

EXECUTIVE COUNCIL

CONFIDENTIAL

Title of Report: Waste Management Strategy Options

Paper No: 223/11

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Report of: Director of Public Works/Maintenance Manager

1. Purpose

- 1.1 To broadly set out the situation in relation to waste and its management and offer for comment options which might be followed in developing a formal waste management strategy and plan with a view to improving waste management.
- 1.2 The suggested broad policy approach is set out in Appendix A, as is a draft action plan model.

2. Recommendations

- 2.1 That the Waste Management Strategy Options be referred to an Away Day with Honourable Members at the earliest opportunity.

3. Financial Implications

- 3.1 None at this stage

4. Background

- 4.1 A report on waste management produced by Halcrow in 1997 advised on policies to be adopted on Waste Management and Disposal systems “resulting in environmentally acceptable practices consistent with relevant international obligations and suitable to the circumstances of the Falkland Islands”
- 4.2 Some aspects of the report have been followed, but a core element of the report was an assumption that municipal service waste (MSW) could be integrated into the MoD waste stream at Mount Pleasant, and this has not been proven to be practical, not least of all because this would have required the application of stringent standards, with associated costs and resulted in a significant amount of material having to be either still landfilled elsewhere or shipped out for disposal elsewhere, at significant cost.

4.3 Since the Halcrow report on waste management was published in 1997, the following further actions have been taken by Government:

1. Improved placement control and remediation and covering practice at both Eliza Cove and Mary Hill tips
2. Separation out of waste oils, lead acid and other large batteries and gas cylinders at tips for use or disposal in safe manner
3. Encouragement of use of waste oils for heating fuel
4. Giving assistance where practical to farms in forming better landfills
5. Disposal of Albemarle oil
6. Collection and disposal of sheep dip
7. Replacement of hospital incinerator by abattoir incinerator
8. Discussions with private sector on improved disposal of refrigerant gases
9. Phasing out of fire extinguishers containing CFCs.
10. The establishment of a glass recycling system.
11. The installation of collection and pumping systems for sewage to reduce discharge into Stanley Harbour.
12. Private sector recycling initiatives have also been supported and for a short period aluminium cans and vehicle batteries were being exported as scrap.
13. An improved collection system has also been introduced which has amongst other things reduced vermin levels in Stanley.

4.4 General Waste Types and Indicative Volumes

1. Municipal Solid Waste (MSW) In terms of Stanley, around 1,000 tonnes is generated from household and commercial wastes and collected via the 'wheelie bin' system, of which 39% is biodegradable food and garden waste, a further 12% is paper and card and 27% is glass. An estimated 170 – 200 tonnes of other MSW is generated by commercial premises in the form of packaging and by-products and taken to site by skips and other means. This MSW is disposed by landfill at Eliza Cove tip.
2. Scrap Metal 300 tonnes total which assumes some volume from BAS, but this is variable. Since the report was published, the EU Landfill Directive has severely limited the disposal of commercial wastes and scrap vehicles by landfill. The effect of this has impacted on MPA, but the Falkland Islands is not obliged to comply with the Directive.

3. Oily Waste The current volume produced in Stanley and the Power Station is around 50,000 litres per annum. This is primarily subject to disposal at Stanley Growers who use it for fuel and who also accept some oil landed from ships under the MARPOL Convention. Oily wastes are also accepted at Stanley Services Ltd at a charge and shipped out for processing.
4. Other hazardous waste There are some, generally small disposals of asbestos based materials, which are landfilled in marked locations.
Hospital waste is now disposed through the abattoir incinerator, which is capable of achieving required temperatures (1000°C) in both primary and secondary burn chambers.

It is perhaps worth of note that the removal of food and garden, paper and cardboard and glass waste from the domestic stream would reduce the volume by approximately 80%

- 4.5 Halcrow did not consider waste water (sewage) disposal in depth since they considered the volumes discharged to be too low to be a concern. However, since 1997, Government has taken two key steps to improve sewage disposal practices:-

1. A collection and pumping scheme has been built and brought into use which has significantly reduced discharge into Stanley Harbour – to approximately 12% of previous levels.
2. New FIG housing developments outside the catchment of this system have or are proposed to utilise package sewage treatment units, and other developments although small scale have been required to utilise treatment in some form.

5. Standards

- 5.1 There is no requirement for the Falkland Islands to adhere to any EU or UK legislation, although it does have obligations under the Montreal Protocol relating to ozone depleting substances and under MARPOL on wastes from shipping. There is no specific legislation within the Falklands, other than that relating to land use planning and public health.
- 5.2 The current practices of landfilling without separation or pre-treatment of organic waste, would not comply with the EU landfill directives and these are periodically reviewed and tightened.
- 5.3 EU countries are signatories to the Basel Convention which limits exports and imports on hazardous waste, requires legislation and detail reporting to the Convention Secretariat. This has not yet been extended to the Falkland Islands. Several years ago the United Kingdom indicated that nevertheless there were impacts of the Convention on Overseas Territories (including the Falkland Islands). In particular FIG could not export waste for disposal to a Convention country without having obtained in advance all necessary permissions from the

Convention country, nor should it export hazardous waste to a non-Convention country unless the government of that country had agreed to receive it. FIG has an “umbrella agreement” relating to disposal of hazardous waste via facilities in the United Kingdom. This umbrella agreement was entered into by the United Kingdom in accordance with its obligations to us under the Convention and requires UK import permits to be issued before the hazardous waste in question is shipped from the Falkland Islands. The definition of “hazardous waste” for the purposes of the Convention and, indeed, in UK legislation for domestic purposes is quite wide. Printer inks, paints, lacquers, varnish, wood preserving chemicals, waste from production and processing materials and asbestos are among materials occurring in the Falkland Islands which are categorised as “hazardous wastes”.

5.4 The London Convention on Dumping at Sea and Orders in Council under the Environmental Protection Act apply to the Falkland Islands and control dumping and discharge to the sea (they do not affect sewage discharge). By way of example scrap metal and asbestos may not be dumped at sea nor may sludge from sewage farms or ashes from incineration.

5.5 Licences are required and issued for the disposal into the sea of by-products from the Abattoir, with monitoring being undertaken by the Environmental Planning Department.

5.6 Members must decide whether they require more information on the current EU regulations or whether they wish instead to construct their own, less stringent, policies. It is suggested that any that new legislation should only be introduced if, without it, there is a significant risk that harm to the environment or public health cannot be effectively controlled or minimised.

5.7 The Islands Plan states that “The unspoiled nature of the environment is to be prized and protected. We aim to achieve longer-term environmental sustainability.”

5.8 In September 2001, Government signed the Environmental Charter for Overseas Territories, which in relation to waste management requires FIG:

- (1) to aim for solutions which benefit the local environment
- (2) to contribute towards the protection and improvement of the environment
- (3) to encourage activities and technologies that benefit the environment
- (4) to control pollution, with the polluter paying for prevention or remedies, and establishing effective monitoring and enforcement mechanisms.

5.9 To some extent, therefore, we are committed to introducing legislation on waste management. Areas which might be tackled in an Environmental Protection Ordinance are set out below in brief. It is interesting to consider on whom legislation would impact – clearly, Government, through PWD, is the primary waste disposal operative and Government would also be the regulator under any legislation. It is not without possibility that the disposal operation could be

privatised, and charges are to a certain extent already raised for domestic and commercial waste disposal under the “polluter pays” principle. Thus any legislation must bear in mind the possibility of regulating operations independent of whether or not government runs the service.

5.10 Local legislation might address

- (1) Limiting environmental damage from existing landfill operations, by licensing, with penalties for waste disposal without a licence. This might also involve litter control.
- (2) The level of treatment of wastes to reduce volume or hazard
- (3) Limiting air pollution and odours
- (4) Limiting CFCs and other ozone-depleting substances
- (5) Pesticides
- (6) Stockpiles of scrap metal and vehicles
- (7) Hazardous waste. FIG has exported sheep dip to the UK in accordance with the Basel Convention
- (8) Damage to marine environments from shipping wastes. This would incorporate responsibilities under MARPOL, linking for instance fishery licences and harbour dues to use waste collection facilities in the Falklands
- (9) Future regulation of waste from oil activities
- (10) The introduction of import levies to fund or encourage improved disposal practices eg a levy on batteries or vehicles
- (11) Improved controls possibly including fines for fly tipping or unauthorised dumping at tips. This would go hand in hand with improved facilities/increased attendance.

5.11 This legislation could broadly be based on the UK Environmental Protection Act. If however Members wish to see further work on legislation, there would be significant implications for the Attorney General’s Chambers in reviewing legislation through to date.

6. **Provision of landfill, reception, separation, recycling and waste compacting**

6.1 Landfill in Stanley is currently provided in 7 acres at Eliza Cove, and existing facilities are expected to cope with demand for at perhaps years at current disposal volumes, as improved management, open burning to reduce volume and the progressive formation of bunds at the outer limits of the fill area which increases the effective depth and therefore the volume available are all assisting in extending usable life. Further expansion of Eliza Cove tip is considered

acceptable by the writer as it would not result in a new area being affected and is a relatively remote site. It also does not impact on water-courses and levels of leachate appear unlikely to have any appreciable effect on surrounding waters due to relatively low volume of material.

6.2 This may well be practical as the eastern minefield fence line is arbitrary insofar as the limit was that indicated as adequate for an acceptable period by PWD, rather than by known minefields and the reduction of areas deemed to be minefields appears to be being actively pursued by the FCO. This would supply waste disposal capacity for perhaps a further 20 years over that offered by the existing site limits. This could offer the opportunity to use peat as a cover material, provided that the practice of open burning is stopped. If the waste is managed, with putrescibles being taken out and either composted or recycled, then open burning to reduce vermin and overall volume could cease. Here it is possible to excavate down to a clay bed, into 4 metres of peat, filling and then using the peat for cover.

6.3 Eliza Cove however suffers from:

- (a) windblown debris, although somewhat reduced due to fencing and improved practices
- (b) low staffing and plant levels to manage the site
- (c) only partial separation of waste, leading to high volumes of organic waste going into the tip, and potentially hazardous waste entering the facility.

6.4 The provision of a reception facility at Eliza Cove where some improved separation of wastes could occur, and where waste could be wetted and compacted before landfill. Ideally this would require a covered building, although that is not entirely necessary, and a mechanical compactor. Any further scavenging of the waste however, would require high costs in staffing and would only be supportable if the waste was then going into another disposal stream.

6.5 To reduce (and potentially recycle) organic waste going into the waste stream, the options are to either/or provide

a. separate bins and collections for food and organic waste.

b. Introduce and get good 'buy in' to a bring system

An estimate of 600 tonnes of produced compost has been arrived at (compared with indications of perhaps 100 tonnes of compost and soil media a year being imported and sold locally), with the addition of seaweed and potential soft wastes from the abattoir, fish processing and green wastes from Stanley Growers.

The cost of a full scheme however, at one UK municipal tip, was around £350,000 so clearly work would be needed on the detail and a business case developed.

