directed the Board of Administration to investigate the feasibility of commissioning an energy from waste plant (Billet XII 1998). The technology was to be mass burn - alternative technologies were discounted as they were not tried or tested for the treatment of municipal solid waste.
Mar – May 2000	Expressions of interest were sought from companies with experience in the design, construction and operation of energy from waste plants. Over 40 expressions of interest were received.
Jul 2000	A joint meeting of the Advisory and Finance Committee and the Board of Administration assessed the procurement options and resolved that the States should initially fund and own the energy from waste plant and other waste facilities and that a design, construct and operate contract (max 10 years) should be let. The adoption of a turnkey contract was felt to offer the best risk management approach.
Dec 2000	Expressions of interest submissions were examined by a review panel which recommended that 12 companies were suitable for further consideration. The remaining companies were deemed unsuitable either because of the technology they proposed (normally gasification or pyrolysis) or because they had insufficient experience and capability for the Guernsey project.
Jan 2001	Ramboll, a leading Danish engineering consultancy with experience of energy from waste projects, was appointed as technical consultants. Ramboll produced a project definition brief to define the facility's technical and operational requirements and this was used to develop the tender documents.
	The Board of Administration's preferred strategy was to procure the energy from waste facility through a design, build and two year operate contract (DB2O).
Early 2001	Following the receipt of expressions of interest from appropriately qualified and experienced technology lead bidders, suitable companies were invited for interview. A list of preferred bidders was then selected as follows: <ul style="list-style-type: none"> • Alstom Power Generation Ltd. • Lurgi (UK) Ltd (lead contractor/technology supplier) / SITA and/or Guernsey Electricity (operator). • Babcock Borsig Power Environment GmbH (lead contractor/technology supplier) / CGEA-ONYX (operator) / Garenne Group. • Martin Engineering Systems Ltd (technology) / MES Environmental Ltd (operator).
Apr 2001	The Advisory and Finance Committee twice asked the Board of

	Administration to give tenderers the option to offer alternative tenders for design, build, fund and operate (DBFO) proposals. The Committee noted the firm advice from 4Ps (an agency which advises UK local authorities on procurement) that the chosen DB2O procurement option was unlikely to provide best value for money. The Board of Administration considered that it would be inappropriate to pursue a DBFO contract since it would result in unacceptable programme delays and would not result in financial benefits.
May 2001	The Advisory and Finance Committee wrote again to the Board of Administration. The Committee considered that best value for the sustainable long term provision of waste services could only be achieved if the design of all waste facilities, including the energy from waste plant, fully accounted for long term operational considerations. The Committee's strong preference was for the seeking of tenders for the provision of integrated waste services and asked the Board of Administration to invite tenderers to put forward a DBFO tender if they so wished. The Board of Administration responded that, although it intended to proceed with the DB2O contract, it would in parallel start to formulate tender documentation for the operation of waste disposal facilities, including the energy from waste facility, upon expiry of the DB2O contract.
Jun 2001	The strategy was agreed to procure the energy from waste facility through a design, build and two year operate turnkey contract (DB2O) followed by a finance and 25 year operate contract (FO25).
Aug 2001	Tods Murray was appointed as legal advisers to draft a bespoke design, build and two year operate (DB2O) contract. A bespoke DB2O contract was chosen to ensure not only that the plant was constructed to a high technical specification but also that consideration was given to the operation of the plant as the contractor would have to operate and maintain the plant for two years. A plant was required that would be attractive to future operators. In addition, it was decided to procure the DB2O contract through a special purpose vehicle as this afforded the States maximum future flexibility. The States could then sell the shares of the special purpose company or form a joint venture company or a States trading company as appropriate.
Early 2002	The energy from waste division of Alstom Power was bought by CNIM, owner of Martin Engineering Systems. Alstom therefore withdrew from the preferred bidder list and was replaced by AMEC Capital Projects Ltd (lead contractor) / Volund (technology supplier).
Apr 2002	Juniper Consultancy was commissioned to consider incineration versus emerging technologies as the most suitable waste management option for Guernsey. Juniper concluded that incineration with energy recovery was the most appropriate option.
Jun 2002	The States approved in principle the procurement of a mass burn energy from waste facility by means of a design, construct and two year operate contract (DB2O) to be signed by a Special Purpose company wholly owned by the States of Guernsey (Billet XIII 2002).

mid 2002	AMEC informed the Board of Administration that the company was no longer prepared to tender for government let turnkey contracts as Volund, the technology supplier, was not prepared to take the turnkey risk.
	Prior to the issue of tender documentation, Babcock Borsig Power Environment's parent holding company experienced serious trading difficulties with the result that the firm was unable to tender and subsequently went into insolvency.
	As a result the final tender list was reduced to two: <ul style="list-style-type: none"> • Lurgi (UK) Ltd (lead contractor/technology supplier) / TIRU and/or Guernsey Electricity (operator). • Martin Engineering Systems Ltd (technology) / MES Environmental Ltd (operator).
	The preferred bidder list could not be expanded due to changes in the energy from waste market place, arising from unprofitable turnkey project experience, major groups leaving the energy from waste field and restructuring of group companies.
Jul 2002	Tender documents were issued to Lurgi and Martin Engineering Systems for the procurement of an energy from waste plant.
Jan 2003	Tenders were received from Lurgi and Martin Engineering Systems for the design, construction, two-year operation and provision of essential spare/wearing parts for a mass burn energy from waste plant as follows: <ul style="list-style-type: none"> • Lurgi £102,454,000 • Martin £92,669,283 Tender sums at this level were not considered viable.
Early 2003	The Board of Administration held post tender negotiations with both tenderers with a view to establishing the scope for significant cost reductions and to identify a preferred partner for the construction of the plant.
	Following post tender negotiations and examination of options for reducing the cost of the energy from waste plant, whilst maintaining the key objective of constructing a robust reliable plant capable of meeting European emission standards and meeting the needs of Guernsey, the tenderers agreed to a further tendering stage against a revised brief and procurement route. The original tender specification was amended as follows: <ul style="list-style-type: none"> • Revised architectural treatment • Simplified building type • Reduced waste storage bunker capacity • Eliminate need for deep basements • Allow above ground bunker with ramp access • Accept a possible visible building height of 33m (concept 27.5m) • Reduce tipping bays to 2 plus 1 manual tipping bay (concept 4 bays) • Amended flue gas treatment system for NOx abatement but still complying with European emission standards • Allow vertical as opposed to horizontal boiler • Exclusion of the animal carcass incinerator

	<ul style="list-style-type: none"> • Client obtains planning and environmental permits • Contract terms to be rewritten to reflect partnering approach 												
Apr 2003	Juniper produced an addendum to its April 2002 report examining progress in the development of new technologies over the year since its last report. Juniper concluded that, because of the failure of some companies and the slower than forecast progress of others, the States of Guernsey should be less inclined to consider novel solutions instead of the proven incineration processes which had been tendered.												
May 2003	<p>Lurgi and Martin Engineering Systems submitted amended tenders in the following amounts:</p> <table border="1"> <thead> <tr> <th></th> <th>Lurgi</th> <th>Martin</th> </tr> </thead> <tbody> <tr> <td>Design and Construct</td> <td>£72,254,178</td> <td>£74,346,819</td> </tr> <tr> <td>Two year operation</td> <td>£8,696,000</td> <td>£6,258,082</td> </tr> </tbody> </table>		Lurgi	Martin	Design and Construct	£72,254,178	£74,346,819	Two year operation	£8,696,000	£6,258,082			
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	<p>Following post tender negotiations, inclusion of cap-ex capitalisations and the assumption of 60,000 tonnes per annum throughput, the following amounts were derived:</p> <table border="1"> <thead> <tr> <th></th> <th>Lurgi</th> <th>Martin</th> </tr> </thead> <tbody> <tr> <td>Design and Construct</td> <td>£72,713,545</td> <td>£73,184,869</td> </tr> <tr> <td>Two year operation</td> <td>£8,199,406</td> <td>£6,215,175</td> </tr> <tr> <td>Less electricity income</td> <td>(£1,322,933)</td> <td>(£1,536,187)</td> </tr> </tbody> </table>		Lurgi	Martin	Design and Construct	£72,713,545	£73,184,869	Two year operation	£8,199,406	£6,215,175	Less electricity income	(£1,322,933)	(£1,536,187)
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	The Martin Engineering Systems tender was submitted on the basis of a Limited Liability Partnership (LLP). A LLP structure limits the liability of its members to the amount of capital – usually a just a nominal sum – that they contribute. CMS Cameron McKenna was commissioned to give an independent opinion on the risks associated with contracting with a LLP. Both CMS Cameron McKenna and Tods Murray (the Board of Administration’s legal advisers) concluded that the LLP structure would expose the States of Guernsey to a far greater degree of risk than was normal in a turnkey contract.												
Jul 2003	Following consideration of the tender appraisal report, the Board of Administration identified Lurgi as its preferred tenderer and commenced a series of detailed negotiation and clarification meetings.												
Sep 2003	<p>Following the post-tender negotiations with Lurgi, the Board of Administration recommended the States to accept the design, construct and operate fee negotiated with Lurgi in the following sums:</p> <table border="1"> <tbody> <tr> <td>Initial Periods Services</td> <td>£2,982,500</td> </tr> <tr> <td>Construction of energy from waste facility</td> <td>£69,813,978</td> </tr> <tr> <td>Two year operation</td> <td>£7,513,106</td> </tr> <tr> <td>Total</td> <td>£80,309,584</td> </tr> </tbody> </table>	Initial Periods Services	£2,982,500	Construction of energy from waste facility	£69,813,978	Two year operation	£7,513,106	Total	£80,309,584				
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Sep 2003	The States reaffirmed its previous in principle decision to procure an energy from waste facility under a design build and two year operate contract. The States directed the Board of Administration to proceed in accordance with the provisions of the Letter of Intent signed with Lurgi and to commence the initial services period at a sum not to exceed £2,982,500. The States authorised the Board of Administration, following the initial services period, to contract with Lurgi for the												

	construction and two year operation of the energy from waste facility (Billet XX 2003).
Oct 2003	Lurgi commenced work on the nine month initial services period, including: <ol style="list-style-type: none">1. Detailed architectural design2. Detailed engineering design3. Site survey4. Modelling of noise and emissions5. Finalisation of contract documents6. Hazard and operability study7. Preparation of data for input to planning process

APPENDIX 4: VIEWS OF THE DOUZAINES ON THE COLLECTION OF HOUSEHOLD WASTE

1. The Panel has met the Island Douzaine Council and its working party on waste. The purpose was to ascertain the views of each Parish in the light of their present and possible future responsibilities under both the Parochial Collection of Refuse (Guernsey) Law 2001 and the soon to be enacted Environmental Pollution (Guernsey) Law 2004.
2. Our meeting with the Island Douzaine Council Working Party, together with the written representations from each of the Douzaines, indicated that the Douzaines are concerned to retain responsibility for raising refuse rates on a parochial basis and engaging with their preferred contractors (subject to contractors being licensed under the law of 2004). The Douzaines argue that they are best placed to manage local collections of household waste and that the present system is efficient, cost-effective and popular with parishioners. There is a willingness on the part of the Douzaines to work collectively; both in rationalising the area covered by different contractors and on other matters. They may also be willing to engage with one or more of the existing or additional contractors to undertake the collection from doorsteps of recyclables, in the event that an island-wide scheme for kerbside recycling were to be introduced.
3. The Panel has made the Douzaines aware of the fact that the Environmental Pollution (Guernsey) Law 2004 contains the potential for repealing the Parochial Collection of Refuse (Guernsey) Law 2001. If done, this could lead to the replacement of the present (voluntary) service with a centralised service provided by the States. This would incur an increase in both administrative and management costs. The Island Douzaine Council has expressed their utmost concern that this should not happen.
4. However, there are disparate views held by the Douzaines with respect to changing the method of charging for the collection of household waste for disposal. If it were to be decided that refuse should be charged for on a volume/weight basis, rather than by the blunt instrument of a set refuse rate per household, the Douzaines, or some of them, will need to modify their stance on this issue if they are to play a full part in the future of household waste collection and management.
5. It would be unfortunate if this were not to be possible as there is considerable merit in their collective assertion that they are best placed to perform the functions historically ascribed to them by law.

APPENDIX 5: THE COSTS AND BENEFITS OF ALTERNATIVE WASTE TECHNOLOGIES

1. This Appendix sets out the latest information as regards the costs and benefits of alternative waste technologies as compared with “mass burn” incineration.

Cost

2. Reliable on-island cost estimates for a variety of waste treatment technologies are not yet available. Fichtner concluded that “reliable costings for gasification and pyrolysis will only come from real quotations against detailed project specifications”²⁶.
3. However, most alternative waste technologies are likely to have lower capital costs for the plant itself than an energy from waste mass burn incinerator. The smaller building and equipment size for most technologies will also allow cheaper foundation and building design. This will be particularly so in Guernsey, especially at the Longue Hougue site.
4. Operational costs are harder to estimate and will vary depending on the level of manpower needed and the tonnage and type of residue and reject material still needing to be landfilled (both costs are likely to be higher in Guernsey than in the UK).
5. Capital and operational cost estimates for the UK were included in the 2002 Cabinet Office report “Waste Not – Want Not”²⁷. Estimates of capital and operational costs of alternative technologies across Europe are also given on the Environment Agency website²⁸ and in the Eunomia 2004 report on biodegradable municipal waste diversion²⁹. A summary of these costs is given in Figure 17 below.
6. The accuracy and applicability of these estimates to Guernsey should be guided by the £55 per tonne operating cost and £19 million capital cost of an energy from waste plant against the much higher known cost of the plant on the Isle of Man and the predicted cost on Guernsey. The Panel advises caution in taking reported performance or costings to be directly applicable to Guernsey’s circumstances. In any evaluation of a particular technology as a possible means of dealing with solid waste in Guernsey a site specific analysis and costing would be essential.
7. Technology vendors’ estimates should be viewed with caution. They may include or exclude waste pre-treatment, additional transport, land purchase,

²⁶ The Viability of Advanced Thermal Treatment of MSW in the UK, produced by Fichtner Consulting Engineers and published by ESTET in March 2004.

²⁷ Cabinet Office report, “Waste Not, Want Not”, 2002 (Annex F)

²⁸ Environment Agency, Waste Technology Data Centre website (2004)

²⁹ Eunomia report, “Economic Analysis of Options for Managing Biodegradable Municipal Waste”

demolition/foundation design, and the costs of planning and licensing. They are also variously based on assumed incomes from recyclate and energy sales from the process. There are also Guernsey and/or Longue Hougue specific considerations, such as the cost of electricity on Guernsey, whether or not a premium is payable for energy derived from renewable sources, and Guernsey premiums for construction and operational labour.

Figure 17: Indicative Capital and Operational Costs for a Range of Waste Technologies

Technology	Cabinet Office Report		Environment Agency / Eunomia	
	Capital cost	Operational cost	Capital cost	Operational cost
Windrow composting	£0.5m - £1.23m (25,000 tonnes pa)	£13 - £25 per tonne		
In-vessel composting	£0.6m - £4.5m (20,000 tonnes pa)	£18 - £45 per tonne		
Anaerobic digestion	£1.4m - £5.0m (10,000 tonnes pa)	£9 - £20 per tonne		
Mechanical & Biological Treatment (MBT)	£7.6m - £8.5m (50,000 tonnes pa)	£15 - £50 per tonne		
Mass burn energy from waste	£12.5m - £19m (50,000 tonnes pa)	£35 - £55 per tonne		
Pyrolysis	£8m - £93m (32,000 - 360,000 tonnes pa)	£20 - £55 per tonne	£17m - £22m (35,000 and 60,000 tonnes pa)	£5 - £35 per tonne
Gasification			£11m - £19m (40,000 and 80,000 tonnes pa)	£26 - £38 per tonne
Materials Recovery Facility	£2.5m - £6.0m (25,000 -125,000 tonnes pa)	£19 - £35 per tonne		

8. It is clear that, in the UK, until landfill tax reaches around £35 per tonne, all alternative technologies will cost more than landfill. This is not the case on Guernsey, however, as the States exercise direct control over the gate price at landfill and scope exists to encourage more sustainable waste management through price control.

Emissions

9. All thermal treatment technologies for waste are likely to be able to meet or exceed Waste Incineration Directive standards [see table from Fichtner report, page 31²⁶]. Emissions from other plants, such as composting and Mechanical and Biological Treatment, can be controlled through regulation to acceptable standards. The only facility in future strategies unlikely to be able to meet emission standards is the Mont Cuet landfill site.

Plant Size

10. Land Area: Not greatly affected by technology choice – typically 1.5 to 2 hectares.
- Plant Height: Lower for all alternative technologies (10m to 20m) compared with mass burn energy from waste (30m).
- Stack height: Usually determined by Nitrous Oxides (NO_x) emission standards – but likely to be less for alternative technologies than mass burn energy from waste.
- Foundations: Simpler/cheaper for all alternative technologies - smaller, lower, lighter equipment.

Many alternative technologies offer a modular design not dissimilar to techniques employed in the offshore oil and gas industries. The two advantages are that the plant can be constructed at the point of origin (for assembly on site) and the ability to “up-size” by adding further modules.

Technology Capability

11. Whilst a mass burn energy from waste incinerator can accept most waste types with or without pre treatment, other technologies have limitations. Gasification and pyrolysis may depend on pre-treated waste input including Refused Derived Fuel from other technologies. Anaerobic Digestion and composting will only be applicable to parts of the total residual waste and need careful input control. The Panel noted, however, that existing installations of certain types of alternative technologies outside the UK have plants in sustained operation treating unsorted municipal solid wastes.

Process Outputs

12. The process outputs from the various technologies are as follows:

Composting	Quality depends on input and process control. Quality can be variable, lower grades of “compost” being suitable only for landfill, landfill cover or low-grade land restoration.
Mechanical & Biological Treatment	Produces composts and refuse derived fuels. Markets are uncertain for these products even in the UK. Recyclates subject to normal and Guernsey-specific pressures.
Anaerobic Digestion	Gas fuel. Digestate may be suitable for spreading on land.
Mass Burn Energy from Waste	Usually steam heat for power/heating. The generation of electricity is a less efficient alternative. Bottom ash is suitable for aggregate use. Gas cleaning residues are usually alkaline and need hazardous waste treatment and/or specialised landfill.
Gasification	Gas fuel. Clinker produced at high temperature so is usually acceptable as aggregate.
Pyrolysis	Gas and oil fuels. High carbon char often needs to be landfilled.

Energy Efficiency

13. This may not be a real concern for Guernsey where all energy is imported and is at a lower price than the UK. Thermal efficiency of all alternative treatments is less than for mass burn energy from waste.

APPENDIX 6: EAST RIDING OF YORKSHIRE AND HULL COUNCILS – BEST PRACTICABLE ENVIRONMENTAL OPTION APPRAISAL

Following rejection of planning permission for a mass burn incinerator, the East Riding of Yorkshire and Hull Councils decided to undertake jointly a comprehensive Best Practicable Environmental Option appraisal for their future waste management strategy. The authorities have a history of joint working at a political level and the process was guided by a joint officer working group.

The strategy involved:

- 254,000 Households
- 330,000 Tonnes of Municipal Waste (Expected 2004/05)
- 2003/4 Recycling/Composting rates of 11% and 14.5% respectively in Hull and East Riding

According to the Royal Commission on Environmental Pollution (1988) 12th Report Best Practicable Environmental Option, a BPEO assessment is:

“The outcome of a systematic and consultative decision-making procedure which emphasises the protection and conservation of the environment across land, air and water.

The BPEO procedure establishes for a given set of objectives, the option that provides the most benefits or the least damage to the environment as a whole, at acceptable cost, in the long term as well as in the short term”

The council awarded the contract to undertake this work in February 2004, and the outcomes were ready to be finalised in December 2004. The process had 8 stages:

Step 1. Develop Waste Management Scenarios

11 scenarios were chosen using a range and mix of available technologies:

BV = England / Wales “Best Value” recycling target (25%)

MBT = Mechanical and Biological Treatment

AD = Anaerobic Digestion

RDF = Refuse Derived Fuel

ATT = Advanced Thermal Treatment eg. Pyrolysis or gasification

Scenario	
Scenario 1	BV Recycling, Large Scale Incineration
Scenario 2	High Recycling, Smaller Scale Incineration
Scenario 3	BV Recycling, MBT & AD
Scenario 4	High Recycling, MBT & AD
Scenario 5	High Recycling, MBT with RDF and ATT
Scenario 6	BV Recycling, MBT with AD, RDF & Co-firing
Scenario 7	BV Recycling, Autoclave with RDF & ATT
Scenario 8	High Recycling, 60% Incineration, 40% MBT with AD & RDF to Incineration
Scenario 9	BV Recycling, 40% Incineration, 60% MBT with AD & RDF to Incineration
Scenario 10	High recycling, 40% Incineration, 60% MBT with AD & RDF to ATT
Scenario 11	BV Recycling, 40% Autoclaving with AD and RDF to ATT, 60% MBT with AD and RDF to ATT

Step 2. Identify Decision Criteria

These were taken from standard Office of the Deputy Prime Minister criteria, and measured in a range of ways including use of the BPEO "WISARD" software.

ODPM Criterion	Measurement	Assessment Method
1. To ensure prudent use of land and other resources	1a) Land take (ha)	Quantitative
	1b) Assessment of non-renewable resources using WISARD	Quantitative using WISARD
2. To reduce greenhouse gas emissions	2a) Greenhouse gases	Quantitative using WISARD
3. To minimise adverse impacts on air quality and emissions which are injurious to public health	3a) Air acidification	Quantitative using WISARD
	3b) Toxicity to humans	Quantitative using WISARD
	3c) Potential health impacts	Qualitative
4. To conserve landscapes and townscapes	4a) Building size, type etc.	Qualitative
5. To protect local amenity	5a) Odour	Quantitative using WISARD
	5b) Noise, dust, litter etc.	Qualitative assessment
6. To minimise adverse effects on water quality	6a) Water eutrophication	Quantitative using WISARD
	6b) Eco-toxicity	Quantitative using WISARD

ODPM Criterion	Measurement	Assessment Method
7. To minimise local transport impacts	7a) Traffic	Qualitative
8. To provide employment opportunities	8a) Job creation and skills levels	Qualitative and Quantitative
9. To provide opportunities for public involvement and education	9a) Education & involvement of the public	Qualitative
10. To minimise costs of waste management	10a) Costs and revenues	Quantitative
11. To ensure reliability and deliverability	11a) Performance & track record	Qualitative and Quantitative
	11b) Compatibility with collection systems	Qualitative
12. To conform with waste policy	12a) Recycling / Recovery performance (BVPis)	Quantitative
	12b) Diversion of biodegradable waste	Quantitative

Step 3, Step4, Step 5 . Quantitatively and Qualitatively Assess and Score Scenarios

Scenario	Total Value Score
Scenario 2 High Recycling, Smaller Scale Incineration	14.80
Scenario 5 High Recycling, MBT with RDF and ATT	14.64
Scenario 4 High Recycling, MBT & AD	13.63
Scenario 8 High Recycling, 60% Incineration, 40% MBT with AD & RDF to Incineration	11.88
Scenario 1 BV Recycling, Large Scale Incineration	11.81
Scenario 10 High recycling, 40% Incineration, 60% MBT with AD & RDF to ATT	11.63
Scenario 7 BV Recycling, Autoclave with RDF & ATT	9.75
Scenario 6 BV Recycling, MBT with AD, RDF & Co-firing	8.86
Scenario 3 BV Recycling, MBT & AD	8.80
Scenario 9 BV Recycling, 40% Incineration, 60% MBT with AD & RDF to Incineration	8.53
Scenario 11 BV Recycling, 40% Autoclaving with AD and RDF to ATT, 60% MBT with AD and RDF to ATT	8.23

Scenarios 2, 5, and 4 preferred at that stage.

Step 6, Step 7. Public Consultation and Weighting Scores

Communication was a major part of this exercise, including

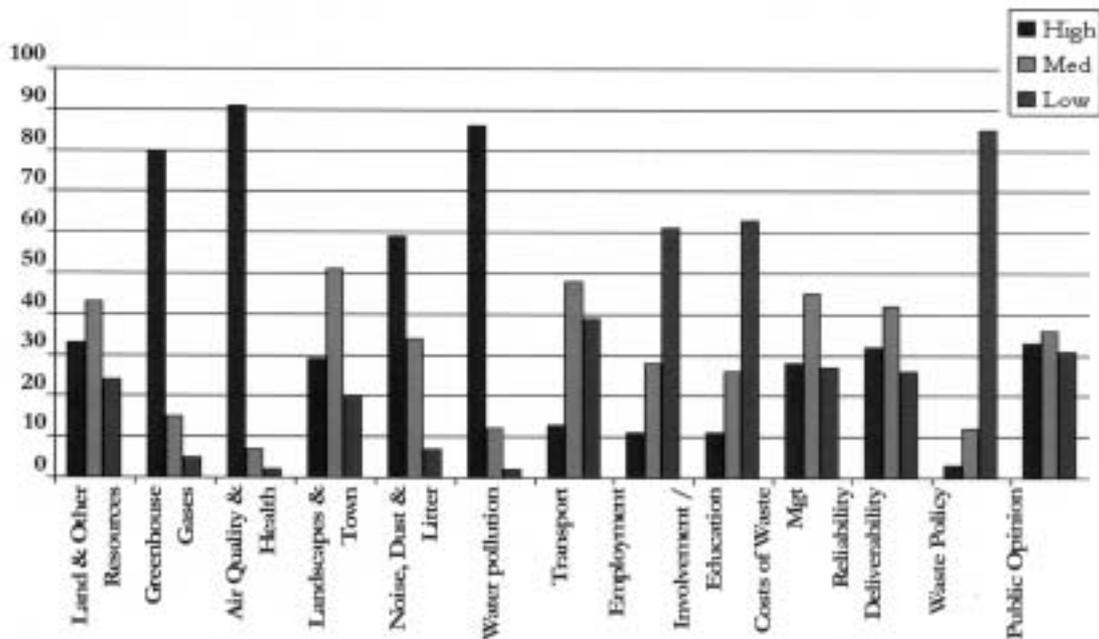
- Information on what ‘BPEO’ is
- An explanation of the waste management technologies being considered
- Elected Members workshops in both Authorities
- 8 Public Workshops
- ‘Interested Parties’ Workshop – eg environmental groups etc
- Questionnaire to Every Household in Hull and East Riding

Residents were then asked in a postal questionnaire:

1. to allocate High (5), Medium (4) and Low (4) to the 12 ODPM Criteria, plus an additional criterion - the importance of public acceptability.
2. to rank the six technologies in order of preference
3. if they wanted to strive for a 45% high recycling, or 25% ‘Best Value’ recycling.

Question 1 result:

CRITERIA PERFORMANCE



The ranking after weighting was:

- | | | |
|-----|------------|---|
| 1st | Scenario 5 | High recycling and MBT + RDF → ATT |
| 2nd | Scenario 2 | High recycling and Incineration (smaller scale) |
| 3rd | Scenario 4 | High recycling and MBT + AD |

Question 2: ranking the technologies in order of preference:

- | | | |
|-----|------------|---|
| 1st | Scenario 2 | High recycling and Incineration (smaller scale) |
| 2nd | Scenario 5 | High recycling and MBT + RDF → ATT |
| 3rd | Scenario 4 | High recycling and MBT + AD |

Question 3: preference for level of recycling:

86% of Respondents Favour High Recycling

14% of Respondents Favour Best Value Recycling

Ranking after consideration of Question 3:

- | | | |
|-----|------------|---|
| 1st | Scenario 2 | High recycling and Incineration (smaller scale) |
| 2nd | Scenario 5 | High recycling and MBT + RDF → ATT |
| 3rd | Scenario 4 | High recycling and MBT + AD |

Step 8. Identification of the BPEO Strategy

Following the agreed steps the three top performing scenarios were checked against “external” factors. These included:

- the likely availability or volatility of outlet markets for recyclates, AD composts or refuse-derived fuels;
- the delay likely in the provision of “alternative” technologies viewed against the need for urgent action to avoid significant penalties;
- the likely availability of financial backing for the different technologies.

The preferred strategy was therefore identified as high level (45%) recycling (well above the Government’s “Best Value” 25% target) with smaller scale incineration – scenario 2. This advice has been passed on to the two authorities for final approval.

This leaves the Councils in a position of agreeing the waste management strategy but still needing to secure planning permissions, consents and contracts for provision and/or operation of the facilities needed.

Appendix 3

**Correspondence from the Health and Social Services Department
and the Public Services Department**

Our Ref: ENV/sk

Your Ref: ENV/WSA/REVIEW

Deputy B M Flouquet
Minister
Environment Department
Sir Charles Frossard House
PO Box 43
La Charroterie
St. Peter Port
GY1 1FH

1 March 2005

Dear Deputy Flouquet

**REPORT ON THE FUTURE OF SOLID WASTE DISPOSAL IN GUERNSEY –
PROVISION OF COMMENTS**

In reference to the specific question you raise in your letter to the Minister of 14 February 2005, I would make the following comments.

1. The assertion that Mont Cuet “does not and cannot meet accepted standards of landfill” is only accurate when comparing it to the European Union (EU) Landfill Directive which came into effect in July 2004 and applied retrospectively. The site does meet the standards set out in the current waste management licence issued by the Board. Given the nature of the EU Directive and its imperative to divert biodegradable waste away from landfill, it would also be true to say that the proposed Energy from Waste (EfW) plant would have put in place a means to achieve the objectives of the Directive at Mont Cuet.

The Landfill Directive when applied to existing sites can allow for the landfilling of biodegradable wastes. If the States of Guernsey wished to implement the standards set out in the EU Landfill Directive, as its licensing standard, it is true that Mont Cuet could not comply, specifically with the engineering requirements for a landfill liner, but this must be balanced against Article 14 of the Directive which states that sites existing at the time of the

implementation of the Directive, such as Mont Cuet, can have up to a maximum of eight years to comply with such standards. On recent projections, Mont Cuet's biodegradable input should have ceased at around this time. On balance, whilst it is true to say that it cannot comply, it can also be argued that trying to impose such an EU standard could be seen as disproportionate, given the scale and size of the current and future lifespan of the site.

Leachate controls at Mont Cuet, undertaken as a licence condition, ensure that there is no uncontrolled leachate leakage to the environment and that all discharges meet specified high standards. Discharges are continuously monitored to ensure compliance.

With reference to the ten comments in Figure 16, the Health and Social Services Department considers that many of the points are matters of opinion and some are factually incorrect. I am sure that the Public Services Department will comment further. We would say that the standard of operation at the site is high and compliance with the waste management licence is also of an acceptable high standard.

2. The DEFRA New Technologies Demonstration Programme aims to investigate a limited number of alternative techniques for dealing with municipal solid waste. The Environmental Pollution (Guernsey) Law, 2004 makes the licensing of such processes the responsibility of the Director of Environmental Health and Pollution Regulation acting independently from this Department. He advises that, as part of the licensing process in Guernsey, any proposed technique will be required to meet the Waste Incineration Directive (WID) as the minimum standard with regard to emissions. As part of the permitting control system, it will also be incumbent on the operator of any proposed plant to demonstrate that the plant represents the Best Available Technique (BAT). Guidance has been issued by the European Commission in the form of a BAT Reference (BREF) document. Any permit to operate will also need to meet the standards set out in this document, specifically section 5.2 if the waste is untreated municipal solid waste, or section 5.3 if the waste is pre-treated or selected municipal solid waste. As such, the permitting system will remain extensively the same as set out for the proposed Energy from Waste Plant, with the onus on the operators to demonstrate that they comply with the Waste Incineration Directive and utilise the Best Available Technique, whichever thermal treatment technique is proposed.
3. The question of exports is a matter on which this Department, as the current regulating authority, must be seen to be impartial, giving neither support nor preventing the legitimate export of waste. As the competent authority, the Department may be called upon by other competent authorities of destination, with regard to export, to determine whether the details set out in a notification document are accurate and the shipment complies with the necessary controls required. Consequently, this Department should not be drawn into this debate. This notwithstanding, there are a number of technical difficulties currently in

place that may prevent the export of municipal solid waste. In order for exports to Jersey to proceed, Jersey would need to implement a local Transfrontier Shipment Ordinance. Once this has been achieved, Jersey can apply to have the Basel convention extended to it via the UK's ratification. Finally, the States would need to amend the Transfrontier Shipment of Waste Ordinance 2002 that currently permits imports from Jersey but prevents exports. The time scale to achieve the extension of the UK's ratification is likely to take between 9 and 12 months. Overall, the time-scale to achieve all three requirements above is likely to be a significant factor.

Where exports to other EU member States are concerned, there are again certain requirements that must be met for the shipments to be legitimate. Where an EU member State has declared, via a published "Plan", that waste imports for disposal shall be banned from entering that State, such as the UK has done, shipments of such waste cannot proceed legally. Whilst there may be some doubt about whether certain States permit or prevent imports of municipal solid waste, this doubt arises from the fact that undertakings from commercial operators or waste brokers etc are not sufficient indication that such movements are permitted by that State. Only the relevant competent authority of destination, which will have to regard to any nationally published plan, can make a determination whether the shipments can proceed. If the shipment does not accord with the published plan, the competent authority has a duty to refuse the shipment. Any undertaking other than from the relevant State Department or competent authority of destination must be treated with caution. In making such a determination, the competent authority of destination is required to consult with the competent authority of dispatch. As outlined above, this is why this Department, in its role as competent authority, must remain impartial in these matters.

The legitimacy of export of municipal solid waste to a EU Member State is further complicated by the judgements of the European Court of Justice, specifically with regard to the movement of municipal solid waste across borders, destined for incineration. As Guernsey is not within the EU, the EU judgement has no direct effect in Guernsey but it will have bearing on Guernsey as exports of waste from Guernsey into the EU are treated as movements from a third party State. The court ruling below is binding on all EU Member States. The European Court of Justice in C458/00 and C-228/00 determined that incineration of municipal solid waste is a disposal operation, even when energy is recovered. The effect of this judgement is that if a State's published plan indicates that waste imports for disposal are not permitted, exports of municipal solid waste destined for incineration cannot be imported into that State. One option available in these circumstances could be to process the municipal solid waste in Guernsey to produce a refuse-derived fuel that could then be exported as a waste fuel and be deemed a genuine recovery operation. It could be the view of the regulatory authority that to try and export untreated municipal solid waste under the guise of recovery, to a State that had banned imports for disposal, would represent illegal traffic and it would have to inform the

competent authority of destination of these misgivings if such a movement was proposed under the guise of recovery. Competent authorities term the act of calling a known disposal operation “recovery” as “sham recovery”, and it is the duty of competent authorities to prevent such occurrences under the EU Regulation. The current market for refuse derived fuel is very limited and not without some risk. It can only be assumed that the recommendation to follow such a line by the Review Panel is based on the premise that the wheels of the European Court move relatively slowly and that, by the time a judgement could be made against such a movement, a year or so of export may have proceeded. To base the future of Guernsey’s interim waste disposal options on such a limited operation is indeed a risky strategy, given the panel’s views of risk with respect to the proposed energy from waste plant.

I shall be grateful if a copy of this letter could be appended to your Department's report to the States.

Yours sincerely

B L Brehaut (Signed)

B L BREHAUT
on behalf of the Health and Social Services Department

4 March 2005

Deputy B M Flouquet
Minister
Environment Department
Sir Charles Frossard House
La Charroterie
St Peter Port
Guernsey
GY1 1FH

Dear Deputy Flouquet

**REPORT ON THE FUTURE OF SOLID WASTE DISPOSAL IN GUERNSEY -
PROVISION OF COMMENTS**

Thank you for your letter dated 8 February 2005, concerning the above.

I should like to address the issues raised in your letter as follows:

- 1) The general statement in Paragraph 4.3 that Mont Cuet does not and cannot meet accepted standards of landfill and is only suitable for inert waste is strongly denied. The site was engineered and is managed to accept putrescible waste. The Site is licensed in accordance with the UK Waste Management Licensing system.

Whilst it may not meet the criteria for the EC Landfill Directive, which seeks to end co-disposal of wastes, this is not appropriate for an Island such as Guernsey where alternative disposal routes for special wastes such as asbestos, are not available.

Responses to the ten comments listed in Figure 16 are included in the Director of Guernsey Technical Services' memorandum to the Chief Officer of Public Services, dated 1 February 2005, which was copied to the Chief Officer, Environment Department. A copy of this memorandum is attached.

- 2) The Liquid Waste Strategy proposes some form of centralised sewage treatment plant to be developed. Sewage treatment inevitably results in the production of sewage sludge, and this requires disposal, either by incineration, landfill or some other method. Without an appropriate disposal route for this sludge, there will be limitations on developing a sewage treatment plant for Guernsey.

Depending on the method of disposal, a drying plant may be required for pre-treatment of the sludge, at a not inconsiderable additional expense to the overall cost of the treatment plant.

- 3) An increase in gate fees does appear to encourage the reduction of waste entering the site. However, the provision of alternative facilities and recycling incentives is likely to have a greater impact on the volumes entering the site, irrespective of the gate price.

The sudden imposition of a large increase in prices without the appropriate infrastructure being available to both private waste disposal contractors and the public, is likely to have an adverse effect. An increase in fly tipping, uncontrolled burning and other unauthorised disposal methods is likely to result, to the detriment of Guernsey's environment.

- 4) Whilst wishing to encourage recycling the practical reality is that the banning of recyclables into Mont Cuet would be unenforceable, and impossible to implement at short notice without the provision of separation at source facilities and a materials recovery facilities (MRF).
- 5) At current filling rates there is just under 10 years remaining capacity at Mont Cuet. This is based on a modelled domed restoration profile, similar to Creve Coeur.

In order to retain 5 years filling capacity at Mont Cuet, a solution for the Island's waste disposal problem has to be implemented within 5 years.

Operationally it would be advantageous to cease accepting general waste within a shorter time frame, as problems with litter will increase once the site reaches road level.

While the Public Services Department has no objections to the export of waste this does not appear to be practical as a short-term measure. It would require an engineered site, permitted to carry out waste sorting and preparation for export. This could only be achieved after all the necessary permissions and licences had been secured.

Potential sites would have to be identified. It is not reasonable to just assume that Longue Hougue would be used for this purpose, as this may prevent the site from being used as part of a long-term waste disposal solution in the future. Environmental Impact Assessments would be required for potential sites, and due to the nature of works being carried out, a planning enquiry is likely to be required.

All this would have to be done in consultation with Environmental Health, as waste regulators, and would have to satisfy the provisions of the proposed Control of Environmental Pollution legislation due to be implemented in 2005. The site would require an integrated Pollution Prevention & Control (PPC) Permit for a waste management facility to comply with this.

The time frame for the above project is likely to take several years, and if the States wishes to proceed with this proposal the process should begin without delay in order to maintain a minimum capacity at Mont Cuet, currently our only landfill site.

I trust that the above response is satisfactory to your requirements. Please do not hesitate to contact the Department should you require any further information.

Yours sincerely

William M Bell (Signed)

Minister

MEMORANDUM

TO: The Chief Executive, Public Services Department.

FROM: Director of Technical Services, Guernsey Technical Services

DATE: 1 February 2005

OUR REF: 9017/RR

WASTE DISPOSAL – PANEL OF ENQUIRY COMMENTS ON MONT CUET

The report published last week, dated 25 January 2005 and titled 'The Future of Solid Waste Disposal in Guernsey – Report of the Panel of Inquiry' provides comment on current and recommended waste disposal operations for the Island.

In 'Part 4: An Interim Solution', the report comments on the current operation and management of Mont Cuet Landfill Site, both in the text and through 'Figure 16: Comments on the Establishment and Operation of Mont Cuet Landfill'.

Whilst accepting that the site does not conform with a conventional modern landfill site in the UK or Europe, a number of points raised in the text and Figure 16 are generally inaccurate, and insulting to all those involved in the development and subsequent management of the Site.

The comments show an ignorance of the measures employed in the development and management of the Site. With the exception of a brief site visit, Guernsey Technical Services were not consulted on this subject during the Panel of Inquiry review, and in view of this these comments are wholly inappropriate and inflammatory in the context of this report.

The States of Guernsey resolved to purchase and prepare Mont Cuet for landfilling on 28 July 1994. Other alternative disposal methods were investigated at this time, however, with a projected lifespan of 22 years, the low cost disposal method of landfill was preferred as an interim measure whilst the long term Waste Strategy Assessment was carried out for the Island.

Whilst not subject to local or UK legislation, the development of the site was subject to the approval of the Environmental Health Department, acting as Waste Regulation Authority (WRA), with recognised waste management consultants advising both parties. The site is voluntarily operated in accordance with the proposed provisions of the Control of Environmental Pollution legislation. A Waste Management Licence ((WML/V001) was issued on 15th December 1998. In effect, this means that the site was developed and has subsequently been operated in line with the UK Waste Management Licensing system (for new sites, this has now been superseded by the IPPC permit system).

In the Panel of Inquiry Report, section 4.3 does recognise that Mont Cuet is the only solid waste disposal option currently available, however, it is stated that it is unfortunate that the

authorities in Guernsey “should not previously have planned any alternative or taken the steps necessary to raise the standard of landfill management”, a statement which the above facts show to be untrue.

With regard to Figure 16, the comments made are dealt with individually, as follows:

1. Whilst the location and geological setting of the site is not typical of sites generally employed as landfill sites in the UK and Europe, it was prepared for landfilling in consultation with the WRA and UK waste management consultants, and in accordance with the provisions of Waste Management Paper 4 – Licensing of Waste Management Facilities. There is at least one similar licensed site in the South West of the UK.

Provisions relative to the site specific conditions were imposed on the development of the site, taking into consideration previous landfilling operations adjacent to the site, and ground and seawater ingress.

2. It is accepted that the site is infiltrated by both groundwater and seawater; however measures have been taken to manage this, with the installation of a grout curtain along the seaward boundary of the site and drainage systems built into the design of the site. The majority of seawater infiltration occurs at base level in the site, and where this does not occur, most notably in the North East corner of the site, drainage measures have been employed to connect these flows directly to the basal drainage layer.

Much of the groundwater entering the site is contaminated by leachate produced by previous landfilling operations in the vicinity of the Site. Mont Cuet was designed to act as a sump for these leachates, enabling them to be dealt with as one. It is accepted that a lining system would have been impracticable. It would also have restricted the collection of leachates produced by the adjacent historical landfill sites, which are also unlined.

3. The infrastructure is adequate for the size and operation of the site. Adequate weighbridge records are maintained, providing both weight and descriptive information on wastes. These are supplemented by Waste Audits – further monitoring of waste types would be impracticable.

It is accepted that more could potentially be done to divert inappropriate materials, which are generally mixed with other waste and not spotted until the waste is offloaded, although it is unlikely that this would best be achieved at the landfill site.

4. There is a formal working plan for the site, as required by the Waste Management Licence, although it is accepted that a review of this is overdue. This has been discussed with the WRA. Working Drawings are also drawn up using AutoCAD software on a weekly basis, indicating current landfilling cells and highlighting difficult and special waste locations.
5. It is accepted that there will be an increasing problem with wind-blown litter as the quarry is filled. The installation of litter fencing has been discussed with the WRA, and it has been agreed that due to the limited space and high rock faces around the site, the installation of permanent litter fencing is not currently

feasible. This is predominantly due to health and safety concerns. It is planned to use mobile litter fencing within the site when operations allow this to be done practically. Once the waste level is close to road level, permanent litter netting is planned to be installed.

6. Landfill Gas is currently managed by the installation of passive venting 'chimneys', which are progressively raised during landfilling. A Gas Extraction and Utilisation Scheme was tendered last year, and approved by the States of Guernsey on 26 January 2005. Operationally, an active collection system had not been feasible until recently. The scheme also allows for the collection and utilisation of Landfill Gas from the adjacent Creve Coeur Landfill Site.
7. Leachate is extensively managed and is in compliance with discharge consent limits stipulated in the site licence. These are based on the EU Shellfish Water Environmental Quality Standards (EQSs), and other appropriate standards. Through drainage measures, there is limited contact between seawater infiltration and the waste. The leachate level within the site is maintained at approximately 1m below the base level of the waste, within the basal drainage layer.

The management of leachate is controlled by a Programmable Logic Controller (PLC) linked to a SCADA computer monitoring system. The whole operation is fully automated, with a dial out facility to contact operatives should a fault occur. The PLC continuously monitors leachate quality, preventing discharges where dissolved oxygen and pH are outside discharge consent limits. Discharges only occur at high tide, allowing maximum dilution of the discharged leachate. The system has recently been upgraded to current industry standards.

The influx of seawater into the drainage system produces a leachate at the treatment plant equivalent to 70 – 80% seawater. As a result, conventional biological treatment is not feasible as the biological content is insufficient to sustain such a biomass.

Regular weekly sampling of the leachate is carried out, with full discharge consent analysis carried out on a monthly basis.

8. There is, and has been throughout the development and operational life of the site, formal management and monitoring of wastes deposited, landfill gas, groundwater, leachate, and dust, as required by the site licence. Whilst noise and odour are not formally monitored, provisions for controlling these nuisances are contained within the site licence, and complaints investigated.
9. Environmental baselines are applied. The quarry sump has been monitored for water quality indicators since 1992, when the filling of Creve Coeur began. As part of the preliminary site investigations, boreholes were drilled around the site in 1995, and have been monitored ever since for both groundwater quality and landfill gas. Leachate has been monitored regularly ever since the site opened in 1998. Biological baseline monitoring of the foreshore adjacent to the outfall is carried out on a six monthly basis. All monitoring is carried out by

Guernsey Technical Services in accordance with Environment Agency guidance.

In accordance with the Waste Management Licence, an annual review of environmental monitoring data and information on wastes deposited is completed and submitted to the WRA. Where information on this data is requested by the public, then it is provided. Guernsey Technical Services is currently investigating access to environmental monitoring data via the States of Guernsey website.

10. The issue of third party accreditation for operations will be raised with WRA, but is not currently employed.

The accreditation of monitoring procedures has been considered, although not yet implemented, pending the publication of the UK Environment Agency's new guidance for landfill monitoring. The publication of this guidance was completed last month, spanning some 10 documents published over the last 3 years. This will form the basis for a review of monitoring procedures by Guernsey Technical Services in 2005.

It is with regret that the comments referred to above have been published in a document which should be providing definitive recommendations on the long term management of wastes, be it through a mass burn Energy from Waste plant, export, or an alternative technology.

Figure 16 implies complete incompetence in the States of Guernsey's management of waste disposal facilities, whereas the information provided above shows this to be far from the truth. Whilst it may not be perfect, a relatively high standard is maintained at Mont Cuet Landfill Site, appropriate to the specific circumstances of the Site.

In view of the fact that this report has been sent to all States members and is freely available to the general public via the States website, it is strongly suggested that a response is made through the media, and through the website correcting the inaccuracies contained within the report and highlighted above. I also suggest that the content of this memorandum is distributed to all States members.

D R Parish (Signed)

D R PARISH

Director of Technical Services

Copies to: The Chief Executive, Environment Department
 The Chief Environmental Health Officer, Environmental Health
 Director of Engineering Services, Guernsey Technical Services
 Director of Environmental Services, Guernsey Technical Services
 Waste Disposal & Recycling Manager, Guernsey Technical Services

Appendix 4

**Correspondence Between
the Minister for the Environment and the Independent Panel**

Our Ref: ED/WSA/REVIEW

Advocate R Dadd
Chairman
Guernsey Solid Waste Disposal Panel of Inquiry
c/o Government Business Unit
Sir Charles Frossard House
La Charroterie
St Peter Port
GY1 1FH

4th February 2005

Dear Advocate Dadd

The Future of Solid Waste Disposal in Guernsey – Report of The Panel of Inquiry

I note from discussions between the Chief Officer, Environment Department and the Head of the Government Business Unit that you consider that the Review Panel will be unable to meet with the Environment Department but may be able to provide information requested in writing

The Department may have a number of questions on which it would seek clarification but in the first instance I should be grateful if you could provide me with the following information.

A copy of all information submitted to the Inquiry Panel from Stadtreinigung Hamburg/Mindest SA regarding the export of waste to Germany. Whilst I appreciate that this information may be considered commercially confidential it is important for my Department to be able to understand the detailed nature of the offer in order for it to be able take this into account as the Department formulates its recommendations to the States. Previous experience suggests that direct correspondence with Mindest SA through the only contact address we have fails to generate a timely response.

A copy of all background information influencing the Panels recommendation that the Defra New Technology Development Programme be followed, whether that information took the form of correspondence with Defra or knowledge possessed by individual members of the Panel.

The reasoning, calculations or time line scheduling that lies behind the Panel's recommendation that a minimum of five years' landfill life must be maintained at Mont Cuet until a long term solution becomes available.

I should also be obliged if you would confirm whether the Panel held discussions with Guernsey Electricity with reference to the potential impact on Guernsey Electricity's supply side if the 4 MW of power from the EfW was not available. And whether the Panel had discussions with the Public Services Department with reference to the disposal of sewage sludge from the proposed sewage treatment plant (WSA1) if the EfW was not available.

And finally, I understand the Panel did not meet with the consultants ISL in order to explore the waste arisings and recycling potential issues and I should be grateful if you would comment on why the Panel felt such a meeting was not necessary.

Yours sincerely

B M Flouquet (Signed)

B M Flouquet
Minister

Deputy B M Flouquet
Minister
Environment Department
Sir Charles Frossard House

23 February 2005

Dear Deputy Flouquet

**THE FUTURE OF SOLID WASTE DISPOSAL IN GUERNSEY – REPORT OF
THE PANEL OF INQUIRY**

I refer to your letter of 4 February addressed to Advocate Dadd as Chairman of the Panel c/o the Government Business Unit. I passed your letter to Advocate Dadd but, in view of the consensus of opinion that the Panel has effectively been wound up, he has asked me to respond.

In respect of the first paragraph of your letter Advocate Dadd advised that

- he did not think that a meeting between the Panel and the Environment Department was practical – because the Panel had effectively been wound up
- consideration could be given to addressing any written queries from the Environment Department but only with the Policy Council's blessing – this would entail the former members of the Panel getting back together formally to consider their replies with a view to assisting the Department identify the way forward but not to deal with political questions on the way that the Panel carried out its task.

The Policy Council has not asked that the former members of the Panel meet to give consideration to questions raised by the Environment Department but, in any case, I think that the questions posed in your letter are not what Advocate Dadd had in mind when he made the suggestion.

I also indicated to your Chief Officer that if he required clarification of any points contained in the Panel's Report that appeared unclear then I would do my best to assist. However, I think that the questions posed in your letter go beyond such clarification.

I am sorry that I am unable to be of more help.

Yours sincerely

George Marsh (Signed)

George Marsh
Head of Government Business

Our Ref: ED/WSA/REVIEW

Mr G Marsh
Head of Government Business
Government Business Unit
Sir Charles Frossard House
PO Box 43
La Charroterie
St Peter Port
Guernsey
GY1 1FH

4th March 2005

Dear Mr Marsh

THE FUTURE OF SOLID WASTE DISPOSAL IN GUERNSEY – REPORT OF THE PANEL OF INQUIRY

I refer to your response dated 23rd February 2005 to my letter addressed to Advocate Dadd as Chairman of the Panel. I note your response which I find wholly unsatisfactory.

In the first bullet point, you state that Advocate Dadd advised that he did not think that a meeting between the Panel and the Environment Department was practical because the Panel had been wound up. In the second point, you state that consideration could be given to addressing any written questions. This is simply restating the position that was known before 4th February and it was because of that position that I put forward the Department's questions in writing to Advocate Dadd in my letter dated 4th February.

I note that Advocate Dadd held the view that answers to the Department's questions could only be given with the Policy Council's blessing. If it is the Panel's view that what the Department is asking is so politically sensitive that it requires the Policy Council's blessing, then you or Advocate Dadd as the Chairman of the Panel must surely seek the Policy Council's blessing to answer those questions. I note that the Policy Council has not asked the Panel to meet but I would have expected you or Advocate Dadd to ask the Policy Council if it was happy for you to forward answers in response to the Environment Department's questions.

The third paragraph of my letter simply asked for access to the information that the Panel had regarding the offer made by Stadtreinigung Hamburg-Mindest SA. The reason for the Department requesting that information was clearly set out in my letter and I would have thought that it would have been a very simple exercise for Advocate Dadd to accede to that request, after all, are we not all trying to strive for the best solution for Guernsey?

My request, as set out in the fourth paragraph of my letter, namely the background information influencing the Panel's recommendation to support the DEFRA New Technology Development Programme is, I believe, equally easy for Advocate Dadd to address.

I recognise that to answer the question raised in my fifth paragraph, namely the reasoning, calculations or time-line scheduling behind the Panel's recommendation that a minimum of 5 years landfill life must be retained at Mont Cuet may not be so easy as the basis for the decision may be cerebral rather than factual. Nevertheless, I would have thought that if the Panel was to make such an important recommendation, namely that the Island can deplete its landfill reserves to 5 years, it would have had some documented reasoning to support that view.

In the penultimate paragraph of my letter I ask a very simple question as to whether or not the Panel met with Guernsey Electricity and whether or not the Panel explored the implications of their recommendations on the sewage treatment strategy. Again, surely these are very simple questions to respond to and should not necessitate the reconvening of the Panel to answer them.

Finally, I recognise that my final question, namely why the Panel felt a meeting with Integrated Skills Limited was not necessary might potentially be a question which can not fully be answered without reconvening the Panel although I would have thought that Advocate Dadd as Chairman would have been able to explain the Panel's position on this particular point.

You will appreciate that the time available to the Environment Department to report to the Policy Council with its recommendations following consideration of the Panel's report is fast running out and I am dismayed that the Department is facing such a lack of co-operation on this most important issue. As a consequence, I have copied the relevant correspondence including this letter to the Chief Minister and I would advise that I am currently minded to append the relevant correspondence to the Department's States Report on this subject.

Yours sincerely

B M Flouquet (Signed)

B M Flouquet
Minister

cc Chief Minister, Policy Council

**Advocate R J Dadd
c/o Government Business Unit
Sir Charles Frossard House**

Deputy B M Flouquet
Minister
Environment Department
Sir Charles Frossard House

11 March 2005

Dear Deputy Flouquet

THE FUTURE OF SOLID WASTE DISPOSAL IN GUERNSEY – REPORT OF THE PANEL OF INQUIRY

I am responding to your letter of 4 March 2005 to George Marsh.

I do not think that the members of the former Panel would find the tone of your letter at all helpful.

For the record, I would remind you that the Panel was chosen by the Policy Council and comprised independent experts in each of the relevant fields. Each Panel member made a strong commitment to the review and the Panel gathered and assessed and reached its conclusions upon a considerable body of evidence. This was no mean achievement in such a short space of time.

As I have pointed out before, the Panel has now been wound up. Its report was unanimous: every member of the Panel signed off on the exact wording of everything that was said. I am simply not in a position to re-interpret or expand or explain this or that paragraph or section of the report; nor would it be proper for me to do so. The report stands on its own. What it says is no more and no less than what the Panel wanted it to say.

In answer to your questions all I can do therefore is refer you to what is in the Panel's report as follows:

Copy of information submitted to the Panel by Stadtreinigung Hamburg/Mindest SA	I understand that on 25 February George Marsh advised your Chief Officer regarding the information received from Stadtreinigung Hamburg – Mindest SA
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Background information on the DEFRA new technology programme	All that the Panel wished to say about this is included in paragraphs 3.22 to 3.29 of the report.
The Panel's recommendation that a minimum of five years' landfill life must be maintained at Mont Cuet	The Panel's views on this subject are covered in paragraphs 4.6 to 4.8 of the report.
Discussions with Guernsey Electricity, the Public Services Department and ISL	The Panel consulted with wide range of third parties as listed in Appendix 2 of the report. The Panel consulted sufficiently widely to enable it to reach the conclusions and recommendations outlined in the report.

By way of information, I had previously explained the position set out in this letter personally to the Chief Minister.

I am sorry there is nothing more that I can add.

Yours sincerely

Roger Dadd (Signed)

Roger Dadd

Appendix 5

Transfer Station Costs**Cost Estimate**

Further to the conditions stated for the design above, which have an influence on the size of the investments, the following assumptions are made for the investment and operation budgets:

- Price level of December 2004
- The works are assumed to be conducted by local contractors
- Detailed design and tendering are included in the investments as preparatory works.

Investment

The investment costs are presented in the table below:

M&E Works Item	no.	Cost	
		£/unit	£
Weighbridges	2	85,000	170,000
Refuse Crane	1		340,000
Hopper/Compacting Unit	2	65,000	130,000
Shredder	2	250,000	500,000
Conveyor Belt	1		40,000
Overhead Magnetic Separator	1		50,000
Non Ferrous Metal Separator	1		120,000
Compacting Containers	110	8,000	880,000
Open containers (15 m3)	10	1,000	10,000
Container Rail System	2	30,000	60,000
Wheelloader/excavator (pre-sorting)	1		90,000
Vehicle (Container Handling)	1		60,000
Biofilter, including fan	1		220,000
CMS, electronics	1		250,000
M&E Works Total			2,920,000
Civil Works			
Item			
<i>Infrastructure</i>			
Site Preparation			290,000
Roads and Hardstandings			1.100,000
Landscaping			75,000
Site Services (Lighting, Water Mains)			110,000
<i>Substructures</i>			
Bunker			95,000
Pits, Sumps			15,000
Piling			240,000

<i>Superstructures</i>			
Floor Slab			85,000
Equipment Bases			10,000
<i>Building Structure</i>			
Building Envelope			1,100,000
Electrical Installations			190,000
Control Room			75,000
Administrative Offices			210,000
Architectural Treatment			50,000
Prelims			300,000
Civil Works Total			3,945,000
Contingency (15 %)			1,030,000
Capital Investment Costs, Total			7,895,000

Operating Costs

The operating costs are presented in the table below:

Operating Costs	no.	Cost	
		£/unit	£/a
Staff	10	30,000	300,000
<i>Maintenance</i>			
M&E Elements (% of cap. costs)	12.0%		350,400
Civ. Works Elem. (% of cap. costs)	2.0%		78,900
<i>Consumables</i>			
Electricity, kWh ¹⁾	2,000,000	0.072	177,600
Total Operating Costs			906,900

¹⁾ Electricity costs include a monthly fee based on peak consumption.

NPV

Considering the capital investments costs above and the operating costs the annual costs including capital expenditure and operational expenditure can be calculated. Using an interest rate of 5 % and a plant lifetime of 25 years the following gate fee can be estimated:

NPV summary	Cost	
	£	£/a
Capex	7,895,000	560,167
Opex		906,900
Cost, Total per year		1,467,067
Cost per tonne (50,000 t/y)		29.34

Appendix 6

JERSEY / GUERNSEY

Feasibility Study of a Joint Channel Island EfW Solution

Job 157003M
Ref.No. 834-041861
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- B) Specific Civils Requirements, memo no. 834-041959
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1. Context

1.1 Background

Jersey

Jersey Public Services Department (Jersey PSD) has developed its Solid Waste Strategy over the last few years. In October 2004 this was released for public consultation. At a similar time, the States of Jersey decided that, as the proposed Strategy included such a significant capital expenditure, the Scrutiny Panel should review the proposed Strategy.

With the Guernsey proposal coming under review it was felt that there could be mutual benefits for both Islands to consider whether a joint facility for the disposal of residual waste may exist.

Jersey PSD wishes to ensure that the review of this option is carried out quickly to ensure that it matches the timing of the Scrutiny report and to ensure that the overall timetable of taking the proposed Waste Strategy to the States in February/March 2005 is not delayed.

Guernsey

In June 2004, it was decided to commission a Panel of Inquiry to inquire into such matters as it is deemed appropriate into the future of solid waste disposal in Guernsey, which inquiry was to include the resolution of the States in September 2003 in relation to the procurement of an Energy from Waste facility. As such it is anticipated that the Panel will consider whether:

- a) the best technique had been provided,
- b) value for money had been secured and
- c) other waste disposal options had been appropriately considered.

In relation to item c) the Environment Department recognised a study had to be carried out to further study the feasibility or otherwise of participating in a joint solution together with Jersey, which is in a similar situation.

The Panel of Inquiry is expected to present their recommendation to the Policy Council during January 2005.

The Feasibility Study

The Jersey Team and the Guernsey Team first met on the following dates to discuss and develop the present feasibility study:

- 30 November 2004, Kick-off Meeting in Guernsey
- 13 December 2004, Discussion Meeting in Gatwick
- 20 December 2004, Discussion Meeting in Gatwick
- 12 January 2005, Finalisation Meeting in Jersey

The feasibility study assesses the feasibility of building a joint EfW Plant in Jersey as opposed to building two separate units each handling the waste fractions generated on each Island.

1.2 The Project Team

For the purpose of carrying out this feasibility study a joint approach has been taken and the Project Team responsible for the study comprises:

Representing Jersey:

- Boyd Bennie, Director, Waste Strategy Project, Public Services Department
- John Rogers, Director of Waste Management, Public Services Department
- Babbie Fichtner JV, Jersey's technical consultant, represented by Senior Consultant, Dr. John Weatherby

Representing Guernsey:

- Alan Richards, Project Director, EfW Project, Guernsey Technical Services
- Gary McCracken, Assistant Project Manager, EfW Project, Guernsey Technical Services
- Nick Whalley, Project Manager, Waste Management, Guernsey Technical Services
- Ramboll, Guernsey Technical Services' technical consultant, represented by Klaus Jacob Jensen

2. Assumptions

A number of key assumptions have been made to enable the team to carry out this feasibility study within the timeframe made available to them.

It is realised that if it is decided to proceed with a joint solution then some of the key assumptions could be challenged and perhaps a better solution can be found if some of the key assumptions are changed.

The Project Team is convinced though that no such change would fundamentally change the recommendations made in this feasibility study.

The key assumptions are:

- (a) For all solutions, a Plant Lifetime of 25 years has been anticipated.
- (b) In Guernsey it is anticipated that a transfer station be built on Longue Hougue. All activities will take place within a dedicated building basically with one entrance and one exit door.
- (c) All waste shall be delivered to this transfer station, compacted and loaded into specialised containers or trailers, and then be transported to St. Peter Port harbour.
- (d) The Project Team has considered two different methods for transferring the waste to Jersey. The first method includes a lift-on lift-off (LO-LO) methodology, which implies that waste will have to be transported in compacted form in containers. The second method is based on a roll-on roll-off (RO-RO) approach whereby waste is transported in sealed plastic wrapped bales in bulk-tippers. The RO-RO method would require a facility at the Jersey Plant to split all bales so that the waste can be incinerated. Time has not allowed for a detailed analysis of each of the methods but initial costing indicates that the RO-RO method is the most cost-effective solution. In addition this solution seems to offer some technical and operational advantages.
- (e) The technology selected for the EfW Plant shall be similar for the joint solution as for the split solutions. Both Jersey and Guernsey have adopted similar criteria for the selection of the main facility to dispose of the solid residual waste:
 - The proposed technology must be proven with operating plants to demonstrate its reliability. This means that plants of similar capacities must have been operating commercially for a significant period.
 - Operating plants must demonstrate adequate availability and be safe to operate.
 - The technology must achieve the emission limits of the Waste Incineration Directive (WID) and must comply with the concept of the Best Available Technique (BAT).
- (f) Guernsey has adopted a plant in compliance with WID and BAT and in addition, the emission standard for NO_x have been set even lower than specified in

- the WID, following a requirement from the Guernsey Regulator to do so. It is assumed for Jersey that the plant will comply with WID and BAT. However, the governing issue in selecting flue gas treatment system is that it will be possible to demonstrate that the contributions of the emissions from the plant will not cause the ground level pollution levels to exceed any of the air quality standards. This will be demonstrated within the Environmental Impact Assessment, where a rigorous approach will demonstrate this. The consequence of this is that for Jersey, it is assumed that Selective Catalytic Reduction of NO_x is not required, and that a dry flue gas treatment system can be used.
- (g) It has been assumed that a new stack will be provided at a height of about 90m, similar in size to the JEC stack. The public acceptance of a new stack, and the height of the new stack remain to be confirmed.
 - (h) It is assumed that bottom ash produced from the plant will be suitable as secondary aggregate in line with better performing European plants. This will mean that both Islands need to control the input of waste, particularly batteries and electrical equipment.
 - (i) The flue gas treatment system, and therefore the type of residue produced, has not been finally determined for Jersey yet. This is important because such residues are classified as hazardous wastes. Guernsey has selected an advanced system purpose built to minimise the production of hazardous waste. Currently the solution assumed for Jersey and for the combined plant is a basic system, which will incur lower capital and operating costs and which will produce more hazardous residues. However, both Jersey and Guernsey will need to consider this choice carefully, as a more advanced system will be significantly more expensive.
 - (j) It is assumed for the proposed solution in Jersey that the fly ash and FGT residue produced from Jersey's waste will be disposed of in sealed pits on Jersey, and that the proportion arising from Guernsey's waste will be exported to hazardous landfill sites abroad. However, as it is not clear if this is an acceptable solution for Jersey, the cost of Jersey also exporting its FGT residue has been identified. In this case, it is also possible that the wet scrubbing system together with acid washing may become financially advantageous and this would need to be further investigated.
 - (k) The selected site on Jersey, which is described in more detail in Section 6, is located next to the Jersey Electricity Company (JEC) power station and on an area of ground which has been made up by uncontrolled fill. Assumptions have been made about a number of areas where the new plant can use some of the existing JEC plant facilities, and regarding the condition of the ground. These assumptions would need to be confirmed by a detailed analysis. A detailed review may well indicate further cost savings, but in this report a conservative approach has been taken.
 - (l) Assumptions have been made regarding the architectural appearance of the new plant. As the plant will be located in an industrial area, it is not felt necessary to provide a complicated architectural design. However, it is noted that parts of the plant will be visible from some parts of the Island and from the

port. As part of the planning process, the appearance of the plant will need to be considered.

- (m) It has been assumed that the FGT plant will be located outdoors. This is a cheaper option, but it has an additional advantage that it makes it more likely that the HV transformer could be retained in situ, as a building would block in the transformer and may cause cooling problems. On the other hand and from a visual impact point of view, an outdoor located FGT plant is likely to be considered disadvantageous.
- (n) The new plant will involve a change to the local traffic patterns. It has been assumed that this is acceptable, but this will need to be confirmed by a detailed analysis.
- (o) It has been assumed that the tipping apron would be reached via an inclined ramp. If this option is not popular, it would be possible to consider alternatives such as conveyors. The cost impact of using conveyors would not be high, but waste conveyors are notoriously problematic and operational concerns would need to be addressed.
- (p) It is assumed that the new plant's electrical output will be sold at 2.4p/kWh. There are some options available, one of which is to investigate further the possibility of Jersey PSD using some of this electricity for its own power requirements across the Island, using the JEC distribution network. The revenue from electricity sales is significant and assumptions regarding the sale price are important. A recent contract in Guernsey between Guernsey Electricity and a power provider has had prices in the order of 2.9p/kWh. The possibility to negotiate an even better price perhaps with political support has not been considered as part of this study although the sensitivity of the costs to the electricity price has been modelled in Section 9.3.1.

3. Waste Characteristics

By waste characteristics shall generally be understood waste arisings, waste categories and calorific values of waste fractions.

The Plant Lifetime is 25 years and as such this study shall take into account forecasting of waste characteristics, particularly combustible waste arisings.

The current waste characteristics on the two Islands are fairly well known. Jersey has detailed knowledge of waste characteristics from its current EfW Plant operation and Guernsey has monitored waste arisings being deposited in Mont Cuet for several years through weighbridge data supplemented by regular thorough visual inspections to characterise waste fractions.

Guernsey is in the process of finalising its Waste Management Plans and Jersey is similarly in the process of finalising its Waste Management Strategy.

3.1 Jersey

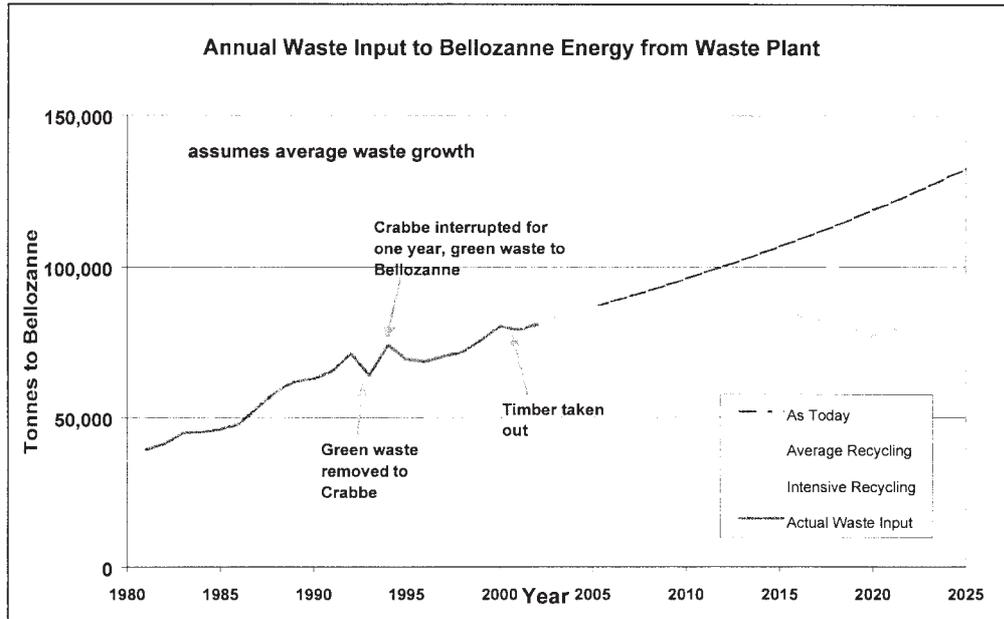
Jersey currently disposes of all its residual solid waste at Bellozanne incinerator. This includes domestic municipal waste, commercial and industrial waste, bulky waste such as mattresses, tyres and other non-inert waste. The plant also burns some dried sewage sludge (at 98 % Dry Solids). The only exceptions to this are green waste, recyclable material and some hazardous wastes such as oils.

The Solid Waste Strategy proposes an expansion of recycling to remove more of the metal, glass, paper and green waste.

The character of the residual waste is relatively well understood, as Jersey has operated the incinerator for 24 years.

The Net Calorific Value (NCV) of the waste is estimated to be between 9-10 MJ/kg as a daily average, with an average of about 9.5 MJ/kg. Increasing the recycling rate is unlikely to significantly increase this value, as the removal of more metal and glass will be balanced by increased newspaper recycling. Therefore it has been assumed that there will only be a small increase in the average NCV, to about 10 MJ/kg.

As part of the Solid Waste Strategy, Island Plans, population growth and European waste trends have been considered. This has led to the following predicted waste arisings. As with all such predictions, it is recognised that there is a high risk that actual waste patterns will change and therefore any proposal must have significant flexibility.



From the figure, it can be seen that the residual waste arisings in Jersey are likely to be in the region of 90,000 tpa by 2010 and by 2025 these could be as high as 120,000 tpa. These figures are subject to a number of significant assumptions regarding population growth (based on Island Plans) and individual waste growth patterns. The design of the proposed new plant will therefore need to take into account the possible variation in waste arisings. In addition, Jersey currently has a monthly seasonal waste variation of about $\pm 12\%$, with the peaks in the summer. This variation is calculated as the difference of the monthly maximum from the average.

For the purposes of dimensioning the capacity of the new plant, it is assumed that Jersey will produce 90,000 tpa of residual waste in 2010 and 120,000 tpa by 2025.

3.2 Guernsey

Weighbridge Data

In Guernsey weighbridge data from Mont Cuet landfill is the main source of information in relation to the waste arisings on the Island. Waste audits are performed each year and estimation of incinerable waste fractions is made. The estimated results of the most recent published in November 2004 is shown in the table below:

Audit Category	Quantity (tonnes/annum)
Cardboard	1,149
Foam/rubber	234
Dense plastic	1,138
Plastic film	653

Audit Category	Quantity (tonnes/annum)
GRP	99
Wood	7,679
Paper	173
Plaster/plasterboard	774
Textiles	1,016
Beds/chairs/sofas	1,119
Hotel/bagged rubbish	6,158
Food/parish	22,918
Fragmentiser residue	1,534
Total	44,644

The above table represents the theoretically achievable incinerable waste arisings from the latest visual audit and assumes perfect separation of the incoming waste, which is not achievable in practice. Further analyses indicate a figure of 50,000 tpa being better representative of incinerable waste arisings, refer to a) ISL input to Environment Department, draft waste management plan 2004, 53,575 tpa. and b) Ramboll Project Definition Brief memo 5, 2001, 47,595 tpa.

Sludge

Establishment of a new wastewater treatment plant is foreseen and generation of approximately 1,100 tonnes/year of dried sludge is estimated under the assumption that a new wastewater treatment plant would have digesters for the sludge. Generation of sludge should not be included in the projection of current waste arisings but should be considered as being an incinerable waste fraction within the lifetime of a new incinerator. It is anticipated that sludge will be transported as sludge with a dry content of 80 %, resulting in sludge amounts of 1,375 tonnes/year. This means that equipment (sludge drier) to produce this product will have to be included when the future waste water treatment plant is being built.

Tyres

An estimated 46,000 tyres a year is foreseen to be disposed off in Guernsey. Most of those tyres are currently exported to the UK mainland for reuse and this business is expected to continue regardless of any decision related to the EfW Plants. A small proportion of these tyres will inevitably end up in the EfW Plant, where they should be shredded prior to being fed to the incinerator.

However, the annual amounts of tyres are considered negligible in relation to the overall waste arisings in Guernsey and the calorific value.

Alderney

The States Committee of Alderney did recently support an export solution of the waste generated on the Island for treatment at the proposed incinerator facility in Guernsey. It is believed that this fraction will be transferred to treatment in Jersey.