- 6.6 Volumes of metal food packaging recycled materials will be low. It is unlikely to reap any financial benefit.
- 6.7 Other possibilities for MSW landfill are at Pony's Pass Quarry and sharing with MPA.
- 6.8 Pony's Pass Quarry would be a medium to long term option, not necessarily after its use as a quarry ceases, but possibly earlier, when an area is worked out. This would allow the use of quarry material that is not suitable for construction purposes for cover, and initiate the remediation of the quarry itself.
- 6.9 This site will however need extreme care in terms of controlling and monitoring leachate due to the potential effect on Mullet Creek stream and creek where fish are regularly taken for consumption. This alone may preclude the use of the quarry for landfill other than of inert wastes, unless leachate is treated before release. This would increase both construction and operational costs. When previously considered by ExCo this was not viewed as an acceptable option due to the potential environmental impact.
- 6.10 Mary Hill is used as a landfill primarily for inert wastes, with these now primarily limited to items such as cast vehicles, gas cylinders and ISO containers. There is however room for improvement in that liquids such as hydraulic fluids are not removed prior to dumping.
- 6.11 The site has been re-engineered such that access and dumping are now only possible through an entrance at the lower level and material arising from excavations is used to provide cover, although kept to a minimum so as to not take up volume needlessly.
- 6.12 Signage provision and communication with known hauliers and contractors as methods used to try and keep some control over what is dumped.
- 6.13 Further improvement to control could only be effected to any significant extent by at least part-time staffing and a more sophisticated reception area, including facility to remove fluids from old vehicles.
- 6.14 Mary Hill could not be used for MSW due to its proximity with Stanley Airport.
- 6.15 There is superficially some attraction on sharing waste disposal with MPA. However given that MoD operate at EU standards, this will then impose those standards on FIG, which may not be acceptable and certainly will remove any option of pragmatism and this previously resulted in that option not being followed, even setting that aside, when previously approached the MoD were reluctant to sell space in their landfill which they correctly see as a finite resource. There have however been recent productive meetings with MoD and some co-operative working may be possible.
- 6.16 Application even of the European Landfill Directive, adopted in April 1999 and which set deadlines by which certain targets on control, treatment and recovery of waste imposed a requirement, for instance to reduce biodegradable municipal

solid waste going to landfill by 75% by 2006, a target date and level which clearly has not been met. Achieving and significant reduction in biodegradable waste would require separation out of this type of waste and in all probability either incineration of such waste (already reviewed and abandoned as too expensive due to fuel costs for incineration), or the setting up of composting facilities, which as noted above at 3.4a is likely to be expensive.

6.17 There are also logistical issues and costs. The location of a waste disposal facility close to Stanley keeps transportation costs down and does not discourage private initiatives in both transportation and perhaps participation in the disposal process.

6.18 It seems unlikely that, at least for the foreseeable future, local operators could gain certification to take an active part in waste disposal at MPA, although there has been very recent expression of interest from an operator who may be able to achieve this. Further, a reception and sorting facility would still be needed and the staffing levels for this are unlikely to be much lower than for a combined reception and disposal facility.

6.19 Current provision is at low cost. Staffing at Eliza Cove averages 2 man hours/day. Even a moderate proposal to clean up the place, further reduce wind blow and have minimal scavenging will require 2½ people per day, better equipment for digging and loading, as well as a compacting machine. An estimate for Eliza Cove might be:

Building and compactor	£300,000 (or less with no building)
Machinery	100,000
Staffing (additional)	35,000 per annum

Further initiatives to separate waste, compost or recycle, have not been costed.

6.20 For waste in Camp, the greatest single improvement which is likely to be effective is the provision at each farm of a hole in which to place and cover the waste. This will then remove the visual eyesore of any remaining beach dumps which in many areas have been the only practical option.

6.21 Assistance has already been given by using PWD road construction plant for excavations and can continue to be on an opportunistic basis.

6.22 Levels of waste in Camp are low. Other than encouraging the transfer of some hazardous waste, such as vehicle batteries, refrigerator gases etc into Stanley for proper disposal and, if not already used for burning; used oils; it is not considered that at the scale of operation on most farms there is need to do a great deal more, although it may be possible to garner some involvement in recycling on a bring, or via transfer points served by Concordia Bay.

6.23 There is likely to be a peak in perhaps 3 to 5 years of batteries from storage banks associated with wind turbine/24 hour power systems. Specific action on this will need to be planned as these begin to fail.

7. **Hazardous waste and oils**

7.1 Hazardous waste arises only in very small quantities in the Falklands.

Of these, refrigerants, other coolants and hydraulic fluids from vehicles and fluids used in have the greatest impact on the environment when they escape or evaporate. Lead acid batteries, small appliance batteries and redundant electronic equipment also come into this category technically, but have less impact globally. Old vehicle tyres represent a problem in landfill with a potential for fire, although this can be effectively controlled if placed well separated rather than in clusters.

7.2 Lead acid battery fluid can be neutralised and dispersed. Small appliance batteries can at this scale be packed in proprietary hermetically sealed plastic canisters and landfilled. Lead acid and similar large storage accumulators are already being streamed out and separately stored, but other than for a short period export for recycling has not proven possible. This is not a significant cost item, but has the potential to reduce long term lead pollution of and by tip sites.

7.3 The service would need to be extended to Camp to be effective and may require the provision of a free-to-Stanley service to encourage participation. There are likely to be significant peaks in Camp when storage banks for 24 hour power systems reach the end of their useful life. These batteries though, are largely Ni-Cad type and will need to be disposed of by export.

7.4 This might be funded by placing levies on battery imports, partly or wholly recoverable on return of a used unit.

7.5 Electronic equipment should have certain components such as transistors and capacitors removed and these and other hazardous waste should all be placed in appropriate containers and shipped out for disposal.

7.6 It should be noted that current disposal procedures for FIG equipment, particularly computers needs review, these, if not sold are currently crushed and landfilled, this destruction being a requirement of FIG stores procedures. FIG is almost certainly the largest producer of this type of waste due to the high number of computers held.

7.7 Again, the imposition of some form of levy or deposit on importation could encourage and fund proper disposal.

7.8 CFCs from refrigerators for recycling in UK. These substances are regulated by the Montreal Protocol, which apply to the Falkland Islands, but has not yet been introduced by way of legislation. Disposal for recycling can almost certainly be addressed by the private sector, where there is understood to be capability to recover refrigerants, even from domestic appliances, which make up the great majority of units. This will be a reducing need, as appliances coming out of Europe now contain CFC free coolants, which have no negative effect upon release.

- 7.9 This could be funded by levies on new imports and encouraged by offering money for old units handed in for proper disposal.
- 7.10 It should be noted however that imports from outside EU do not necessarily conform. There may be a need to regulate in this area to prevent imports of non-compliant materials.
- 7.11 Old vehicle tyres may be shredded or recycled, but preliminary investigation suggests that this appears impractical and uneconomic at this scale.
- 7.12 An alternative, proven effective elsewhere, is use for soil or sand stabilisation in targeted areas. These are not visually attractive initially, but rapidly collect windblown soil inside, generate some shelter for vegetation to establish and then rapidly cover in with that vegetation in a manner that can only be replicated by much more expensive solutions such as geotextiles. Trialling could initially be at Yorke Bay for sand capture and stabilisation and on the Cape Pembroke Peninsula which has significant peaty areas devoid of vegetation. This might particularly be useful if larger scale de-mining were to take place.
- 7.13 Export of hazardous waste to the UK is likely, therefore, only to be an annual or biennial event, driven by accumulated volumes. It may be possible to share export with MPA or BAS, but regulatory requirements continue to increase and there would be need for training to enable compliance to be achieved.
- 7.14 Export will be potentially expensive, but will unavoidable if these materials are to be taken out of the landfill waste stream.
- 7.15 Oils produced on the Islands are now recyclable through the burners at SGL and the abattoir. Currently there is a supply of about 50,000 litres from Stanley and up to 110,000 litres from MPA which is consumed by SGL alone, who have equipment to enable oily water to be processed and burned.
- 7.16 MARPOL (Marine Pollutant) regulations require ports to offer ships reception facilities for oily wastes. Stanley Services currently provide such a service, with the resultant material being transported to Montevideo, although the level of take-up is understood to be low.
- 7.17 Using any significant amount onshore of landed oily wastes will require the setting up of adequate testing and reception facilities to ensure that unwanted materials have not been incorporated in the oils, so that they can be used safely for heat production. Oils found unsatisfactory for burning would have to be re-exported for disposal.
- 7.18 There is the potential to reduce costly fuel imports and particularly reduce heating costs for major public buildings and private sector operations. However reception of oils on a wider basis than at present (low levels are accepted from some cruise vessels by Stanley Growers where this is of acceptable quality) will be a high risk operation involving capital cost. It is understood that the experience of Stanley Services to date is that some oil is too thick or too sedimented to burn.

7.19 There is also a requirement under MARPOL to accommodate the landing of other principally food, wastes. At present FIG has largely avoided this through its own biosecurity controls. These landings could be hazardous if the food waste contains infection from another country, for instance cheese has a high potential to carry FMD bacilli. As a part of the Government's undertaking to the European Union on the licensing of the abattoir, all such landings are required to be placed in sealed skips to avoid bird-borne carry, and then incinerated. There would, of course, be a charge to vessels for this service. To date, no action has been taken to encourage the landing of food wastes.

8. Financial Implications and Who Pays?

8.1 The principle that the polluter pays is included in the Environment Charter (para 2.4 above). This implies that Government should conduct a wholesale review of charging for waste disposal either at point of sale of the product (eg a levy on oil or refundable on the use of bottles or tins) or on collection of the waste. Some commercial waste (from pubs and food premises) is collected by FIG at a charge and although perhaps 50% of known businesses avail themselves of this service the charge raised primarily only covers collection costs. By volume most trade waste is disposed directly by the private sector.

8.2 Charges however, do not always generate good behaviour. Charging ships too much to land oil or food waste might encourage them to dispose at sea. Charging for dumping vehicles, batteries, refrigerators at the tip, or for commercial waste, would increase fly-tipping. The trick is to set the charges at an acceptable (and comparative) level, and to back these up with stiff fines for unlicensed dumping of wastes. There is however the inevitable monitoring and enforcement element with associated staffing needs and costs.

8.3 Inevitably, Government will not escape additional costs. Minimum costs above for development of a better and better controlled landfill vary from £100-£400,000 capital and £35,000 per annum. Provision of composting facilities and separate bins, bring facilities for recycled material, the export of recycled material and hazardous waste, will all add to the bill, unless it proves possible to enable the private sector to develop business activities around waste which are viable, although this may require support in the form of start up costs.

8.4 More appropriate costings will be provided following guidance on choices to be made.

9. Conclusions and decisions required

9.1 There is a perceived need to improve waste management in the islands, but it appears more probable than not that this will come at a cost due to the scale of operation and distance from potential markets even for materials which are relatively simple to separate out and are marketable elsewhere.