The combustible waste in Alderney has been estimated at 1,650 tonnes/year but no particular efforts have been made to include this fraction in the feasibility study as it is deemed to have limited effect on the outcome.

3.2.1 Calorific Value

Indicative values for the calorific value of the waste arisings to be incinerated in Guernsey have been estimated using waste audit data. From this study the calorific value of the incinerable waste has been estimated to vary between 10.0 – 12.0 MJ/kg.

Since the study reductions in recyclable and inert material being presented at Mont Cuet have been experienced. This reduction is thought to be a result of increased recycling and separation measures which became economically favourable after higher gate fee and contamination charges were introduced in 2002.

Reservations for the changes in the waste stream and the additional waste from Alderney shall thus be made in relation to the calorific value presented above. However, it is assumed that this will have only a minor influence on the current calorific value of the waste.

3.2.2 Projection of Waste Arisings and Calorific Value

In projecting the waste arisings for incineration in Guernsey several issues will have to be considered including:

1. Population projection in Guernsey
2. Social trends (e.g. economic growth and recycling participation) will affect waste generation and composition
3. Recycling and the efficacy of segregation of materials in the waste stream

Population Projection

Forecasts by the Advisory and Finance Committee Economics and Statistics Unit, based on the 1996 census, showed an increasing population. The average increase in population was predicted to be 0.27 % per year from 2000 to 2025. The 2001 census confirmed an annual increase in the order of 0.38 % in the years 1996 to 2001.

Social Trends

Economic growth will also have influence on waste generation. Increased economic growth will lead to an increased amount of waste. In Guernsey the average increase in GDP from 1980 to 1999 was approximately 4.0 % per annum and the average increase in GNP from 1980 to 1999 was approximately 3.5 % per annum. In the period from 1999 to 2003 the increase in the GDP has fluctuated somewhat and averaged 1.65% per annum.

Recycling and Segregation

Recycling and segregation of inert waste from the waste stream to Mont Cuet has – as described above – been intensified during the last few years. It is however difficult to estimate the future initiatives and the effect these might have on the waste stream.

Of the existing initiatives the private facility at Pointes Lane should be mentioned. This facility is currently managing some approximately 20,000 tpa of mixed waste, of which 16,000 tpa is diverted from landfill by removing recyclable materials (metals, stone, ground) and by waste separation. The remaining 4,000 tpa is delivered to Mont Cuet. This site delivers a further 16,000 tpa of unsorted waste to Mont Cuet. This business is expected to continue in its current form even though increasing landfill disposal fees could incentivise an increase in activities.

Projection

Following the issues presented above the following assumptions have been made concerning the projection of waste arisings:

- A population growth is foreseen, and similar increases in the household waste fraction is foreseen.
- An economic growth is foreseen. A constant economic growth as seen in the past 20 years cannot be expected, however an economical growth of 1-3 % in average is expected over the lifetime of an Energy from Waste plant.
- Initiatives for further encouragement of recycling and segregation of waste are foreseen. These initiatives are assumed to compensate partly for the increase in the waste arisings due to the economic growth.
- Dewatered sludge will be included in the waste stream during the Plant Lifetime.

Subsequent to these assumptions an average annual increase in the waste arisings of 1.3 % are foreseen, leading to an approximate figure of 70,000 tpa at the end of the Plant Lifetime.

In projecting the calorific value of the waste diverted to incineration the exact influence of increased recycling and segregation is difficult to assess. Experience from other European countries where effective recycling has been implemented and even where waste has been pre-treated excessively suggests that the calorific

value will increase. Initiatives in Guernsey are not believed to be in the same scale, although a small increase in calorific value can be expected. Inclusion of sludge in the waste stream will decrease the overall calorific value, if only dewatered by belt press/centrifuges.

In conclusion it is expected that the calorific value of the waste will be approximately 11.0 MJ/kg.

3.3 Joint Plant Waste arisings

Based upon the separate prediction for each Island, it is estimated that a new facility is likely to process the following:

- 2010: Jersey 90,000 tpa with a NCV of about 9.5 MJ/kg and Guernsey 50,000 tpa with a NCV of 11 MJ/kg
- 2025: Jersey 120,000 tpa with a NCV of about 10 MJ/kg and Guernsey 70,000 tpa with a NCV of 11 MJ/kg

This gives a combined waste arising of 140,000 tpa in 2010 and 190,000 tpa in 2025, with an assumed NCV of 10.4 MJ/kg

4. Engineering Requirements in Guernsey

4.1 Transfer Station, Description

As part of the engineering requirements in Guernsey an establishment for a transfer station for waste is needed

Transferring waste from small containers or collection vehicles to large containers or bulk-tippers at a transfer station makes the transport more cost-effective on the condition that the amount of waste is large enough and the haulage distance (from the transfer station to the final destination of the waste) long enough.

The transfer station in Guernsey is assumed to be located approximately one mile north of St. Peter Port harbour at the same location laid out for the incineration plant, Longue Hougue. At this location waste suitable for incineration should be collected and made ready to be transported to the prospect Jersey incineration plant.

In order to be able to estimate the capital and operational costs of establishing a transfer station, the Project Team has prepared an outline scheme for such transfer station. The outline scheme is based on the following key specifications:

- Two 1,200 m³ tipping bays served by overhead cranes with traditional grabs.
- The entire building (approximately 55,000 sq.ft.) including an area for intermediate storage of containers/waste is enveloped so that all that can be seen from St. Peter Port will be vehicles entering and leaving the building.
- LO-LO method, i.e. the waste is containerised in compacted form.
- Equipment for shredding and separating metals from waste other than parish/domestic waste to be included.
- Simplistic architecture.

The Project Team realises that further refinement (particularly the implementation of RO-RO instead of LO-LO) of the specification could lead to different costing of the transfer station, but such refinement would have to take place at a later stage with appropriate consultation with the waste suppliers.

Please refer to appendix A) for a more detailed presentation of the suggested transfer station

4.2 Cost

Please refer to appendix A) for a detailed specification of the cost estimate.

Construction costs including M&E and civil works for constructing the transfer station is estimated to be £7.9million. The operating costs to maintain and operate the facility are estimated at £900,000 per year.

Assuming a waste throughput of 50,000 tonnes per year and applying a simple Net Present Value calculation suggests that the total cost of operating such facility (i.e. capital investment plus operating costs averaged over the Plant Lifetime) is approximately £29 per tonne.

5. Inter-Island Transporting and Shipping

Investigations into the logistics and cost of shipping waste from Guernsey to Jersey have been made with a number of local shipping and haulage companies.

Consideration has been given to the shipping services (charter or scheduled), loading options (LO-LO, RO-RO) and frequency of sailings.

5.1 Transfer Station to Port

All inquiries into the cost of shipping waste to Jersey have included transporting the waste from a transfer station at Longue Hougue to the dockside Guernsey.

5.2 Shipping

Waste shipments from Guernsey would have to leave from St Peter Port Harbour. Scheduled sailings only depart from St Peter Port Harbour and St Sampson's Harbour is not equipped with RO-RO facilities or cranes of sufficient capacity.

Waste Shipments into Jersey would have to dock at Elizabeth Harbour (RO-RO) or the Victoria Pier (LO-LO). Discharge of waste at the Victoria Pier has the advantage that the pier is only a short distance from the site of the proposed incinerator. Waste discharged at Elizabeth Harbour would require transportation by road through St Helier via La Route du La Liberation.

Within the time given to prepare this report, the Project Team has managed to obtain quotations from two companies for transportation of 60,000 tonnes per year of waste from Guernsey to Jersey. One quotation is for the RO-RO solution and the other is for LO-LO solution.

The LO-LO Option

Compacted into dedicated TEU compaction containers, shipped twice weekly using chartered LO-LO shipping. Transportation from Longue Hougue Transfer Station Guernsey to dockside Victoria Pier, Jersey. Containers would be stored at Longue Hougue. Full containers would only be transported to the harbour once the vessel had docked, approximately 33 return journeys transporting full containers to the dock and returning with empties would be required for every shipment.

Quotation has been received in the range of £48 per tonne (including £14 in total harbour dues). There will be a small additional charge for storage and transfer from the harbour to the new EfW plant, estimated as about £4 per tonne.

The RO-RO Option

Compacted into smaller sealed bales transported on trailers shipped daily using scheduled RO-RO shipping. Transportation would be from Longue Hougue Transfer Station to the Energy from Waste facility at La Collette. Waste would be baled and wrapped at Longue Hougue and loaded directly onto bulk tippers, the bulk tippers would be transported to the harbour as they are filled. Approximately 10 bulk tippers will require delivery to the harbour every Monday to Saturday. The bulk tippers will be unloaded at Elizabeth Harbour and transported by road to La Collette.

Quotation has been received for the above option in the range of £35 per tonne (also including £14 in total harbour dues).

5.3 Summary

From the quotations received it would appear that the RO-RO solution offers the most cost efficient solution for the Islands.

It should be said that the quotations are indicative and based on relatively simple specifications and not in a competitive environment on contractually binding long-term conditions between a waste transport company and a shipping company.

On the other hand it should also be mentioned that the harbour dues, which are approximately £7 per tonne in each harbour have been assumed to be payable and it is considered possible that these dues should be able to be negotiated to a lower level.

If this combined plant is seen as a feasible option, other shipping options should be explored, including alternative shipping companies and the option of purchasing a dedicated ship.

6. Engineering Requirements in Jersey

6.1 Specification of Joint Plant in Jersey

For the purposes of the costings outlined in the report, it is assumed that the proposed joint EfW plant in Jersey would be based on proven mass-burn technology. It is expected that this plant would comprise two incineration streams including water cooled grates, waste heat boilers, fluegas treatment and energy recovery in the form of a steam turbine coupled to an 11kV generator. There are a vast number of examples of EfW plants utilising similar technology in operation worldwide and these plants are capable of reliable operation in excess of 25 years.

The flue gas treatment plant shall incorporate a bag filter to remove particulates, injection of Powdered Activated Carbon (PAC) to remove heavy metals and dioxins from the gas stream and injection of Hydrated lime for the removal of acid gases. It is still possible that a more advanced FGT plant may be selected, depending on how the FGT residues are to be disposed of (refer to Section 7.1.1 for other options considered).

The waste heat boilers would produce superheated steam at a temperature of 400°C and a pressure of 40bar. This steam will drive a turbine that will be coupled to a generator, which will generate power at 11kV. A proportion of the power generated will be used by the EfW plant as 'house load' (approximately 15% for the proposed solution), the remaining power will be exported to the Jersey electricity network. The turbine stages shall be a combination of impulse and reaction type, which will be optimised to give high levels of efficiency at the required operating conditions.

The boiler house will be in the region of 35 to 40m high and will be visible from numerous positions around the bay of St. Helier. For this reason it is likely that the new EfW plant will require some architectural treatment to enable the plant design to successfully get through the planning process. At this stage an undulating roof has been envisaged in a similar style to the existing power station. It has been assumed that it will be acceptable for the FGT plant to be located outside, in common with many UK plants, although it is noted that this is a combination of tanks, ducts and vessels.

It should be noted though, that it is possible that more extensive architectural treatment may be required which can increase the capital cost very significantly.

6.2 Design Issues

Location

A new Jersey only plant would be located at Bellozanne on the existing site.

It is essential that the joint EfW plant is located near to the docks to ensure that the waste is transported as short a distance as possible. If the LO-LO approach is adopted, the associated LO-LO facility is to be located at Victoria Pier. If the RO-RO approach is to be adopted, the bulk tippers will roll off at Elizabeth Harbour.

The most suitably sized area for a plant that is sufficiently close to the docks is the land adjacent to the JEC Power Station.

There is also a plot of land to the South of the JEC Power Station, currently used as a civic amenity site and composting area. Whilst this area would be large enough for a new plant, its location would be very prominent, being visible from much of the surrounding area. In addition, the civil costs are likely to be much higher due to the potential for tidal impacts, the proximity to the sea and the deeper excavations needed down to rock. For these reasons, this site has not been considered further.

Environmental Impact Assessment

The new plant will require a full planning application and an Environmental Impact Assessment. Major issues are likely to be the visual impact of the plant, emissions and traffic.

The boiler will dictate the maximum height of the building. To maintain a 2 second residence time at 850 °C and to avoid problems associated with fouling and corrosion a horizontal boiler is preferred. This will be enclosed within a boiler house with a height 35 to 40m. This is significantly higher than the JEC buildings. It is also assumed that a new stack will be required. If this became a fundamental issue, it is possible that two flues in the existing JEC stack could be used.

The new plant will emit small quantities of pollutants. A full dispersion model will be required to prove that these emissions will not be injurious to health. The emissions will need to be considered together with those from the JEC plant. Whilst the emissions will be dramatically reduced from those from the old plant, these will be spread over a different area. Whilst it will be a requirement of the EIA to show that these will have no significant health impacts, the local population may raise objections in any case.

The traffic from Guernsey would come from the Victoria Pier, causing little disruption, or the Elizabeth Harbour. In view of the reduction of transport of goods that will take place in the Elizabeth Harbour area due to the ongoing rearrangement of those activities, the additional traffic should only have a minor impact. The bulk of Jersey's waste would be delivered via St Helier and traffic routes will need to be considered. It is also assumed that the bulky handling plant would re-

main at Bellozanne, so shredded bulky waste would be delivered to the plant using containers.

Ground Conditions

The composition of the reclaimed land at the proposed site is unknown. Uncontrolled tipping onto the bedrock was known to have taken place in the area of the proposed site. The bedrock level is believed to be approximately 8m below the existing ground level at the area where the bunker is proposed to be located. Refer to Appendix B – Specific Civils Requirements.

Joint EfW Capacity

The following waste arising levels are assumed for the Islands of Jersey and Guernsey:

Island	Waste arisings (year 2010) / ktpa	Waste arisings (year 2025) / ktpa	NCV / MJ/kg
Jersey	90	120	10
Guernsey	50	70	11
Combined (Jersey + Guernsey)	140	190	10.4

For the design capacity of the plant, a utilisation of 80% is assumed. This takes into account all outage hours, together with any periods of operation at reduced loads. The utilisation is lower than would normally be assumed for the mainland due to difficulties in getting specialists and spares to Jersey. It is also noted that there is a seasonal variation of about $\pm 12\%$ in Jersey's waste. This has not been taken into account in the sizing, as it is possible to provide some smoothing by holding some bulky waste at Bellozanne.

Based on these assumptions, the average hourly throughput in year 2025 will be $190,000 \text{ tpa} / (8,760 \times 0.8) = 27.1 \text{ t/h}$.

A minimum of two streams is essential as any single stream plant will be subject to regular outages of two weeks or more. More than two streams would mean that capital and operating costs would increase. For a two-stream plant the design basis is therefore a 2 x 14 t/h plant.

This size of plant is a common size in Europe and can be supplied by several reputable companies.

Bunker Capacity

Utilisation factor is not taken into account when calculating bunker capacity, however seasonal variation is taken into account to allow for the maximum possible waste deliveries.

$$\begin{aligned} \text{Hourly throughput} &= (190,000 / 8,760) \times 1.12 = 24 \text{ t/h} \\ \text{Daily throughput} &= 24 \times 24 = 580 \text{ t/day} \end{aligned}$$

Assuming that;

- Average waste density is 0.35 t/m³.
- Width of bunker constrained to 15m by crane rails
- Depth of bunker 15 m due to site constraints (bedrock is about 8m deep and the maximum achievable tipping apron height is about 10m above ground level due to the slope of the access ramp).

Capacity			Length	Width	Depth
days	tonnes	m ³	m	m	m
1	580	1,660	7.4	15	15
2	1,160	3,320	14.8	15	15
3	1,740	4,970	22.1	15	15
4	2,320	6,630	29.5	15	15
5	2,900	8,290	36.8	15	15

A bunker length of 30m would therefore provide about 4 days storage at summer 2025 levels (5.6 days in 2010). Within the confines of the site, it would be possible to extend the bunker by a further 10m, thereby increasing the summer 2025 storage capacity to 5.3 days (7.5 days in 2010) and allowing better for receiving of large quantities of waste from Guernsey. This possibility should be further reviewed during a detailed design stage as the additional capacity would improve the flexibility and reduce disruption.

If more storage is required then it is normal practice to stack the waste against the rear wall of the bunker, which would be about 10m higher than the tipping apron, thereby providing a further 30% potential capacity.

Electrical Generation Capacity

JEC has suggested that additional electricity generation would have a low value on Jersey. Previous studies have shown that there is no satisfactory heat requirement on the Island and therefore, whilst the option to export heat to consumers should be explored further, the main use for the energy is in generation of electricity. It is also worth considering the strategic advantage to the Islands of having an alternative energy source to the French nuclear link.

It is therefore concluded that the EfW plant should generate electricity for its own use and to export the remainder to the Jersey grid.

In year 2025 (Jersey 120ktpa + Guernsey 70ktpa);
 Maximum thermal input = Waste throughput x NCV / 3600
 = (2 x 14,000) x 10.4 / 3600 = 79 MW_{th}

Assuming a Net electrical efficiency of 23%
 Maximum electrical output = 18.2 MW_e peak

Therefore, to achieve maximum electricity production, the turbine generator would be sized to export about 18 MW_e, and generate the auxiliary power for the plant (generator size about 20.5 MW).

Estimated Power Generation		
	2010	2025
Annual waste throughput, tpa	140,000	190,000
Thermal Input, GJ	1,400,000	1,980,000
Net efficiency, %	20%	23%
Power generated GWh	79	126

The plant net efficiency will vary depending on the plant throughput, as the steam turbine will be less efficient at low loads. The new plant would probably incorporate reheat to reduce the visible plume from the stack (reducing efficiency), but use seawater cooling (raising efficiency compared with an air cooled condenser).

Reception facilities

Waste will be received in the following forms

- Waste from Guernsey if the LO-LO method is adopted: This will be delivered to the dock in 20-foot containers filled with either compacted putrescible waste or shredded bulky waste. Containers will hold about 15 tonnes of waste. This will potentially give the opportunity to store shredded bulky waste for longer periods if the EfW plant is not operating at full output. From the dock, the containers will be transferred on flat bed trailers directly to the tipping apron, via the ramp. The containers will then tip into the bunker using a mechanism on the vehicle.
- Waste from Guernsey if the RO-RO approach is adopted: This will be delivered in bulk tippers, which will unload the bales in the reception hall onto an arrangement which will cut the bales up so that the waste can be fed to the bunker in de-baled and hence incinerable form. This approach will give the plant operator some freedom to intermediately store bales in

periods with high levels of waste in the bunker due to either plant outages or waste generation peaks.

- Normal collection services in Jersey. Refuse Collection Vehicles will deliver direct to the plant, accessing the tipping apron from the ramp and tipping directly into the bunker.
- Jersey's Bulky Waste. Currently bulky and commercial waste is delivered to the Refuse Handling Plant (RHP) at Bellozanne. It is assumed that this will continue as at present. Bulky waste will be shredded and undesirable waste such as electronic equipment removed. The shredded waste will then be transferred using containers to the new EfW plant. The system will be similar to that proposed for Guernsey, with the waste compacted into containers in about 15 tonne loads. On this basis, by 2025, about 15 deliveries per day would be required (RHP waste is about 45% of Bellozanne's total input).

Following tipping, the empty containers and bulk tippers would be washed in a drive-through building on the EfW plant site, before being returned.

If the LO-LO approach is adopted Guernsey's waste will be delivered twice a week. The waste will be unloaded onto the dockside. The containers will be moved and stacked with a forklift truck. From the dock, the 30-40 containers per shipment will be taken to the plant. The forklift truck and three units (capital cost of £375k every 8 years) to move the trailers and a handling charge of £4/tonne is estimated. All containers will be emptied in a day.

On the days when there are no deliveries by sea, the same units can be used to transport the shredded bulky waste from Bellozanne to the EfW plant. For this, a cost of £4/tonne has also been allowed. A compactor will be provided for Bellozanne (cost about £65k). This working method will smooth the deliveries to the EfW plant.

If the RO-RO approach is adopted Guernsey's waste will be delivered six times a week as the associated ship will arrive in Elizabeth Harbour all days except Sundays. The waste transport company will drive to the Plant and unload the bales.

In the proposed plan, the tipping apron will be raised about 8m above ground level and be accessed from an inclined ramp with a 1 in 10 gradient. This is a sizeable construction, with a capital cost in excess of £2M. If this solution is not seen as popular due to visual impact or other factors, other possibilities would need to be evaluated.

- It is not considered possible to access the tipping apron from Mount Bingham as the bends in the existing road are too tight for the proposed traffic.
- A lift could be used to raise lorries to the tipping apron. However, this is not a solution, which has been demonstrated elsewhere. It is probably not

practical to turn the longer lorries on the tipping apron and such a lift would be slow, so delivery times would be a concern.

- It would be possible to tip waste in a building at the South of the site and use a belt conveyor running the length of the plant to transfer the waste to the bunker. With this solution it may be possible to move the FGT plant onto the abattoir site as the tipping apron would not be required. This could be a workable solution, and the additional conveyor cost would be cheaper than the tipping apron and ramp costs. However, whilst some plants do use conveyors to transport waste, this is operationally difficult due to waste becoming tangled on drives, problems with keeping the conveyors clean and fire risk. It is felt that the ramp is the most practical solution, but if this is not acceptable, then a conveyor-based solution could be studied in more detail.

Basic Plant Design

For the purposes of this review, it is assumed that the plant will be a conventional mass burn energy from waste plant. This technology can be described as follows:

From the waste bunker, two grab cranes are used to transfer the waste into the feed hoppers. Waste is then fed onto the grate where it is burnt. Ash falls down the grate and off the end into a quench bath. The bulk of the ash in the waste is removed in this manner, and transferred from the bath to a storage area from which it is taken away from site using loading shovels and trucks or skips. The grate will be provided with auxiliary fuel burners, using gas oil, to heat the units up and to achieve the required 850 °C gas temperatures.

The combustion products from the grate pass up into a combustion zone where they are mixed with secondary air. Reagents such as ammonia are injected to reduce the NO_x levels. The flue gases then pass into the boiler, which will preferentially be a horizontal design. The final design of the boiler will be agreed with the selected supplier, but the design will need to be proven and to follow industry accepted practice, such as the requirements to ensure combustion is complete prior to the heat transfer tubes, acceptable gas and steam temperatures and refractory selection.

The gas is successively cooled in superheaters, evaporators and the economiser. The flue gas is then passed to the gas cleaning section. For the purposes of this study, it is assumed that a basic dry Flue Gas Treatment (FGT) system is used. This has a lower capital cost, but produces more residue than more complex systems such as that proposed for Guernsey. This is discussed further in the next section.

The clean flue gases are then passed to the chimney. The flue gas would be reheated in a heat exchanger to reduce the visible plume from the stack. It is as-

sumed that the gases would be heated to about 200°C with steam from the process, reducing the plant efficiency slightly. The exact flue gas temperature would be determined from detailed dispersion modelling of the visible plume.

For this review, it is assumed that a new chimney of the same height as the JEC chimney will be installed, rather than using the existing JEC chimney. Re-using the JEC chimney would (potentially) have little cost saving as the flues would need to be refurbished, and would require a very long flue gas duct with consequent pressure drop and corrosion issues. This could be considered if the chimney becomes a planning issue.

The steam produced in the plant will be led to a new turbine to generate electricity. Whilst it would be possible to export heat, no significant consumers have been identified in previous studies, which may make such use economic. The option to export heat will be retained and new heat consumers should continue to be sought. The exhaust steam from the turbine will be cooled in a seawater-cooled condenser, using the existing sea water supply and return systems.

Use of Existing JEC Equipment

Several of the boilers in the JEC power plant are not in use. There therefore exist a number of areas where significant cost savings could be made in the new plant. For this review, we have identified some areas where definite savings can be made and taken account of these. Other potential areas are noted below where additional savings could be made. It should be noted that we would expect the JEC to charge for such use, and it is therefore difficult to assess the actual savings available.

Definite savings taken into account are as follows:

- Use of sea water supply system. There is a pumping station on the dock-side with sufficient capacity for the new plant. The Jersey-only option was to use an air cooled condenser at substantial cost and space requirement. The ACC has therefore been replaced with new pipework and a water cooled condenser at significantly reduced cost.
- Workshops and offices – the existing JEC workshop and office building would be largely retained and used by the EfW plant, thereby recovering some of the costs needed to relocate the JEC facilities.
- Oil tanks. The auxiliary burners can be run using either gas oil or light fuel oil. The existing JEC storage tanks can be used to avoid the need for a separate tank.
- Electrical connection. The JEC is installing a new 11kV switchboard in the power station. We understand that this can be easily expanded with a new panel. The new turbine will generate at 11kV, therefore there is a saving in the additional cabling from Bellozanne to Queens Road and for grid con-

nection costs. A detailed study will be needed to confirm this, but there are clear savings.

- Use of JEC demineralised water. The JEC has sufficient capacity (2 x 25 m³/h streams) to make good quality demin water, together with storage capacity.

There are many other potential savings if a reasonable commercial position could be made between the new plant and the JEC:

- Use of JEC plant air. The JEC has adequate quantities of compressed air, which could be used for plant and service air, and possibly instrument air.
- Use of fire water system. The JEC have an existing fire water system with electric and diesel pumps.
- Use of turbine hall. There would be space to remove an old turbine and install a new one, saving on building cost and turbine crane.
- Potential use of an existing sea water condenser. If the turbine was to be located in the JEC turbine hall, it would be worth reviewing whether an existing condenser could be used, saving on the condenser cost and sea water piping.
- Potential use of feedwater supply system. As the JEC no longer use two boilers, there is sufficient feedwater capacity. If the turbine were located in the JEC turbine hall, it would be possible to supply steam to the turbine, use the JEC condensate and feedwater supply system, and return feedwater at about 65bar absolute to the EfW plant. This could save on feedwater tanks, condensate and feedwater pumps, deaerator, condensate heaters.

The Project Team would wish at this stage to flag up that the use of existing equipment with an unknown asset life as part of a turnkey contract possibly could make it very difficult to obtain satisfactory performance guarantees for the new plant as any contractor is likely to make guarantees conditional on perfect performance of any such existing equipment.

The re-use of an existing JEC steam turbine has been considered but is unlikely to be possible due to the steam conditions of about 490 °C and 60 bar absolute (an EfW plant is assumed to supply steam at about 40 bar absolute and 400 °C in line with accepted industry practice).

Plant Layout

The proposed plant layout is shown in Appendix 1, Figure 725-003. This drawing shows a two-stream EfW plant with a capacity of about 14 t/h per stream. The arrangement is a conventional one except that the FGT equipment is separated from the boiler with longer flue gas ducts. This is because it may be possible to avoid moving the JEC 90kV transformer. JEC has estimated the cost of relocation to be about £4 M and therefore every attempt to leave it in situ should be made. The

JEC were not positive regarding this, and therefore in the base price it is assumed that it will be relocated.

Space has been allocated to extend the bunker and provide a third stream if absolutely required, although it should be recognised that this would only happen if absolutely necessary.

Requirement for flexibility to allow for planned outages

Management of the waste bunker level will allow single stream outages of up to a week to be accommodated without resorting to offsite storage. Immediately prior to a scheduled outage it should be ensured that the bunker is almost empty so that the waste will be gradually allowed to build up and if necessary waste can be stacked against the rear wall of the bunker.

Planned outages should not take part in high summer, when waste arisings are highest and odour is a bigger problem.

Both Islands will also deliver normal domestic waste and shredded bulky waste separately. As bulky waste tends to contain few putrescibles, it is possible to store bulky waste for longer periods without health issues or odours. As the bulky waste is likely to contribute to about 45% of the total, it is possible to provide for periods of low plant capacity by storing bulky waste. During the early years, when a single stream will be able to cope with much of the capacity, it will be relatively easy to cope with outages of one line of 3-5 weeks, or for the whole plant of up to 2 weeks, although the bunker area may emit significant odours.

Emergency Plan

Baling facilities will be provided at the relocated bulky waste facility so that in the event of a stoppage on both streams and once the bunker has been filled to capacity, waste deliveries can still be accepted, baled and stored offsite. Note that no allowance has been made for space for offsite storage in this report.

Guernsey will provide a similar facility to enable Guernsey to bale its own waste in case of emergency.

For longer stops, such as after a serious fire, both Islands will need to make contingency plans to either landfill the waste, or to export it from the Islands to an alternative disposal facility.

6.3 Form of Contract

Both Islands have considered the different contracting forms available:

- Multiple contract – the plant could be built by several suppliers, each providing part of the plant (eg. Civils, boiler, FGT, turbine, electrical, I&C). Whilst this may offer overall cost savings if managed carefully, both Islands have expressed a strong preference for a turnkey solution.
- Design and Build – the plant would be built by a single contractor. Both Islands have proposed this as their preferred solutions as this best matches the compromise between lower capital costs and limiting the project risk.
- Design Build Operate (DBO) – the plant could be built and operated by a contractor for a gate fee. This option has been considered by Jersey PSd but rejected as the overall costs would be higher than the Design and Build option. Jersey PSd already operates Bellozanne in a cost efficient manner, and employing a third party would increase management overheads and profit. On top of this, a private contractor would not be able to borrow money on such attractive terms as Guernsey or Jersey.
- It should be noted that Guernsey have decided to build their plant and the contractor would operate the plant for two years before transferring operations to Guernsey (DB2O). This is mainly because Guernsey has no tradition of operating such a plant. This method allows operators to receive training from experienced operators. The cost of doing this is relatively high, as can be seen by comparing the proposed operating costs for Guernsey with Jersey's actual operating costs today. As Jersey already possesses such knowledge, this is not necessary for a plant built on Jersey.
- Contracting Out the waste management service. This is the method commonly followed by councils in the UK. The solution would be similar in consequence to the DBO strategy. Neither Island is currently pursuing such a strategy.

For Jersey alone, and the combined solution, it is proposed that a Design and Build contract would be let based upon a standard form such as FIDIC Silver Book, IChemE Red Book or MF/1.

The contract would adopt the following special conditions:

- 30 month to three year construction period.
- Take Over following successful completion of a 14-day operability test demonstrating environmental compliance and high load operation.
- Extensive performance testing based on DIN 1942 and 1943 within three months of Take Over to demonstrate key guarantees.
- One year availability test.
- Two year Defects Liability Period.(DLP)
- Performance Bond to protect Purchaser from shortfall between payments and delivery (amount of Bond dependent on payment terms).
- 10% Retention Bond from passing performance tests to end of DLP

- Key Guarantees on throughput, electrical export, firing diagram, emissions, noise, consumables and availability. Economic guarantees to be attached to Liquidated Damages(LD).
- Proposed contract limits of 100% contract price liability, 10% LD cap on delay, 15% LD cap on performance and 5% LD cap on availability.

6.4 Capital Costs

This section compares the initial cost estimates made for the Jersey Plant at Bellozanne with the larger plant proposed for La Collette. The price has been built up using local estimates for enabling works, a database of recent tendered prices for EfW plants in the UK and an uplift due to working on Jersey. This will largely affect the management, erection and civils portions of the works.

It is recognised that this price has been established without contractors tendering for the work. The EfW plant market is extremely volatile as there are few reputable suppliers and a varying number of projects. The fixed price of a plant will depend very much on the current position in the market at the time of tendering.

It is noted that the Guernsey plant was tendered in a competitive situation. For comparison:

- Guernsey plant, single stream 70,000 tpa, £80M total project costs in today's prices.
- Babtie Fichtner estimate for Bellozanne plant (total project cost including interest during construction and enabling works) £80.4M in end of 2003. Prices uplifted to £84.8M in 2004 prices for a 150,000 tpa plant.
- Babtie Fichtner price for the new larger plant to serve both Islands, £113M (total project cost including interest during construction and enabling works).

When comparing the tendered Guernsey project costs with the estimates for the Jersey plant, the estimates could appear to be inadequate. There are some explanations for the costs of the Guernsey plant:

- The plant is located by the sea in an area affected by tidal flows, 31% of the total cost is due to civil costs (the civil cost is normally assessed to be about 25% of the total cost).
- The Plant is to be built a) with a large bund in front and b) with substantial tree-planting scheme to reduce visual impact.
- Guernsey has a complex flue gas system, incorporating an electro static precipitator, a wet scrubber, a bag filter, a reheat system and Selective Catalytic Reduction.
- Guernsey is to use an air-cooled condenser, which will be more expensive than seawater cooling.

- The FGT plant is fully enclosed and the building structure is curved.

Because of the apparent difference in the Guernsey price and the Jersey estimate, combined with the fact that the new Jersey plant has not been priced by any of the suppliers who may bid for the work, the Project Team has decided to test the sensitivity of the proposal to contract price, cf. section 9.3 of this report.

Comparison of the initial cost estimates for the Jersey Plant at Bellozanne with the larger plant proposed for La Collette.

Item	Bellozanne	La Collette
Enabling Works	£3,900,000	£9,800,000
Electrical System New Turbine Connection Works	£758,000	£300,000
EfW Plant Turnkey Contract Works	£58,432,000	£82,594,000
Including 5 % Contingency	£61,353,000	£86,724,000
Total EfW Plant plus electrical connections	£62,111,000	£87,030,000
Additional/Miscellaneous Works	£1,359,000	£1,000,000
Decommissioning Works, Existing Plant	£3,195,000	£2,210,000
Project Development Costs	£9,810,000	£12,950,000
Sub-total end of 2003 price	£80,375,000	-
Uplift from 2003 to 2004 level for Bellozanne	£4,425,000	-
Total Project Costs, 2004 level	£84,800,000	£112,990,000

The costs for both the Jersey and the combined EfW plants and enabling works are budgetary estimates only and are not fixed costs. To establish actual costs would mean that fixed price quotations based upon detailed specifications would need to be provided. Tender prices vary strongly depending on the market climate at the time of bidding. The EfW supply market has a limited number of credible suppliers and is therefore subject to fluctuations depending on how busy each supplier is. It is also noted that the scope of the supply may also be subject to change, based upon selection of the FGT plant, architectural treatment and other technical solutions.

Potential Cost Savings

The following table lists the cost savings due to the new location.

Potential Cost Savings (compared to Bellozanne site)			
Item	Bellozanne (£)	La Collette (£)	Saving (£)
Cost Savings (allowed for in current estimatee)			
Refuse Handling Plant left at Bellozanne	1,000,000	0	1,000,000
Electrical Grid Connection, refurbishment of Bellozanne 3.3kV network	1,375,000	300,000	1,075,000

Emergency Generator	60,000	0	60,000
Auxiliary Fuel Tank	20,000	0	20,000
Air Cooled Condenser	2,400,000	0	1,800,000
Water Cooled Condenser plus piping	0	600,000	
Demin Plant and Storage	100,000	0	100,000
Workshops & Offices (use JEC)	300,000	0	300,000
Total			4,355,000
Other Potential Cost Savings (not allowed for in current estimate)			
Use Existing turbine hall / condenser			1,200,000
Feedwater system			500,000
Fire System	125,000	75,000	50,000
Instrument / Plant Compressed Air	90,000	20,000	70,000

Additional Costs

The following are some additional costs due to the relocation:

- Abattoir Relocation. The existing abattoir would need to be demolished and relocated. No new site has been decided upon yet. An estimated allowance of £3M has been made for this work.
- JEC Workshops. Even though the workshops can be largely left in situ, access would be restricted and part would be modified to accommodate the new turbine. Therefore the existing building could be used for the EfW workshop, offices and stores, but the JEC would need a new building, estimated by the JEC to cost about £2M.
- HV 90kV transformer. The JEC would intend to relocate this transformer. This is part of the main link with France and security is therefore essential. JEC has estimated £4M for its relocation.
- Civil works. The land is uncontrolled fill. The trial pit confirms that it is unsuitable for piling. The proposed method is therefore to remove the top 5m of soil on the site and grade this, with fill of engineering standard returned to the site. It is assumed that there is no significant contamination.
- Elevated ramp and tipping apron. To gain sufficient elevation for the large bunker, the tipping apron will be high. This substantially adds to civil costs.
- Architectural features. No significant architectural design has been allowed for due to the industrial location. A wavy roof, in keeping with the JEC building is proposed on the higher buildings, with an estimated cost of about £500,000.
- Roads. It is not clear if additional costs will be incurred to improve the surrounding roads. A nominal sum of £500,000 has been allowed.
- Significant car parking space will be lost. It is assumed that this is required and Jersey PSd will need to provide car parking close by. A nominal cost of £100,000 has been allocated.

6.5 Operational Costs

	Bellozanne	La Collette
Fixed Costs for EfW Plant 2010		
2010 Tonnage, tpa	90,000	140,000
- Labour	£1,280,287	£1,448,716
- Maintenance	£1,318,700	£1,614,089
- Overheads	£150,000	£200,000
- Imported Power Cost	£11,213	£17,442
- Total fixed costs	£2,760,200	£3,280,247
Variable Costs for EfW Plant 2010		
- Sodium Hydroxide	£97,455	£151,597
- Lime	£82,120	£127,742
- Activated Carbon	£59,279	£92,212
- Ammonium / Urea	£22,605	£35,163
- Disposal of Inert Bottom Ash	£252,000	£392,000
- Auxilliary Fuel	£163,085	£253,688
- Towns Water	£44,150	£68,678
- Boiler Chemicals	£43,568	£67,772
- Effluent Discharge	£22,075	£34,339
- Total Variable Costs (Excl.FGT residue)	£786,337	£1,223,191
Variable Cost/t (excl. FGT residue)	£8,74	£8,74
Total Fixed + Variable Costs (excl. FGT res.)	£3,550,000	£4,510,000
- Hazardous Waste (FGT Residue) Jersey	£178,000	£178,000
- Hazardous Waste (FGT Residue) Guernsey)	£0	£640,000
2025 Tonnage, tpa	120,000	190,000
Fixed Costs	£2,760,200	£3,280,247
Variable Costs (excl. FGT residue)	£1,048,449	£1,660,045
New OPEX (excl. FGT residue)	£3,810,000	£4,950,000
Hazardous Waste Jersey	£237,000	£237,000
Hazardous Waste Guernsey	£0	£896,000

Costs are based upon dry FGT system with SNCR only.

Bottom ash is prepared as secondary aggregate at a cost of £14/tonne.

Fly ash and FGT residue from Jersey's waste is disposed of in sealed pits on Jersey, at a cost of £37/tonne. The fly ash and FGT residue from Guernsey's waste would be exported to hazardous waste landfills abroad, at a cost of about £240 / tonne. The Project Team wish to refer to a potential saving here as it would probably be possible to transport the hazardous waste (or some of it) to the UK mainland using some of the RO-RO bulk tippers (these will make a round trip

Guernsey-Jersey-Portsmouth-Guernsey in any case), which is likely to reduce the cost per tonne of hazardous waste from the currently foreseen £240/tonne to approximately £140/tonne, representing a potential annual saving in the order of £370,000 per annum on operating costs. This should be further examined, if it is decided to continue developing the joint solution.

If Jersey were to export its own FGT residue, there would be an additional cost of about £1M pa in 2010 (or approximately half of this if transport costs can be reduced using the RO-RO bulk tippers). This may mean that a wet scrubber solution such as that proposed for Guernsey, with acid washing, may become financially advantageous, although preliminary rough costings do not suggest the costs would be much reduced.

Power Sales

Item	Bellozanne	La Collette
Year 2010		
Waste throughput (tpa)	90,000	140,000
Waste throughput (tph)	13	20
Waste NCV (MJ/kg)	9.5	10.36
Net Electrical Efficiency (%)	22	19.5
Price Electricity (£/MWh) first 2 MW	52	24
Price Electricity (£/MWh)	16	24
Thermal Input (GWh th)	237.50	402.89
Annual Electrical Output (GWh)	52.25	78.56
GWh at high price	17.00	17.00
PSD loss due to buying power from JEC	0.00	£340,000
Annual Electricity Revenue	£1,450,000	£1,550,000
Year 2025		
Waste throughput (tpa)	120,000	190,000
Waste throughput (tph)	17	27
Waste NCV (MJ/kg)	10	10.36
Net Electrical Efficiency (%)	23	23
Price Electricity (£/MWh) first 2 MW	52	24
Price Electricity (£/MWh)	16	24
Thermal Input (GWh th)	333.33	546.78
Annual Electrical Output (GWh)	76.67	125.76
GWh at high price	17.00	17.00
PSD loss due to buying power from JEC	0	£340,000
Annual Electricity Revenue	£1,840,000	£2,680,000

7. Residues

7.1 Jersey, landfill options

Jersey has very limited landfill, and no sites available for biodegradable waste. Inert waste is used as fill at the reclamation site at La Collette.

Currently ash from the incinerator is separated into bottom ash and fly ash. The intention is that the bottom ash is to be used as secondary aggregate after maturation. However, due to high levels of some heavy metals this is currently not possible and this is re-mixed with the fly ash and deposited in sealed pits at La Collette.

7.1.1 Residue arisings and characteristics

The amount of residue produced depends on the nature of the waste entering the EfW plant and the flue gas treatment plant selected. Municipal waste typically has 20-25% ash content. In a mass burn plant, about 90% of this ash leaves the plant as coarse bottom ash. About 10% of the ash leaves as fly ash. This normally has higher levels of heavy metals and other pollutants. Reagent is added to the flue gas in the FGT and this increases the amount of solid FGT residue to about 5.3% of the incoming waste. FGT residue is considered hazardous due to the presence of lime and the leachability of heavy metals.

A number of FGT systems have been considered for Jersey, but no final decisions have been made. The current proposal is based upon a dry FGT system.

The different systems investigated are:

- Dry FGT system, where the flue gas is cooled to about 140 °C by the economiser and hydrated lime and activated carbon (PAC) are injected. These are captured together with the fly ash in the bag filter. The residue is normally recycled to improve the efficiency of the reaction. The system is simple to operate, well-proven and low in capital cost. However, it produces the most residue.
- Conditioned Dry FGT system. The system is similar but a water spray is used to cool the final stage of the flue gas. The additional water improves the efficiency of the reaction, slightly reducing the amount of lime required.
- Two stage dry FGT system. A two stage bag filter is used with the flue gas being cooled further between the stages. The reaction efficiency is further improved, but the capital cost is increased.
- Semi Dry FGT system. Quicklime is made into a slurry and injected into a reaction tower. The reaction efficiency is higher, reducing the reagent and residue. This system is well proven, although the lime slurry producing system is often considered to be rather dirty.

- Sodium Bicarbonate systems. These operate similarly to the hydrated lime dry system, with sodium bicarbonate used instead. Whilst the reaction is more efficient, the heavier chemical means that there is little benefit in terms of mass flows. There is some potential of regeneration of the residues, thereby “recycling” the residue. However, this option has been considered for Jersey and does not appear to offer either financial or environmental advantages.
- Wet scrubber. Instead of injecting a solid reagent, the flue gas is scrubbed by a solution to remove the acid gases. The result is a liquid effluent stream instead of a solid residue. However, fly ash is normally removed first, upstream of the scrubber. The effluent stream is normally treated further to precipitate the pollutants from the solution and filtering the effluent to produce a separate sludge. This solution has several alternative forms. The approach adopted in Guernsey is one of these, where the effluent stream is used to scrub the fly ash to remove the leachable elements, such as the heavy metals. The result is that the fly ash can be considered to be non-hazardous and mixed with bottom ash whilst the hazardous sludge is disposed of to a hazardous landfill. The advantage is that the sludge volume is much reduced compared with any of the other solutions.

It is worth noting that were Jersey to adopt Guernsey’s solution, an investigation would be needed to confirm that there was a disposal route for the fly ash. When producing secondary aggregate, the ash is screened and the fine element normally rejected. Therefore it is likely that the fly ash would be landfilled in any case, although it may not be necessary to use secure pits.

Consideration of the best FGT system and residue disposal scheme requires extensive discussion and cannot be resolved for Jersey at this stage. However, the following table indicates the likely effect of each solution:

FGT Options for EfW plant treating 90,000 tpa of waste (Bellozanne 2010)					
	Eco Dry	Condi- tioned Dry	Two stage dry	Semi Dry	Wet Scrubber
Reagents	Hydrated lime and PAC	Hydrated Lime and PAC	Hydrated Lime and PAC	Quick-lime and PAC	Limestone, NaOH and PAC
FGT residue tpa (hazardous)	4,800	4,600	4,300	4,400	-
Fly Ash (inert) tpa	-	-	-	-	2,300
Hazardous Sludge tpa	-	-	-	-	930
Other waste streams	-	-	-	-	Effluent stream, ion exchange resin

7.1.2 FGT Residue Disposal

A number of options for the FGT residue disposal have been considered:

- Disposal in hazardous landfill. This is a common method and that used in Jersey. It is unlikely that FGT residue will achieve the leachability criteria of the Landfill Directive and therefore this may not be allowed if the Landfill Directive is strictly complied with, without further treatment. Guernsey has no suitable hazardous landfill.
- Export of the residue to treatment facilities, or salt mines abroad. As this is a hazardous waste, it may be possible to export this to sites better suited for disposal, rather than sterilising parts of small Islands. This is an expensive option due to the combined cost of export and the cost of treatment/landfill.
- Mixing with cement followed by landfill. This is intended to lock the residue away. It is an expensive option due to the cost of cement and in effect doubles the amount of residue to be disposed of.
- Vitrification of the residue. The residue is turned into a glassy substance by the application of heat. Whilst this may appear an attractive possibility, investigation indicates that the system is not particularly suited to fly ash and there is a risk that the pollutants such as heavy metals will be released to atmosphere during the process, thereby nullifying the apparent advantages. Vitrification is considered to be very expensive and energy consuming.
- Acid washing- as proposed for Guernsey. This is a possible solution, although the costs are high. A reduced amount of residue (about one fifth of that produced by a dry system) still requires hazardous landfilling and it would need to be confirmed that there was a safe disposal route for the inert fly ash.

7.1.3 Opportunities for recycling

Bottom ash will be recycled as secondary aggregate on Jersey, assuming quality is satisfactory. Ferrous metal will be separated from the bottom ash and recycled via the scrap-yard on Jersey.

7.1.4 Residue ownership

Assuming the bottom ash is of sufficient quality, this could be used on Jersey as secondary aggregate and would provide the most cost effective solution. However, this would require that Guernsey removes items such as electronic equipment from the waste at source. Such a segregation system is not currently in place in Guernsey. Exporting bottom ash from Jersey would be expensive, and assuming the secondary aggregate has a use on Jersey, would not be environmentally beneficial.

The proposed solution is for each Island to deal with its own residues from the FGT plant.

The fly ash and FGT residue produced would be split proportionately to the incoming waste from each Island. In the base model, it is assumed that Jersey would continue to dispose of this in sealed pits (at a cost of £37/tonne) whilst the Guernsey residue would be shipped from Jersey. As there would be little point in Guernsey dealing with this itself, it has been assumed that this would be exported to disposal in salt mines, at a cost of around £240/tonne. As noted earlier, it may be possible to significantly reduce this disposal cost by using some of the existing RO-RO bulk tippers, which will be shipped to Portsmouth in any case.

It is possible that ultimately Jersey will need to find an alternative disposal route for its own residues and the cost of this would be substantial. However, this would also apply to the Jersey only scenario, where it is also assumed that the residues are buried on the Island.

7.2 Guernsey, landfill options

Guernsey currently has two operational Landfill Sites:

Mont Cuet landfill site on the North West point of Guernsey was developed to accept the Island's Municipal Solid Waste. Mont Cuet landfill site opened in February 1998 with a capacity of 974,000 m³. At current fill rates the site will be full in 2013.

Mont Cuet Landfill site is equipped with leachate capture and treatment facilities and methane extraction vents. It is intended that gas utilisation equipment be installed in the future. The site has not been developed to accept hazardous waste and therefore is not licensed to do so.

Once an Energy from Waste facility becomes operational Mont Cuet will still be required to dispose of non combustible waste that cannot be accepted elsewhere such as asbestos and contaminated soil.

Longue Hougue inert waste disposal site is a land reclamation site situated on the east coast of Guernsey. The site consists of a tidal lagoon enclosed by a permeable made rock breakwater. Longue Hougue is Guernsey's only inert waste disposal site and at current tipping rates will be complete in approximately 10 years. The site is licensed to accept only uncontaminated inert waste. Agreement has been granted by the regulator for the disposal of weathered incinerator bottom ash and washed fly ash above the mean high water mark. Longue Hougue is not suitable for the disposal of untreated fly ash or hydroxide sludge.

Investigations have identified two smaller disused quarries that, subject to an Environmental Impact Assessment, could be engineered for the disposal of hazardous waste. Both quarries have a capacity of approximately 30,000m³ each although their volumes will reduce depending on the engineering work required. The identified quarries each have a lifespan of approximately 30 years for the disposal of hydroxide sludge (800 t/y) but only approximately 12 years for the disposal of dry flue gas treatment residue (2,500 t/y).

A Duly Motivated Request has been submitted to and accepted by the UK Environment Agency for the acceptance of hazardous waste currently held or expected to arise in Guernsey over the next few years. Included in this DMR are the Hydroxide Sludge (800 t/y) and ion exchange resins (12 t/y) created by the EfW facility. Should an EIA demonstrate that it is not possible to develop a Hazardous Waste site locally this will provide the support to extend the duration that the Environment Agency will accept Guernsey's hazardous waste under the Basle convention.

7.3 Solutions for landfilling of Residues generated by new plant

Residue Disposal Costs

It should be noted that all cost estimates are approximate only and will be dependent on flows and contracted routes, together with any regulatory controls to be applied. The costs noted below exclude the capital and maintenance costs of the equipment and are the disposal costs alone.

Currently it costs about £37/tonne to dispose of FGT residue in secure pits on Jersey. This figure has been used to derive the plant operating costs (equivalent to £2.00/tonne of waste)

It has been estimated that to export FGT residue to the mainland for treatment/disposal would cost about £240/tonne of residue (equivalent to £12.80/tonne of waste). A potential saving of up to £100/tonne of residue on this estimate has also been identified if Jersey were permitted to export the hazardous residue to mainland UK and the proposed RO-RO bulk tippers could be used. If residue were to be exported the legal position regarding its export would need to be established. However, it is considered that this is likely to be acceptable.

Cement solidification followed by landfill is likely to cost around about £110/tonne of residue (equivalent to £5.90/tonne of waste).

No reliable costs of vitrification have been established.

8. Programme

8.1 Guernsey EfW Plant

If a decision were made by the Panel of Enquiry and subsequently by the States of Deliberation to finalise Contract negotiations with Lurgi with the aim of making this Contract effective as soon as possible then a likely Programme would be as follows:

ID	Activity	Start	End
1	Panel of Enquiry issue report	July 2004	January 2005
2	Policy Council endorsement	February 2005	March 2005
3	States Debate	April 2005	May 2005
4	Project re-mobilisation GTS-Lurgi UK	February 2005	July 2005
5	Contract Effective		August 2005
6	EfW Plant Take Over + 27 months	August 2005	November 2007

8.2 Jersey EfW Plant and joint solution

The following table illustrates the key project phases for the Jersey EfW Plant project (located at Bellozanne) and the joint Jersey + Guernsey Plant project (located at La Collette). The increase in project programme for the joint plant is attributable to the requirement for a 6 month detailed design period for the site at La Collette.

ID	Project Item	Bellozanne	La Collette
1	Lodge R&P on Draft Solid Waste Strategy & EfW Plant	Mar 2005	Mar 2005
2	Jersey States Debate Draft Strategy & EfW Plant	Apr 2005	Apr 2005
3	Guernsey States debate on principle of combined plant		Apr 2005
4	Detailed Study at La Collette	-	Apr – Oct 2005
5	Island States approval to proceed with combined solution		Oct 2005
6	EIA / Health Impact Assessment– Site Specific issues	Mar – May 2005	Sept – Dec 2005
7	Invitations to Tender for EfW Plant	1 st June 2005	1 st Feb 2006
8	Return of Tenders for EfW Plant	31 st Aug 2005	30 th April 2006
9	Conclude Commercial Decision on Tenders	Oct 2005	July 2006
10	Funding Application	Oct 2005	July 2006
11	Funding Approval	Feb 2006	Oct 2006
12	Island States Approval to proceed	Feb 2006	Oct 2006

ID	Project Item	Bellozanne	La Collette
13	Planning & Environmental Permit for EfW Plant	Mar 2005 – Feb 2006	Nov 2005 – Oct 2006
14	Contract Award for EfW Plant	Mar 2006	Nov 2006
15	Start Construction EfW Plant	Apr 2006	Dec 2006
16	Commission EfW Plant	Feb 2009	Oct 2009
17	Demolish Old EfW Plant	Oct 2009	Jun 2010

The programme listed above is considered to be optimistic and only achievable if each stage is reached and passed without delays.

The Detailed Study for the proposed plant at La Collette would include the following:

- Review of main technical detail, including key issues identified such as FGT selection, tipping apron access, HV transformer.
- Proposal for commercial set-up between the two Islands (Special Purpose Company proposed) and between the two Islands and other contractors such as the waste transport company.
- Planning aspects, particularly acceptability of location to residents, traffic issues and visual impact.
- Discussion with Jersey Regulator on emissions and environmental issues
- Residue disposal issues including assessment of whether or not the hazardous waste fraction could be exported to mainland UK.
- Further investigation into the feasibility of applying either a RO-RO approach or a LO-LO approach.
- Exploring the current market and obtain firmer confirmation of commitment from those companies, which have expressed an interest in bidding for the project.
- Review of the Jersey Waste Management Strategy against the Guernsey Waste Management Plan to establish that the two documents are tailored to the joint solution.
- The establishment of a recommendation to the States of Guernsey in relation to what should be done with the waste in the period between now and commissioning of the joint plant in Jersey.
- Full site investigation including boreholes, soil and topographic study

9. Financial Summary

In the financial summary all figures from the preceding sections of this study have been put together to enable an overall financial comparison of 25-year Plant Lifetime costs (Net Present Value) of implementing each of the two proposed solutions.

A discount rate of 5% has been applied (resulting in an NPV factor of 14.094) and for simplicity in relation to calculating the operating costs over the Plant Lifetime, average waste arising figures have been used, i.e. 60,000 tpa for Guernsey and 105,000 tpa for Jersey.

9.1 Split solution

Item	Island	£	£
Capex	Guernsey	80,000,000	
	Jersey	84,800,000	
Sub-total			164,800,000
Opex	Guernsey per annum	1,980,000	
	Guernsey, 25 years (NPV)	27,900,000	
	Jersey per annum	2,240,000	
	Jersey, 25 years (NPV)	31,500,000	
Sub-total	Jersey+Guernsey, 25 years (NPV)		59,400,000
Total			224,200,000

9.2 Joint Solution

Item	Island	£	£
Capex	Guernsey	7,900,000	
	Jersey	113,000,000	
Sub-total			120,900,000
Opex	Guernsey per annum	3,000,000	
	Guernsey, 25 years (NPV)	42,300,000	
	Jersey per annum	3,590,000	
	Jersey, 25 years (NPV)	50,600,000	
Sub-total	Jersey+Guernsey, 25 years (NPV)		92,900,000
Total			213,800,000

9.3 Discussion

The overall picture is that there appears to be a potential financial benefit for the joint solution as compared to the split solution. The total costs are about 5% less for the joint solution. It should be borne in mind that this conclusion is made from

a point of view of looking at the total costs for the two Islands. The benefit or otherwise to each of the Islands can not be identified by the Project Team as it will depend on the commercial arrangements eventually made between the Islands.

From the tables above it can be seen that the total capex element is significantly less for the joint solution than it is for the split solution. Again, how the financing of the capex element will eventually take place is outside the scope of this feasibility study but regardless it is considered to be of interest for both Islands.

9.3.1 Sensitivity Analysis

In this feasibility study the Project Team has identified that the overall feasibility of the Project may be sensitive to a few key parameters.

The sensitivity to a) changes in discount rate from 5% to 6%, b) to increases in capex contributions for the yet untendered Jersey Plants by 30%, c) an increased income from sales of electricity for the joint solution of 2.9p/kWh as opposed to 2.4p/kWh and d) a saving of £100 for the disposal costs of the Guernsey fraction of the hazardous residues are as presented in the table below:

Issue	Split solution	Joint Solution	Difference
<i>Basis, cf. sections 9.1 and 9.2</i>	£224.2M	£213.8M	-£10.4M
Uplift of Jersey capex cost estimates by 30%	£249.7M	£247.7M	-£2.0M
Increased electricity sales price 2.9p/kWh	£224.2M	£207.6M	-£16.6M
Saving in Guernsey FGT export costs of £100/tonne	£224.2M	£209.2M	-£15.9M
Change in discount rate from 5% to 6%	£218.7M	£205.1M	-£13.6M

From the table it can be seen that the overall sensitivity of the feasibility is somewhat sensitive to increased electricity sales price for the joint plant at La Collette and to obtaining savings in the costs of disposal of hazardous residues.

However, the feasibility is more sensitive to differences between the estimates and the actual prices for the capital costs, which will not be known for quite some time as it can only be tested by going to the market with proper Tender documents. This should be read in context with a) the fact that the Guernsey element of the Project Team has serious concerns as to whether the pre-tender estimates prepared by the Jersey element of the Project Team is sufficiently robust and b) the yet unknown potential additional costs for the actual Jersey plant due to issues such as flue gas cleaning requirements and architectural requirements.

9.3.2 Key Risks

The Project Team has focused on describing technical and overall financial consequences of either building two separate plants (split solution) or one combined all-Channel Islands solution (joint solution).

During the discussions, risks related to the different solutions have been identified and the key risks and other risks are identified in the following:

➤ Market risk

There is a very significant risk that it will be difficult to obtain thorough and competitive tenders without very strong political support and confidence in the project in the light of the limited number of bidders available for this type of project. If it proves difficult to attract good tenders, the risk is that the effort put into the preparation of Tenders by the bidders is insufficient and as a result, contract negotiations and finalisation of specifications and tender design will protract significantly and costs will increase towards finalisation.

➤ Cost Estimation

There is a large discrepancy between the price of Guernsey's plant and the estimated cost of the combined plant so that more confidence would be needed in the estimated price before a definite decision could be made. If there is a significant difference between the actual prices and the pre-tender estimate then the viability of the joint solution could be jeopardised and further significant delays could occur.

➤ Planning Risks

No EIA has been conducted for the La Collette Site in Jersey. As a result there is no indication of requirements for visual expression (architecture) and a basic design has been anticipated for now. It is possible that the planners will require a) the flue gas treatment system to be contained in a building, b) architectural treatment of the entire building including landscaping and c) improved roads to facilitate access to the Plant for the increased traffic. Such requirements would increase the price for joint solution.

➤ Licensing Risks

The performance requirements (EU-Directive 4/12/2004) of the EfW Plant in Jersey are not clarified, as detailed discussions with the Jersey Regulator have not yet taken place. It is possible that the Jersey Regulator will re-

quire the emission standards to be the same as is currently the case for the proposed Guernsey Plant and this would mean considerable additional capital costs for a) a wet flue gas treatment system, b) catalytic NO_x reduction and c) larger building. Due to increased parasitic electrical load, it would also mean reduced power sales. These additional costs would partly be reduced by reduced costs for disposing of hazardous residues.

➤ Residue Disposal risks

Jersey still has made no decision on how to dispose of FGT residues. It is assumed that residues will continue to be buried in sealed pits and other options will be significantly more expensive. Guernsey does not have a landfill which would be able to receive any significant amounts of hazardous residues, and as such there is an issue in relation to disposal of hazardous residues, which will be generated by the proposed Jersey plant for the joint solution. The costings presented in this feasibility study includes for the more expensive disposal route for the hazardous residues generated from Guernsey's waste.

➤ Delays

This report provides only a brief review of a proposed complex project. Complex contracts would have to be put in place between Jersey and Guernsey and between the joint company and a) its main Contractor, b) Jersey Electricity Company, c) other contractors such as the waste transport company. It is possible that the finalisation of these documents will cause delays to the programme currently suggested in section 8 of this report.

To be able to make a decision, many of the subjects covered would need to be reviewed in greater detail. In addition further discussion and the possible reaction of local residents may cause significant delays to the overall programme.

For Guernsey, the implementation of the joint solution would mean a further indisputable delay in providing a solution. Such a delay would significantly increase the volume of waste to be landfilled and hence shorten the remaining life of Mont Cuet. This delay would be a minimum of 2 years, cf. section 8 of this report. The costs to Guernsey of this additional delay have not been included in the cost estimates for the two solutions even though it could be significant.

➤ Site

The ground risk is increased due to the location on made ground of poor quality (uncontrolled fill). However, the proposed solution is to excavate much of the fill, so the increased risk should not be significant. However, it is noted that there is very little real information on the rock location and quality and significant ground investigation is needed to ensure that the rock is suitable and that there is no tidal effect.

- Public acceptability of importing Guernsey's waste. This has yet to be tested whilst the joint solution may be popular with Guernsey residents, the reaction of Jersey residents is as yet untested. Significant benefits to Jersey residents are likely to be needed to outweigh having a larger plant on the Island.

9.3.3 Other Risks

Other risks identified are:

- Long-term availability of Guernsey's waste in case of changes in law etc. The proposed plant would be very large for Jersey alone.
- JEC. The proximity of the JEC plant is seen as an advantage. This is true as long as the current positive JEC attitude remains. If the JEC do not like the proposals, this could be a significant problem. In addition, a commercial arrangement will need to be reached with the JEC regarding any facility sharing, relocation etc.
- Quality control of Guernsey's waste – a system would need to be put in place to ensure Guernsey's waste was of an adequate quality (i.e. in terms of contaminants, shred size etc.)
- Construction delay. Both Islands have significant drivers for the new plant – Guernsey has restricted landfill and Jersey has an old plant with high emissions.
- Cost overruns. The risks for Guernsey are raised by the potential for cost increases. If capital costs for the Jersey plant solutions end up being significantly higher than the estimates then it is likely to be an issue as to how to split such costs. Depending on the commercial arrangements made between the Islands, it may have a significant impact on the feasibility for Guernsey of a joint solution if Guernsey will have to contribute significantly to cost increases.
- Poor performance of the new plant. This risk is not limited to the joint solution when compared to the split solution.

10. Executive Summary

A Project Team representing both Jersey and Guernsey has reviewed to what extent there is merit in procuring one larger Energy from Waste facility (“the joint solution”) as opposed to procuring one Energy from Waste facility on each Island (“the split solution”).

As Jersey has a larger population and produces about 60% more residual waste, the logical location for the single EfW plant is on Jersey. As significant quantities of waste will be transferred by sea from Guernsey, the location of the plant on Jersey would need to be near to the docks, and the proposed site is alongside the power station at La Collette.

The joint solution would involve the construction of a dedicated waste transfer station in Guernsey and it would require the waste to be shipped from Guernsey to Jersey. An outline scheme for the Guernsey waste transfer station has been prepared to enable the Project Team to estimate capital and operating costs.

10.1 Costs

In order to be able to compare the joint solution with the split solution, the Project Team has prepared a Net Present Value calculation for the total costs of building and operating each of the solutions over a 25-year period.

The more detailed calculation is available in section 9.

Case	Capital costs	Operating costs	Total costs
Split solution	£164,800,000	£59,400,000	£224,200,000
Joint solution	£120,900,000	£92,900,000	£213,800,000

The calculation is based on a number of assumptions and the key assumptions are:

- In the split solution, the Guernsey cost is based on actual tender values, as a contract with Lurgi UK is available and ready to be signed. The costing of the Jersey plants (in both solutions) are based on estimates prepared by Jersey’s technical consultants and the costing of the Guernsey waste transfer station is based on an estimate prepared by Guernsey’s technical consultant.
- The preparation of the estimates for the joint solution plant is based on a low cost solution having dry flue gas treatment system without catalytic NO_x-reduction. The dry flue gas treatment system has not been placed in a building envelope but is placed outdoors.

On the basis of the assumptions made, the joint solution seems to be the most feasible in terms of total costs over the plant lifetime.

This feasibility study has not considered in detail how the total costs shall be financed and obviously this would be very important to each Island.

10.2 Programme

If the preferred solution is the split solution, Guernsey could have its Energy from Waste facility operating from November 2007 (provided that the Contract between the States and Lurgi is made effective) and Jersey could have its new Energy Facility in Bellozanne operating from February 2009.

If the preferred solution is the joint solution then the new larger Energy from Waste plant could be operating from October 2009. This programme is considered to be an optimistic programme and it assumes that the implementation of this solution is smooth without delays.

10.3 Benefits and Risks

The Project Team has identified and qualified some key benefits and risks associated with implementing the joint solution and they are:

Benefits

- It is considered to be a benefit to Guernsey not to have an Energy from Waste facility in Longue Hougue. In the same instance it should be mentioned that the Site in Longue Hougue would still be required but that would be for the new waste transfer station.
- The capital investment requirement by each Island would be reduced.
- The project would make progress towards improved cooperation on large capital projects for the Channel Islands.
- There would be no need to educate dedicated operational staff in Guernsey and Jersey would transfer its experienced staff from their existing plant in Bellozanne.
- In the early years of operation (where the waste arisings are expected to be lower) the two-stream solution could provide better security as it is deemed unlikely that both lines would have long outages at the same time.

Risks

- Market risk. There are a limited number of bidders available for turnkey contracts for Energy from Waste plants and historically, the Channel Islands have struggled to make the necessary decisions and commitments. It is very expensive for the bidders to participate in such tender process and

- there is a significant risk that it will be difficult to attract sufficient qualified bidders if a clear political will to build the plant is not apparent.
- Cost estimation. The estimate for the Jersey plant is based on a low cost solution and there appear to be a mismatch between the tendered price for the Guernsey plant and the estimate for the Jersey plants. There is a risk that the actual prices for the Jersey plants will exceed the estimate. No certainty can be established before tenders are in and negotiations have taken place.
 - Planning and licensing risk. There is a risk that the planning authorities and the Regulator in Jersey will require the plant (in the joint solution) to be more sophisticated than that, which is foreseen and costed so far.
 - Delay risk. If the joint solution is preferred the point in time where Guernsey will have access to an Energy from Waste facility will be delayed by a minimum of 2 years. Contracts will have to be put in place between the Islands and the contractors for the new solution in a relatively short period of time and it is possible that these negotiations will become protracted and further delay the process.
 - Residue disposal risk. No approved solution is available for disposal of the various residues generated by the joint solution plant.
 - Site risk. The La Collette site in Jersey adjacent to the existing power station is made up of uncontrolled fill. To some extent the costing has taken this into account but whether or not this is adequate will depend on the result of further detailed ground investigations.
 - Public acceptability in Jersey for a new facility at La Collette.

10.4 Summary

This feasibility study has identified that it would be technically possible to implement a joint solution.

In terms of the calculated total costs for treating all waste over the next 25 years, the costs of implementing the joint solution have been calculated to be some 5% less than that of the split solution.

There are benefits and risks associated with implementing the joint solution. Some of the benefits are of political character.

The planning and licensing risk, the residue disposal risk, the site risk, the public acceptability risk and to some extent the delay risk can be managed by carrying out further investigative work now.

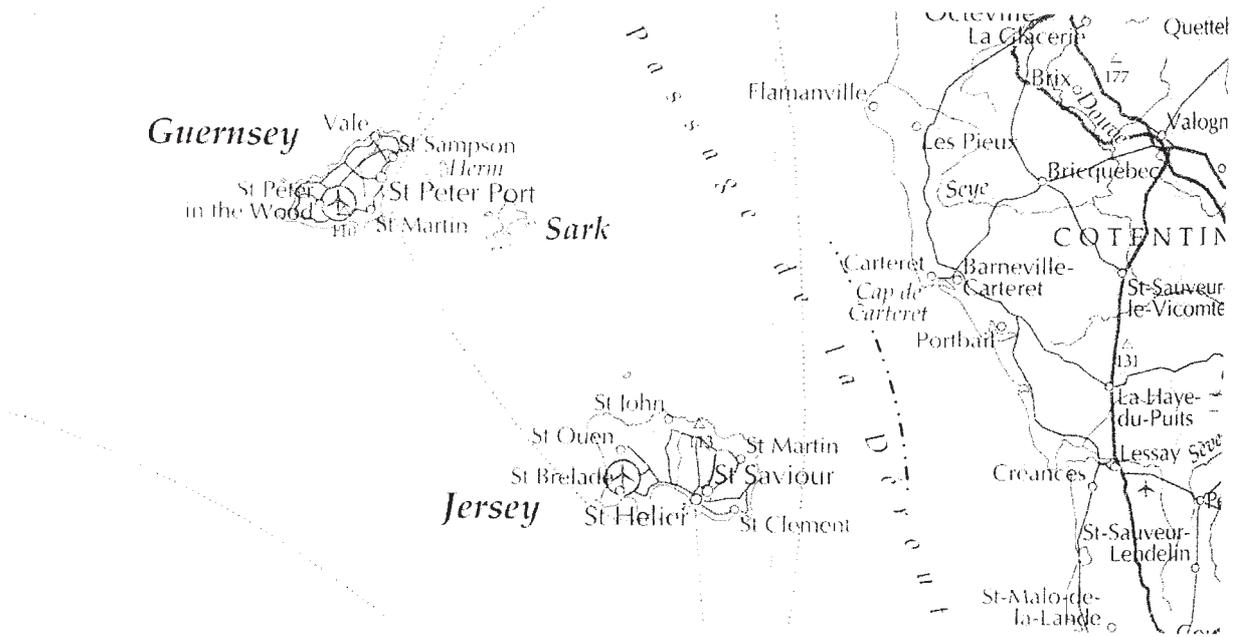
In the short term, what can be done to reduce the market risk and the cost estimation risk is limited.

To a large extent, it is a political decision whether or not on the basis of this report, the joint solution or the split solution is the preferred solution and the Project Team should not state a political view.

Provided that the joint solution is seen at this stage to be an acceptable solution, the Project Team would suggest that further investigative work should be carried out to eliminate potential showstoppers such as:

- Is the proposed site at La Collette suitable and publicly acceptable for the construction of a joint solution Energy from Waste facility?
- Carry out a confidence exercise to test the markets willingness to bid for a joint solution plant.
- Recommend various financing scenarios and clarify what the implication to each Island would be.
- Conduct a public consultation in both Islands to obtain confidence that the joint solution is publicly acceptable
- Commence an Environmental / Health impact study for the La Collette site and compare this with the Bellozanne site.
- Liase with the Regulator and the Planning authorities to improve certainty about the proposed EfW plant acceptability
- Confirm the required plant capacity based upon the waste arisings from both Islands.

It should be mentioned that if it is decided to commission further investigative work, it is likely that Guernsey will be unable to maintain contract validity and in particular the current high level of price certainty of the Lurgi UK tender.



Feasibility Study of a Joint Channel Island EfW Solution

Appendix A: Guernsey Transfer Station

January 2005

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January 2005

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Annexes:

Annex A:	Principal Waste Stream Flow (diagram)
Annex B:	Proposed lay-out of Waste Transfer Station
Annex C:	Cross Sections of Transfer Station
Annex D:	Principal layout for container changing system

1. Engineering Requirements in Guernsey – transfer station

This memo has been prepared with the purpose of roughly describing and cost estimating the civil works and process equipment required for building a waste transfer station in Guernsey (the 'Longue Hougue Waste Transfer Station' – the LHWTS) for receipt, treatment and containerisation of incinerable waste generated on the island. This memo is therefore an appendix to the main feasibility study, which assesses the overall feasibility of either sharing one large EfW Plant in Jersey ('joint solution') or building two separate plants – one on each island.

The LHWTS is assumed to be located approximately 1,5 km north of St. Peter Port harbour at the same location laid out for the incineration plant, Longue Hougue.

In order to enable transport to Jersey the waste should undergo treatment such as shredding, removal of metals and be compacted into suitable containers. Hereafter, the containers will be transported on trucks to the harbour and shipped for Jersey.

For simplicity, the memo assumes that a 'lift-on lift-off' solution (LO-LO) is implemented for containers both in Guernsey and in Jersey. An alternative solution could be the 'roll-on roll-off' solution (RO-RO). The Project Team has assessed that this would not have any significant impact on the overall feasibility.

An alternative method of pre-treatment could be baling but given the fact that the overall costs broadly speaking would be the same this option has not been further considered here. The overall system would remain the same, and logistics, as well as total costs would largely stay as set out herein. If so decided, consequently the bales would have to be cut up before incineration in order to fully burn, requiring establishment of new additional cutting and handling systems at the Jersey incineration plant.

According to the EU directive concerning Environmental Impact Assessment it is not needed to conduct an EIA in order to build a transfer station, however it depends on the implementation of the directive into national law. We are unfamiliar with the detailed implementation of requirement for EIA in Guernsey.

Due to the expected amount of waste and shipping intervals of 33 container units twice a week, it is foreseen that containers may be transported back and forth from the transfer station to the harbour at least twice a week. On the LHWTS there will be established a storage area for both empty and compacted (full) containers.

In order to avoid unacceptable unloading and loading time of the ship it must be expected that some short-term storage of both full and empty containers in the port is necessary both in Guernsey and Jersey. Containers should be transported and stocked in the port ready to be loaded upon the day of departure. Moreover, storage space for empty containers should also be available upon arrival.

2. Assumptions and design criteria

2.1 Amount and type of Waste to be received

The expected amount of waste is presently 50,000 tonne per year rising to 70,000 tons in twenty years.

On a daily basis (250 working days per year) the estimated average amount is approximately 200 tonne rising to 280 tonne per day. It is estimated that approx. half of the waste is suitable for compacting without sorting and shredding while the other half needs to be shredded. A minor part of the waste is foreseen to require to be sorted before shredding and compacting.

The LHWTS shall be designed to receive an average amount of waste in the order of 200-280 tons. With the average density of 250 kg/m³ this means a daily average volume of up to 1.100m³.

Therefore, with a built-in buffer capacity of three days, it is recommended to establish two parallel waste receiving lines, each of approx. 100-140 tons per day, line (A) for direct loading to the compacting unit and line (B) for shredding before loading into the compacting unit, including a small line (C) for pre-sorting.