There is however renewed interest from the private sector in seeking to set up a recycling business which is encouraging and should be encouraged not least of all because it may offer the lowest cost method but also the opportunity to privatise the waste management process.

9.2 Standards and Legislation

- It is recommended that officers work to establish firmer standards in waste disposal, and bring forward minimal environmental legislation to regulate these standards.
- Do Members wish to emulate EU Directives?

9.3 Landfill

- It is recommended that officers plan to extend Eliza Cove tip, with new standards for reception, separation, and compaction of waste.
- Do Members wish recycling/separation initiatives to be pursued in –
 - (a) organic waste/composting?
 - (b) metals and glass?
- Encouraging private sector engagement in recycling or composting activity by means including initial financial support?
-
- Should there be a more focussed and active programme for waste disposal provision in, and from, Camp?

9.4

- It is recommended that officers work to develop a Waste Management Development Plan, as broadly set out in Appendix A, initially dealing with MSW and primarily focussing on Stanley, the largest producer.
- Do Members wish recycling/separation initiatives to be pursued in –
 - (a) organic waste/composting?
 - (b) metals?
- Encouraging private sector engagement in recycling or composting activity by means including initial financial support?
- Should there be a more focussed and active programme for waste disposal provision in and from Camp?

9.5 Hazardous Waste and Oils

- It is recommended that proposals be developed to deal with the separation, and disposal by export, of lead acid battery fluid, electronic equipment, cfc from refrigerators
- Members should consider whether to encourage and facilitate
 - (a) the landing of oils

(b) and the landing of food waste

under the MARPOL Convention.

10. Financial Implications

- It is recommended that future funding for waste disposal enshrines the principle of “polluter pays” and “user pays”.

Might this in principle include import duties on certain classes of goods?

Might this include in principle the application of charges for dumping at the landfill site(s)?

Might this instead be achieved through the proposed commercial property service charge?

- Members will need to consider the scale of allocation in the Capital programme for Eliza Cove, and level of funding in the Islands Plan for other initiatives in waste disposal or recycling they may in principle wish to support.

11. Legal implications

There are no direct legal implications arising from this report. There is however the potential for new legislation to need to be researched and drafted which may take significant resources to effect.

12. Human Resource Implications

None at this stage, but to carry the project forward meaningfully is likely to need a dedicated staff member.

Waste Action

FALKLAND ISLANDS

'APPENDIX A'
EXAMPLE OF
- WASTE MANAGEMENT
STRATEGY &
DEVELOPMENT PLAN

Key Acronyms (terms, abbreviations and references most frequently used)

WMDP – Waste Management Development Plan

Waste Management Development Plan. The plan provides a strategic framework for the management of waste for the islands area based on Local Waste Management Strategy: The initial focus of the plans within this document is MSW, with other wastes being suggested as being addressed in more detail in subsequent years.

BMW – Biodegradable Municipal Waste

Solid waste collected by FIG that is capable of undergoing anaerobic or aerobic decomposition, such as food or garden waste and paper and cardboard, i.e. waste that rots.

BPEO – Best Practicable Environmental Option

BPEO 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 optimal mix of waste management techniques that provides the most benefit and least damage to the environment, community and the economy, at acceptable cost, in the short and long term.

MSW – Municipal Solid Waste

Household waste and any other similar waste collected by FIG or agents acting on their behalf (for the purposes of this Plan, the definition excludes all industrial wastes, agricultural wastes, and construction and demolition wastes, as well as clinical and special wastes not managed by FIG).

Non-MSW – Non-Municipal Solid Wastes

Other solid wastes subject to regulatory control but over which FIG does not have statutory control (for the purposes of this plan this includes the industrial and construction and demolition wastes and other locally important wastes not yet subject to regulatory control, e.g. agricultural waste)

Introduction and Background

Waste Management Strategy

The following waste management strategy approach has been drawn up against a background of;

1. An international desire to reduce environmental impacts, both at local level and worldwide in relation to atmospheric levels of carbon dioxide and other pollutants associated with the production and transportation of goods all of which can be improved by minimising waste and improving the level of re-use of materials.
2. In the ideal model, all materials would be used or re-used, but unfortunately in the context of the Falkland Islands, the volumes are very low relative to the size of facilities that would ordinarily be considered viable to re-use or process the waste, and the alternative – of separating and shipping out materials for processing or re-use elsewhere appear likely to be challenged strongly by costs for freight, unless arrangements can be made for waste to be taken out as ‘backloaded’ material in containers needing to be returned or shipped to locations willing to take the waste.
3. Any export of waste will have to meet international controls in place which will require the waste to be transported and disposed of in very approved ways and meeting stringent controls

It should be here noted that the contents of the Waste Management Plan in this Appendix are indicative only at this stage, as all elements are dependant upon decisions by MLA's in terms of the way in which they wish to see the management of waste progressed.

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The following broad objectives and approach are suggested:

1. To minimise waste and impact on the environment caused by waste.
2. To minimise waste going to landfill throughout the Islands.
3. To maximise the local recycling of material that would otherwise become waste.
4. To maximise also (insofar as is practical at near cost break even or better) the recycling of materials which cannot be utilised locally but which can be exported and re-processed.
5. To encourage private sector activity to minimise or recycle waste, including, where this appears appropriate in the broader Economic context, by means of support by loans or grants.

Proposed Broad Strategy

1. Fully identify and quantify waste currently going to landfill by type with a view to better planning its reduction and management over a twenty year period.
2. Identify those areas where practical progress is most likely to be made at local level
3. Promote waste minimisation, reduction and recycling measures through the issue of advice and information.
4. Ensure waste minimising measures are considered for incorporation into all new (business?) projects via the planning control process.
5. Continue to seek to identify systems, technologies and measures that will reduce or allow the full recycling of waste.
6. Encourage direct private sector activity, particularly in the field of recycling, including for export
7. Evaluate a grant assistance/loan programme for recycling and minimisation initiatives, with bias towards those schemes which show best long term environmental benefit.
8. Evaluate the resources needed to develop, deliver and sustain the policy and strategy.

Waste Management Development Plan

This Waste Management Development Plan (WMDP) has been developed by the joint efforts of the PWD Property and Municipal Section to provide a strategic framework for improved waste management across the Falkland Islands.

The key aim of the plan is to:

‘Contribute to the sustainable development of the Falkland Islands by developing waste management systems that will improve control of waste generation, reduce the environmental impacts of waste production, improve resource efficiency, stimulate investment and maximise the economic opportunities arising from waste.

The principle of sustainable development is now fully understood and should be embedded at all levels of government thinking and policymaking.

The Falkland Island Government recognises that effective resource use is a crucial element of sustainable development as set out in the Island Plan:

‘Ensure progress towards a sustainable waste management of Falkland Islands waste to achieve sets targets for landfill reduction.

Falkland Islands overall target should be to aim to increase the amount of waste collected by the Falkland Islands that is recycled or otherwise utilised such as through composting.

This plan has five main parts:

- Section 1 →** Sets out the background to the WMDP (waste management development plan) in the context of the Falkland Islands and details current waste management practices and infrastructure.
- Section 2 →** Summarises the strategic framework and key drivers behind the development of the WMDP and presents a summary of the methodology used to develop the Best Practical Environmental Option (BPEO) for municipal solid waste (MSW) in Falkland Islands.
- Section 3 →** Presents details of best practicable environmental option (BPEO) for the management of municipal solid waste (MSW) in Falkland Islands which seeks to build on the existing range of waste management arrangements and significantly increase the amount of waste that is reused, recycled or composted.
- Section 4 →** Presents a framework for developing BPEO for non-MSW streams that are not, as yet, specifically covered by existing strategies.
- Section 5 →** Presents the essential elements to ensure the Plan is implemented effectively, including a detailed Action Plan, setting out future actions, timescales and responsibilities.

The plan primarily focuses on MSW – i.e. waste produced by households and commercial premises much of which is collected and managed by FIG. It sets out the strategy for implementing the BPEO for these wastes.

Information and data on non-MSW – i.e. industrial and other waste – are currently insufficient to conduct a thorough analysis to identify BPEO(s). Moreover, as there is no single agency responsible for control of these wastes, developing and implementing BPEO is necessarily even more complex. It is however necessary to consider how this can be better managed over the longer term and review of this is an essential part of the underpinning work that will need to be carried out in developing the detail of the strategy. Some data can be gleaned from import statistics, but much of this is inevitably presented in generic groupings despite the high number of classifications used.

Falkland Islands BPEO for MSW – rationale and summary

In Falkland Islands a range of potential waste prevention, recycling and composting measures could potentially operate in parallel with the existing energy recovery plant (utilising waste oil as a heat source) There could be strong support for these measures which would prevent waste at source, and increase the proportion waste composted and recycled, without threatening the performance and viability of the existing commercial ventures.

A key objective of Falkland Islands should be the desire to recycle more, potentially through segregated kerbside collections, or ‘bring’ systems (such as is operated for glass recycling) and insofar as this is practical extend the improved processes into camp

The geographical fragmentation and remoteness of the islands, and their highly dispersed human populations, are critical factors in determining the practicable. These factors mean that waste collection and transport are inevitably less practicable and more costly than elsewhere, and it is difficult to envisage significant improvements in recycling in the most remote areas on either economic or environmental grounds.

Kerbside recycling collections could only realistically be targeted at the more densely populated areas such as Stanley, and even here, ‘bring’ systems such as is being successfully being used for glass would appear preferable from a cost point of view, although potentially resulting in lower take-up unless good buy-in is achieved. The latter appears to be the case with glass recycling, but the actual level of participation has not been formally measured.

It is suggested that source-segregation of recyclable wastes should form a key element of the BPEO.

The islands have a reasonable track record of resource efficiency and the BPEO for MSW is intended to build on this. However, for the reasons outlined above, it is unrealistic to target similar levels of recycling as would be expected in other parts of the world.

The Falkland Islands BPEO for MSW would appear to suggest the following main developments are worth investigation:

- Reducing MSW at source through education and awareness-raising, the provision of practical community support, and promoting home composting
- Introducing source-segregated recycling, either through ‘bring’ or kerbside collection systems for Stanley
- Providing recycling ‘bring’ facilities in remote areas
- Reducing the amount of MSW sent to landfill, and increasing the amount recovered for energy
- Reducing the amount of MSW exported and increasing the amount recycled and composted locally
- Developing local reprocessing capacity and local recycled product markets for glass and paper and (in Stanley) green waste
- This should lead to the disposal of reduced quantities of residual MSW to landfill.

The BPEO sets targets for waste prevention, energy recovery, materials recycling and landfill disposal of residual wastes. Delivery of these targets will result in an important shift from the current waste management mix – there will be less landfill disposal and more recycling of MSW.

The quantity of waste produced in the Falkland Islands appears to be increasing, and the priority is therefore to prevent waste occurring at source. The BPEO targets assume the quantity of waste produced in the Falkland Islands could be capped at current levels by 2020.

The main development proposed by the BPEO for MSW is a shift away from landfill and a move towards recycling or processing. Most of this shift will be initially be targeted at the Stanley waste stream but should always with an eye to its relevance and potential extension to camp. This is ambitious for such a remote and dispersed area and will require development of greater reprocessing capacity within the Islands.

All the targets in the BPEO for MSW should be reviewed on an annual basis, and where necessary re-aligned to meet the financial commitments of FIG.

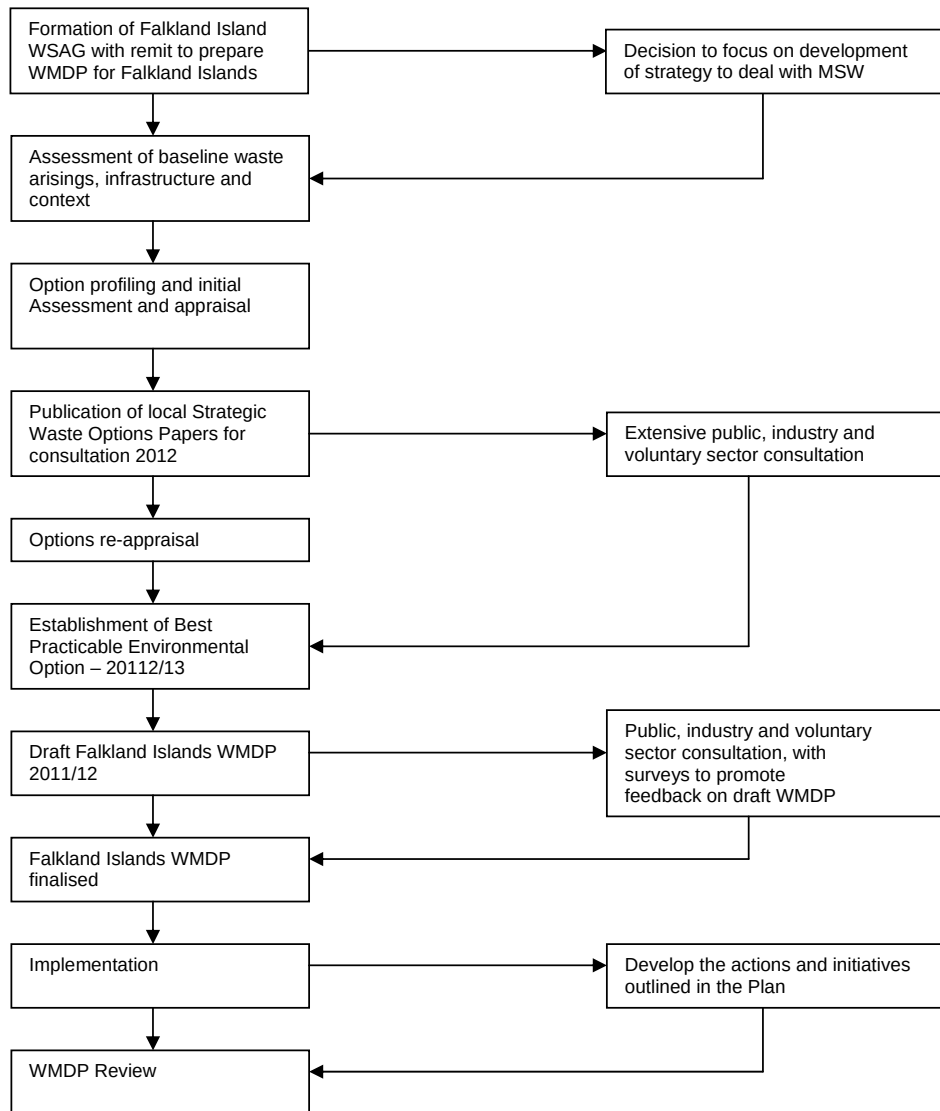
Implementing the Falkland Islands WMDP

Taking forward the Falkland Islands WMDP will require cooperative working at a range of levels and with a number of stakeholders. Consequently, it is essential that commitment is given by all stakeholders to both the principles behind the plan and the range of actions promoted.

It is clear from this that implementation of the WMDP may, at least initially, result in an increase in cost for some aspects of managing the islands waste. Increasing levels of funding will be required, and waste producers will in some instances potentially required to pay more, particularly for waste that continues to go to landfill.

It will be the responsibility of everyone living and working in Falkland Islands to make this plan work. Some can make a bigger contribution than others, but every contribution will make a difference.

Falkland Island WMDP Process



Key Acronyms (terms, abbreviations and references most frequently used)

WMDP – Waste Management Development Plan

The plan provides a strategic framework for the management of waste. The initial focus of the plan is MSW, with other wastes being addressed in more detail in subsequent years.

BMW – Biodegradable Municipal Waste

Solid waste collected by FIG that is capable of undergoing anaerobic or aerobic decomposition, such as food or garden waste and paper and cardboard, i.e. waste that rots.

BPEO – Best Practicable Environmental Option

BPEO 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 optimal mix of waste management techniques that provides the most benefit and least damage to the environment, local communities and the economy, at acceptable cost, in the short and long term (20 years)

MSW – Municipal Solid Waste

Household waste and any other similar waste collected by FIG or agents acting on their behalf (for the purposes of this Plan, the definition excludes all industrial wastes, agricultural wastes, and construction and demolition wastes, as well as clinical and special wastes not managed by FIG).

Non-MSW – Non-Municipal Solid Wastes

Other solid wastes subject to regulatory control but over which FIG does not have statutory control (for the purposes of this plan this includes the industrial and construction and demolition wastes, and other locally important wastes not yet subject to regulatory control, e.g. agricultural waste)

Overview

Waste management in Falklands is potentially facing a period of rapid and radical change driven in part by external influences. The need for improved environmental protection and public expectation can be expected to influence the way we reduce our current dependence on landfill and moving towards more sustainable methods of managing waste so that these can become resources.

We must seek to reduce the growth in waste arising, minimise resource use, reduce the hazardous content of waste and find waste management solutions that do not compromise the future. This is in line with the principle of sustainable development. This will require a fundamental change in our current attitude to waste and an acceptance that each of us has a responsibility to reduce waste and not simply to pass the responsibility to others.

The Falkland Islands has already made some headway in moving towards an integrated, sustainable waste management system for municipal solid waste (MSW). The islands waste planning process has helped considerably to build on this track record in resource efficiency and focus future developments. In future the process will continue to encourage the cross-fertilisation of ideas between the two island groups.

West Falkland differs from the East in many ways, not least in terms of the issues facing future management of the islands waste. The area is geographically remote, and has a highly dispersed population, which creates a number of difficult waste management issues. The most pressing of these is economics, e.g. the costs of collecting segregated waste and accessing a market for recycling are extremely high, and the logistics associated with those characteristics.

Given Falkland Island's isolated location, self-sufficient waste management solutions are preferable – to minimise the economic and environmental costs incurred by transporting waste to other countries whilst at the same time reducing environmental impacts.

This approach should also encourage economic development by promoting the development of local business opportunities in waste recovery.

The key aim of the Waste Management Development Plan is to:

‘Contribute to the sustainable development of the Falkland Islands by developing waste management systems that will control waste generation, reduce the environmental impacts of waste production, improve resource efficiency, stimulate investment and maximise the economic opportunities arising from waste’.

This aim is supported by the following objectives:

1. Set out in detail the existing waste management infrastructure and arrangements develop the principles and plan for progress in waste management in the medium and long term to meet current and future legislative requirements and the objectives.
2. Ensure that the waste management system developed is in accordance with Best Practicable Environmental Option (BPEO) and accords with the principles of sustainable development and integrated waste management, and makes the maximum possible contribution to reducing society’s environmental impact at an acceptable cost.
3. Provide a clear framework for stakeholders to judge the future development of waste management services in the Falklands, and to guide both FIG's Integrated Waste Management Plans and private investment decisions.
4. To ensure that Development Planning policy in Falkland Islands is consistent with, and contributes to, the overall aims of the Falklands WMDP.
5. To maximise the opportunities for Falkland Islands businesses arising from sustainable waste management.
6. To provide all key stakeholders with the opportunity for input to the WMDP process.
7. Ensure that the WMDP process offers a clear, transparent and informative approach to local stakeholders.
8. To raise public awareness of the future challenges in implementing the WMDP and promote active participation by all stakeholders in meeting the objectives.
9. To maintain regular review of the new waste management technologies to ensure the continued BPEO for the Falkland Islands in the longer term.

Developing an Integrated Plan

The WMDP seeks to adopt an integrated approach which:

- ensures that all waste streams are considered together and the solutions chosen for individual waste streams are considered in the light of how they impact on the management of others
- considers Waste prevention, reuse, recycling, energy recovery, disposal, promotion and education in a coherent and planned way

The Falkland Islands WMDP currently focuses on the management of household and commercial waste. It has not been possible to take the fully integrated approach such as composting and recycling at this stage. This is largely because of issues associated with data availability on the quantity, sources, and composition of local non-MSW streams, and independent approaches currently being developed by relevant local non-MSW producing sectors. These sectors (e.g. fish and oil-related) have not been approached or consulted as part of process of developing the Falkland Island BPEO, but no concrete proposals for new non-MSW initiatives have yet been developed. Development of a fully integrated plan for Falkland Islands that addresses non-MSW streams will require on-going dialogue with non-MSW producers.

Developing WMDP for the Falkland Islands that fully integrates all waste streams.

When completed and integrated across Falkland Islands, the WMDP will require to collectively satisfying any legislative requirements which may be introduced.

The ideal would be identical practice and service across the islands, but economies of scale and the scattered nature of the camp communities make this at best a challenging prospect and in practice it is likely that most waste from camp will continue to go to localised landfills.

An important element of this document is to seek the involvement of all key stakeholders (Industrial and commercial companies, FIG and the general public) at various stages of the process.

This WMDP must be seen not in isolation, but as part of a wider drive towards environmental and community awareness, and sustainable development objectives. The WMDP will influence and in turn be influenced by a raft of other policy documents and initiatives, and has a key role in integrating the investment programmes and other plans, strategies and initiatives developed by FIG.

Islands Description

The current population of the Islands is around 2,955 (2006 census) with the biggest conurbation being Stanley. Current projections indicate a likely increase in the population, with an associated increase in the number of households is estimated to increase over the coming years.

Any increase in the population figures will have important implications for MSW management. However further work is required on how these changes will translate into impacts on the total waste arising.

Practice within Falkland Islands

The Falkland Islands has a relatively self-contained waste management system for household, commercial, and industrial wastes. However certain specific wastes such as special wastes and some industrial wastes are by necessity exported for specialist treatment and disposal.

Other than one private contractor there is little private sector involvement in waste management in the islands. The provision of waste management services is dominated by FIG.