It is assumed that the average daily amount of waste to be received at the transfer station may vary up to +/- 50%. Therefore, for the purpose of designing the transfer station to cover possible variations in daily amounts to be received, forecasting future waste volumes and allow for a reasonable buffer capacity (see 3.10 and 3.5), it is recommended to erect the two receiving pits somewhat larger at 1,200m³ each (see 2.3).

The types of waste to be received at the site include household and industrial waste including tyres. Inert waste and hazardous waste shall not be received. However, a storage container dedicated waste oil could be located within the transfer building. Furthermore, sewage sludge could be received in pit A if the dry matter is above 80-90%, even though a more likely scenario would be that dried sewage sludge would be separately containerised and transported from the future sewage treatment plant directly to shipping as and when required.

Please refer to annex A for the principal waste flow at the LHWTS.

2.2 Container cycles

It is recommended that stockpiling of waste at the LHWTS or in the port be not accepted for more than preferably 3 days to 5 days at the most, as decomposition of the waste inevitable will give rise to odour emissions - please refer to 3.10 and 4.2.

Containers should therefore be transported for shipping on the same day of departure.

2.3 Principal system and layout of LHWTS

The general layout and operation of the LHWTS is based on the assumption that waste is registered and weighed upon arrival at the site. Hereafter, the waste is delivered at the *Transfer Building* covering a *loading building* erected above existing ground level, and a container handling storage area at the existing terrain level (level '0').

It is proposed that a platform is built, raised about +2 metres above existing terrain level for the collection vehicles to drive onto by means of a ramp with the slope of no more than 1:20. The platform is large enough for the vehicles to manoeuvre and discharge their load into the pits placed inside this loading building erected on the platform.

It is proposed to construct two parallel receiving waste pits with a capacity of A = 1,200 m³ and B = 1,200 m³. Please refer to annex B and annex C for arrangement drawings.

After unloading into the pits the waste is loaded, partly via shredder, into a compacting container, ready for transport to the port and shipped for Jersey. All containers are stored and handled inside the transfer building, on the north and east side of the loading building, at the existing ground level (please refer to annex B, C and D).

The LHWTs shall also be provided with a limited amount of office and staffing facilities, queuing lanes, lighting, and fencing, etc. The gates shall be locked outside operating hours.

The principal layout of the waste flow is illustrated in annex A, and layout of transfer station is shown in annex B and C.

2.4 Trucks for transport of waste containers

In this study, it is assumed that the transport of containers back and forth from the port will be carried out as part of the shipping and transport agreement. We believe 3-axled solo trucks will be required due to the road limitations (ref. section 3.9).

2.5 Containers

The collection (transfer) containers are recommended to be 20' and 30 m³ in size and weighing approx. 3-4,000 kg. The compacted waste in the containers is expected to have a density of 500 kg/m³. Each container will thus on average hold 15 tonnes of compacted waste.

In order to establish a certain buffer capacity and flexibility, and make allowance for the transfer time to the port and return the containers, the necessary number of containers attached to the transfer station is somewhat larger than the number to be emptied per shipment. The total number of compacting containers is estimated to be 110.

The containers are located at the rear (east) and on the north side of the transfer building, on 2 automatic track container changing systems placed on the existing terrain level, holding 6 and 10 containers respectively. Please refer to annex D. For the purpose of designing the Transfer Station the following estimate on number of containers is used:

Placement:	No. of containers:	
Compacted and shipped	33	
Empty on way of return	33	
Outside the Transfer Station, sub total:		66
Container changing system (empty/compacting)	16	
In storage before transport (full and empty)	28	
In process at Transfer station, sub total:		44

Containers attached to transfer system in all:	110
--	-----

Table 1. Numbers of containers required.

An additional maximum 10 open 15m³ containers are foreseen for collection of out-sorted scrap metal and inert waste fraction for recycling and disposal at the landfill (line C). Open containers shall be placed on the east side of the loading building (see annex C).

3. Layout and functions

It is recommended to establish a system based on a combination of tipping of incoming waste into concrete pits, pre-sorting as required, shredding (downsizing) as required and loading of waste into large containers in which the waste is compacted by means of a stationary compacting unit. All activities shall take place inside a building so that all, which can be seen from St. Peters Port would be vehicles entering and leaving the LHWTS. This requirement implies that the building becomes fairly large.

The recommended arrangement shall include:

ID	Component:
1	Access and exit roads
2	Internal roads
3	Weighbridge and registration for incoming and outgoing traffic
4	Tipping of incoming waste from vehicles in to pits (line A + B)
5	Sorting as required (line C)
6	Shredding (2 units) of approx. 50% (line B)
7	Loading in 2 compactors by use of transfer-crane mounted with 3 ton grab, excavator with grab and conveyer belt
8	Loading of the waste containers by means of 2 stationary compacting units
9	Automatic container changing system (2 rail track systems)
10	Storage area for full and empty containers
11	Handling and loading area for heavy vehicles for transport to shipping, and support of container track system
12	Maintenance and washing cleaning area for vehicles, equipment and possibly for regular cleaning/disinfection of containers in accordance to local requirements. Proposed separately from the Transfer Building (not included in proposal).

Table 2. Components of Transfer Station

A layout sketch of the site is shown in annex B. A principal sketch of the cross section of the transfer building including pit and compactor are illustrated in annex C.

3.1 Access and exit roads

All access to the transfer station is through the main gate from the existing road to the west of the site.

3.2 Internal roads

One-way roads are the preferred solution for internal roads at a transfer station. This allows for easy conduct of traffic and minimising of queuing.

With collection vehicles turning and rearing towards the edge of the platform for tipping, full one-way traffic is not possible in the area in front of the pits. As a result two-lane roads and sufficient space for manoeuvring at the transfer station and at the tipping platform should be maintained for all vehicles. Besides, operation of the delivery vehicles and the vehicles that remove the filled containers must be kept separate and managed to avoid traffic congestion.

Queuing of incoming collection vehicles during rush hours may not be fully avoided, but sufficient queuing lane is foreseen established inside the transfer station so that queuing should be minimised outside the premises.

However, due to the uneven arrival of collection vehicles for discharge, some queuing of collection vehicles must be expected at the transfer station. The layout is intended to accommodate for this, i.e. the incoming collection vehicles may queue on the entrance lane of the road leading to and from the discharge platform. This can be done without causing other problems, as only the delivery vehicles use this road and the exit road is kept clear at all times. Vehicles for collection of containers access the transfer station through the main gate, but bypass the weighbridge directly to the container loading area.

All internal roads, ramps, the platform and other operating areas are proposed paved with asphalt or interlocking concrete stones to facilitate cleaning and maintenance for continuous access to the site. The surface layer also allows for collection of all surface water to be led to the sewage system.

The final design of the structure of the pavements depends on e.g. the results of the geo-mechanical investigations. Generally, all working areas and surfaces shall be designed for heavy traffic.

3.3 Weighbridge and registration for incoming and outgoing waste containers

In order to account for the waste received at the transfer station, as well as outgoing waste, it is recommended to provide the station with two weighbridges and related electronic waste registration system. Weighing of waste is the basis for accounting with the authorities, waste producers, transporting companies, the disposal at the landfill and the shipping of the waste.

The waste registration system is essential, as it will provide the basis for payments the costs between the waste producers and the transfer station will be based on the tonnage flow through the station. Standard information will be registered for all relevant vehicles so as to establish a record of all movements.

In connection with the registration of incoming waste the selection of the area and line for unloading (pit) and other handling requirements shall be defined depending on the type of waste fraction received.

In addition the registration system should be extended to include a logistic management system for the waste containers on the site and for shipment.

It is recommended to establish an electronically computerized weighbridge on the entrance lane to the station in front of the office building. The weighbridge contains a number of weighing cells connected to a computer in the office building.

The weighbridge is established in a pit, thus the top of the weighbridge slab is level with the road. For removal of water from the pit a drainage pipe is established in a hollow at the bottom. The pit is constructed in reinforced concrete. On the top of walls of the pit, angle iron is mounted for protection. The weighbridge slab is constructed as a steel construction with standard I-profiles with a concrete surface.

The design criteria of the weighbridges are a minimum width of 3 m and a length of 10 to 18 meters.

3.4 Transfer building

The LHWTS is proposed to be constructed as a steel frame structure with facades and inner wall sides covered by aluminium profiles or similar for easy clearing and maintenance. Heating within the building has not been anticipated. The proposed building construction is relative easy to expand if more space is required at a later stage.

3.5 Tipping of incoming waste from vehicles in to pits

Delivering and unloading of waste from vehicles shall be from the platform into the pits placed in the *loading* building (refer to annex B and annex C).

3.5.1 Unloading platform

The platform is suited inside the *loading* building. The platform area allows the vehicles to manoeuvre before unloading in to the pits (refer to annex B). The platform shall be levelled +2.0 m above existing terrain level.

The platform shall be constructed by e.g. retaining walls possibly with a thickness of 300 mm reinforced concrete and with the internal part of the platform being build up with material excavated during the preparatory works and addition materials supplied to the site.

3.5.2 Loading building

It is recommended to establish a permanent building for the unloading and handling of the waste within the transfer building.

The building shall be erected on the same level as the platform.

The building is proposed to be constructed as a steel frame structure with facades and inner wall sides covered by aluminium profiles or similar for easy clearing and maintenance. Heating within the building has not been anticipated.

For size and main dimensions of the building please refer to annex B and C for principal layout.

The building shall contain the following items:

Ref.:	Loading Building Item:
1	2 Pits for unloading, 1.200 m ³ each, and area for unloading to pre-sorting
2	1 Travelling Crane mounted with grab for loading of compactors and shredders, 3 ton capacity
3	1 Vehicle (e.g. excavator type) mounted with grab for manual sorting and loading of shredder
4	Various containers for out sorted materials to be disposed of or recycled elsewhere (to be placed outside building)
5	2 Shredders for down sizing items before compacting
6	1-2 Conveyor belt for loading from shredders in to compactor
7	1 Overhead Magnetic Separator for removal of iron, and 1 Eddy Current equipment for removal of other metals, mounted above conveyor belt
8	2 Compactors for loading in to containers
9	Operator/control room

Table 3. Items included in loading building

3.6 Automatic container changing system

A double automatic container changing system based on a rail track system is to be implemented. The systems are placed on the east and north side of the loading building.

The containers are placed on and removed from the track by use of a container-loading vehicle. The containers are moved forward either manually or by an automatic wire system. The containers mount to the compactor automatically with the hydraulic "claws". Please refer to annex D.

3.7 Storage area for containers

On the (east) rear end of the transfer building, areas shall be established for the storage of containers. The area may be separated in to areas of empty and compacted (full) containers, depending on the final design of the container handling and management system.

Concrete slabs shall be constructed under the locations for the containers as the unloading of the containers and the collection provides a large impact to the surface during this operation. The minimum structure is assumed as follows (from bottom and on a compacted sub grade):

- 500 – 600 mm granular sub-base
- 50 mm blinding layer of concrete, $f_{ck} \geq 5$ MPa
- 250 mm reinforce concrete, concrete $f_{ck} \geq 20$ MPa, reinforcement ribbed bars with $f_{yk} \geq 400$ MPa

The container storage area may for economic reasons be divided in to specific unloading areas and areas designed "only" for heavy traffic (see also 3.2).

3.8 Handling and loading area for heavy vehicles for transport to shipping

Area space shall be reserved for delivery of empty containers and loading of compacted (full) containers on to the trucks for shipment.

3.9 Transfer Vehicles and transport regulations

The Traffic Committee regulations on vehicle size are as follows:

- Longue Hogue to St Peter Port Harbour Route
Articulated Vehicles: Max Size 16.55m length (including tractor) 2.6m width, Max weight 44 tonnes (max 9 tonnes per axle). There are no height restrictions set by the traffic department.

The route that would be taken from Longue Hogue Transfer Station to St Peter Port is the route already used by heavy vehicles.

It is recommended to use a vehicle capable of loading and unloading containers independently.

- Rest of Island
Articulated Vehicles: Max Size 10.67m length (including tractor), 2.3m width, Max weight 28 tonnes, 4-axle vehicle (max 9 tonnes per axle). There are no height restrictions set by the traffic department though they would advise a maximum height of 12 ft (= 3,7 meter) as this is the height limit for overhanging tree branches.

Rigid Vehicles: Max Size 9.45m length, 2.3m width, Max weight 28 tonnes, 4-axle vehicle (max 9 tonnes per axle). There are no height restric-

tions set by the traffic department though they would advise a maximum height of 12 ft (= 3,7 meter) as this is the height limit for overhanging tree branches.

The containers will, in accordance with the requirements for the Longue Hougue to St Peter Port Harbour Route, be 30 m³ containers about 2.2 metres high, 2.6 metres wide, and 6.5 metres long. The truck traffic with containers generated on the LHWTS shall then be limited to this route.

3.10 Flexibility and buffer (both in the pit and on-site)

The transfer station construction must allow for some flexibility, especially with regard to the waste amounts transferred and the number of containers to be handled and transported each day. A day-to-day variation must be expected refer to section 2.1.

Alternatively, calculation of the amount of waste forecasted to being generated in 20 years from now (approx. 70,000 tons/year) would cover this uncertainty. However, increasing the transfer vehicle fleet and the number of containers serving the transfer station, and increase in shipment, thus increasing the transport capacity, shall in most cases achieve increased transfer capacity. This is a more cost efficient solution than allowing the number or volume of pits to be increased, as the increase in transport capacity must anyway be provided.

The layout and intermediate storage (during the day/time cycle) in containers at the transfer station in combination with transport capacity between the transfer station and the harbour is therefore planned to meet the daily demand of transport of waste from the collection areas.

Due to the amount of waste for downsizing and the relative sensitive downsizing process it is proposed to purchase two shredders. Then it will be possible to take one out for service and still be able to continue the flow in facility B.

3.11 Other requirements

Following design criteria should be applied:

- The site has to be guarded with a permanent staff present within opening hours a) to ensure registration of the incoming vehicles, b) to guide the drivers of the waste delivery vehicles, c) to maintain tidiness of the site, d) to operate the loading crane, e) to ensure that containers are shifted constantly, f) arrange for transport to harbour.
- The Transfer building and loading building placed inside, are proposed to be constructed with facades covered by aluminium profiles or similar, for easy cleaning and maintenance.
- Regarding the *loading* building it is generally recommended to close of the building from the other parts of the Transfer Building due to possible dust and noise from the operation.

For reason of maintenance and to enable easy and direct access to the main (heavy duty) equipment as shredders and compactors it is recommended to erect the east wall of the loading building with a (sliding) door system or otherwise easy removable system.

- The site shall contain office/staff facilities for the permanent staff of the transfer station. The building shall be connected to the public sewage system as well as power and water supply systems.

The size of the office building should be minimum 50 m² and shall contain the following:

- Offices for the waste registration officer and possibly office for the foreman
- Locker rooms
- Kitchen and lunch room
- Toilet with baths in accordance with health and safety regulations in consideration of type of work and type of waste to be handled
- Depot (small tools and spare parts etc. will be stored).

In the design of the building, it is important that the registration officer shall have clear sight to the main entrance as well as to the weighbridge.

The building proposed to be constructed with facades covered by aluminium profiles or similar, for easy cleaning and maintenance. The office building shall be heated.

- The access ramp and area to unload into the pits shall be protected with safety rails and other safety measures as deemed necessary.
- The site perimeter shall be fenced.

It is recommended that the entire transfer station shall be fenced with a 2-m high fence with columns in concrete or steel. The entrance gate shall be 4-8 m wide in a solid construction in the same height as the fence. The gate shall be lockable.

- All other areas than those paved with asphalt or interlocking concrete stones shall be paved with gravel

3.12 Electricity

Supply of electricity shall be established via the local grid.

The LHWTS shall be illuminated for the vehicles to manoeuvre safely. It is important that also the area in front of the office building and at the weighbridge is illuminated for waste registration officer to observe the trucks. It has been assumed to erect a sufficient number of up to 8-m poles/wall mounted e.g. 200 W armatures placed inside the transfer building and in the site perimeter.

3.13 Water Supply

The water supply shall be provided via a service pipe from the public water supply located in the main road. The water supply shall furnish the building with water and one connection outside the building for washing the containers and pavements.

3.14 Sewage

Relatively small quantities of sewage water derive from the buildings. All surface water from the site shall be collected and the sewage water shall be led to the public sewage system.

Please note that erecting of a washing facility for vehicles and containers may result in establishment of additional facilities in accordance to local requirements.

4. Operation

It is expected that the transfer station will be open Monday to Friday for 7 am to 4 pm and Saturday from 7 am to 12 pm.

4.1 Staff

The permanent staffs of the waste transfer station consists of the following job positions:

- Foreman
- Waste registration officer (weighing and registration, admin.)
- Checkers (guiding drivers, checking of incoming waste, etc.)
- Manual workers (cleaning of areas, assisting the foreman, driver assistant etc.)
- Driver, sorting and loading vehicle
- Transfer Crane Operator
- Container shifting operator

In total 10 permanent staff on site is foreseen.

4.2 Odour control

For limitations of odour emission to surroundings, the main assumptions shall be as follows:

Stockpiling of waste at the transfer stations should be within the container cycle refer to 2.2, as decomposition of the waste, especially in the summertime, will give rise to odour emissions and attract rodents and insects. Containers must therefore as far as possible be transported for shipping within this timeframe. This issue on interim storage of waste shall be carefully considered and clarified with relevant authorities.

The main "share" of odour is considered to come from the *loading* building. An odour control system, including odour removal and air-sterilisation system (e.g. BIOZONE, Germazap or similar), may be supplied to the Transfer Building for limitation of odour emissions, both from the *loading* building as well as from the container handling and storage areas. For this ventilating of the transfer building it must be expected to require a powerful system.

In addition, it is recommended to install an odour monitoring system (e.g. *OdorSonic System* or similar). This system should include a number of odour measuring and sampling points strategically placed around the site. The system should include software and database for estimation and simulation of spreading of odour annoyance and intensity from the site, based on wind vector, atmospheric turbulence, temperature and assembled parameters and so forth. This system would allow the site management to take measures for a short-term reduction of the emissions. These measures again lead directly to the mitigation of the impact and annoyance situation in the surrounding areas.

4.3 Other Precautions

Care must be taken to keep the transfer station tidy and to avoid flying items to go beyond the premises of the transfer station. Staff must clean (sweep) the outdoor and indoor surfaces of both discharge platform and transfer container bays by the end of each working day and remove at least once a week flying objects which have escaped the premises.

In order to prevent spillage during discharge from collection trucks in to the pit, the platform from which the discharge takes place is provided with a steel shield extending over the pit so that the waste is directed. All working areas inside the loading building (e.g. around pre-sorting area and shredders) shall be kept tidy at all times.

Health and safety precautions and installations shall be taken into considerations during final design of the station.

5. Cost estimate

Further to the conditions stated for the design above, which have an influence on the size of the investments, the following assumptions are made for the investment and operation budgets:

- Price level of December 2004
- The works are assumed to be conducted by local contractors
- Detailed design and tendering are included in the investments as preparatory works.

5.1 Investment

The investment costs are presented in the table below.

M&E Works Item	no.	Cost	
		£/unit	£
Weighbridges	2	85,000	170,000
Refuse Crane	1		340,000
Hopper/Compacting Unit	2	65,000	130,000
Shredder	2	250,000	500,000
Conveyor Belt	1		40,000
Overhead Magnetic Separator	1		50,000
Non Ferrous Metal Separator	1		120,000
Compacting Containers	110	8,000	880,000
Open containers (15 m3)	10	1,000	10,000
Container Rail System	2	30,000	60,000
Wheelloader/excavator (pre-sorting)	1		90,000
Vehicle (Container Handling)	1		60,000
Biofilter, including fan	1		220,000
CMS, electronics	1		250,000
M&E Works Total			2,920,000
Civil Works			
<i>Infrastructure</i>			
Site Preparation			290,000
Roads and Hardstandings			1.100,000
Landscaping			75,000
Site Services (Lighting, Water Mains)			110,000
<i>Substructures</i>			
Bunker			95,000
Pits, Sumps			15,000
Piling			240,000
<i>Superstructures</i>			
Floor Slab			85,000
Equipment Bases			10,000

<i>Building Structure</i>			
Building Envelope			1,100,000
Electrical Installations			190,000
Control Room			75,000
Administrative Offices			210,000
Architectural Treatment			50,000
Prelims			300,000
Civil Works Total			3,945,000
Contingency (15 %)			1,030,000
Capital Investment Costs, Total			7,895,000

5.2 Operating costs

The operating costs are presented in the table below.

Operating Costs	no.	Cost	
		£/unit	£/a
Staff	10	30,000	300,000
<i>Maintenance</i>			
M&E Elements (% of cap. costs)	12.0%		350,400
Civ. Works Elem. (% of cap. costs)	2.0%		78,900
<i>Consumables</i>			
Electricity, kWh ¹⁾	2,000,000	0.072	177,600
Total Operating Costs			906,900

¹⁾ Electricity costs include a monthly fee based on peak consumption.

5.3 NPV

Considering the capital investments costs above and the operating costs the annual costs including capital expenditure and operational expenditure can be calculated. Using an interest rate of 5 % and a plant lifetime of 25 years the following gate fee can be estimated:

NPV summary	Cost	
	£	£/a
Capex	7,895,000	560,167
Opex		906,900
Cost, Total per year		1,467,067
Cost per tonne (50,000 t/y)		29.34

6. Summary

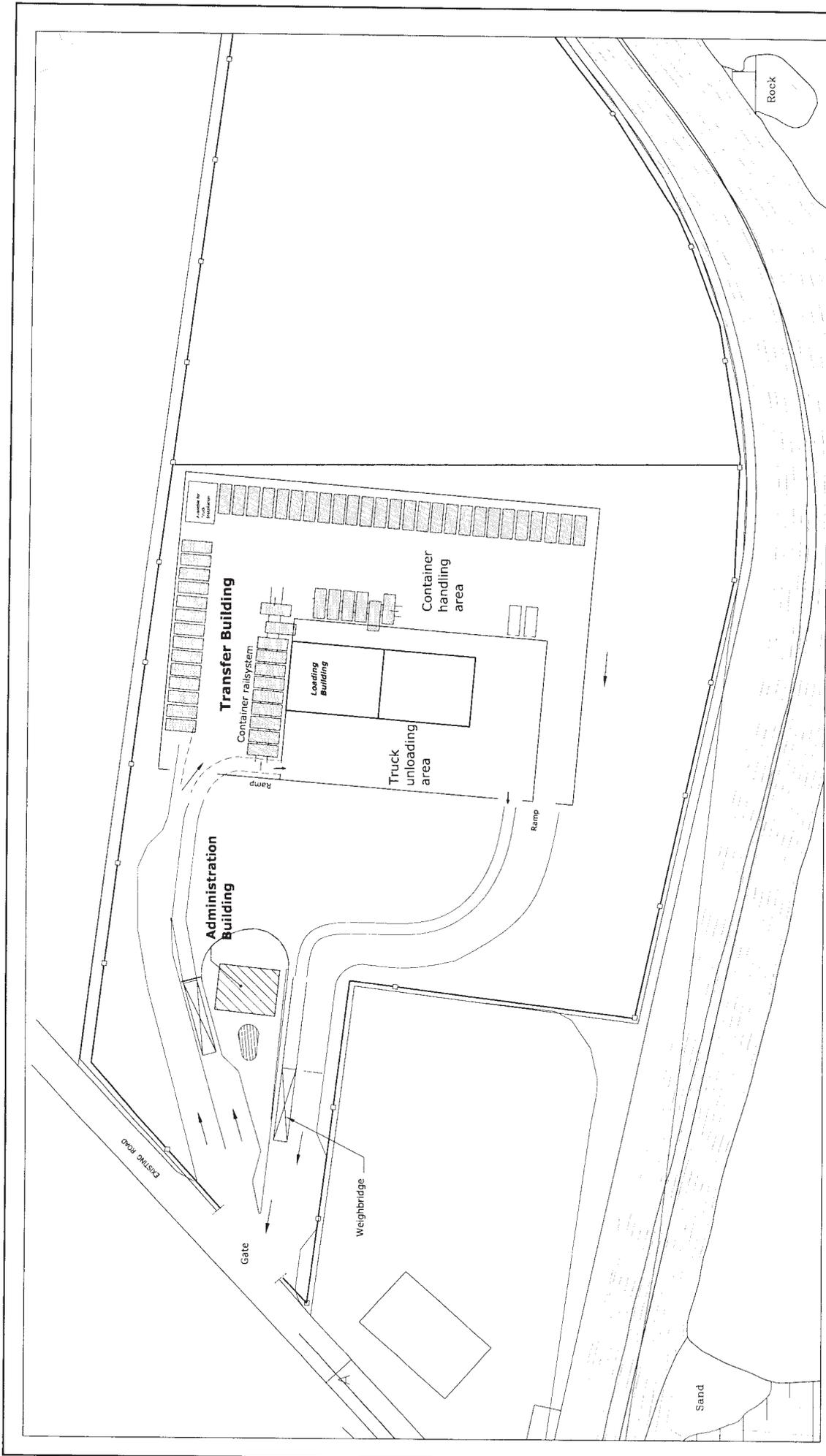
This report has presented the design and estimated the costs of a transfer station.

It is recognised that both the design and the cost estimates could be further optimised but it is the view of the Project Team that it would not change the total costs significantly.

The capital cost element of the LHWTS has been estimated to £7.9 M. In addition, the costs of maintaining and operating the facility have been estimated to £900,000 per year.

The NPV estimation suggests that the price of handling one tonne of waste is approximately £29 in the early years of operation of the LHWTS.

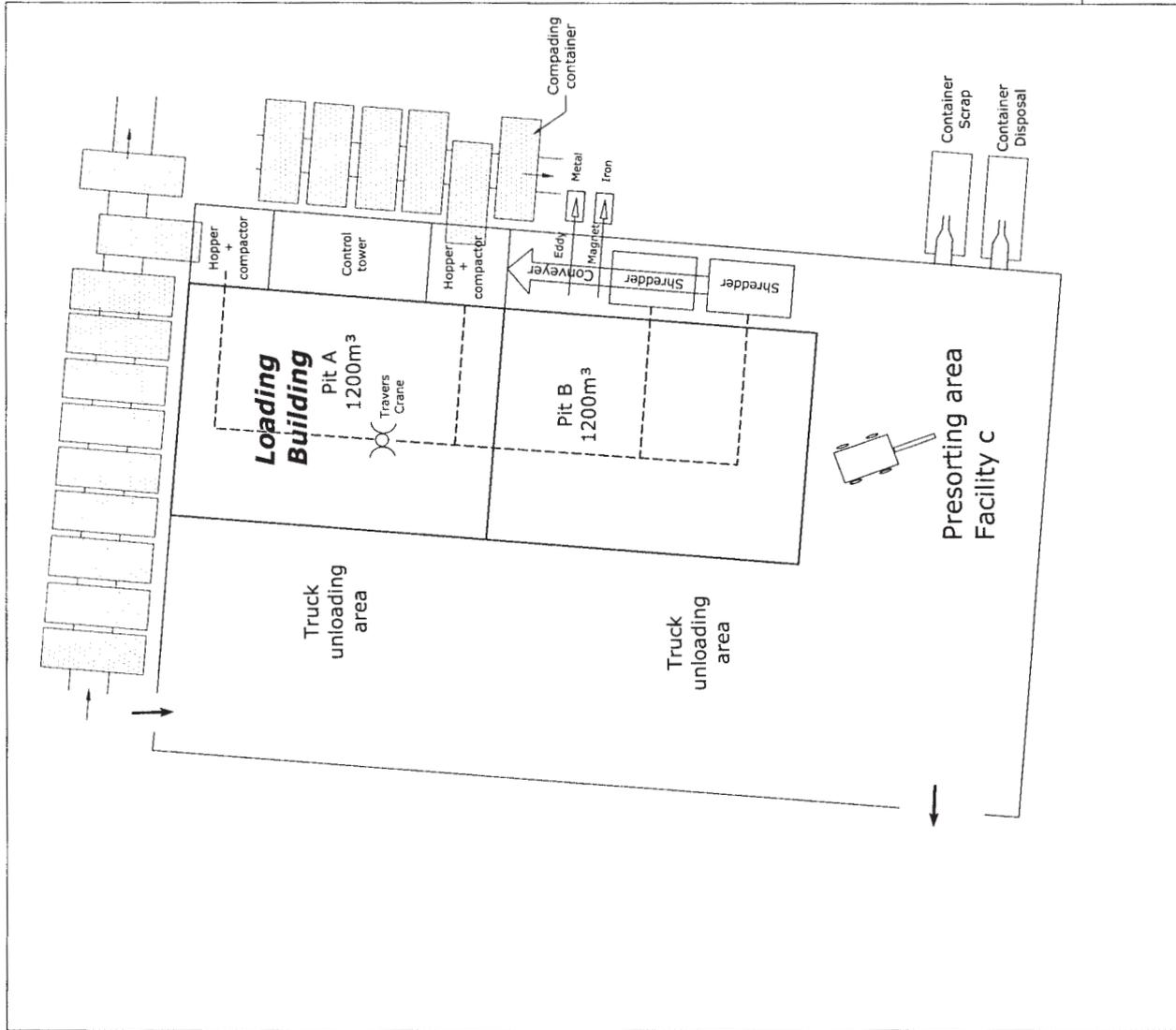
This price will slightly decrease as the waste arisings increase.



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Rev. Date Prepared Checked Approved
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States of Guernsey Environment Department
Transfer Station, Lay-out

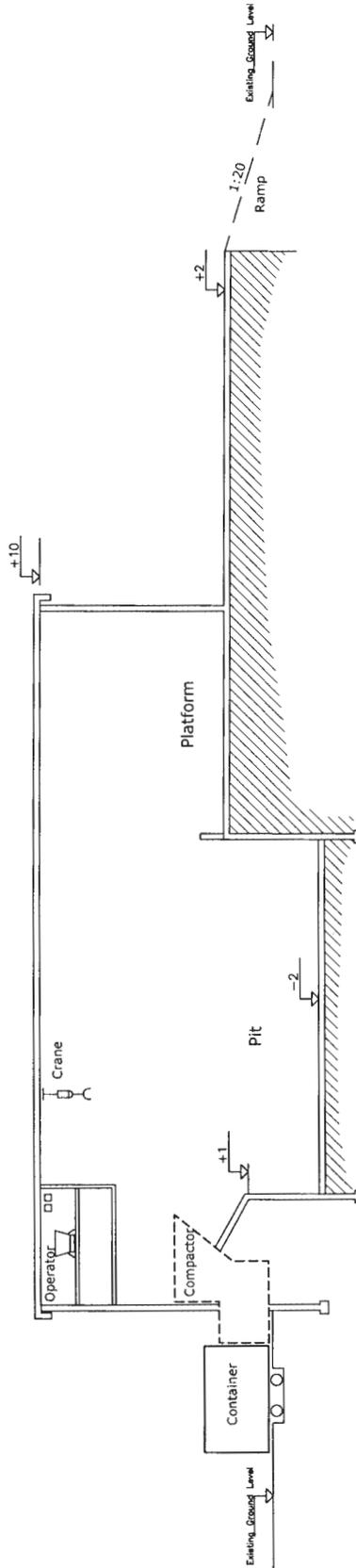




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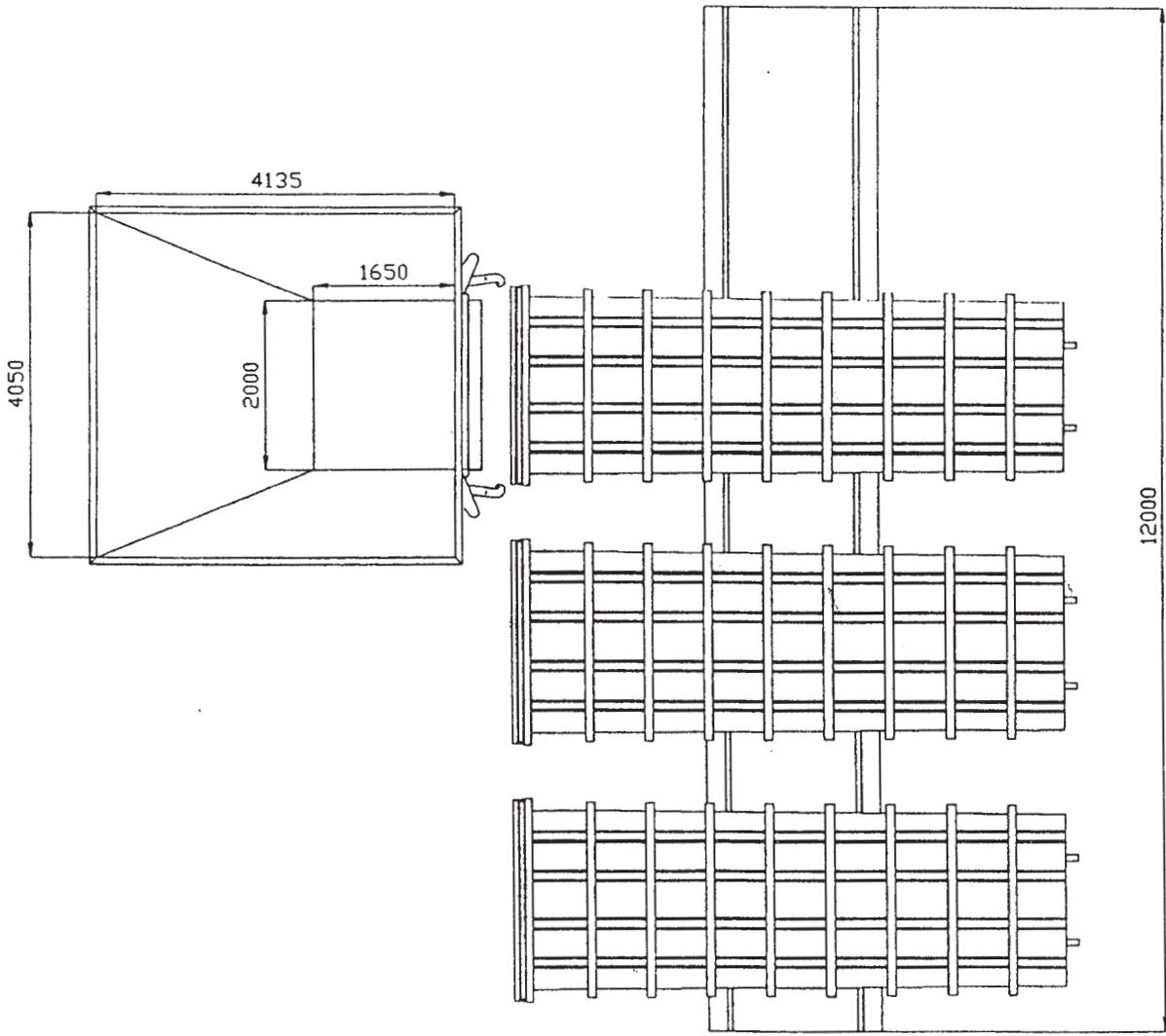
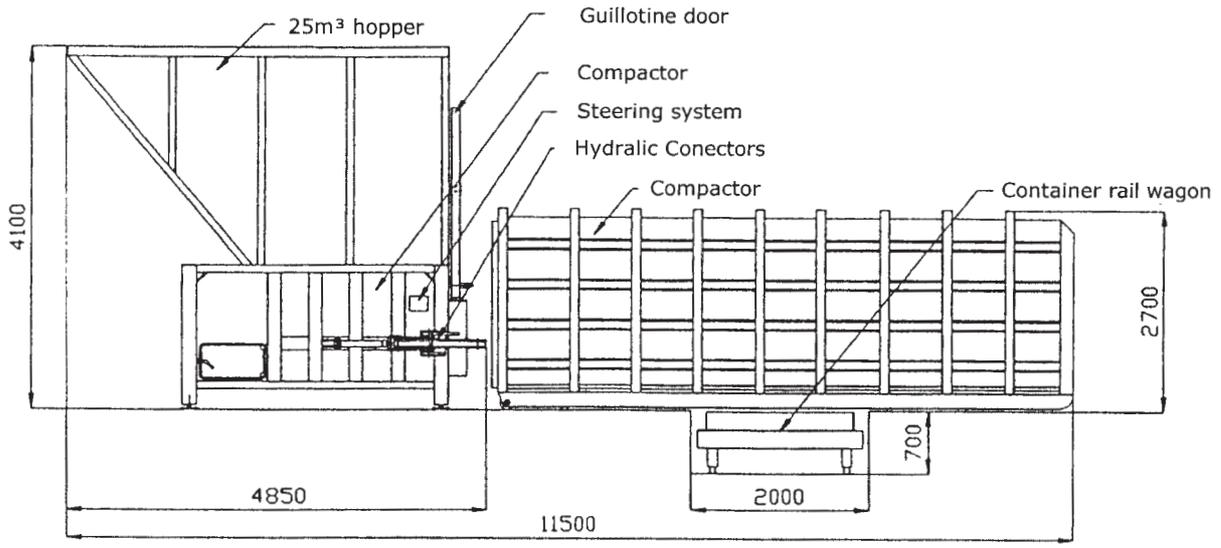
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States of Guernsey Environment Department
 Transfer Building Cross Section





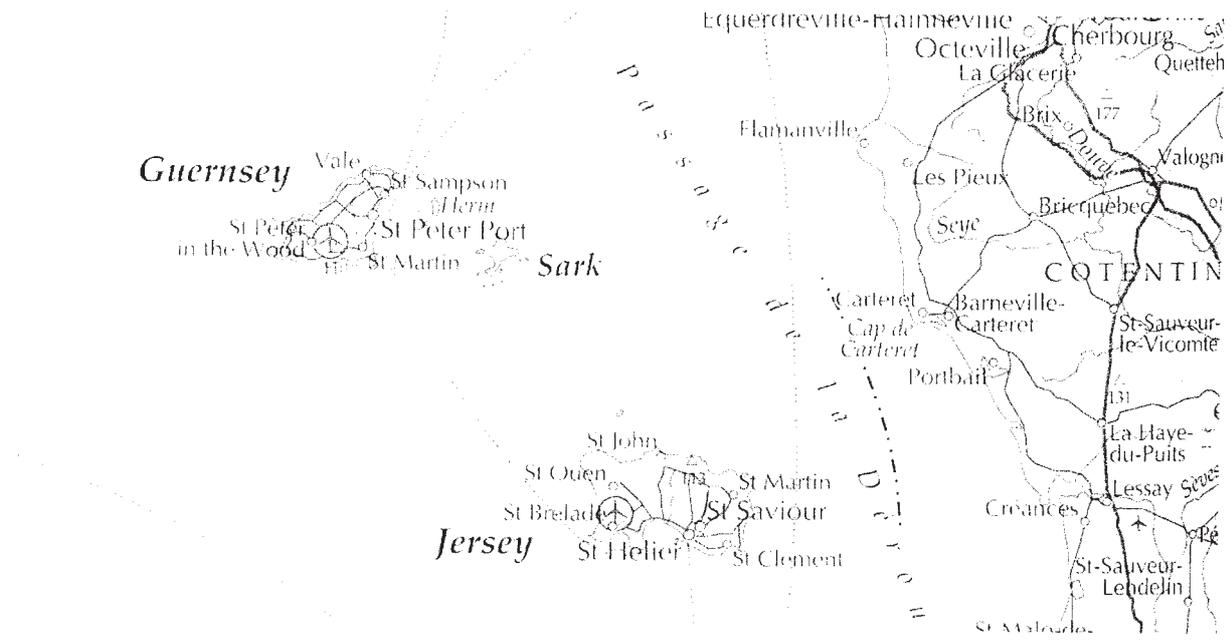
Rev.	Date	Prepared	Checked	Approved
	2004-12-08	2004-12-08	SIMA/JWS	NIS

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States of Guernsey Environment Department
 Container Compacting System (Example)



Feasibility Study of a Joint Channel Island EfW Solution

Appendix B: Specific Civils Requirements in Jersey

January 2005

Appendix B:

Specific Civils Requirements in Jersey

January 2005

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1. La Collette Energy from Waste Plant: Specific Civils Requirements

1.1 The Brief and Objectives:

The following report discusses the site-specific issues with constructing a new Energy from Waste facility adjacent to the existing power station. The list of issues is not necessarily exhaustive and costs and quantities are very much outline. The scope has been derived from assessing the main differences between siting the plant on this site as opposed to a location adjacent to the existing incinerator at Bellozanne. It has been assumed that the site at Bellozanne would enable the proposed plant to be founded directly onto bedrock with minimal ground works.