There is however some renewed private sector interest in recycling activity, both in collection and reprocessing, and although numbers are small at the moment it has potential to increase in the future and is seen as being likely to be the most cost effective way forward, particularly if a margin of profit can be gained from recycling or recovery.

MSW Arisings, Composition and Trends

Total MSW arisings (through the wheelie bin system) in Stanley is currently estimated at 1,000 tonnes per annum. Of this, an estimated 25 tonnes are from commercial premises and 975 tonnes are from households.

A significant amount of commercial waste is however collected via skips or delivered directly to the tip. A one week sample of arrivals at Eliza Cove tip suggests that perhaps a further 170 to 200 tonnes of other waste is produced by commercial premises, largely in the form of packaging and builders waste, but with a significant fraction of food waste also.

A key aspect of any waste-management plan is determining with reasonable accuracy the volume and composition of the waste stream that is to be managed – i.e. the relative proportions of the various component materials (e.g. metals, plastics, biodegradable materials, etc).

However there has only been very limited analysis done, of what have been deemed to be representative samples of waste collected through the bin system.

This indicated not dissimilar composition from UK:

It is though perhaps worthy of note that if glass, paper and cardboard and food and garden waste were taken out of the domestic waste stream this would reduce the volume by approximately 80%.

Average UK household bin content

→ Textiles	2%
→ Metals	8%
→ Glass	9%
→ Plastic	11%
→ Other	17%
→ Kitchen Scraps & Garden Rubbish	20%
→ Paper & Card	33%



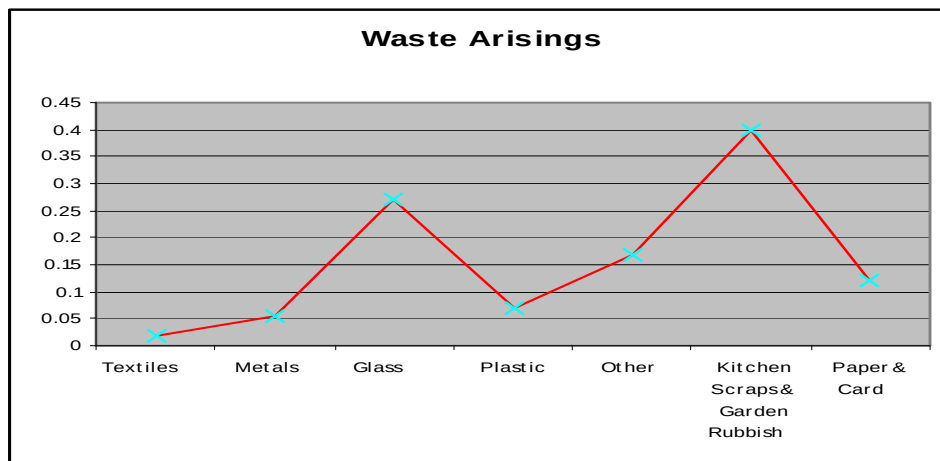
Average Falkland household bin content

→ Textiles	1.9%
→ Metals	5.6%
→ Glass	27.2%
→ Plastic	7.1%
→ Other	17%
→ Kitchen Scraps & Garden Rubbish	39.8%
→ Paper & Card	11.9%



Of this, and assuming the 1,000 tonne estimate is correct, approximately 270 tonnes is glass. Of that perhaps 70 tonnes a year is currently being recycled. Only one of the restaurant/bar premises is known to make use of the glass recycling facility.

Stanley Household Waste Composition



A key factor in delivering an effective waste-management system is predicting future waste growth, although in Falkland Islands this is extremely difficult. Waste growth is influenced by

a number of complex inter-related variables, including changes in waste producer behaviour, demographics, and the number of households and the type/level of economic activity in an area. The only thing for certain is that sustained waste growth will require the development of new waste-management facilities and will ultimately incur additional cost.

In terms of MSW, one of the main determinants of waste growth is believed to be the number of households producing waste.

In Falkland Islands the number of households is likely to grow slowly over the next 10 -15 year period, the current figure being assumed is 20 households per year, but developments in the oil and gas sector, and tourism in particular, will be an important influence.

Such growth in MSW will clearly have an effect on development of the WMDP, in particular the targets for waste recycling and recovery.

MSW Collection Systems

Existing MSW collection is a combination of a bring system for glass and kerbside collections operated by one private (Bonners Haulage) company on behalf of FIG. Bonners Haulage provides a weekly kerbside collection for the uplift of unsegregated domestic and commercial wastes.

Bonners Haulage also operates a weekly kerbside collection for unsegregated domestic and commercial wastes from those commercial premises choosing to use the service, currently 57 or approximately half of commercial premises.

In Stanley bulky items are normally removed by the owner and take to the Eliza Cove tip for disposal.

A local entrepreneur organisation operated a number of different recycling collections in Stanley for a period but this collapsed with the loss of a direct shipping link to Chile. There does however appear to be renewed interest.

Glass collection points are provided in and around Stanley where glass bottles are crushed and the arisings are used for trench fill and aggregate for concrete.

Currently there is no separate paper and card collection for recycling purposes.

Reprocessing and Composting

Green and food wastes together with paper and card (largely arising from packaging) go to landfill, with some open burning of the latter also taking place in situ.

Disposal

Eliza Cove tip is designated to take mixed waste other than scrap metal and other bulky non biodegradable waste.

Mary Hill quarry landfill site is designated to take scrap metal and other bulky non biodegradable waste.

These sites, currently caters for Stanley's entire waste disposal requirements, and are expected to reach capacity in 10-15 years at current disposal volumes and methods.

In the Falkland Islands these wastes include industrial wastes (oil, fish, food and craft-related), construction and demolition wastes, agricultural wastes, incinerated clinical wastes, special wastes and relatively small quantities of other important wastes (e.g. oils, vehicles, fridges, etc).

Industrial Wastes

It is difficult to provide a reliable estimate of industrial waste arisings on the islands as only a limited amount of work has been carried out on the islands to investigate these wastes, and this has, to date, been largely qualitative.

Important local sources of industrial waste include those arising from fishing, fish processing and aquaculture wastes, oil-related wastes, agricultural waste, ports and harbours waste, craft wastes and waste imported from South Georgia and Antarctica.

Much of the area's industrial waste is either land filled locally although some smaller quantities are exported elsewhere for recovery or disposal. More work is required to identify and quantify these trends and the implications for WMDP development.

Construction and Demolition Wastes

There is a quantity of construction and demolition waste arising annually in the Stanley area of which the majority is exempt from waste-management control. Of the remainder, it is estimated that roughly half is reused or recycled and the other half is land filled, sometimes after open burning.

The extent of these wastes however varies considerably from year to year as a result of changes in the level of development activity.

Agricultural Waste

A small amount of agricultural waste is disposed of at local landfill sites. A more substantial quantity is disposed of to land on the many farms throughout the isles.

Special Wastes

Special wastes require more controlled disposal due to their potential toxicological and other environmental effects. Normally this type of waste is handled by specialist companies depending on the nature of the special waste.

Other Wastes

In Stanley, clinical wastes are managed by the hospital. The hospital currently sends all clinical waste to the abattoir for incineration and disposal.

White and brown goods such as fridges, washing machines etc are currently disposed of at Mary Hill tip. The volumes of these are relatively low but there is clear room to improve disposal practice, by at least ensuring the removal of refrigerants, although these would need to be exported for processing.

Non-MSW Trends

Predicting trends in non-MSW arisings is highly complex. As the islands undergo a shift away from the traditional industries towards new areas of economic activity, the mix of non-MSW streams will change. New challenges and opportunities will arise as a result.

Identifying and quantifying the current baseline and future trends in commercial and industrial and other non-MSW streams will need to be addressed as part of the ongoing development of the WMDP.

It is FIG's policy within the Island Plan to move towards more sustainable waste management systems.

This should lead to increased recycling and potentially composting together with increasingly separating waste into different streams and dealing with those in improved ways with less reliance on landfill disposal.

There are however practical and cost issues which can be expected to constrain the rate at which improvement can be made unless there is either significant investment of both resources and funding, or it proves possible (for a business) to identify at an early stage revenue streams from some classes of waste which can then support further development and expansion.

Other Technical Requirements

Guidance for landfill should stipulate a number of requirements, which will have an impact on the ability of landfill sites to accept certain waste types. This will have a knock-on effect on the cost of landfill and could potentially shorten the life of some sites. Until a full assessment of Falkland Islands landfill sites has been made, the full impact of any strategy cannot be fully understood. The main requirements of the any guidance should include be as follows:

- Pre-treatment of wastes prior to land filling
- Classification of sites to certain standards or acceptance of certain waste types
- Specific wastes banned from landfill, including liquids and tyres
- Waste requires to be treated prior to acceptance into landfill in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery.

Below is a list of key principles which should be taken into account in developing a WMDP to establish a sustainable future for waste management, a number of which have influenced the development of other island communities WMDP.

These are:

- The Waste Hierarchy
- The proximity principle and self sufficiency
- Best Practicable Environmental Option.

How these principles may affect the development of waste-management systems and methods in Falkland Islands is described below.

The Waste Hierarchy

The waste hierarchy provides a framework within which waste-management options are prioritised. The objective of the Hierarchy is firstly to prevent and minimise the production of waste and thereafter increase the percentage of waste that is reused, recycled and recovered (in that order of preference). Once improved systems are in place the percentage of waste being disposed of to landfill should continue to reduce.

Waste Prevention

The need has never been greater to prevent waste occurring and, wherever possible, minimise and reuse waste.

Waste prevention, therefore, needs to form a key element of the Islands Waste Strategy:

Waste prevention can be achieved at a number of stages including pre-product design stage, changes to management and production processes and the development of clean or 'wasteless' technologies.

The Islands location and the need to import almost everything does however place severe constraints on the extent to which prevention and minimisation can be practiced.

For instance packaging can be expected to continue to form a significant percentage of the waste stream, as can beyond life appliances of all types and

Waste reduction initiatives must address two distinct waste streams:

→ household waste

→ commercial and industrial waste.

Household waste is by far the greatest proportion of MSW. The prevention – i.e. avoidance, minimisation and reuse – of household waste will save money in the transport and subsequent management of waste throughout the islands. Waste reduction can be achieved by households and businesses through customer decisions about what to buy and how efficiently to use the products they buy and what to do with the products when they are finished – bin them, pass them on to someone who can use them, use them again or use them for something different.

In less isolated societies choices can also be made on how much packaging to accept, but in the context of the Falklands packaging is rather less controllable as almost everything has to be shipped in, and therefore robustly protected, although this is helped to a small degree by containerisation.

Durability then becomes key, but usually comes with a price tag attached.

In recent years there has been a decline in the reuse and refurbishment of consumer durables as the cost of replacing them has fallen in relation to the cost of repair. Balancing this however is the increasing complexity of equipment and its construction in a manner which makes repair neither simple nor economic.

However, as well as removing items from the waste stream, reuse and refurbishment are linked to job creation and economic improvement.