1.2 Foundation Strategy:

Assumed ground conditions are as given by a Preliminary Geological Desk Study prepared by Amplus in December 2004 together with the results of a large trial excavation at the Abattoir site on 13 December 2004. The desk study contains 4 series of ground condition results, 2 of which are relevant to the location of the development and given in Appendices 2 & 4. The boreholes in Appendix 2 are relevant to the Flue Gas Treatment (FGT) showing Made ground over rock at ~7m depth. The boreholes in Appendix 4 are relevant to, but somewhat removed from, the approach ramp indicating rock at around 12m depths. The Fill record for both these areas shows inert sand, stone, brick, concrete and "boulders" in a silty matrix. The recent trial pit was excavated to around 4m depth to examine the fill content which appears to contain mixed demolition rubble as elsewhere but including metal items such as angle iron, springs, wire and large boulders of stone and concrete, some reinforced.

There are several components of the proposed plant and associated infrastructure that can be considered separately due to their elevation or applied loading as follows:

- Approach Ramp and Tipping Apron, rising to some 7-8m above existing ground level (egl).
- Bunker some 7-8m blow egl
- Boiler Building with heavy plant at egl
- Flue Gas Treatment normally loaded also at egl, south of transformers
- Flue stacks (pair at 100m high) within a windshield, south-west of FGT

It is thought that the quality of the Fill is particularly poor in the vicinity of the Abattoir / bunker & boiler house where the old contractor's compound existed and possibly contained demolition waste and surplus random material subsequently incorporated into the fill without sorting and compaction. This ground would not be suitable for the level of loadings required nor could it be suitably improved by techniques such as dynamic compaction, dynamic tamping, vibro-compaction or vibro-replacement with traditional forms of foundation (i.e pads or strips). The obvious foundation option is to use piles as have been used for other structures in the area. However the observed poorer fill containing more and larger obstructions together with the significantly higher loading requirement (~3,500kN per column at 6m centres) of this project combines to make piling a high-risk foundation option. The only pile type considered viable in these conditions is a "small" size drilled and permanently cased one. Adopting such a pile type installed from existing

ground level would be likely to incur penetration problems due to the metal inclusions prevalent in the upper zone of the fill.

Consequently a foundation design at this feasibility stage without better and further information on the ground conditions would have to conclude that additional measures need to be taken to facilitate adequate foundations in the Abattoir without undue risk. These include:

- Excavation to bedrock and replacement with concrete or engineered fill. This would result in dewatering and stability problems.
- Partial excavation to base of Made Ground (say 4-5m depth) and replacement with concrete or engineered fill. No dewatering anticipated and reduced stability concerns
- Partial excavation to remove obstructions in fill, probing to confirm freedom of material below, replacement with engineered fill and pile installation using heavy duty casing.
- Dynamic and/or vibro methods of ground improvement in conjunction with a thick reinforced concrete raft foundation.

Structural deformation tolerances impact on the above selection. There would be severe differential settlement if the bunker was taken to rock and the boiler house was not piled or founded on concrete on rock. Assumed settlement tolerances have been taken as ~10mm. For costing purposes therefore, it is recommended that either the second foundation option with concrete replacement or the third option is adopted for the boiler house.

For the lesser-loaded FGT (1000kN column loads at 6m centres), located adjacent to the Power Station's engineers offices, some improvement in ground conditions could be expected such that the risk of piling problems due to obstructions is reduced. There are also less piles needed and therefore more contingency positions available should some meet premature refusal. Consequently a piled solution installed from existing ground level together with an allowance for supplementary pile numbers should be appropriate.

The approach ramp over the existing road is the potentially most difficult structure for which to select a foundation option since there is limited contingency for either excavation or repositioning the piles. The quality of the fill may improve as the ramp overprints the road at 5m height plus but elsewhere as it approaches this height, excavation to ~4/5m depth would be necessary and encroach towards the public highway. The exact alignment would need to be considered with such temporary works in mind.

The flue stacks contained within a windshield some 6.5m diameter will need to be founded either on a concrete caisson type block taken onto rock or on a thick pile cap supported on piles. The foundation caisson or pile cap would need to be wider than the superstructure to provide sufficient lever arm to resist extreme wind loadings (approx 13m diameter). For the caisson option a top-down form of construction support is envisaged so as to minimise disruption to the surrounding ground thereby reducing the lateral support. Dewatering would be needed to allow the rock formation to be suitably prepared to receive concrete. Ground anchors drilled and grouted into the rock could be installed from ground level and post-stressed to combat horizontal wind loads. (Allow 25 number bars 40mm dia to ~20m depth).

The pile cap option would need excavation and removal of the obstructive fill and replacement prior to piling as for the boiler house. No dewatering or rock formation preparation would be needed and some of the piles could be

socketed to act in tension. For costing purposes the piling option is recommended with a 3m thick RC cap integral with the windshield structure.

2. Menu of Civils Costs

2.1 Approach Ramp and Tipping Apron piled to rock

Rock assumed at 10m below egl

100m length of ramp (to take 2 No. 40T gross weight vehicles), plus 900m² elevated Apron on columns at 6m centres, both supported on piles / pile caps (assume additional 25% of cost of superstructure).

Probing would be required to confirm clearance below and /or local need for partial excavation to 4.5m (assume required), sorting of arisings and replacement to form engineered fill, resurfacing of 350m² of existing road. Obstructive arisings would be required to be transported off site to a licensed tip. Re-useable arisings to be stockpiled for subsequent replacement and compaction as road formation. Supplementary granular material up to 1/3 of excavation quantity to be imported, placed and compacted, provided by Client or deficit accepted and ground left lower.

2.2 Bunker on rock assumed

Rock assumed at 8m below egl

Bulk excavation of whole building one footprint comprising Tipping Apron, Bunker and Boilerhouse to be commenced to 4.5m depths possibly in stages to minimise extent of stockpile. Bunker to be further excavated to rock head, assumed at 8m. Cofferdam likely for second stage excavation with dewatering and rock formation preparation. Also likely to require rock dowels / grouted bar anchors to combat buoyancy effects. Bunker walls in ground to act as retaining structures,

2.3 Boiler Building with heavy plant

Rock assumed at 8m below egl and Made Ground to 4.5m below egl

Bulk excavation as above to 4.5m, sort arisings and assume reuse 2/3 as engineered fill with up to 1/3 classed as obstructive and removed to a licensed tip. Supplement the deficit with granular material, client supplied material or construct the floor slab below ground level. All three options would have cost implications, the latter would require that the first meter of the wall would be reinforced concrete, monolithic with the base slab and possibly supplemented with a tanking membrane. The first and last option would be likely to cost in the order on £100k while the 2nd would be much less as the material would be 'free issue'. Install piles after advance probing as required (5 No. as pile cap per column and elsewhere at 3m centres as floor slab support). Cast suspended floor slab assumed 500mm thick RC where as this would be say 150mm if cast directly over bedrock. Therefore an allowance for a 350mm thick slab (500-150) has been used for the purpose of a cost breakdown.

2.4 Flue Gas Treatment (FGT) normally loaded

Rock assumed at 8m below egl

Assume no excavation of fill, probe to confirm this assumption and install piles, 2 per column base and elsewhere at 3m centres as floor slab support. Cast suspended floor slab of same thickness as that used in Section 3 above.

2.5 Flue stacks in Chimney / Windshield

Rock assumed at 8m below eq!

Excavate to 4.5m with battered sides to remove obstructive fill. Sort arisings and remove up to 1/3 off site, probe pile positions to confirm clearance below and backfill with selected arisings plus granular to underside of pile cap. Install sufficient number of combined axial (800 kN capacity) and tension socketed piles (allow 10 such piles), cast 3m thick pile cap integral with windshield chimney.

3. Foundation Works at Site adjacent to Incinerator

Extensive site investigations would be required to enable the detailed design to be completed as well as confirm the assumptions, which have been made to date. Details of the rock head with respect to levels and properties as well as the contaminants in the made ground would have to be established at a series of locations around the proposed site.

4. Notes / Assumptions:

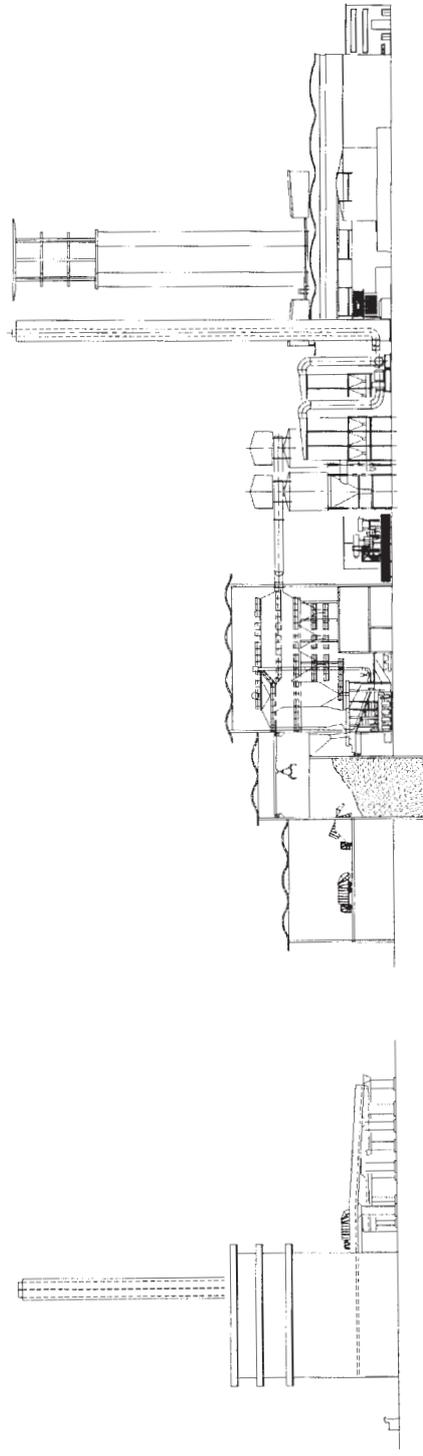
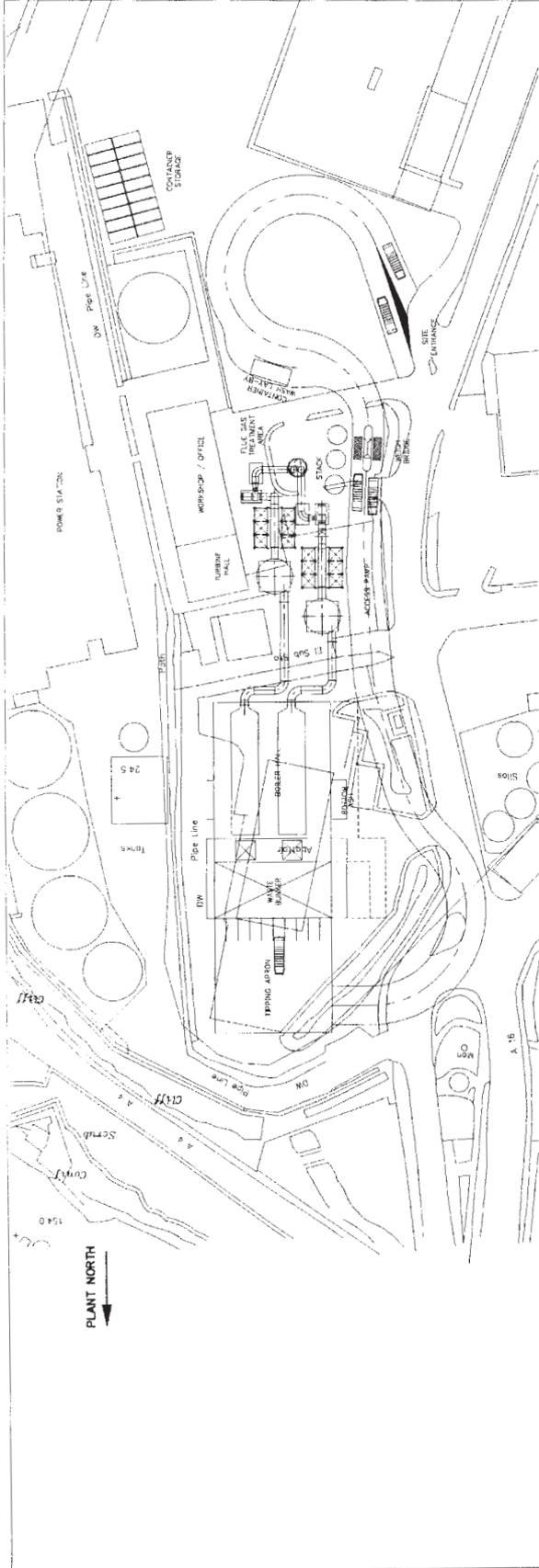
1. Site Restraints: There is limited stockpile area on site to take excavated arisings, sort and reuse as engineered fill. It is assumed that use of the Client's reclaim area some 250m from the site will be available both as a stockpile and site compound area.
2. During construction of the ramp it is assumed that traffic will be diverted west towards the sea wall around the industrial buildings there with one-way traffic control in place for several months while part of the road is excavated to remove obstructions to piling activities.
3. Sorting of made ground (MG) and removal likely to result in shortfall of material. No imported granular fill allowed - assume lower resulting ground level up to 1.5m below existing.
4. 19,000m³ of MG excavated from beneath ramp, apron, bunker, boiler-house and chimney base for processing (2/3 assumed as suitable for replacement). 1,750m³ of natural beach material removed from stage 2 excavations at bunker base - for reuse.
5. It is assumed that all the material excavated out and reused is not contaminated or contain asbestos such that sorting will take place without any special precautions by mechanical means, visually.
6. An allowance of £200k has been made for disposal costs or landfill taxes for up to 1/3 of the excavated material.
7. No allowance for traffic management or reconstruction of affected road (50m length) or any permanent modifications to the local infrastructure.

8. No allowance for abattoir demolition, dealing with asbestos, removal of the structure above ground.
9. Most prices have been estimated using UK prices escalated to those applicable on Jersey. (Concrete factored by 2.2, earthworks by 1.33). Some prices such as piling have been derived from enquiries on the island.
10. A cost associated with overcoming the issue of a reduced ground level as a result of sorting the waste from the excavated material has not been included below (See Section 3).
11. No Allowance has been made for additional site drainage (foul or surface) or any architectural requirements, which may well be likely due to the proposed location.
12. Costs are current; no allowance made for inflation.

5. Cost Breakdown

ID	Item	Cost
1	Ramp including substructure	£2,500,000
2	Apron including substructure	£2,250,000
3	Pre-piling earthworks	£425,000
4	Piles beneath buildings, (boiler house and FGT)	£360,000
5	Suspended floors to boiler house and FGT	£310,000
6	Piles and Pile Cap beneath Chimney	£325,000
7	Bunker retaining walls, cofferdam, dewatering, base anchors	£750,000
	Sub-total	£6,920,000
8	Preliminary items, assumed at 15%	£1,038,000
9	Contingencies, assumed at 10%	£692,000
10	Professional / Design fees at 10%	£692,000
	Total	£9,342,000

Appendix C



NORTH ELEVATION OF MAIN PLANT WITH ACCESS RAMP

WEST ELEVATION (SECTIONAL THROUGH MAIN PLANT)

Scale: 1:500	Sheet No: 725-003-A2	Project No: 725-003	Client: PUBLIC INFRASTRUCTURE DEPARTMENT
DD: NOV 2011	Rev: A1	Rev: A1	Project: WEST COAST BARRIERS INVESTIGATION
Drawn By: RK	Checkd By: JM	Issue Date: 15.11.04	Project: PROPOSED OULINE LA VOLT PUMP & ELEVATIONS
Drawn By: JM	Checkd By: JM	Issue Date: 15.11.04	Project: PROPOSED OULINE LA VOLT PUMP & ELEVATIONS
Scale: 1:500	Sheet No: 725-003-A2	Project No: 725-003	Client: PUBLIC INFRASTRUCTURE DEPARTMENT
DD: NOV 2011	Rev: A1	Rev: A1	Project: WEST COAST BARRIERS INVESTIGATION
Drawn By: RK	Checkd By: JM	Issue Date: 15.11.04	Project: PROPOSED OULINE LA VOLT PUMP & ELEVATIONS
Drawn By: JM	Checkd By: JM	Issue Date: 15.11.04	Project: PROPOSED OULINE LA VOLT PUMP & ELEVATIONS

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COMMERCE AND EMPLOYMENT

A STATES OF GUERNSEY GOVERNMENT DEPARTMENT

Waste Disposal through an Energy from Waste Plant

– An Economic Impact Assessment

By

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Economic and Strategic Adviser

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Commerce and Employment Department

September, 2004

WASTE DISPOSAL THROUGH AN ENERGY-FROM-WASTE PLANT:
AN ECONOMIC IMPACT ASSESSMENT

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WASTE DISPOSAL THROUGH AN ENERGY-FROM-WASTE PLANT:
AN ECONOMIC IMPACT ASSESSMENT

Key Findings

This investigation by Commerce and Employment has focused on the economic impact of the planned increase in waste disposal charges arising from an energy from waste plant on industry and on the future waste stream.

The key finding is that a 3 fold increase in waste disposal costs (from circa £33 per tonne to £100 per tonne) will have an economic effect and this will influence the decisions taken by companies in waste management. The proposed changes could add a further £3 million to the cost of operating businesses in Guernsey. Businesses will make decisions to minimise the cost increase. These decisions will include opportunities for increasing sorting and recycling. When combined with changing attitudes in the community to waste disposal this could substantially reduce the future waste arising over the projected life of the plant to 2025.

It may therefore be more prudent to build a smaller energy-from-waste plant than the projected maximum 70,000 tonne capacity requirement projected in the Ramboll Report 2001, which advised the Guernsey Department of Engineering on projected plant capacity. A reduced waste stream would also apply to any of the technological or waste disposal alternatives being considered by the Review Panel.

The other key conclusion is that the increase in waste disposal costs, whilst unwelcome in industry and commerce, will not of itself jeopardise the Island economy. Indeed the proposed cost increase will raise the incentive for waste sorting and stimulate the Island's recycling industries. This in turn will make best use of the Island's ever decreasing landfill capacity and therefore should be implemented even if an energy-from-waste plant is not built in the immediate future.

An outline action plan for addressing the immediate waste issue is presented which includes site and service provisions.

1 Background

The Island faces a waste disposal problem. With increases in economic wealth and a steady increase in population, the Island has been generating increasing amounts of waste. Disposal of waste in an Island community is always a challenge. Fortunately for the post-War generation, the Island had an historic low cost opportunity of waste disposal due to the large quarries provided by the Island's major export industry of Guernsey granite in the 19th Century. In the 1950s through to the 1970's volumes of mixed waste could therefore be tipped into these "holes in the ground" at relatively low cost.

It is now recognised that landfill sites require careful management and preparation to prevent leachate from polluting ground waters. This is made easier by pre-sorting the waste stream to avoid environmental damage and long-term economic costs arising from problems with the disposal process. As an increasing number of quarries were filled, and most of the quarries required as a strategic water storage resource, it has become essential to maximise the life of the current land-fill site at Mont Cuet quarry.

Given the known capital cost of an energy from waste plant and the emerging technologies for dealing with waste it may be appropriate to re-examine whether there are any remaining quarry sites for managed land-fill. A combination of an additional site together with improved re-cycling could be sufficient to buy enough time to fully prove the other technologies in waste disposal which are claimed to be more environmentally friendly and appear to offer a lower capital cost solution.

An example of how an economic opportunity was created out of the need to separate waste from inert construction material is provide by the building industry. Ronez invested in a crushing plant. This has meant that a significant quantity of the Island's "waste" stone / block and brick from the construction industry can be recycled into a construction material. Apart from the separated stone, inert rubble can be tipped at the land reclamation site at Longue Hougue for circa £5 / tonne. At its peak in excess of 200,000 tonnes per annum were being supplied from the construction industry for land reclamation at Longue Hougue. Current figures suggest around 175,000 tonnes per annum are being supplied to Longue Hougue. This is expected to continue to decline as the building boom cools down.

The recent boom in the Island's construction industry has therefore not created a waste disposal problem but rather, through the enterprise of the private sector and the strategy of the public sector, created a resource for investing in the Island's future economic infrastructure.

The public and private partnership in the solutions found for inert material disposal provide an example for how the remaining waste disposal challenges can be creatively and economically addressed.

2 Remaining Waste Disposal Challenge

Having diverted valuable inert waste to uses of greater economic benefit to the Island, this still leaves 40-50,000 tonnes of combustible waste from a range of sources together with some product groups like white goods (fridges, TV's, computers) which cannot be burnt and materials like glass which, whilst they can be burnt in an incinerator, reduce incinerator efficiency.

An analysis of the waste fractions and the industries from which they are generated is contained in Table 1 "Description of waste material, industry from which it is generated, combustible fraction".

The figures in table 1 on the following page are the latest 2004 figures with a projection for an annual total based on recent records. In recent years the total waste stream has not been growing significantly so the 46,000 tonnes may be taken as a relatively stable figure.

The greatest quantity of material from a single industry (circa 9,500 tonnes) is of mixed skips from the construction and building industry. It is estimated that around 40% of this is combustible with a mixture of wood, plasterboards, plastics and paper.

Horticulture waste of just under 1,500 tonnes comes from mixed skips. The majority of the horticultural waste is tipped at Chouet headland and is used for coverings for the landfill site.

General industrial/commercial waste, of which 90% is combustible, is just under 15,000 tonnes and consists of a wide variety of sources including packaging, reject goods, some cardboard and plastics. To this must be added a further circa 9,000 tonnes under a separate industrial category making a total of circa 24,000 tonnes. This is the largest single waste section.

The remaining significant section is the private household and parish waste at just under 19,000 tonnes (circa 40% of the waste total).

In the future a further 4,000 tonnes of dried "sludge" material from the new Water Board filtration works will also need to be also be disposed of. It should be noted that in the longer term the plans are to reduce this to some 2,000 tonnes by greater drying at source.

Table 1

Weighbridge Description	Industry	Combust. Element (%)	Total tonnes	Non Combustible tonnes	Combustible Volume tonnes
Animals	Agriculture	0	36	36	0
Slaughter house	Agriculture	0	0	0	0
Asbestos (Bonded ASB)	Construction	0	311	311	0
Asbestos	Construction	0	13	13	0
Builders	Construction	40	9,572	5,743	3,829
Bund Material	Construction	0	0	0	0
Hard core	Construction	0	1	1	0
Chemicals	Industry/Horticulture	0	7	7	0
Hort	Horticulture	100	1,372	0	1,372
Liquid/non special	Industry/Horticulture	0	17	17	0
Ind/Com	Industrial/Commercial	90	14,778	1,478	13,300
Ind/comm. comp	Industrial Commercial	90	8,784	878	7,906
Contaminated Soil	Industry/Domestic	0	7	7	0
Bags	domestic/commercial	100	1,669	0	1,669
Cardboard / Paper	Retail/Domestic	100	0	0	0
Cardboard	Retail/Commercial	100	81	0	81
Others	General	0	243	243	0
Scrap	Gen/Domestic Scrap	0	558	558	0
HSHLD/ Trade	Domestic/Visitor/General	80	0	0	0
Coastal	Municipal	100	255	0	255
Sreet Clean	Municipal	100	176	0	176
Sewage sludge	Municipal	0	43	43	0
Parish	Domestic	100	14,769	0	14,769
Priv. HSHLD	Domestic	60	4,247	1,699	2,548
Fontaine Vinery XSS	Domestic	0	2,629	2,629	0
Fridges	Domestic	0	30	30	0
Scrap (Public)	Domestic (Scrap)	0	137	137	0
Site Prep	Green Domestic	0	18,242	18,242	0
Waste for recycling		0	1	1	0
Belgreve Vinery Compost		100	0	0	0
Glass		0	0	0	0
Wood		100	0	0	0
Total across the weighbridge			77,977	32,072	45,905

Based on present supply plus the anticipated "sludge" from the filtration works the projected capacity requirement for an Energy from Waste plant is 50,000 tonnes of combustible material.

This analysis shows that commerce and industry make up a major part of the waste disposal stream and therefore commercial decisions taken about the management of the waste stream will have a significant impact on future requirements for waste disposal (termed future waste arisings).

3 Impact of Waste Disposal Costs on Industry/Commerce

The current standard rate for waste disposal at Mont Cuet is £33.25 per tonne. A full list of waste disposal charges is set out in Appendix 1. The economics for running an energy-from-waste plant dictate that the disposal costs would have to rise to a gate fee of £100 per tonne as set out in the projected charge rates in Table 2. If implemented, without any further reduction in the waste stream through re-cycling, this will add a further £3 million per annum to the cost of running businesses in Guernsey.

Table 2: Projected disposal costs for waste brought into a waste management site – Source Draft Waste Management Plan September 2004

Material	Abundance at disposal site	Means of disposal	Gate fee (£/t)
Metals	8%	Scrap metal yard	£50
Paper & board	4%	Waste paper processor	£50
Wood	2%	EfW	£100
Green	25%	Compost	£25
Inert	16%	Longue Hougue	£5.10
Residue	45%	EfW	£100
		Average disposal cost (£/t)	£60.07

The impact of the significant cost increases, particularly the threefold increase, in costs for the energy-from-waste plant disposal stream for each of the industry sectors has been examined. A list of the businesses and industry representative groups consulted can be found in Appendix 4. A copy of the construction industry questionnaire is in Appendix 2 – Questionnaire.

It should be noted that whilst the £100 per tonne figure is the gate fee required to make the energy-from-waste plant viable it is likely that many of the alternative solutions, apart from composting on the Island, or recycling will have a similar gate fee cost. Therefore the increase in charges to around £100 per tonne for the energy-from-waste plant should not be solely linked with this technical solution. Other disposal options are likely to incur a similar disposal charge.

Primary Industries

It may be thought that given the operating margins of some of the primary industries and the volumes of waste which can be produced, that this industrial sector could be particularly vulnerable to the significant cost increases in waste disposal through an energy from waste plant. However, as the analysis has shown, the primary industries produce relatively little waste for landfill as they either recycle or re-use waste through more economical routes.

(i) The Fishing Industry

The fishing industry generates no significant quantity of waste for disposal. Fish which cannot be marketed are either used as bait or returned to the sea.

(ii) Agriculture

The Island's cattle population produces between 30,000 – 40,000 of tonnes of waste per annum which is collected in slurry tanks. This is then returned to the land under a Code of Practice. A further 1,000 tonnes is generated by Guernsey Poultry Farms. This is also returned to the land. Using agricultural wastes in this managed way reduces the need to import expensive artificial fertilisers and reduces risks to the Island's water supplies from high nutrient levels .

(iii) Horticulture

Horticultural waste used to form a significant quantity of landfill material. In the 1970's with the decline of the tomato market there were weeks when thousands of tonnes of tomatoes were tipped into landfill sites forming a putrescible waste.

Horticultural waste is now separated on site from non-plant material, e.g. support strings, wires and plastic bags. The bulky plant material can then be composted or used in the Chouet tip in a waste degradation process. This produces a covering material suitable for "coverings" in the landfill site now that inert material is reused for landfill and land reclamation.

With the reduction in landfill quantities with an energy-from-waste plant (or an equivalent non landfill disposal solution) the requirement for this type of horticultural waste use will decline. A managed composting process will therefore be required. The gate fee for horticultural waste could therefore increase from the current £5.55 per tonne at Chouet headland to circa £25 per tonne – see Table 2. It is envisaged that the composting process would be appropriately managed to produce a material which can be either sold on the market or used as a land management resource within the horticultural and amenity industries on the Island.

The increase in costs, whilst significant for horticulture, will therefore not be to the £100 per tonne gate fee for the energy-from-waste plant. It may also stimulate individual nursery interest in composting their own materials on site and retailing the consequent horticultural product. In the longer term the quantity of waste from horticulture is also likely to decline through more efficient use of materials such as peat and an overall decline in the size of the industry.

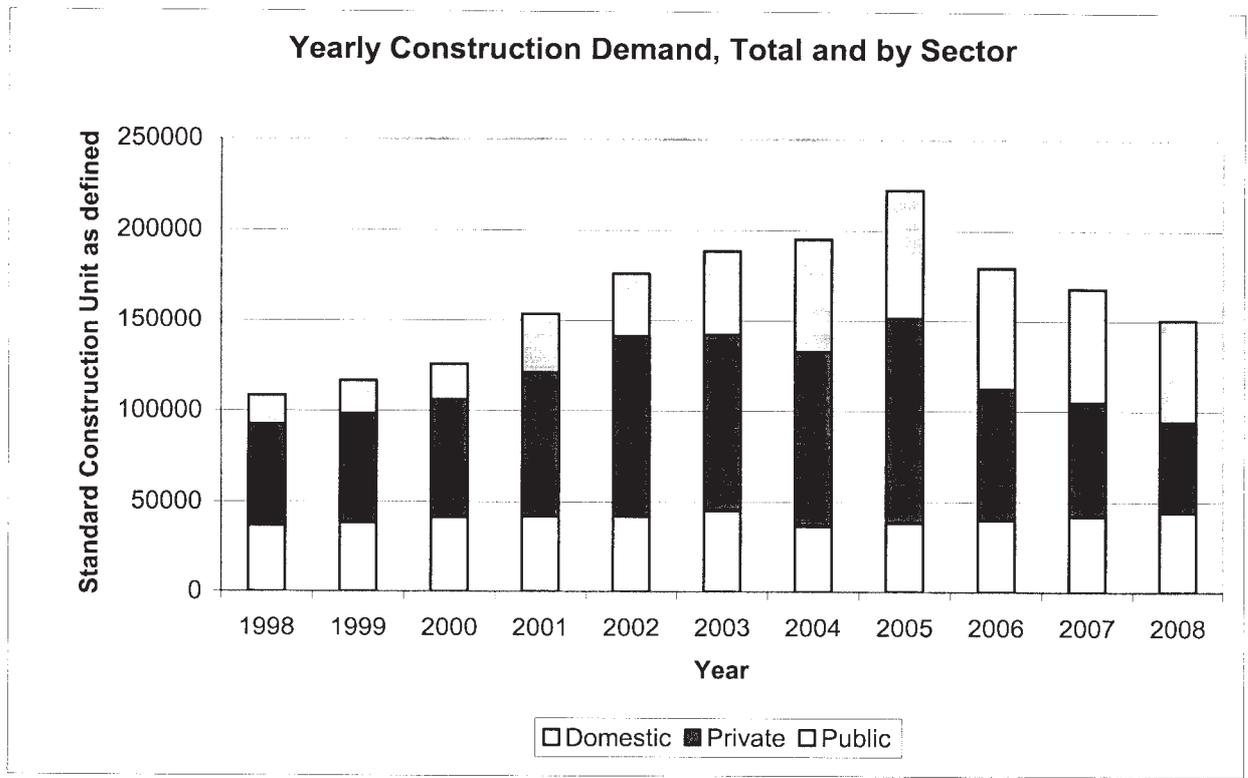
Construction

As noted in section 1 the construction industry has already found ways to recycle or reuse the largest volume of its waste material in the form of stone for crushed aggregate and inert waste for land reclamation.

The volume of waste from this industrial sector is also set to decline. The Island is currently at a peak in construction activity. The peak has already been passed in terms of site preparation waste which resulted in some 200,000 tonnes being delivered to the land reclamation site at Longue Hougue in 2002/2003. This is expected to reduce to around 175,000 tonnes for 2004. The reduction in general builders' waste from the construction process may be expected to follow with a 12-18 month lag time.

Using Commerce and Employment's economic model of the construction industry it is possible to see the demand for construction work expressed in terms of "construction units" (note construction units are a measure of the total construction activity in the building process) over the decade 1998 – 2008 reference figure 1. The peak construction activity is in the year 2005 at circa 222,000 construction units. Construction activity is forecast to decline to a level which whilst still 50% higher than 1998 is 30% lower than the peak at 150,000 units by 2008. On a linear basis we may therefore expect a 30% reduction in the generation of waste material from the construction process.

Figure 1 Demand for Construction and building work in Guernsey from the Economic Model



Due to the importance of this particular sector, a survey of the waste use was carried out with Mike Nicolle across a range of building companies. A copy of the full report and the survey questionnaire can be found in Appendix 2. The main findings of the work are as follows:

- All the companies interviewed carried out waste sorting of some kind.
- The industry was generally not well aware of the recycling options for cardboard and plastic through Mayside.
- With the current buoyant market in construction, extra costs can be passed on to the consumer. However with a much tighter market forecast for the construction industry in the future this may not always be the case.

At present companies have not given much thought on how to reduce waste. Until the price for waste disposal is raised they will not seriously consider their options. This situation was similar in the case of hardcore where, once the price was raised for this material, landfill disposal almost completely ceased. Following this change a lot of the material then went for recycling or land reclamation.

When construction companies were informed of the likely increase in cost to £100 per tonne they believed that they would reduce waste wherever possible by:

- Looking for ways to reduce the amount of waste created.
- Recycling timber.
- Burning combustible material on site.
- Exporting cardboard and paper through the recycling process which would be at a lower cost than the gate fee for the energy-from-waste plant.

The steep increase from £33.25 per tonne to £100 per tonne, coupled with the fact that disposal through the energy from waste plant would require pre-sorting into combustible and non-combustible, is likely to be an economic trigger for a change in commercial practice.

When combined with the projected reduction in construction activity from its current peak, the waste stream from the construction industry is likely to show a significant reduction in the short to medium term.

Retail Industries

The retail sector of the economy has to deal with significant quantities of waste in packaging material, mainly cardboard and polythene. Many of the larger firms already use a recycling scheme for cardboard and polythene operated by Mayside Reclamation.

The view of Tony Creasey with respect to his own company, Creaseys, is that the envisaged increase in disposal charges will increase his Company's efforts at sorting for recycling both on economic and environmental grounds. Most of the large retailers have sites where sorting, temporary storage and collection for recycling can take place. Significant quantities of cardboard (2,500 tonnes per annum) are now exported from the Island.

When the proposed increase in waste charges was raised at a retail section meeting for the Chamber of Commerce there was clear support for increased recycling by the medium and smaller retailers. Their difficulty is that they do not have site facilities for the handling and storage of material. Rental prices for their floor area are high and the opportunity cost of lost sales can be even greater. In addition a sales/stock area overflowing with rubbish can damage the company image.

The current daily collections at a regular time for mixed waste disposal result in clean cardboard and plastics being mixed together with putrescible material. Many more retailers may wish to recycle material but cannot do so with the present waste collection service arrangements.

With the proposed increase in charges for waste disposal through incineration there will be a greater economic opportunity to improve the collection service and even provide one tailor-made for the smaller retailer whilst still charging less than the proposed gate charge for the energy-from-waste plant. Were such a service to be made available then there could be a very significant drop in the amount of cardboard and polythene sent for mass burn from this sector of the economy.

Commerce/Industry

Contrasting submissions on the waste issue were received from the Chamber of Commerce and the Confederation of Guernsey Industry. The Chamber of Commerce Environment Sub-Committee had not received any strong representation from its members on the issue, whereas the Confederation of Guernsey Industry had clear, strong views on the economics of waste disposal through an energy-from-waste plant.

Leading companies like Specsavers already put considerable efforts into recycling. The waste disposal issues for the economy and the environment are likely to increase the efforts of recycling amongst such forward looking companies.

For businesses without waste management or environmental management plans, a combination of the significant cost increase for disposal and improved services for recycling could prove to be a crucial influence for change in current practices. At present there is no indication of the economic threshold at which recycling would become the preferred option and it is likely to vary with the diversity of companies in the commerce and industry sector.

The economic and environmental awareness of the Confederation of Guernsey Industry Group clearly indicates that there is a significant section of Guernsey industry that could be leaders in a change in management practice in dealing with waste.

Other sectors (possibly more represented by the Chamber of Commerce) have yet to seriously consider the matter despite being given opportunities by their representative organisation. When faced with a cost increase to £100 per tonne for disposal at an energy-from-waste plant many of this Group may begin actively looking for alternative means of waste disposal.

No representation has been received from companies who feel that increases in waste disposal costs will jeopardise their existence.

Financial Services

Waste disposal costs represent a very small overhead to the financial services industry. It is very unlikely that the proposed increase in charges will have any significant impact on this sector.

The main waste stream is of paper and documents for disposal. These can be readily recycled after shredding and the collection companies may be expected to take advantage of recycling opportunities if these are lower than the gate cost for the energy-from-waste plant. In addition many finance companies are very conscious of their community responsibilities and may prefer to specify that waste is recycled.

The Visitor Economy

Carl Symes of GHATA thought that there could be a significant impact on Island hotels and restaurants with the proposed increase in price of refuse disposal from circa £33 per tonne to £100 per tonne. Hotels and restaurants are significant rubbish generators and the industry is not in a position to pass on cost increases in their sector.

However, there are also opportunities for waste separation at source and for recycling. If the hotel and restaurant sector were offered this opportunity and this option were financially beneficial then there could be a strong move to waste separation and recycling which could significantly reduce the volume of waste from this sector.

At present, Eurobins are the chosen means of storing waste prior to collection. If space were available, then to have, say four Eurobins; one for glass/bottles, one for tins, one for paper/cardboard and one for general refuse, then refuse would be sorted into bags and disposed of in the correct Eurobin. This would then provide the opportunity for a greater use of recycling from the waste generated.

The proposal for four Eurobins would be most appropriate for hotels where space is available, however town restaurants may find space prohibitive. Frequency of collection to do away with smells and vermin is important. Taking refuse to a more central collection point in, say the town would also be an option. However with the time

pressures, particularly on the small hotels and restaurants, ease of disposal is paramount and therefore collection points may not prove popular unless they were distributed very near to the operating premises.

In conclusion, a significant price increase would impact on the visitor economy sector however there are many opportunities to increase recycling with appropriate services for collection. If this were financially beneficial then a large quantity of the waste currently generated could be available for recycling rather than for disposal through an energy-from-waste plant.

Waste Recycling Industries

The Island's waste recycling industries have increased in recent years. As part of the investigation the following companies were interviewed:

- Mayside Reclamation – Recycling paper, cardboard, polythene.
- Island Waste Ltd - Representing over 70% of the skip market in the Island.
- Guernsey Recycling Services – Recyclable material comes from domestic, industrial and construction sources, and it is the main exporter of metal recovered for recycling.

(i) Mayside

The Mayside paper saver scheme for newspapers and magazines resulted in 2,500 tonnes being exported in 2003. This export is subsidised by the Environment Department for the freight costs of £50 per tonne. A further 2,500 tonnes of cardboard were shipped based on commercial rates with no subsidy making a total of 5,000 tonnes exported in 2003. Each tonne of export also results in a fee of £7 per tonne in harbour dues bringing a revenue of £35,000 into the States of Guernsey harbour accounts.

Mayside have also recently started a polythene recycling scheme which has been successfully implemented with some of the Island's larger businesses.

Mayside operates a "Blue Route" collection scheme for £7.40 per collection of 5 – 15 bags. A daily service could be provided and would become economic when compared to the costs of disposal at the energy-from-waste plant of £100 per tonne. The Director Brian Perry believes that recycling and exporting to the UK would cost less than £80 / tonne and so could be attractively priced compared with an energy from waste gate price of £100 per tonne.

A crucial factor is that the market for waste has changed significantly in recent years. Demand now exceeds supply. This has been caused by the dramatic growth in the world economies of China and India. Clean, separated, compacted waste can now be economically shipped around the globe for recycling and reuse.

In addition the long-term forecast rise in oil prices, as easily recoverable and accessible reserves are reduced, will increase the costs of plastics and glass manufacture.

The view of the waste recycling companies is therefore that the demand for their service and resulting product is strong and will increase in the long-term.

Mayside would like to double the export of paper and cardboard to an estimated 10,000 tonnes per annum. However site availability is a concern as their lease at Leale's yard is due to expire in 2006.

(ii) Island Waste Limited

Island Waste Ltd are an association of Circuit (2001) Ltd, Skips 'R' Us Ltd, Access Skips Ltd and Vehicle Recovery Service, employing 40 staff. They have expertise in separation of mostly commercial waste with over 10 years experience. They believe that the potential for recycling in Guernsey has not been met and that there is significant potential as part of a waste management plan to increase their recycling activity. from the commercial waste that they currently process. The full submission from Island Waste Limited can be found in Appendix 3.

Island Waste Limited wish to see their services incorporated as part of a overall Waste Management Plan. Their view is that the proposed increase in gate charges for the energy from waste plant will significantly reduce the amount of waste presented for burning as greater sorting and recycling will be economically viable given the increase in gate fee.

(iii) Guernsey Recycling Ltd

Guernsey Recycling Ltd undertakes a significant amount of recycling of waste, mainly from domestic, light industrial, heavy industrial and construction sources. The company are the recipients of States bulk refuse and export some 7,000 tonnes of recycled metal waste. There are opportunities to expand this business with an increased supply of sorted items delivered to their depot.

The recycling companies are looking for longterm suitable sites from which to operate. The ideal site may be adjacent to a future energy-from-waste plant (or plant with a similar purpose) at the Longue Hougue site.

The site needs for the recycling industries should be planned in with the energy-from-waste plant. The recycling companies are a part of the Island industries and the advent of increasing waste disposal charges will actually present an opportunity rather than a threat to these companies, if the appropriate public/private partnership can be formed to manage and deal with the waste streams.

4 Future Waste Arising

The overall summary from the industry and commercial sectors is that the proposed increase for waste disposal from £33 per tonne to £100 per tonne would pass an economic trigger point that will stimulate an industry response. This will affect the quantity of material predicted for an energy-from-waste plant measured as “future waste arising”.

The prediction for the future waste arising for the energy-from-waste plant was carried out by an independent consultancy company Ramboll*, a Danish company which produced a report in 2001. **Significant changes have happened in the economy since this date and so the forecast made by Ramboll, upon which the design recommendation for a 70,000 tonne energy-from-waste plant was made, have been critically examined.**

A further factor is that it is not known from the Ramboll report the extent to which the Island industries were consulted and critically engaged in the process. The Commerce and Employment Department are in an important position in this respect with a link to all sectors of Island commerce and industry and can bring this perspective into the forecasting process.

Future Waste Arising forecast.

The forecast for future waste arising can never be an exact science, particularly over a 20 year period. However there are four factors of importance when making a projection for the future waste stream in Guernsey:

1. The population projection in Guernsey.
2. Economic growth.
3. Recycling and the efficacy of segregation of materials in the waste stream.
4. International demand for recycled material and the stream of waste material arising from product supply and product use.

The first three factors were examined in the Ramboll report in their future waste arising prediction. The Ramboll data and assumptions in their projections are compared to the latest data now available and the commercial perspective of industry following the consultation process.

The international trend will impact on the Island over the 20 year period proposed for the life of an energy-from-waste plant. This could not be examined in any detail in the time-scales available for this report but factors that could affect the waste stream are identified for further research.

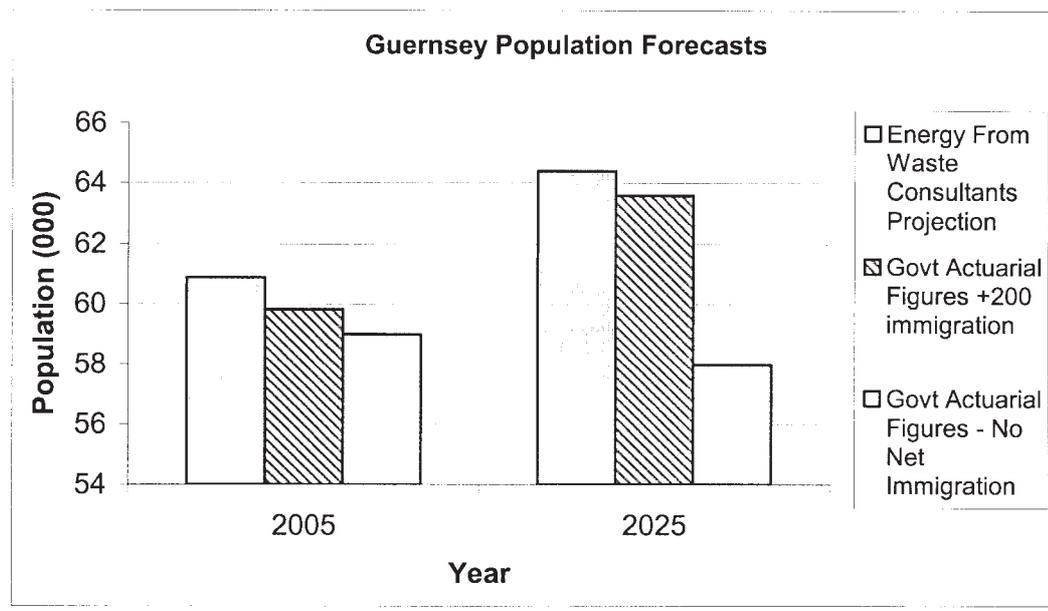
* Reference Ramboll report for the States of Guernsey Department of Engineering: New Waste-to-Energy Plant “Project Definition Waste Arisings and Calorific Value” date 19/3/2001 reference no. 834-010506

Population Projection

The population level impacts on the waste stream both directly in terms of household refuse from individual consumers and in terms of the economically active individuals contributing to Island Employment.

The Ramboll population projections for the period 2005-2025 were based on the 1996 census. This report used the latest government actuarial figures from the more recent 2001 census. These figures show that the population is expected be lower both at the start year of the plan for the plant, 2005 and in the final year of its projected operating life 2025, compared with the Ramboll projection. These figures use the “standard median projection” with an assumed plus 200 persons net immigration per year. However if there is no net immigration, the actuarial figures show that the population is projected to fall by 2025. This produces a figure significantly lower than the Ramboll projection of over 64,000 persons by 2025 see figure 2.

Figure 2.



A further trend in the latest statistics is that they appear to be showing an increase in the number of absent residents who own a property but do not occupy it all year in Guernsey. See Table 3 below. If this trend were to continue this would further reduce the permanently resident population over the projected period that would impact on the waste generated per person per annum.

Table 3 Absent residents and resident population. (source Guernsey census 2001).

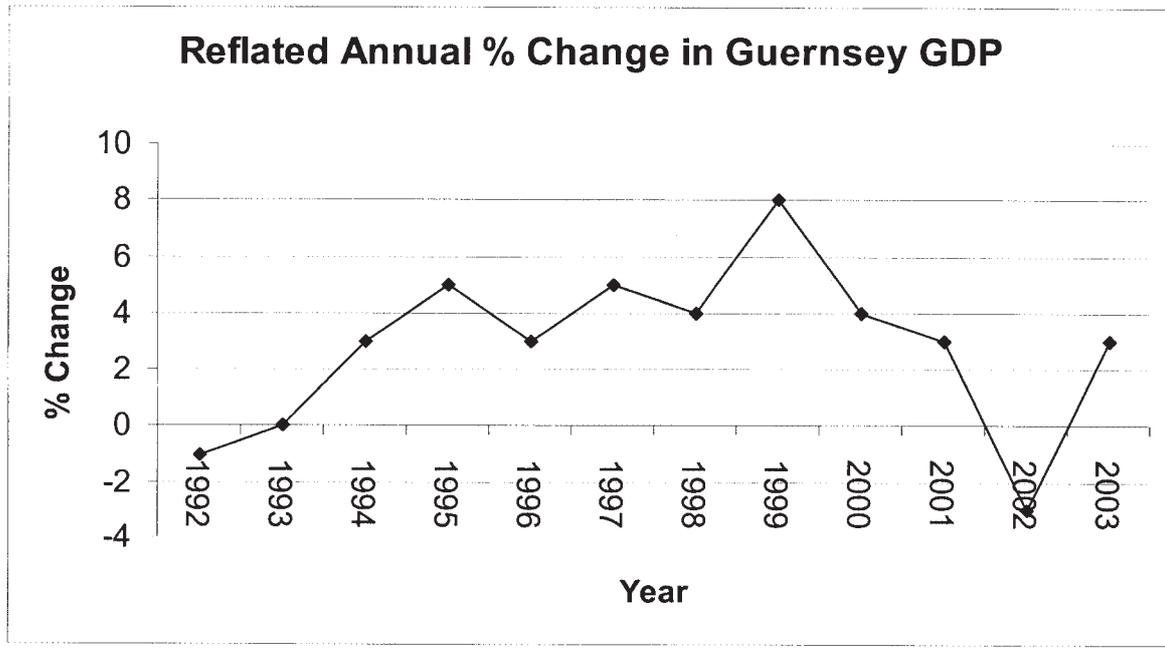
	1976	1981	1986	1991	1996	2001
A Residents Present	51,447	51,407	53,170	56,149	55,677	56,223
B Residents Absent	2,190	1,906	2,312	2,718	3,004	3,584
Resident Population (A+B)	53,637	53,313	55,482	58,867	58,681	59,807

Economic Growth

Generally speaking the greater the level of economic activity, the greater the quantity of waste generated from industry. However, it should be noted that this relationship assumes an unchanging composition of the commerce and industry sector.

The primary means of measuring economic activity in the Island is the gross domestic product. The figures have been calculated as an annual percentage change and reflat to take out the inflationary effect which does not generate any real new economic activity and therefore any real extra increase in waste. The last 12 years of economic activity expressed as a reflat GDP is illustrated in figure 3 below.

Figure 3.



The period illustrated in the figure of 1992-2003 covers an overall economic cycle of low growth in the early 1990's through to a high growth period in 1998-2001 followed by a zero growth averaged over the period 2002-2003.

It has not been possible to verify the Ramboll figures presented in their analysis with the Economics and Statistics Unit. There appear to be some errors or differences with the figures used to calculate reflatd values in this report. More up to date information is now available which has been verified with the Economics and Statistics Unit. In addition the Ramboll figures finished at 1999 which was still a peak year in economic growth.

The average increase in GDP calculated in the Ramboll figures was approximately 4%, the latest figures (over a different time span) give an average of 2.9%.

Despite the differences in the figures, Ramboll's assumption for future economic growth was reasonable of 1-3% over the average of the plant lifetime.

However, what the Ramboll report failed to take account of is the changing nature of Guernsey commerce and industry and the impact that this is likely to have on the waste stream.

Over the period to 2025, some of the industries which generate large amounts of waste are not anticipated to grow and could actually decline significantly in volume terms. These include:

- (i) Construction: The construction activity peak is over the current period 2001-2005. Following the completion of major private sector projects in the St Peter Port to St Sampson's corridor on the east coast and a satisfaction of the office supply market, overall construction activity is expected to fall by up to 30% reference pages 8/9. The generation of waste material may be expected to reduce accordingly.
- (ii) Horticulture: Horticulture is a major generator of plant waste but is declining in overall size and volume of production.
- (iii) Manufacturing: The manufacturing sector in Guernsey peaked in the 1980's and is not expected to show a return to growth in the immediate future.
- (iv) Visitor sector: The tourism / visitor sector has an excess bedstock capacity. The lower end of the market is being taken up by migrant workers in lodging. This is expected to decline rapidly after the construction peak in 2005. The future for the visitor economy is for a smaller sized, quality market.

In contrast the types of industries and economic sectors that are anticipated to take growth forward in the economy will generate relatively little waste per unit of value added to GDP.

These include the financial services sector, management and supply businesses (but not manufacturing) like Specsavers and Healthspan which deliver value and service associated with a strong brand value and some of the future potential industries which may be on-line linked with e-business or part of a “virtual knowledge economy” linked with intellectual property.

Taking the likely change in the composition of economic activity, which makes up the Island’s Gross Domestic Product, it is quite possible that GDP levels could increase in the future whilst waste production per unit of GDP could actually decline.

The assumption therefore implied in the Ramboll report of waste generation increasing with GDP is therefore felt to be incorrect within the Island’s current and anticipated economic circumstances.

Recycling and the efficacy of segregation of materials in the waste stream

This investigation has shown that the proposed increase in waste disposal charges from £33 per tonne to £100 per tonne will focus business minds on the economics of waste disposal. There is also an increasing environmental awareness across sectors of the industry. If this is combined with improved services for waste collection and an export market through the recycling companies then the commercial sectors could make a significant switch away from the supply of material for an energy-from-waste plant and into greater sorting and recycling for export of waste.

Much will depend on the relative economics of recycling versus burning. Mayside believe that their export market will offer a lower disposal cost compared with the £100 per tonne gate fee for incineration. The relative economics of recycling verses incineration appear promising, however this will require a more detailed investigation in the Island context, to verify the expectation of the Company in-order to build a sound waste management strategy.

From the known prices, it is clear that an increase in gate fee alone to £100 per tonne will give a significant stimulus to the recycling industries. Given an appropriate service provision there is potential for an increased supply of sorted waste material.

The States response and policy framework within a much needed integrated waste management plan is also of strategic importance. Crucial to the success of increasing recycling are the following factors which are largely in States hands:

- (i) A change in the current economics of waste disposal which would be signalled by an increase in the gate fee to £100 per tonne at Mont Cuet.
- (ii) The supply of a suitable site (or sites) for waste segregation and recycling (currently a problem for the sorting and recycling companies).
- (iii) Engagement by the States and the recycling companies with the economic sectors. This could include forming sector groups to manage the waste segregation practices and collection across an industry sector, for example the small to medium sized retailers or the hoteliers/restaurateurs who would wish to recycle but do not have any premises to store or contain material awaiting collection.

Changes in the international market for recycled products and the supply of packaging material and products which lead to waste generation

Historically the increase in growth of economic activity in the developed world has been associated with an increase in the quantity of waste materials such as packaging and a relatively low demand for the recycled product. However, over the future projected lifespan to 2025 of the Energy from Waste Plant, three factors may change this relationship:

- (i) The rising economic demand for raw materials from the high growth economies of China, India and the Pacific basin countries. This is increasing demand and therefore prices for the raw materials supplied by the recycling industries.
- (ii) An increasing oil cost over this period. Oil is the source of the main material for plastics and packaging products. A rising oil price also increases production costs for non-oil based products like glass.
- (iii) Increasing regulation, particularly by the European Union, on reducing landfill as a means of disposal and of legally binding directives for the recycling of used products and packaging materials. This may not have an immediate effect in the short-term but over the full life period of the plant it is almost certain that many production and product distribution processes will have to change to meet the new European directives. Some of the recent EU directives related to waste management are listed in Appendix 5 for further reference.

Consultation with specialists in this field is recommended before it may be assumed that the waste generation factors which applied in the last century will apply to the 21st Century.

Future Waste Arisings Prediction

Even with the higher levels of population forecast and the incorrect assumptions on the relationship between economic growth and waste generation on the Island, Ramboll came up with:

Ramboll Prediction

An average increase in the waste arisings of approximately 1.3% (per annum) is predicted in the lifetime of the plant, making the prediction of the future waste arisings, excluding sludge, approximately 65,000 tonnes per year.

Note: With the sludge quantities anticipated to be 4,400 tonnes per year the future waste arising was increased to 69,400 tonnes per year.

However, this investigation would indicate that from either:

- A lower population growth than that predicted by Ramboll; or
- A reduction in the waste generated per value of GDP; or
- An increase in the sorting and recycling response from industry differing from that assumed in the Ramboll report; or
- A combination of all three:-

There may be no increase in the waste arisings, i.e. it would take less than a 2% change in the Ramboll prediction of future waste arisings to mean that a current capacity plant of 50,000 tonnes would be the appropriate capacity to build for this period.

It should be noted that this conclusion is based on the information available to Commerce and Employment which could be collected and analysed in the time available.

What has been collected and assessed is sufficient to cast some doubt over the projected size of the future waste stream predicted to rise to some 70,000 tonnes as stated in the 2001 Ramboll report.

It is also noted that the prediction of the future waste stream will form part of the Waste Management Plan currently being prepared by Guernsey Technical Services. It is strongly recommended that the evidence found in the Commerce and Employment investigation be used in the preparation of the forecasts for future waste arising in the integrated Waste Management Plan.

5 **Future Waste Arisings and the Economics of Operating an Energy-from-Waste Plant (or similar waste disposal technology)**

The prediction of the future waste arisings is crucial to the operation of a future energy-from-waste plant or similar system of disposing of waste material because:

- The plant is a fixed capacity when built and therefore needs to be built to accommodate the maximum capacity anticipated over its lifetime. Broadly speaking the larger the waste stream the larger the energy-from-waste plant and the greater the initial capital cost. This comes at a time of concern at the high level of States capital spending and the need to obtain best value in all capital projects.
- An energy-from-waste plant requires a continuous stream of waste material and is most efficient if operating near to its maximum capacity. If the maximum waste stream is 40% lower than the plant's capacity then it will operate less efficiently or additional waste streams will need to be found to provide an efficient electricity generation process. This in turn would impact on the economics of operating the plant and lead to a gate fee higher than £100 per tonne being required to balance operating revenues and costs.
- An oversized plant could direct States policies towards supplying the waste stream for incineration compared with stimulating the potential for recycling opportunities.

“Best value” may therefore be obtained by building a waste facility with a lower capacity than the maximum predicted for the life of the plant and stimulating recycling options in advance of the plant’s capacity being reached.

6 Conclusions / Recommendations.

1. The increase in waste disposal costs associated an energy from waste plant, will add a further £3 million to the cost of operating businesses in Guernsey. This is unwelcome in industry and commerce, but of itself will not jeopardise any economic sectors. The visitor economy sector is most vulnerable sector if they do not develop any alternative options for waste disposal.
2. Commerce and Industry have demonstrated effective recycling or re-using alternatives for waste when the appropriate economic and management incentives have been put in place e.g. the construction industry solutions to the use of inert waste, agriculture with land management for slurry disposal and horticulture with green waste sorting for composting.
3. The gate fee should raised for mixed loads / combustible waste disposal to £100/tonne, even if an energy from waste plant is not built immediately. This will promote waste separation at source in industry, give an economic stimulus to the recycling industries, and increase the length of time the land fill site can be used.
4. The opportunity to extend land-fill for a period years with alternative quarry sites should re-examined in the light of the known capital costs for an energy from waste plant and the new technologies emerging for waste disposal.
5. Work with the sorting and recycling companies to publicise recycling and increase the supply of recycled material which can be exported due to world market demand.
6. Make available sites for sorting and recycling particularly as the lease on Leale's Yard expires in 2006.
7. Engage with industry and commerce in developing the Island's Waste Management Plan.
The planned increase in charges to £100/tonne will affect industries in different ways and business people will be looking for solutions. The likely responses include:
 - Construction: An increase in sorting, recycling and burning
 - Retail: Large stores will increase recycling. Smaller stores would recycle more but need a daily clean collection service.
 - Manufacturing: The CGI expressed a strong desire to increase recycling over disposal at an energy from waste plant.

- Horticulture: An increase in composting.
 - Financial services: An increase in waste disposal costs are not significant to their business but many firms are environmentally aware and would prefer recycling options.
 - Visitor sector: Waste disposal represents a significant cost and operators would welcome alternatives to the proposed £100/tonne gate fee charge.
8. The commercial response of Island businesses to the proposed increase in gate fees for waste disposal through incineration needs to be carefully considered in making forecasts of the future waste stream.
 9. Promote the development of producer responsibility groups whereby sections of industry work together to develop waste management solutions such as the clean waste collection service required by the smaller retailers and hotels / restaurants.
 10. The data and assumptions used by the contracted consultants to calculate the need to build a waste disposal plant to a capacity of 70,000 tonnes may be flawed in the context of the Island economy. Future waste forecasts should use the latest economic data and take account of the response from industry / commerce to the significant increase in gate fees required to finance an energy from waste plant.
 11. A smaller capacity energy from waste plant (or alternative technical solution) could provide significant savings in initial capital cost and would operate nearer to maximum capacity (and therefore efficiency) for the life of the plant. A smaller capacity plant would also keep the focus on increasing the sorting and recycling options.
 12. Further research into the economics of sorting and recycling on the Island compared other forms. If a real export opportunity exists at costs of less than £100 per tonne then this will impact significantly on the future waste stream and should be strongly promoted. Commerce and Employment could be requested to undertake this work.

7 Outline Action Plan For Addressing Immediate Needs In Waste Management For Commercial Industry

1. Raise the gate fee for tipping at Mont Cuet to £100/tonne from January 2005.

The difference with the current gate fee of £33.25 tonne would raise an additional £3 million per annum on a volume of 45,000 tonnes for waste disposal.

Use the additional revenue to invest in waste management solutions.

2. Provide the infrastructure and facilities for the recycling industries:
- (i) Designate an area of the Longue Hougue site for sorting, baling/compressing and recycling (for export)
 - (ii) Lease the facilities to the commercial businesses operating sorting and recycling on terms which provide the most cost-effective and robust business plan for waste disposal for commerce and industry based on “best value” which will include:
 - Gate fee charge.
 - Open book accounts by the lessees.
 - Site management and maintenance standards which will be audited by the lessors to cover health and safety, site security, noise, dust, pest control.
 - Service to commence and industry including waste collection services (which may be sub-contracted).
3. Facilitate the formation of industry responsibility groups to work together as business groups with similar waste disposal issues to provide solutions with the collection and recycling industries.
4. Establish a site for composting green waste. Invite private companies to tender for operating the process based on:
- Technical competence.
 - Gate fee charge.
 - Open book accounts.
 - Site management.
 - Service to horticulture, amenity and the parishes (if compost waste is pre-sorted).
5. Review any remaining options for extending the present land-fill capacity.

Potential Benefits Of the Outline Action Plan

1. Speed of implementation – sites could be operational in 2005 taking waste streams from landfill.
2. Potentially self-financing from the increase in landfill charges at Mont Cuet.
3. Provides financial incentives and facilities which businesses can respond to.
4. Will promote the minimisation of landfill at Mont Cuet pending the decision on the energy-from-waste plant and the subsequent procurement and building of a facility/alternative solution.
5. Provides appropriate sites for operation and could release less appropriate sites e.g. at Pointes Lane and Fountain Vinery and Leale's Yard.
6. States released from providing waste sorting services (out-sourced to the private sector on best value service leases).
7. Compatible with any of the final decisions of the Review Panel regarding an Energy from Waste plant or alternative technologies or waste export.
8. Could provide more time to appraise emerging technologies if some further managed land-fill sites can be found.

Waste Disposal Sites and Charges**Mont Cuet** Tel 245106

All putrescible waste i.e. food waste, timber, plastics, plaster, rubber, foam, fibreglass, old furniture, wire etc. All loose material must be bagged. Loads containing metal and/or cardboard will be subject to a contamination fee of 25% or 50%. Loads containing noxious putrescible waste mixed with inert waste will be charged a contamination fee of 100 %.

Opening hours: Monday to Friday 7 am to 4 pm
Saturday 7 am to 10 am

Rates for private householders: £1 for up to 3 black plastic sacks
Plus £1 for each additional sack.

Standard rate per tonne: **£33.25**

Contaminated load charges per tonne*:

Minor contaminated loads:	£41.55
Major contaminated loads	£49.90
Loads containing inert waste:	£66.50

Contaminants containing metal and cardboard.

Special Waste: Animal carcasses

Asbestos

Chemicals

Contaminated spoil/noxious waste

Diseased horticultural waste

Sewage sludge and fertiliser

£66.50 per tonne.

Please note: mixed loads containing non-noxious putrescible waste and inert material or metal will be diverted to Fontaine Vinery.

Chouet Horticultural Site Tel: 245106

Garden and horticultural waste, including cuttings of a maximum of half an inch diameter. No diseased crops or pesticides.

Opening hours: Monday to Friday 7am to 1 pm
Saturday 7 am to 10 am

Rates for private householders: Private individuals can dispose of their green waste free of charge.

Commercial rate per tonne **£5.55**

Please note: all commercial vehicles delivering green waste to the Chouet Horticultural site must go via the Mont Cuet landfill site, in order that loads can be weighed.

Longue Hougue Tel: 249628

Only inert “builders” type loads such as hardcore, stone, concrete, gravel, sand and sub and top soils (if largely free of vegetation).

Opening hours: Monday to Friday 7:30am to 4:45pm
Saturday 7am to 10am

Rates for private householders: £1 for up to 3 black plastic sacks
Plus £1 for each additional sack.

Rate per tonne **£5.55**

Please note: any loads containing unacceptable waste for Longue Hougue will be reloaded at a cost of £5.00

Fontaine Vinery Waste Segregation Facility: Tel: 200280

Inert “builders” type loads such as hardcore, stone, concrete and rockwool mixed with non-noxious putrescible waste such as rubber, foam, plastics, timber, woody horticultural, clean cardboard, paper, plasterboard, GRP (Glass Reinforced Plastic). No loads containing noxious putrescible waste such as food, sanitary products, chemicals, animal waste, resins, sealants, oils, petrol’s, etc.

Opening hours: Monday to Friday 9:00am to 3:00pm

Rate per Tonne: **£33.25**

Please note: any loads containing noxious putrescible waste will be rejected. A load tipped at Fontaine Vinery, which upon inspection contains noxious putrescible waste, will be reloaded at a cost of £15.00.

The Fontaine Vinery Facility can only be used by Public Services Department account holders. Please contact the Department on Tel: 717000 Ext: 3436 to apply for an account.

The above options should solve most queries, but do feel free to contact the Public Services Department Finance Section for any further information.

We will be pleased to advise you (Tel: 717000).

Construction Industry / Building Trade Methods for Dealing with Waste

Collection of information regarding the building trades present and future methods for dealing with waste.

The information was obtained by interviewing contractors either in person or over the phone.

Type of contractors interviewed:

- Large building contractor
- Medium building contractor
- Large mechanical and electrical contractor
- Medium mechanical and electrical contractor
- Medium Kitchen/furniture supplier
- Small house builder

All the companies interviewed have for some years been carrying out the sorting of waste. With the larger businesses this mainly consisted of having skips or spoil heaps on site for various materials such as:

- Hardcore waste taken for recycling or landfill cover
- Timber and burnable material for either burning on site, taking to designated sites for burning or taken to landfill.
- Skip for metal taken for recycling
- Skip for mixed loads taken to landfill

All the companies interviewed carried out waste sorting of some kind.

All carried out burning to some extent and intend to increase this activity should the price of disposal rise in the future.

Companies will pass on any extra costs to their customers, where possible.

Timber in most cases is taken to landfill or burnt, some companies saw some gain in recycling, other smaller companies already cut up timber and allow employees to take for burning. In one case the timber is cut up and left at the gate for collection by whoever wants it. In almost all cases burning on site would be considered if the disposal price rises.

Only one company used cardboard recycling from Mayside, this company imported all their materials from outside the island and had large amounts of packaging. This company would be concerned if they were forced to pay for future disposal to an incinerator, and if so, would resort to more burning at their own site.

The Mayside cardboard recycling was not widely known about and involves sorting and storage expenses, however, should disposal prices rise many would consider using this option.

Most companies interviewed employed local labour and did not consider that their turnover or rubbish production would reduce when the present high level of building activity tails off. However larger companies accept that with a reduction in activity less rubbish will be created.

Conclusions:

Companies are generally carrying out a lot of waste separation at the moment, provided it is easy to do.

Hard to sort mixed loads of burnable and unburnable material are presently taken to landfill and the higher dumping price paid. With an incinerator these materials would have to be separated for delivery to the incinerator. Once separated more burning on site will take place.

Extra costs will be passed to the customer.

At present companies have not given much thought on how to reduce waste and until the price for disposal is raised will not seriously consider their options. This situation was similar to the case of hardcore once the price was raised dumping ceased and a lot of the material went for recycling.

Companies will try to reduce the waste wherever possible by:

- Looking for ways to reduce the amount of waste created
- Recycling timber
- Burning combustible material on site
- Exporting cardboard and paper

With a reduction of activity in the building industry, the amount of waste created is bound to reduce.

Michael Nicolle.

Waste Survey

Commerce & Employment are examining the implication for local businesses in regard to the energy from waste project and the potential increase in the associated costs of waste disposal. There is a review into the Energy from Waste Plant, however it would seem that all future options for waste disposal will result in an increase in costs.

Commerce and Employment are concerned regarding the impact of these costs on local businesses and wish to understand the waste disposal options open to the Island's industrial/commercial businesses.

IN order to ascertain some facts, we would like to explore the following:

The significance of waste disposal costs to your business				
Given that costs will increase from £33/t to circa £100/t will you take steps to reduce the cost. I.e. recycling, composting, disposal off-island?				
At present do you sort waste to reduce costs. I.e. clean or contaminated loads?				
Do you presently separate cardboard and recycle via Mayside Reclamation or others?				
Given a price increase to c £100/t would you consider separating and recycling cardboard in the future?				
Do you presently burn any materials at your own site?				
Given a price increase would you consider burning at your own site?				
How do you presently deal with timber waste?				
How will you deal with timber waste in the future?				
How do you presently deal with metal waste?				
How will you deal with metal waste in the future?				
We are presently in boom economy, do you envisage your production of waste being less in the future?				

General information about your company	
Line of business eg builder, electrician, supplier/installer	
Size of business, eg small medium large	
Details of any recycling already undertaken:	

Contact Mike Nicolle on 07781 102755.

Names of companies giving information will remain with Mike Nicolle

Island Waste Limited

Submission to the Guernsey Solid Waste Disposal – Panel of Inquiry form Island Waste Limited, Pointes Lane, St Andrew’s, Guernsey GY6 8UJ. Tel 01481 234058, fax 01481 230478, e circuit@cwgsy.net .

Who are we?

- We are Circuit (2001) Limited, Skips’R’Us Limited, Access Skips Limited, and Vehicle Recovery Service employing 40 staff. Our services include:
 - Separation of waste and recycling of metal, soil and hardcore in our yard
 - States Bulk Refuse scheme – skips and cars
 - Skips – major builders, many States departments
 - Eurobins and dedicated cardboard collection service
 - Hooklift boxes – and main provider for Alderney waste exportation trial
- We are experts in the separation mostly of commercial waste with over 10 years experience. We are not incinerator experts.
- We therefore have no view on the appropriateness of an energy from waste (EfW) facility or any alternative, other than to say there has been a huge investment already in detailed plans for the proposed EfW facility of a number of years, and that a further review calls into question the decision making process of the States of Guernsey.
- Public perception of waste is black bag waste but this only represents 40% of the total. Approximately 60% of the Island’s waste is commercial waste, often mixed in nature. We separate over 10kT mixed waste per year, and a similar amount of hardcore for re-sale, thus saving landfill. We also recover top soil, ferrous and non-ferrous metal.

Why is our yard important?

- Of material delivered to the yard, mixed waste is reduced by over 70% by weight. This would have otherwise gone to landfill. This is inert material that can not be burnt.
- It is the only site with IDC permission, and the only privately operated site, for the sorting and separation of waste in the Island.
- It allows us to give fixed prices for a skip to our customers, rather than by weight.
- In future we will want to pre-separate prior to delivery of separated waste to the Energy from Waste plant (EfW), or alternative.