Recycling, Composting and Anaerobic Digestion

Recycling is the separation of a material for processing, followed by preparation and sale onto a market to replace an existing virgin material. The most commonly recycled materials include newspaper, cardboard and glass. As such there are often numerous environmental benefits, such as reduced air emissions, reduced impacts of extraction, energy savings, lower disposal impacts and more efficient use of raw materials.

The potential markets for most of this waste are however overseas due to economies of scale in relation to processing plant and also need and the primary challenge will be in keeping costs for recovery and transport to market below the market price. There is however some interest in this area from the private sector and it appears that the most sensible route forward is to support and encourage such activity.

The collection of wastes as separate material fractions reduces contamination and the need for additional separation processes. This retains the quality and value of the waste materials.

Composting is the aerobic decomposition of organic material to produce a stable material containing organic matter and plant nutrients. There are often benefits in applying this material to land, including nutrient addition, improved soil structure and improved water retention. These benefits are often only realised through the use of source segregated uncontaminated compostable wastes.

There is also the potential for import substitution

Anaerobic digestion is a similar process to that of composting, except the micro-organisms degrading the waste operate in an oxygen-free environment – i.e. where composting processes focus on enhancing conditions for micro-organisms that thrive in the presence of oxygen, anaerobic digestion targets those that thrive without.

The potential advantage of anaerobic digestion systems is that methane gas is produced as a by-product of the anaerobic process, and this can be used not only to fuel the operation of the plant, but typically also to power other processes in the vicinity of the digestion plant, some analysis of this system has been carried out and it looks unlikely to be cost effective on the Falkland Islands.

Other Recovery

The reuse of waste oil in commercial heating systems is a good example of other recovery which is already being applied in the Islands. There may be potential for expanding this to include used cooking oils, either as are or after some processing into biodiesel, although the latter produces waste which although of much reduced volume relative to the original oil, is of a more environmentally damaging nature unless further processed.

Energy recovery can be recovering part of the energy value from waste, for example by burning or thermally treating the waste directly (for example incineration) or by burning a fuel produced by the waste (as with Refuse Derived Fuel or landfill gas). The energy conversion efficiency of the plant will depend on the specific design, e.g. recovery of energy through combined heat and power. Again early analysis sadly suggests that only a very, very much greater scale does this become viable.

Waste Disposal

Landfill disposal sits at the base of the waste hierarchy for the following reasons:

- potential pollution to land, air and water
- it is a waste of resources and is considered to be unsustainable.

Landfill will, however, continue to form part of an integrated waste-management system of treatment and disposal options for the foreseeable future.

The Proximity Principle and Self-Sufficiency

This means waste should be disposed of as near as possible to the point at which it arises. Most of the waste originating in Falkland Islands is managed within specific areas, with the exception of wastes requiring specialist treatment, such as hazardous wastes, and wastes being sent to the mainland for recycling, e.g. scrap metal.

Although this is likely to continue to be the case to some extent, as greater quantities of material for recycling are collected then greater efforts should be made to exploit local opportunities for the development of commercial reprocessing operations and product markets.

Due to the isolation of the islands, and the associated exceptional high cost of waste transport, the principles of proximity and self-sufficiency are key drivers in developing the island's BPEO.

The Best Practicable Environmental Option (BPEO)

BPEO 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 Falkland Islands WMDP describes the BPEO for MSWs and sets out the process by which the BPEO will be determined and implemented for all other wastes. The process of assessing the Falkland Islands BPEO for MSW placed particular emphasis on proximity and self-sufficiency, and the need to recover as much value from waste locally, to provide social and economic benefits. This same emphasis will be applied in developing non-MSW BPEO(s).

Falkland Islands Best Practicable Environmental Option (BPEO) for Municipal Solid Waste (MSW) – The Strategy for Change

Public Consultation

A possible way forward may be to have a public consultation processes to provide feedback on initial proposals and BPEO. This could take the form of first seeking local views on a number of strategic options relevant to each island - location, and the second on the Draft WASTE MANAGEMENT DEVELOPMENT Plan (WMDP) itself.

Other Key Local Considerations

The geographical fragmentation and remoteness of the islands, and their highly dispersed human populations, is a critical factor in determining the BPEO.

These factors mean that waste collection and transport, for kerbside recycling in particular, are inevitably less practicable and more costly, and it is difficult to justify expensive schemes in the most remote areas on either economic or environmental grounds. For this reason kerbside recycling collections have been targeted at the more densely populated areas such as Stanley.

The Falkland Islands BPEO for MSW requires the following main developments:

- Preventing MSW at source through education and awareness-raising, the provision of practical community support, and promoting home composting
- Introducing source-segregated kerbside recycling collections for the major population areas in both islands.
- Expanding the provision of recycling bring facilities in remote areas
- Continuing to recover energy from waste oil products.

- In the Falkland, reducing the amount of MSW sent to landfill, and increasing the amount recovered for energy
- In the Falklands, reducing the amount of MSW exported and increasing the amount recycled and composted locally
- Developing local reprocessing capacity and local recycled product markets for glass and paper and (in Stanley) green waste
- Disposing of reduced quantities of residual MSW to local landfill sites.

Waste Prevention & Reduction

Prevention of MSW at source encompasses avoiding, minimising and re-using or refurbishing waste. These measures stop materials from entering the waste stream and therefore form a key element of the Falklands BPEO. Due to the forecasted increase in the number of households in the island, without concerted action the area's annual production of MSW will most probably rise. Sustained annual growth in MSW arisings will incur additional cost, particularly in Stanley. Failure to control growth in MSW arisings will undermine the BPEO target.

There is, therefore, a pressing need to ensure the environmental and cost-burden of MSW does not increase during the period of the plan – i.e. to seek to prevent MSW production rising above current levels. This will not only deliver environmental benefits by reducing the pollution and energy use associated with waste, it will also generate savings and ensure compliance with the overall aim of reducing landfill waste.

Waste prevention in Falklands is currently promoted through word of mouth and schools, and by the provision of advice and information directly to householders.

The remoteness of the Falklands means that a proactive 'outreach' approach is required to deliver waste prevention effectively. Additional human resources are necessary to facilitate community involvement and participation, to sustain development, and to ensure long-term local support.

It may be possible to develop and seek funding for dedicated human resources to support Waste Prevention activity in Falkland Islands. This will include research into best practice in the Falkland Islands. The outputs from this research will be two fold:

- Practical guidance to WSAGs on how to develop their Waste Prevention Plan, and a selection of various tools and techniques with which to do this
- Recommendations to FIG and others on instruments which have been demonstrated as successful in preventing waste.

The Falkland Islands WSAG will draw together the results of this work and, in consultation with FIG, develop a detailed Falkland Islands Waste Prevention plan. This plan will set targets, identify actions to be undertaken locally and will tie in to other local initiatives on education, promotion and emerging technologies.

Action 1

Produce a detailed Falkland Islands Waste Development Plan.

FIG is one of the largest employers on the islands, and through its diverse activities generates large quantities of waste. A range of actions, from procurement activities through proper separation of wastes to promoting waste prevention through staff training can make a contribution.

Action 2

Initiate/develop internal programme to prevent and minimise waste.

Home composting is now recognised as a potentially important and cost-effective means of reducing the household component of MSW. This may be particularly relevant in very remote island areas where collection and transportation costs mitigate against segregated kerbside collection.

Home composters could be subsidised for householders in Falklands especially to households in remote islands.

Action 3

Carry out study in Falklands to determine efficiency and impact of home composting with a view to extending provision to all island settlements.

Action 4

The provision of subsidies for home composters in Falkland Islands to less remote areas.

In Falklands, developments in reuse and refurbishment should be carried forward largely through the FIG's adaptation of its existing local amenity sites.

Action 5

Provide waste segregation and reclamation facilities for the public at amenity sites.

Action 6

Develop and expand a Falklands 'scrap store' facility.

Recycling and Composting

Falkland Islands currently has no formal commercial and household recycling system in place. However, there is scope for increasing the quantities of materials collected for recycling and composting including glass, metals, paper and green waste (for composting) in Stanley.

Development of large-scale composting in Falkland Islands is limited, although scope for smaller scale (e.g. community) composting schemes is feasible. In Stanley, while a considerable quantity of compostable material (garden waste) from households could be segregated and collected separately for composting.

Due to the isolation of the island areas and the need to transport wastes long distances for reprocessing, the benefits of traditional, centralised recycling are limited – most major reprocessing centres are on the mainland, and this incurs excessive costs. However, where value and utility in waste can be exploited locally, the benefits can outweigh the cost. Most of the current recycling and composting in the area can be attributed to local reprocessing activity, and future developments will rely heavily on successfully increasing local reprocessing capacity and developing local end markets.

Action 7

Develop and implement household kerbside collection systems for recyclables in Stanley.

Action 8

Develop and implement household kerbside collection for glass and aluminium in Stanley, with an initial review after one year.

Action 9

Implement compost segregated green waste in Stanley.

Action 10

Introduce aluminium can banks to existing recycling centres in Stanley.

Action 11

Review and expand the provision of recycling centres in remote parts of Falkland Islands.

Action 12

Develop aluminium sorting and baling facility in Stanley Area.

Disposal to Landfill

Despite the fact that current land fill sites have perhaps 15 years life expectancy, the provision of sufficient forward landfill capacity for MSW is still a vital part of the BPEO. Without development of this capacity it is likely that some waste would need to be exported at considerable economic and environmental cost. It should therefore be recognised that short-to medium-term (10 year) identification of further provision of non-hazardous landfill capacity is important for the effective future management of other, non-MSW streams.

The general thrust of waste management will likely require increasingly stringent controls on disposal to existing and new landfill sites, requiring pre-treatment of all land filled wastes and prohibiting the landfill disposal of certain waste types.

Action 13

The planning system has a key role to play in identifying and developing sufficient forward landfill capacity in Falkland Islands and must take a proactive approach, in partnership with the local community and industry.

Household hazardous wastes, such as batteries, pesticides, solvents etc., contain chemicals that are potentially toxic. If these wastes are not removed from the waste stream they can adversely affect the environmental performance of the waste-management techniques employed to manage MSW.

It is highly unlikely that the quantity of hazardous wastes present in the MSW stream in Falkland Islands significant in volume. There is however need to identify the scale of this and plan accordingly.

Action 14

Investigate alternative methods for the collection of household hazardous wastes in Falkland Islands.

In order to achieve this it will be necessary to meet the specific targets. These targets could be a percentage of the total MSW stream collected.

It should be noted that they are dependent on a number of variables, in particular future changes in waste growth and composition. A small fraction of waste entering each process will inevitably require final disposal (e.g. rejects from recycling).

Landfill compliance

Landfill requirements to divert BMW from landfill must be met where ever possible. It is likely that the Stanley area will be the front line in biodegradable material recovery, recycling and composting initiatives to meet agreed targets.

The main factors that could threaten this self sufficiency is sustained growth in waste arisings, although current forecasts would suggest that even if waste prevention measures fail this will not occur for a number of years, and excessive cost due to economies of scale.

Successful achievement of the BPEO targets to increase recycling and composting will divert further biodegradable material and support this end.

Implementing the BPEO for MSW

Taking forward the implementation of BPEO will require an ongoing partnership approach between FIG and other local stakeholders to achieve agreed targets.

The crucial next step is to work up detailed Implementation Plans that will flesh out the detail of future facilities, the associated costs, and a detailed timetable for their delivery.

Action 15

The successful implementation of the BPEO is wholly reliant on sufficient additional levels of funding being secured. FIG should consider seeking additional costs of implementing the WMDP to ensure that delivery of the plan.

It is clear that if Falkland Islands is to make better progress in recycling, significant effort must be made to develop both international and local markets for recycled materials.

The successful development of local reprocessing capacity and end-markets is a key element of the WMDP. A small number of projects are underway, including a glass reprocessing (for aggregate replacement) and small scale use of paper waste as animal bedding.

FIG should seek to extend cooperative working with local companies on initiatives to identify and exploit further opportunities for local market development.

Falkland Islands WASTE MANAGEMENT DEVELOPMENT Plan

(i) Before survey – to assess attitudes and behaviour towards the identified waste prevention issue prior to the intervention strategy.

(ii) Campaign – intensive localised intervention strategy run initially for a six-month period working in partnership with local businesses, FIG and local community and voluntary groups.

(iii) After Survey – to assess attitudes and behaviour towards the identified waste prevention issue and to appraise the effectiveness of the different campaigning methods employed.

This format will allow FIG to monitor progress towards more sustainable public waste management behaviour, and to develop models of good practice and Best Value for changing public attitudes to reduction, reuse and recycling.

The WMDP should provide stakeholders with an understanding of the problem suggest optimal solutions and provide a means for taking action. One of the key components will be to match the campaigns with ‘real’ infrastructure – encouragement to make changes that can be supported and enhanced. Concurrently public perception values and needs will be considered. This ensures stakeholder participation and involvement and guides stakeholders towards making their own decisions within their local area. All of which is geared to producing greater participation within local schemes.

It is essential that there is continuity of approach and terminology in the delivery mechanism to change public attitudes towards domestic waste throughout Falkland Islands. The development of the a ‘Waste Aware Falkland’ campaigning programme could provide a framework to allow an integrated partnership approach, providing an island campaigning identity that is deliverable at the local level via the waste management development plan.

It is also critical, as a first step towards creating the necessary awareness for high levels of householder, community and business participation that efforts are made to promote the objectives and detail of the WMDP itself. Again, due to the dispersed and remote nature of the islands, a highly proactive approach will be necessary in this respect.

Action 16

Promote and raise awareness of the Falkland Islands WMDP throughout all sectors of the community.

The community sector can have a significant involvement in methods and solutions for managing wastes in a more sustainable manner. Locally operated and managed community projects also bring social benefits through creation of employment and social inclusion. The success of such projects will be a key determinant in delivering BPEO.

Action 17

Support development of community recycling and composting initiatives in Stanley and promote links with other Community Recycling Network.

While the WMDP has set out a response to the management of wastes locally, each component will contribute to the overall Islands Waste Strategy for Falklands.

Although the WMDP establishes an Action Plan, there may be opportunities for partnership working across waste strategy area boundaries delivering more cost-effective and robust solutions. The main conclusions from this process are as follows:

- Large-scale facilities do not necessarily bring significant economies of scale and this scale of facility can be more difficult to deliver and a loss of flexibility can result
- Composting should be undertaken on a waste strategy area basis or smaller scale
- The Falkland Island should communicate with other island communities when developing new waste management strategies
- There are benefits in terms of access to markets and price commanded in accumulating as large a mass as possible of the highest possible quality of recycled material.

WMDP Implementation

There are a variety of risks which, if realised, could compromise the successful and timely implementation of the BPEO. It is important that these risks are identified and managed. Examples of such risks include: failure to identify sustainable markets for recycled or failure to secure adequate funding.

The options included in the BPEO evaluation are generic and for the most part, not site-specific. Hence site-specific development proposals that arise both inside and outside the borders of the Waste Strategy Area are valid and may satisfy or improve the agreed BPEO.

Managing Non-Municipal Solid Waste (Non-MSW)

Introduction

Due to the lack of complete and robust data for local non-MSW, the development of BPEO for the Falkland Islands has so far focused primarily on municipal solid waste (MSW). MSW represents only around a quarter the area's total waste arisings. Although the FIG (particularly in Stanley) handles substantial quantities of non-MSW, large quantities are managed out with local authority systems. Further work is required to identify and fill data gaps, and provide more detailed information on non-MSW composition, thereby facilitating the assessment of the alternative options for non-MSW.

The key issues for the non-MSW framework are:

- Waste Arisings Data – the lack of requirement to record and report waste arisings data has contributed to the absence of sufficiently detailed data required to make a BPEO decision.
- Producer Behaviour – tools that are currently available and those that need to be developed further to influence the behaviour of commercial and industrial waste producers to ensure the adoption of the BPEO.
- Non-MSW Plan - provision of a detailed plan to ensure that the NWSS and local WMDP deal with all controlled wastes and do not just focus on MSW.

The Falkland Islands waste strategy should work to ensure the above framework is applied to assess future options for local non-MSW streams.

Specific Waste Streams

Using the Consolidated European Waste Catalogue (August 2002) all listed wastes have been grouped into compatible industry sectors. These groupings will form the basis of future work on non-MSW. Any links with the current Priority Waste Stream programme and existing Technical Guidance, Best Practice etc., have been made along with possible links to current BPEO technology options for MSW as set out in the WMDP.

Waste Groupings Prioritisation of Projects

A decision matrix has been developed to classify non-MSW into high, medium and low priority projects. This has been based on the following considerations:

- Links to current MSW BPEO proposals
- Hazardous content
- Recovery/recycling value
- Sectoral Importance (to the islands economy)
- Infrastructure shortfall in Falklands
- Quantity

- Finite resource use
- Legislative/regulatory priority.

These projects will be managed at local level depending on the geographical distribution of arisings.

Waste Grouping	
A	Exploration, Mining, Quarrying and Physical/Chemical Treatment of Minerals
B	Animal/Fish Wastes (Agriculture, Aquaculture, Hunting, Fishing, Food Preparation/Processing)
C	Plant Wastes (Agriculture, Aquaculture, Hunting, Fishing, Food preparation/Processing, Forestry)
D	Petroleum Refining, Natural Gas Purification
E	Wastes from Inorganic Chemical Processes
F	Wastes from Organic Chemical Processes
G	Wastes from Thermal Processes
H	Wastes from Surface Treatments/Coatings (Metals and Other Materials)
I	Waste Organic Solvents, Refrigerants and Propellants
J	Waste Packaging (Absorbents, Wiping Cloths, Filter Materials and Protective Clothing)
K	Wastes not otherwise specified
L	Construction and Demolition Wastes (Soil from Contaminated Sites)
M	Human and Animal Healthcare Wastes (Research Wastes/Excluding Kitchen Wastes)
N	Water Industry Wastes (Water/Sewage Treatment Wastes)
O	Other Waste Industry Wastes

Falkland Islands WASTE MANAGEMENT DEVELOPMENT Plan

A technical group consisting of the key waste producers, waste managers and other stakeholders specific to each of the sector groupings should be formed to drive the range of projects forward. The membership of this group is important to ensure ownership and credibility of the project outputs by those sectors that produce and manage these wastes for the future. The groups will undertake and commission work that will seek to provide the following recommended outputs:

- Establish reliable baseline data and existing regulatory controls
- Report on current practices to deal with waste
- List current facilities and technologies
- Identify emerging technologies and processes
- Recommend good practice and links to existing best practice guidance
- Provide guidance on identifying local BPEO and life-cycle analysis
- Produce user guides
- Identify problematic wastes that may require further research
- Identify waste prevention tools
- Identify skills gaps and training opportunities
- Identify barriers to achieving BPEO and recommendations to overcome
- Describe benefits and opportunities to implementing BPEO
- Identify necessary regulatory controls and other drivers
- Identify any necessary economic and regulatory impact assessments
- Identify enterprise opportunities and social benefits.

Self-Assessment Guidance for BPEO Decision Making

Not all wastes can be addressed as a high priority and the timetabling of BPEO projects will be over the longer term. There are opportunities to encourage the widespread use of the BPEO decision-making processes that consider environmental, economic and social aspects when dealing with these wastes. The development of generic “Self-Assessment BPEO Guidance for the islands will provide a valuable and consistent process for waste management, when making localised assessments on the most sustainable options available and the use of life-cycle assessment. In order to achieve widespread ownership and acceptability of the guidance, it should be developed in an inclusive manner with consultation involving all key stakeholders.

Local Non-MSW Framework Non-MSW Data

A substantial amount of non-MSW is handled privately, including some industrial wastes (e.g. fish wastes, some oil-related wastes), clinical wastes, construction and demolition wastes and agricultural waste. In order to plan effectively for the management of these waste streams an appropriate data set needs to be gathered.

Action 18

Collate non-MSW data and determine quantities and composition of non-MSW streams for which gaps exist.

Falkland Islands Waste Development Plan

Following review of a comprehensive data set and the type/capacities of existing facilities, further consultations with local industry sectors should be carried out to investigate and assess local options for non-MSW streams. It is even more pressing in isolated areas to maintain sufficient forward capacity and an adequate network of suitable facilities for communities and commerce to thrive.

Strategic Priorities

The framework described above will be ultimately applied across the islands to develop plans and best practice for dealing with all non-MSW wastes. However, there are certain specific wastes that are likely to be particularly strategically important. These include the following:

- Oil and gas industry wastes
- Fish wastes
- Agricultural wastes.

Oil and gas industry-related wastes could form one of the biggest single industrial waste streams, and agricultural wastes (e.g. pesticide residues) should be brought under the regulatory control regime of FIG. This latter development will have a major impact on agricultural holdings throughout the island areas.

It is crucial that FIG develops the WMDP ahead of regulatory changes in such a way as to take proactive measures to prevent, minimise and recover these wastes, and ensure their safe, cost-effective disposal in the long term.

Action 19

Apply guidance on BPEO assessment for non-MSW, with short-term priority on oil/gas-industry related, fish and agricultural wastes.

Action 20

Consult with the agricultural sector in Falkland Islands to identify key strategic waste management issues

Commercial and Industrial Wastes

Below is an overview of the known or anticipated sources of industrial waste in the Islands, and some of the issues related to their sustainable management.