What are our challenges?

- Unknown outcome of the EfW review.
- No waste strategy in the Island, the reason given is that it will be done after the EfW review reports.
- Disposal/gate prices unknown in the future, hence capital expenditure cannot be planned.
- New Environmental Law/Ordinance, which is not in the public domain and has not yet gone out for general consultation, despite it becoming a statute early next

year. Without sight of the requirements for licensing waste processing yards we cannot plan ahead.

- We want a more proactive dialogue with the Environment Department as the Waste Management Plan is formulated. We have only had one visit from the Environment Department or their predecessors the Board of Administration, which occurred last week when the full committee came ‘to look at recycling’ in the Island, despite many invitations over a number of years. We think this demonstrates a lack of understanding of the recycling industry in the Island.

Where do we want to be in the future?

- Operate a modern, environmentally accredited recycling and waste management facility, integrated into the Island’s waste strategy, either at Pointes Lane or elsewhere.
- If there is to be a waste separation facility at Longue Hougue, we would like to be involved commercially with the operation of the plant.

Waste policies in the past

- ‘The polluter pays policy’ previously adopted by the States – has not been followed because the gate price at Fontaine is set lower than Mont Cuet.
- Tip fees policy at Mont Cuet – ‘should not make a loss or a profit’, but this does not apply to Fontaine.
- Public perception of waste is black bag waste but this only represents 40% of the total. There is a general lack of understanding of waste issues.

Problems with the current proposed incinerator

- The size of the proposed EfW plant is a guess of what is needed, the data used is basic and it assumes a status quo. The dynamic nature of the waste stream is not appreciated in the planning stages of the proposed EfW plant.
- The proposed incinerator is not part of an integrated Waste Management Plan, which has yet to be published.
- How much incinerable waste will there be now, and in the future? There is a lack of published evidence.
- The future of recycling has not been planned and could be discouraged by the need to maintain the minimum waste stream required to keep the incinerator working.
- The effect of gate price. There is not a fixed amount of incinerable waste produced in the Island, irrespective of gate price. The higher the gate price - the less waste is presented, the more economic become other forms of disposal, including recycling. Conversely the lower the gate price - the more waste is presented, and the less is recycled.
- The need to repay the States loan for the incinerator with gate charges, with a fixed repayment term of 20yrs dictated by States Treasury, will limit the extent to which gate prices can be changed, and as a result, will dominate the economic dynamics of waste disposal and recycling in the Island.
- There is a potential for insufficient waste being tipped to the incinerator because of the high gate price needed to repay the loan. What would the States do in this case?

- There therefore is a possibility of having to lower the gate price to meet the requirements of the minimum burn per year to keep the plant running, however the capital may not be repaid, and the lower gate prices would stifle recycling initiatives in the Island.
- A large plant is difficult to integrate with other options/more modern incinerators in the future, because all the capital investment available has been taken up with the first large plant. If a smaller plant were built now this would give the opportunity to invest in new technology as and when it became available in the future.
- Building a smaller plant now would generally encourage recycling in the Island. The dynamics of EfW plant sizing versus recycling should be studied and predicted prior to specifying the size of the plant, and planning for the variable economics of recycling to be integrated into the waste management plan.

The role of recycling as part of a waste management strategy in the Island

- Fontaine – failure to realise the full potential, financial loss to the tax payer, restricted materials and hours by the local parish authority (Douzaine), does not have planning permission (not required by the States, but it would if operated by a private operator).
- Paper, cardboard, glass, plastics and some metals subsidised by the tax payer
- Island Waste Limited and Ronez recycling stone
- Guernsey Recycling Limited metal facility, but more metal could be collected from domestic waste.
- There is unmet potential of recycling from the domestic and commercial waste stream.
- Alderney has expanded domestic waste recycling and is an example to be followed.
- A strategy and a demonstrable commitment by the States is required for private enterprise to help fulfil the potential of recycling, by generating confidence in the industry and the right economic environment for long term private financial investment.

How should recycling integrate with an incinerator?

- An integral part of a WtE plant is a waste separation facility (MRF) to pre-treat the waste stream prior and post burn.
- Ideally the MRF should be next to the WtE.
- We believe the operation of the MRF should be put out to tender for a private contractor. We also believe the control of the WtE and the MRF should rest with the States.
- There needs to be a correct system of analysis and management to get the gate price right, which under the present proposals has not happened. This should be done in conjunction with the waste industry; and not in secret without adequate explanation or reference to a waste management strategy, as at present.
- The role and siting of civic amenity sites, should be part of the waste management plan. A green waste/composting facility is also required.
- Only after adequate planning of the above should the size of the incinerator (or other system of disposal) of un-recyclable combustible material be estimated.

Summary

1. The potential for recycling in Guernsey has not been met.
2. There is no waste management plan in Guernsey so we do not know how much waste is to be recycled or burnt.
3. If we do not know the size of the waste stream for an incinerator, we can not plan it.
4. A MRF is an integral part of the plan for an incinerator, as the waste must be separated pre and post burn.
5. Irrespective of the outcome of this debate, or final commissioning date of an incinerator, the MRF could be sited and built now to the benefit of the Island, by increasing the volume of recycled material especially commercial waste, reducing the immediate demands on land fill.
6. We believe a smaller incinerator than previously proposed is probably the sensible choice but we are not experts.

We would welcome an opportunity to meet with the panel to discuss this mater.

24 September 2004

Contacts List of Those Providing Comment

Responses were invited from the following:-

Representatives of Local Industry Bodies

Tony Gallienne, President of IoD and Finance Director of Norman Piette Ltd

Jonathan David, Chairman of CGi and Director of Procurement for Specsavers Ltd

Robin Fuller – President of GIBA and Managing Director of the Bank of Bermuda

David Miller – President of Guernsey Growers Association

Mike Collins, Director, Chamber of Commerce

Bob Bartlett, Chamber of Commerce Environment Working Group

Carl Symes. President GHATA, and Director, Fleur du Jardin Hotel/Restaurant

Anthony Creasey, Managing Director, Creaseys Ltd, Chamber of Commerce Retail Group

Eric Legg, Chairman of the Construction Industry Forum

Industry Contacts

John Razzak, Administration and Safety Manager, Island Waste Ltd – Main Skip Co's

Alan Crowe of Guernsey Recycling (1996) Ltd

Tommy Duquemin, Local Director of Mayside Reclamation Ltd

Brian Perry - Perry's Recycling, UK parent company of Mayside Reclamation

Companies and Businesses Consulted

Specsavers (Industry)

Creaseys (Retail)

Ogiers (Retail)

The Guernsey Model Shop (Retail)

R G Falla Ltd (Construction)

Norman Piette Ltd (Construction Supply)

Civil Servants

Alan Richards, Project Director, Guernsey Technical Services, Public Services Department

Richard Nash, Director of Primary Industries, Commerce and Employment Department

Tony Brassell, Business Development Manager, Commerce and Employment Department

Roger Sendall – Sea Fisheries Officer – Report on Discussion with John Dodd of Guernsey Fishermens Trading Co Ltd

Kyan Frith – Senior Finance Officer of Public Services Department

Gareth Jones, Senior Research Analyst, Policy Council

Additional Information

Mike Nicolle, Independent adviser on the Construction Sector

September 2004

Dear

IMPACT OF WASTE DISPOSAL COSTS ON GUERNSEY INDUSTRY

Commerce and Employment are examining the implication for local businesses in regard to the energy from waste project and the potential increases in the associated costs of waste disposal. There is a Review into the Energy from Waste Plant, however it would seem that all the future options of waste disposal will result in an increase in costs, hence this enquiry on behalf of the Department.

Commerce and Employment are concerned about the impact of these costs on local businesses and wish to understand the waste disposal options open to the Island's industrial/commercial businesses. I would therefore welcome a comment from yourself on behalf of that sector of the island's business community that is represented by XXX.

Of particular interest to the examination are the following points:

- The significance of waste disposal costs to your business sector;
- An indication of the potential or ability to reduce the amount of waste that would be sent for incineration (as a result of the cost increase) - ie recycling, composting, disposal off-island.
- The potential impact of a cost increase from £33 per ton to circa £100 per ton for waste disposal;

I would be pleased to receive your views or comments on the above giving an indication of the impact of the possible charge increase as you envisage it affecting the sector of island businesses represented by XXX.

Yours sincerely

John Ogier
Economic & Strategic Adviser

European Regulations Related to Waste Management Considered for this Report

European Directive on the Landfill of Waste (99/31/ECP, (the Landfill Directive).

Council Directive 94/62/EC of 15 December, 1994 on Packaging and Packaging of Waste.

Council Directive 89/369/EEC of 8 June 1989 on the prevention of air pollution from new municipal waste incineration plants.

Council Directive 89/429/EEC of 21 June, 1989 on the reduction of pollution from existing municipal waste-incineration plants.

The European Waste Catalogue.

Communication from the Commission of 22 July 1998: the competitiveness of the recycling industries.

Appendix 8

**Response to
Commerce and Employment Department Report
“Waste Disposal through an Energy from Waste Plant
– an Economic Impact Assessment”
by the
Energy from Waste Project Team
for the
Panel of Inquiry**

The report is entitled as ‘An Economic Impact Assessment’ of the Energy from Waste (EfW) project. After reaching a swift conclusion that the impact would be so small as to have little noticeable effect upon the island (see page 3), the majority of the report addresses other aspects of the project and the island’s waste strategy.

The main argument put forward is that the gate fee of the proposed EfW plant will make recycling more economically favourable and therefore the private sector will, by recycling more waste, present less waste for disposal. The report suggests that the EfW plant specification prepared by Ramboll is probably over-sized and as a consequence the island will incur unnecessary capital expense. Furthermore, the report concludes that the role of the private sector in recycling has not been appreciated in the EfW design process and is inhibited by States policy. Finally an action plan is proposed.

In general, the report frequently presents no evidence for it’s arguments, contains factual errors throughout and demonstrates a general lack of understanding of waste management. For example, in the section entitled ‘Background’:

- 2nd paragraph states that ‘...pre-sorting of the waste stream...’ is undertaken ‘...to avoid environmental damage...’, which is untrue.
- 3rd paragraph states that alternative technologies should be examined as ‘other technologies in waste disposal.. are claimed to be more environmentally friendly...’, yet the report has made no critical examination of these claims, nor does it acknowledge the reports by Juniper (commissioned by the Board of Administration) and Fichtner (commissioned by DEFRA) that conclusively dismiss application of alternatives to mass burn EfW for use in Guernsey, either now or in the near future.
- The boxed statement, as a justification for anticipating a growth in recycling, cites the example of secondary aggregate production in the private sector yet this is far more simplistic and straightforward than the core issue of disposing of non-recyclable residual waste.

These errors have arisen in part because the report is reliant upon a small number of local consultees, most of whom have offered views that represent their business interests. Their views are included verbatim in the report without critical appraisal. In contrast, the research underlying the draft Waste Management Plan (WMP) has consulted extensively across all sectors of the community.

Furthermore, the report is also subjective, ignoring research that is contrary to the recommendations and places emphasis on the views and wishes of the consultees. The use of boxed sections of text is selective and often presents views that are not supported by the preceding paragraphs.

The two most significant flaws in the report, which are repeated throughout, are:

1. **A failure to understand the basis for calculating the capacity of the EfW plant.** Ramboll recognised that a greater level of recycling will be stimulated, in part, by the increase in disposal charges, but a threshold will be reached whereby the cost of further recycling will exceed the EfW gate fee and such activities would not be adopted. This effect has been quantified and taken into account in the capacity sizing of the EfW plant. An independent calculation by the WMP consultants gave similar results. **In other words, incinerable waste arisings of around 50,000 tonnes per annum represent a minimum quantity of ‘residual waste’ that cannot be economically reduced further by recycling.**
2. **An assumption that there is a large potential to implement recycling activities at a cost to the waste producer of less than £100 per tonne.** Consultation with the Environment Department would readily show that recycling activities frequently cost far in excess of this figure, as would examination of the research for the draft WMP and a more critical approach to the views of the consultees. **The failure of the report to carry out any financial analysis of recycling (in terms of collection, segregation and delivery to suitable markets) has resulted in an unrealistic portrayal of the scope for diverting waste from incineration.**

The report contains numerous other inaccuracies but in the interests of providing a swift and concise response for the Panel of Inquiry, only key errors will be discussed.

Section 2. Remaining waste disposal challenge

The third paragraph states ‘...the total waste stream has not been growing significantly so the 46,000 tonnes may be taken as a relatively stable figure.’ This statement is incorrect because it does not acknowledge the establishment of waste sorting facilities at Pointes Lane and Fontaine Vinery since landfill commenced at Mont Cuet. The former claims to be diverting in the region of 14,000 tonnes per annum from landfill. Recent gate fee increases and contamination penalties at Mont Cuet have favoured more separation which has suppressed the tonnage going to landfill; therefore the tonnage across the weighbridge by no means reflects ‘the total waste stream’.

Figures for the percentage of combustible material in various weighbridge categories are quoted. These values are taken from a spreadsheet that is used in-house by GTS to make very approximate judgements, despite informing the report’s author of the limitations of that spreadsheet, it is not fit for the purpose used in this report. Other more definitive sources of combustible waste arisings have not been used.

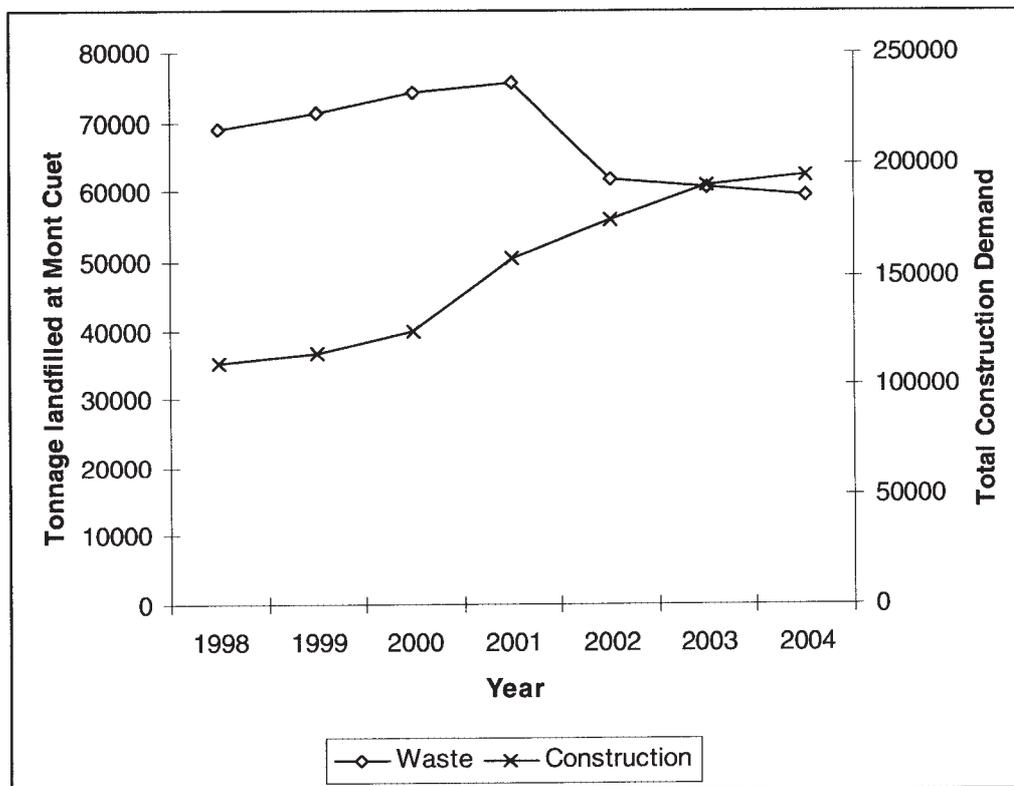
4000 tonnes of sludge is incorrectly attributed to the Water Board filtration works, whereas this waste stream would actually arise from a sewage treatment plant, if constructed.

Section 3. Impact of waste disposal costs on Industry/Commerce

A boxed section of text states that alternative technologies or recycling ‘...will have a similar gate fee cost...’ of £100 per tonne for EfW. No evidence or calculation is presented for this statement. As discussed below, alternative solutions and/or recycling are more likely to exceed £100 per tonne.

On page 8, the last paragraph states that waste from construction is set to decline. The proof offered for this statement is the quantity of inert material arriving at Longue Hougue reclamation site. This is a narrow view of waste generation as it only reflects activity in excavation and demolition i.e. generation of inert waste. No comment is made on the generation of putrescible waste, which is far more problematic to manage. Furthermore it could be argued that refurbishment projects on existing buildings will become more commonplace in the long term as a result of a greater amount of property and spare capacity in the industry. In this scenario waste from the construction sector would continue or even increase.

The graph below illustrates the relationship between construction demand and waste landfilled at Mont Cuet, it can be seen there is no correlation between the two. It is suspected that the increase in Mont Cuet gate fee and the contamination charge for inert waste prompted an increase in waste segregation.



On page 10, it is reported that construction companies would reduce the cost of waste disposal by:

- ‘recycling timber’ – investigations for the WMP have found no evidence of an economically favourable market for this material.
- ‘burning combustible material on site’ – this would be prohibited under the Environmental Pollution (Guernsey) Law.

The section of the report concerned with the Retail Industries draws heavily upon the views of a small number of consultees. The report then goes on to propose that a dedicated collection service for recyclable materials would increase diversion of these materials from disposal. No evidence or financial analysis is given for this statement which is presented as a boxed recommendation on page 11. Research undertaken in preparing the draft WMP has found that costs for collection are considerable, even in locations that offer ideal operational conditions, let alone in the confined areas of St Peter Port where small retailers are located. In the concluding sentence of this section, the report has failed to recognise that an increase in recycling is an anticipated and necessary trend in order for waste arisings to conform with the design capacity of the plant.

On page 12, participation of hotels and restaurants in recycling is suggested as a means of reducing waste presented for disposal. No qualitative evidence is presented for the statement, either in terms of cost or actual waste reduction. The view of the project team is that businesses can, and do, make use of the free-of-charge bring banks for depositing glass and cans. Those businesses which do not would therefore require a dedicated collection service, in which case the costs would be in the same region as the bring scheme i.e. ~£150 per tonne.

The boxed text at the end of this section states ‘there are many opportunities to increase recycling’, whereas the preceding text actually sets out numerous limitations of recycling in this sector.

On page 13, the text describing Mayside’s paper recycling operation includes a comment that ‘Each tonne of export also results in a fee of £7 per tonne in harbour dues bringing a revenue of £35,000 into the States of Guernsey harbour accounts.’ This statement should be put in context, i.e. that the revenue is used to fund harbour operations.

The third paragraph on this page states that the Mayside ‘Blue Route’ scheme collects paper at a charge of £7.40 per tonne. This is either an error or represents a lack of critical appraisal given to the consultees input.

Mayside actually charge £7.40 to collect between 5 and 15 bags of paper. In order for the Blue Route charge to be £7.40 per tonne as stated in the report, each bag would have to weigh between 66 and 200kg, which is not possible given the nature of the bags used in the scheme.

A simple analysis of the Blue Route charging structure is given in the table below.

Equivalent charge (£ per tonne) for Mayside 'Blue Route' paper collection.		Weight of each bag		
		5kg	10kg	15kg
No. of bags collected	5 bags	£296	£148	£98.67
	10 bags	£148	£74	£49.33
	15 bags	£98.67	£49.33	£32.89

It shows that the cost per tonne to the waste producer is unlikely to be less than £50 per tonne and can readily exceed £100 per tonne, particularly when considering that businesses may not devote large areas to storage of waste paper and hence collections may tend to take fewer than 15 bags.

The remainder of the section concerned with Mayside describes the appeal of transporting recyclable materials to markets in Asia. The argument is contradictory in that the scarcity of oil is used as a justification for increasing recycling but the sustainability of transporting material to markets in the most distant possible locations is not challenged.

Finally, no evidence is presented on the ability of Mayside to deliver their claim that they 'would like to double export of paper and cardboard to an estimated 10,000 tonnes per annum', it appears to be no more than a statement of ambition.

The boxed statements at the end of page 13 and 14 do not challenge or contradict any of the research done by the Environment Department, either in terms of anticipated increases in recycling, or in the involvement of the private sector.

On page 14, it is claimed, with no supporting evidence, that 'There are opportunities to expand this business (Guernsey Recycling Ltd)...'. The text continues '...with a supply of sorted items supplied to the depot' which reflects little more than the aspirations of the scrap metal yard to expand.

The boxed statement proposing location of long term sorting/recycling facilities at Longue Hougue is redundant as this was decided at the Integrated Waste Management Facility Planning Inquiry in December 2000.

Section 4 Future Waste Arising

The report lists four factors that it considers to influence waste generation. However, there are additional factors that should also be taken into account including behavioural trends such as consumerism and decreasing household size. The latter issue is particularly significant as it leads to an increase in the purchasing of household goods, e.g. the number of household appliances per capita increases.

Population projection

The report disputes the population predictions made by Ramboll on the basis that new forecasts predict a smaller growth in the population. This conclusion is challenged on four issues:

- Ramboll used population forecasts taken directly from the Economic and Statistics Unit, it is not made apparent whether the difference to the 'Government Actuarial' projection is solely down to the use of newer census data, or if a different interpretation has been applied.
- The report chooses to exclude the effect of net immigration with no justification for doing so.
- The report ignores the receipt of waste from Alderney which effectively adds around 2,200 to Guernsey's population. This places the current waste-generating population at around 62,000 and adding the growth forecast by the Government Actuarial figures results in a 2025 population of just under 66,000 i.e. higher than the Ramboll prediction.
- No evidence for the upwards trend of 'Residents Absent' is given.

Economic Growth

The report questions the validity of economic forecasts by Ramboll and their relationship to increases in waste arisings.

In Technical memo 5 of the EfW Project Definition Brief, Ramboll calculated that the average increase in GDP for the period 1980 – 1999 was approximately 4 %. Ramboll also recognised that a constant growth as seen in the past 20 years could not be expected to continue and assumed an economic growth rate of 1 – 3%. This value is consistent with the latest figures which give an average annual increase of 2.9%, as noted on page 18 of the report.

Changes in various economic sectors are discussed on page 18 and it is suggested that these changes, more than a discrepancy in GDP, undermine Ramboll's forecast. The report proposes a decline in waste from construction, this has already been addressed and it is the project team's view that there is no evidence for a link between declining construction sector activity and the quantity of incinerable waste arisings.

The report also cites the decline in horticulture as a cause of diminished waste arisings, this is irrelevant to sizing of the EfW plant. Green waste has a low calorific value and would therefore not have a significant effect upon the capacity of an EfW plant. Furthermore, the draft WMP recognises that this waste has the potential to be composted into a useful product and proposes that a dedicated facility be established for green waste.

The page concludes with a boxed section of text which states that areas of growth in the economy 'will generate relatively little waste' and continues on page 19 to state that

waste production and GDP may not be linked in the future. These conclusions are not accepted for the following reasons:

- No evidence is offered for the emergence of a ‘virtual knowledge economy’.
- The assertion that waste production may be de-coupled from GDP is contrary to experience throughout the world.
- Most significantly, the report is incorrect in attributing waste production largely to manufacturing and primary industry. The correct interpretation is that economic growth will result in greater affluence of businesses and individuals who will therefore make decisions that generate waste. For example, an increased level of refurbishing office premises and consumer purchases.

As outlined in the opening paragraphs of this response, a key failure of the report lies in its misunderstanding of Ramboll's EfW capacity calculation. Ramboll and this report make estimations of population and GDP increases that only differ slightly but Ramboll assumed a waste growth of only 1.3% per year. This takes account of recycling and waste minimisation above what is currently being undertaken, stimulated by the increased disposal costs. A significant level of commitment will be required to achieve this target:

Assuming a start point of 50,000 tonnes per annum in 2005

Waste arisings by 2025 with 1.3% annual increase = 64,738 tonnes per annum

Waste arisings by 2025 with 2.9% annual increase = 88,568 tonnes per annum

Therefore to keep arisings within the capacity of the plant at an annual growth rate of 1.3%, waste diversion will have to increase annually to a level in 2025 where 24,000 tonnes per annum are extracted. This will be in addition to the recycling and separation activities that are currently undertaken by the Environment Department and operators within the private sector.

Recycling and efficacy of segregation of materials in the waste stream

The report states that recycling will become more viable once disposal charges rise to £100 per tonne. This is accepted and was a key factor in the draft WMP and in the work done by Ramboll in sizing the EfW plant. This section then refers to the requirement for ‘a more detailed investigation’ of the economics of recycling. This has been done and is presented in the draft WMP. It is notable that the calculation by the WMP consultants to determine the anticipated tonnage of waste requiring incineration at the start of the plant's life gives an amount of 53,575 tonnes per annum. This value accords very closely with the independent calculations done by Ramboll that predict 47,595 tonnes per annum.

The recommendations at the end of page 19 are all present in the draft WMP, but the example given in the final paragraph suggests a lack of understanding of the topic. Establishment of a collection service for recyclable materials arising from small

restaurants would effectively duplicate the bring scheme. Costs for that activity are in the order of £150 per tonne depending upon the material and therefore it is highly unlikely retailers would be willing to participate.

As noted in the opening paragraphs of this response, the arguments presented in this section suffer particularly from the assumption that recycling activities will cost less than £100 per tonne.

Changes in the international market

Page 20 lists three factors that may facilitate increased recycling. As a general comment, no evidence is offered that any of the three will occur in a timely enough manner to alter the viability of recycling in Guernsey. Secondly, should these factors come into effect, an increased level of recycling in the long term will be welcomed as a means to constrain waste growth within the capacity limits of the EfW plant.

Future Waste Arisings and the Economics of Operating an Energy from Waste Plant

This section suggests that 'Best Value' may be obtained by building a smaller EfW facility. This conclusion is totally unsubstantiated:

- No evidence, as discussed above, is offered that waste growth will differ from that forecast by Ramboll.
- No evidence, as discussed above, is offered that recycling will reduce waste arisings below that forecast by Ramboll.
- No evidence is given for the relationship between plant size and capital cost, and more crucially, the relationship between plant size and gate fee. Using data included in the Environment Departments response to the requete, the gate fee for a smaller plant running at 50,000 T/yr for the whole of its life time has been calculated with the same model used for previous gate fee calculations.

Capacity	39000T – 54,500T per year
Capital Cost	£64.4M
Design Cost	£3M
Contingency	£6.7M

Gate Fee £111.78 per tonne

Fixed costs do not decrease in proportion to the drop in revenue from the lower waste throughput, therefore a smaller plant would actually have a higher gate fee.

- The requirement of an EfW plant to operate at peak capacity is overstated, and the consequences of under sizing the plant have been ignored by the report. The primary objective of the plant is to reduce the volume of waste to landfill and this will not be met if the plant is too small. Provision of additional capacity will incur capital costs in the region of £30-60 million. In contrast, the unlikely

scenario of over sizing the plant would incur marginally higher operational costs.

Conclusions and Outline Action Plan

The conclusions of the report are presented on page 23 and an action plan is given on page 25, on the basis that the underlying discussions have been dismissed no further comment is offered with the exception of conclusion no.4. It proposes implementation of the EfW plant be delayed in order to further investigate landfill and other technology options. These topics have been conclusively reviewed in Billet XX 2003 and in particular, the reports commissioned from Juniper. The proposal is also contrary to States Resolutions arising from the 1998 debate of WSa2 and the 2003 debate concerning EfW procurement.

Appendix 2

This appendix contains a report written by Mike Nicolle of RG Falla Ltd which discusses the role of waste management in the construction / building trade. The last paragraph of the first page reads:

'Most companies interviewed employed local labour and did not consider that their turnover or rubbish production would reduce when the present high level of building activity tails off.'

This clearly contradicts a major element of the argument put forward by the report and yet it has not been included in the main body. The manner in which information from this appendix is interpreted is consistent with the selective approach taken throughout.

(NB The comments of the Policy Council are set out below)

The Policy Council commends the Environment Department for its timely and well researched response to the Panel of Inquiry's Report into "The Future of Solid Waste Disposal in Guernsey."

Bearing in mind the pressing nature of waste disposal problems in the Island, a majority of the Policy Council, while appreciating the difficulties involved, was disappointed that the Panel of Inquiry, at considerable cost, failed to come forward with firm solutions.

Members note that the Environment Department has concluded that "...the States does not wish to proceed with the Lurgi contract and the States does not wish, at this stage, to retender a mass burn option under a different procurement route."

The Environment Department clearly believes that the States have already decided that the perceived environmental and social benefits of future (albeit unproven) alternative solutions outweigh the advantages of going for a secure solution at known costs which involves mass burn technology.

This may very well be the case, but in considering the Environment Department's Report, and that of the Panel of Inquiry, the States need to consider whether this assumption is valid. It is key to reviewing the rest of the Environment Department's Report, and deciding on future action.

If the Environment Department's assumptions about the will of the States are correct then the Department has identified a practical and logical way to proceed with the development of a strategy for the future of solid waste disposal on the Island – albeit that it does rely on further research, more consultancies and (in all probability) a "wait and see strategy."

In these circumstances the Policy Council supports the proposals.

However, the States should be aware that the route recommended by the Panel of Inquiry, and largely supported in the Environment Department's Report, provides no mid and long term certainty over such an essential part of the Island's infrastructure services as solid waste disposal. Neither is there any guarantee that all the measures proposed will be wholly or even partially successful in the short term. This lack of certainty relates to timescale, cost and technology.

In the field of solid waste disposal, past experience teaches us to be somewhat cautious over claims of "new" technologies and "low costs". Rarely are target dates ever met at the cutting edge of science, and costs tend to escalate from projections.

In continuing to defer a decision on the future of solid waste disposal in Guernsey, there remains a risk that Mont Cuët will be full well before a viable alternative to landfill and/or mass burn is available, leaving the island heavily reliant on costly and (perhaps less than robust) export of waste.

Waste, Water & Stone Review

There is one further aspect that the Policy Council has considered in reviewing the Environment Department's Report. In 1994, the States considered a Review of Strategy on Waste, Water and Stone (Billet d'État, 1994). It was resolved then that the Advisory & Finance Committee should instigate a further report to the States on Waste, Water and Stone requirements at least 10 years before the exhaustion of Les Vardes Quarry.

Ronez has now advised the States that the Quarry has reached this 10-year point. However, the review has not progressed because of the uncertainty over the long-term waste disposal solution adopted by the States. If the States are not to proceed with mass burn technology at this stage then this review should be activated.

In previous States debates (in 1998 and 2003) the States effectively resolved that Les Vardes Quarry would not be used as a solid waste disposal site. However, these decisions were taken on the basis of the States committing to mass burn (through energy from waste). If the Environment Department is indeed correct in its assumptions that the States have moved away from favouring mass burn technology, then it is possible that the future of the exhausted hole in the ground may come back into play. Although infilling the quarry with untreated putrescible waste may fly in the face of good practice in the UK and Europe, the large void could (albeit at a cost) be filled with the reduced volumes of waste from another treatment process (e.g. Mechanical Biological Treatment).

The Policy Council believes that it now makes sense for the future work on waste strategy (including the review of the waste, water and stone issues) to be moved forward through a Policy Council Steering Group. The Council has therefore, with the full agreement of the Minister for the Environment Department, agreed to set up such a body to undertake this review. The Chief Minister will chair this Group, which will also comprise the Ministers of the Environment, Treasury & Resources, Public Services and Health & Social Services Departments.

This Group will ensure that an integrated approach is taken to the complex issues ahead in relation to waste, water and stone.

L C Morgan
Chief Minister

21st April 2005

(NB The Treasury and Resources Department support the proposals)

The States are asked to decide:-

Whether, after consideration of the Report dated 1st April, 2005, of the Environment Department, they are of the opinion:-

1. To direct the Environment Department, in consultation with the UK Department for Constitutional Affairs, to seek agreement to Duly Motivated Requests submitted to France and Germany for the export of municipal solid waste.
2. To agree not to wait until 2008 to determine a long-term waste management strategy.
3. To agree that the Environment Department shall continue to investigate the potential of working jointly with Jersey as set out in paragraph 11.10 of that Report and report back to the States at the earliest opportunity.
4. To authorise the Environment Department, in liaison with the Treasury and Resources Department, to appoint new independent consultants to carry out waste audits and predict future waste arisings as set out in paragraph 14.5 of that report.
5. To authorise the Environment Department, in liaison with the Treasury and Resources Department, to work with DEFRA's independent consultants as set out in paragraph 14.6 of that Report and report back to the States at the earliest opportunity.
6. To agree that air pollution monitoring should continue at Longue Hougue pending a decision on the long-term waste disposal strategy and that all associated costs and utilities standing charges continue to be raised against the EfW loan facility.
7. To agree that the Environment Department should pursue those interim waste minimisation and recycling initiatives set out in section 14 of that Report.
8. To direct the Treasury and Resources Department to authorise the Department to appoint, on a three year contract, additional resources as set out in paragraph 18.4 of that Report.
9. To direct the Treasury and Resources Department to take account of the revenue and additional staff costs, of introducing interim waste minimisation and recycling initiatives, as set out in section 18 of that report and to increase the Department's budget accordingly.
10. To direct the Environment Department to report back to the States on those areas of the Waste Management Plan that could be resolved in advance of the decision on the long-term strategy, as set out in paragraph 17.6 of that Report
11. To direct the Environment Department to explore, as a matter of urgency, the procurement and funding options for a green waste composting facility and civic amenity sites and to report back to the States at the earliest opportunity.

Resolutions

IN THE STATES OF THE ISLAND OF GUERNSEY

ON THE 26th DAY OF MAY 2005

(Meeting adjourned from 25th May, 2005)

The States resolved as follows concerning Billet d'État No V
dated 6th May, 2005

ENVIRONMENT DEPARTMENT

**THE FUTURE OF SOLID WASTE DISPOSAL IN GUERNSEY –
RESPONSE TO THE REPORT OF THE PANEL OF INQUIRY**

After consideration of the Report dated 1st April, 2005, of the Environment Department:-

1. To direct the Environment Department, in consultation with the UK Department for Constitutional Affairs, to seek agreement to Duly Motivated Requests submitted to France and Germany for the export of municipal solid waste.
2. To agree not to wait until 2008 to determine a long-term waste management strategy.
3. To agree that the Environment Department shall continue to investigate the potential of working jointly with Jersey as set out in paragraph 11.10 of that Report and report back to the States at the earliest opportunity.
4. To authorise the Environment Department, in liaison with the Treasury and Resources Department, to appoint new independent consultants to carry out waste audits and predict future waste arisings as set out in paragraph 14.5 of that report.
5. To authorise the Environment Department, in liaison with the Treasury and Resources Department, to work with DEFRA's independent consultants as set out in paragraph 15.3 of that Report and report back to the States at the earliest opportunity.
6. To agree that air pollution monitoring should continue at Longue Hougue pending a decision on the long-term waste disposal strategy and that all associated costs and utilities standing charges continue to be raised against the EfW loan facility.
7. To agree that the Environment Department should pursue those interim waste minimisation and recycling initiatives set out in section 14 of that Report, but so as also to include the recycling of plastic PET bottles, but:
 - (a) with the exception of the initiative (set out on page 531) '*In liaison with the Public Services Department and the private sector, pilot the diversion of mixed waste from Mont Cuet to waste sorting facilities for segregation*'; and
 - (b) to direct and authorise, as a matter of the highest urgency:
 - (i) the Environment Department, to identify, in liaison with the Public Services Department and the private sector, the most advantageous site suitable for the sorting of all mixed waste:

- (ii) the Treasury and Resources Department, to approve the issue and acceptance of tenders to set up, provide plant for, and operate such a site for a minimum of 3 years;
 - (iii) the Environment Department, in liaison with the Public Services Department, to take all such other measures as are necessary for all mixed waste to be diverted to such a site, in order to minimise the waste entering Mont Cuet.
- 8. To direct the Treasury and Resources Department to authorise the Department to appoint, on a three year contract, additional resources as set out in paragraph 18.4 of that Report.
- 9. To direct the Treasury and Resources Department to take account of the revenue and additional staff costs, of introducing interim waste minimisation and recycling initiatives, as set out in section 18 of that report and to increase the Department's budget accordingly.
- 10. To direct the Environment Department to report back to the States on those areas of the Waste Management Plan that could be resolved in advance of the decision on the long-term strategy, as set out in paragraph 17.6 of that Report.
- 11. To direct the Environment Department to explore, as a matter of urgency, the procurement and funding options for a green waste composting facility and civic amenity sites and to report back to the States at the earliest opportunity.
- 12. To direct:
 - (a) the Environment Department, by advertisement and other reasonable means, but without delay, to seek from interested waste management and related operators across the globe complete packages of waste management and disposal solutions for Guernsey; and to report back to the States on all such proposed packages by not later than the date on which they report back to the States on their proposed long-term solution to Guernsey's waste problem;
 - (b) the Treasury and Resources Department to allocate adequate funding for the Environment Department to carry out that brief.

K. H. TOUGH
HER MAJESTY'S GREFFIER