Industrial Sector	Waste Issues	Comments
Farming	Used veterinary products	Special waste disposal procedures required
	Herbicides and pesticides	Special waste disposal procedures required
	plastic	No Recycling opportunity at present
	Fencing and wire	Difficult to handle and bulky, generally landfill
	Mortalities	Require local burial
	Planned culls	No information
Decommissioning	Combustible components	Waste to energy facility, if suitable potential for power station
	Inert components	Local landfill facility or recycling
	Mechanical components	Mat have potential for refurbishment and reuse Possible contaminants Scrap metal recycling
	Metal structural components	May be utilised in civil engineering works after dismantling/inspection. Dismantled for scrap metal recycling
	Concrete structures	Possible recycling for construction purposes. Possible contaminates.
	Chemical components	Special waste holding facility pending shipment Special waste disposal facility required
	Topsoil	Potential for refurbishment and upgrading
Energy production	Redundant equipment	Local scrap metal recycling Likely to be special waste components for local disposal or export
	Oil sludges	Possible recycling or export
Clinical Waste	Certain wastes from hospital, nursing homes and domestic properties	Hazardous exported but where possible incinerated
Offshore support	Drill cuttings	Reuse of base oil for drilling Recycling of base oil for fuel Recycling of civil engineering materials Possible inert landfill facility
Most of this waste is currently either not brought onshore, or re-exported	"Domestic" waste	May be delivered as part of logistics package Waste to energy facility, but largely macerated at sea so does not enter land waste stream
	Contaminated bulk materials, cement, barite, and bentonite.	May be classed as special waste, transfer, treatment or disposal
	Process chemical / wax	Generally special waste, transfer, treatment or disposal
	Cable bobbins and containers	Scrap metal recycling or refurbishment
	Construction / demolition waste	May be inert, combustible or special requiring disposal via landfill
Ports and Harbours	Landed ship waste	Household to waste to energy
	Civil engineering waste	Disposal planned within project development
Tourism	Landed ship waste	As per fish catching
	Population effect	Seasonal increase in waste management

Offices / public sector etc	Paper, card etc	Reuse/recycling (animal bedding - insulation)
	Used computer ink cartridges	Some exported to raise funds for charities

Construction and Demolition (C&D) Waste

C&D Waste can be recycled, realising more of this potential locally would create further aggregate materials that could replace virgin aggregate currently used for construction. Information on the current infrastructure for this waste stream does not exist at present, although it is apparent that some at least is re-used.

Through improved resource management of the construction industry, preventing or reducing the production of waste will have a positive environmental impact, through reduced resource use, lower emissions and energy consumption.

Tyres

There is no system in place for recycling tyres; however tyres can be used in a number of ways, e.g. small retaining walls filled with concrete, stabilising sand or soil, or other landscaping. Scale already assessed as being too small for shredding facility to be set up. Further work is required to identify other uses for this material.

Newsprint

Newsprint is a small component of municipal and commercial waste streams, however its suitability for recycling should be considered.

End-of Life-Vehicles (ELVs)

There are two different categories of this waste stream:

- Premature ELVs – end of life determined by damage as a result of an accident, fire, flood or theft.
- Old ELVs –when a vehicle comes naturally to the end of its life, typically between 10 and 14 years old.

Best Practice requirements of the End-of-Life Vehicle include:

- Design of vehicles (too late for current stream)
- Recycling/recovering component parts before shredding
- Recycling/recovering material from shredder residue.

The first is outwith our control, the second two may be worth investigation but scale looks likely to be an issue. Export of larger metal components may be a possibility.

Waste Prevention & Reduction

In order to realise significant levels of non-MSW prevention a co-ordinated effort is fundamental. There may, probably will be a requirement for further regulatory and economic instruments, increased education and awareness and other measures to stimulate waste prevention activity.

Due to the exceptionally high costs of transporting and disposing of waste in the Falklands, the potential adverse economic impact of increasing non-MSW arisings is also disproportionately high. Conversely, the benefits of waste prevention are of particular

importance and value to such a remote area. There are however particular challenges in a location where almost everything required or used needs to be imported.

There appears to be opportunity to get value from waste materials through reuse and refurbishment. Successful reuse and refurbishment schemes can also provide employment opportunities.

Barriers to facilitating reuse and refurbishment opportunities exist, the most common being the difficulty in making the connection between the waste producer and any potential users of the waste.

‘Waste Exchange’ is a system where the waste of one individual can be considered the resource of another. Schemes of this type make connections between waste producers and potential users of the waste.

Whilst there are examples of waste exchanges operating elsewhere, there are no formal systems currently in the Falkland Islands, although low tech recycling and exchange is an embedded part of the culture and there would appear to be opportunity to make this grow.

There would appear to be potential to extend current ad hoc practice in the following areas:

- Reuse of pallets and boxes
- Reuse of waste wood as a source of fuel
- Reuse of food wastes as animal feed.

A possible mechanism for achieving this is the development of some form of ‘commercial civic amenity site’ (similar in many ways to a waste exchange). This could be an area formed and set aside at one or both tips.

Action 21

Establish independent Falkland Islands Business Waste Prevention projects in partnership with Businesses.

Future work in this area will incorporate other non-MSW producing sectors, most notably the agriculture and farming sectors.

Recycling and Composting

As the cost of traditional methods of disposal increases, the commercial appeal of recycling should increase, and it is crucial that any commercial benefits are harnessed within the local economy.

Aside from initiatives led by FIG there may also be potential for new commercial opportunities in local waste reprocessing. Pressure to dispose of an ever broader range of waste materials in a better manner should provide opportunity, although external costs such as shipping are potential threats to entering external markets.

As with reuse and refurbishment of non-MSW, there seems to be demand, certainly in Stanley, for a centralised service to support this type of activity amongst local non-MSW producers. As many of the companies in the islands are SMEs (small to medium-sized enterprises) there is potential for companies to work collaboratively.

In such instances the quantities of waste collected are made more significant and schemes likely to become more economically viable.

Other Recovery

As with recycling, there may be important local commercial opportunities for recovery of non-MSW, particularly as the cost of more traditional waste disposal methods increase.

Energy recovery through combustion has the advantage that it can effectively treat certain hazardous wastes.

If biomass derived wastes are combusted the energy generated has the advantage of being generated from a renewable source. It should be noted that the actual wastes treated would depend on their nature, the technology of the plant chosen and the economics of managing the wastes.

There may also be potential for collaborative non-MSW recovery projects, such as composting schemes in the food production sector and/or anaerobic digestion in the fish-related industries. Such initiatives would require further investigation.

Small scale trials are known to have been run on the use of fish by-product for fishmeal fertiliser and indications are that although costs for the trial were relatively high, externally sourced fertilisers are becoming increasingly expensive which may drive further work in both this area and in the use of by-product from the abattoir.

Recycling Market Development

A key aspect of the Falkland Islands BPEO for MSW is the development of sufficient local waste processing capacity and the costs for this. Developing the local market for the secondary materials – e.g. waste paper for bedding and or insulation, scrap metal – may require partnerships with non-MSW producing sectors.

Some commercial recycling enterprises in the Falkland Islands may need to be based on a high, quality product for which there is adequate local demand. This may require extensive product development and market research.

Education

The cultural shift that is required to change attitudes and behaviour is not only targeted at local householders. As key waste producers, local business and industry must also be involved in future education and awareness programmes. There is already a great deal of useful information available to businesses on waste and environmental issues, and, where required, complimentary information will be further developed and disseminated. The promotion of information should be targeted wherever possible through existing business networks.

Waste-Producer and Industry Involvement

It is crucial that waste producers are actively engaged in the process of implementing and developing the Falkland Islands WMDP. Local businesses and industry sectors must have their waste-management needs addressed to ensure that the local economy is supported by the Islands waste strategy, and that good practice is promoted to all waste producers.

Developing and Implementing the WMDP

Introduction

The Falkland WMDP provides a framework for taking forward waste-management in Falkland Islands. However, it is recognised that to implement the various short- and longer-term actions will involve a partnership with public, private and voluntary organisations, and our communities.

The WMDP will also provide a framework for investment and for other plans and initiatives involving the private sector

Key tasks include:

- securing funds to develop the WMDP
- implementing the WMDP
- monitoring the WMDP
- supporting and responding to the Waste Development Plan.

Action Plan

The Actions arising in this WMDP are presented in a format that provides further detail on the objective of each action and how they might be delivered and measured. This framework will provide a consistent and transparent format for monitoring and reporting on WMDP progress.

Funding the Area Waste Plan

Considerable resources, both capital and revenue, will be required to implement (although not necessarily to develop) a full WMDP Action Plan, and provide the required waste-management infrastructure to deliver BPEO in Falkland Islands resulting in the full management of all waste, and it is anticipated that a progressive and perhaps to a certain extent opportunistic route will need to be followed, which makes timescales difficult to predict.

The development of WMDP will inevitably result in an increase in the cost of waste management in Falklands and for this reason it is suggested that the route of encouraging and assisting private sector initiatives that offer either a cost benefit sufficient to support commercial activity, or have low net cost be followed.

These costs should ultimately have to be borne by the producers of waste (the user or in this case “polluter pays” principle). This poses a number of challenges as to how these costs are met and will require further detailed consideration over the next few years.

Revenue options could include either or both of import taxes on certain goods or charges for the disposal of waste, but either will potentially require regulation and the resources to apply and recover those charges and in the latter case this will raise the cost of management of waste facilities such as Eliza Cove significantly.

Monitoring Progress and Performance

Monitoring and review of the WMDP performance will be an important element in measuring the influence and success of the plan. This will ensure that the plan continues to be effective and deliver the improvement in waste management in Falkland Islands as a whole.

Indicators

To ensure that the Falkland Islands WMDP becomes a reality, the monitoring and reporting of its implementation is essential.

A wide range of stakeholders have key roles to play, not only in the implementation of the Development Plan but in the monitoring and communicating the progress made, and sustaining the partnership that must be at the heart of the local infrastructure of the islands.

Action 31

Provide a written annual summary report on progress against the Action Plan.

Action 32

Develop a set of detailed key performance indicators and interim targets clearly linked to WDP delivery.

Need for Positive Planning

Development planning – structure and local plans – has an important role to play in this by planning positively for the necessary waste-management infrastructure needed to implement the WMDP.

The planning system should also assist in ensuring that protection is given to the natural, built and historic environment and assist in moving towards a more sustainable form of development.

Action 33

The objectives, targets and facilities required to implement the WDP should be taken into account in the Islands development plan policy.

Action 34

Development Plans will identify suitable sites for waste-management facilities required to deliver the Falkland Islands BPEO.

Glossary

Aerobic A process taking place in the presence of air.

Anaerobic A process taking place in the absence of air.

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

Best Value Places a duty on FIG to deliver services (including waste collection and waste disposal management) to clear standards – covering both cost and quality – by the most effective, economic and efficient means available.

Biomass Plant materials and animal waste used as fuel.

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

Central composting Large-scale schemes that process biodegradable material from the surrounding area in a centralised location.

Commercial Waste arising from premises which are used wholly or mainly for trade, business, sport, recreation or entertainment, excluding household and industrial waste.

Community sector Including charities, campaign organisations and not-for-profit companies.

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

Controlled waste Household, industrial and commercial waste or any such waste which require a waste management licence for treatment, transfer or disposal.

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