

Zero Waste Strategy for Councils

Prepared for
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Manatū Mō Te Taiao

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1 Background

1.1 Zero Waste Concept

Zero Waste is a concept that has caught on in New Zealand and countries around the world. It is a radical framework for approaching the problem of waste in our society. Whereas waste management has traditionally sought to 'manage' the symptoms of our resource inefficient society, Zero Waste is an approach that says we need to progressively address the causes of waste, all through the process chain. Zero Waste is the recognition that, by focusing on managing waste, we will consign ourselves to providing only the ambulance at the bottom of the cliff, and that we need to radically re-think our concepts of waste and resource use.

The Zerowaste Action Planning (ZAP) system has been developed in response to the need for careful planning and strategy development associated with implementing the principles of Zero Waste at a local level. As with any new way of thinking, there is a demand for new disciplines to be developed to put the ideas into practice. The ZAP system is a set of spreadsheet-based tools based around specially developed integrated planning and organisational concepts.

1.2 Project Background

Waste Not Consulting, Maunsell (formerly Meritec) Ltd, and Dunedin City Council, with financial assistance from the Zero Waste New Zealand Trust, produced a comprehensive Zero Waste strategy for Dunedin City in 2001. The strategy was based on a series of spreadsheets linking together costs, employment creation potential, waste diversion quantities, and sustainability criteria for ranking various waste minimisation initiatives.

The strategy developed five key areas for organising and balancing waste minimisation initiatives that have now become a focal point of the ZAP system. These keys are: Take Direct Action, Change the Rules, Foster New Ideas, Communicate and Educate, and Monitor and Feedback.

Funding was granted by the Sustainable Management Funding in 2002 to allow the same consulting team to adapt the strategy into a more comprehensive set of tools that could be used by a range of councils.

The strategy was also to be amended to include liquid waste disposal options and be modified to allow linkages with the WISARD (Waste Integrated System for Analysis of Recovery and Disposal) Life Cycle Assessment software. The strategy was renamed Zerowaste Action Planning (ZAP) system to allow for ease of reference and generality.

1.3 Project Outputs

The funding application set out four main project deliverables.

- 1) A set of spreadsheet-based tools that will enable councils to:
 - Organise initiatives into one of five key areas
 - Rank the initiatives within the key areas according to sustainability criteria
 - Determine waste reduction potential, costs, and employment generation potential over a 15 – 20 year programme
 - Calculate costs of the programme against conventional disposal options.
- 2) A set of User Guide notes to accompany the software.

- 3) Simple examples and case studies of councils that have used the tools
- 4) A strategy for delivery of the tools to key stakeholders.

This document is structured as follows:

- Section 2 presents an overview of the project's relationship to the issues surrounding local body Zero Waste planning
- Section 3 introduces the key concepts upon which the ZAP strategy tools are based and summarises the structure of the ZAP spreadsheet tools
- Section 4 includes the case studies of the projects undertaken with four councils using the ZAP system
- Appendix 1 provides the ZAP User Guide Notes to accompany the software.

The separate Appendices (not published on the internet) to this report include:

- A summary and the complete text of the peer reviewers' comments
- A description of the interface between the ZAP system and the WISARD Life Cycle Assessment model
- A description of how liquid wastes have been included in the ZAP model
- The results of a survey conducted of council officers who have used the ZAP tools
- A dissemination strategy for the tools.

2 Project Issues and Significance

2.1 Issues and Significance

There are an overwhelming number of possible waste reduction initiatives that councils can choose from. Deciding on which initiatives to undertake, and when in a programme to undertake them, can be problematic. Most councils opt for the easiest, the cheapest, or the ones with the highest profile or greatest waste reduction potential. Little consideration is given to whether this will build a solid foundation for ongoing positive change. Poor planning in this regard could create serious problems for the ability of these councils to stay on a Zero Waste path.

When consideration is being given to long-term waste issues there is a need to ensure that the full range of issues and their implication is understood and taken into account. This includes the need to give cognisance to the interconnectedness of the various waste streams, including solid, liquid, gaseous, and hazardous wastes. If full and proper account is not taken of these issues, this could lead to structural deficiencies in the councils' management and minimisation of waste.

A further difficulty in planning for a target such as Zero Waste is that there is an enormous number of variables that simply cannot be planned for, such as the influence of global trade on the economy and the development of new technologies. Failure to account for the possibility of these developments could stop a poorly structured programme in its tracks.

2.2 Who is affected and how

These issues affect all councils embarking on waste minimisation programmes, but particularly the 45% of councils in New Zealand that have adopted a Zero Waste target. The danger is that many councils will not have the necessary in-house expertise or understanding to address these issues and formulate solutions.

The main direct beneficiaries of this project will therefore be city and district councils that have a target of Zero Waste to landfill. All councils that undertake waste minimisation planning could, however, potentially benefit from using this planning tool.

If all of the relevant issues are not addressed, there is the possibility that waste minimisation programmes could stall, and communities revert to predominantly waste disposal oriented rather than waste minimisation approaches. Even where councils may be able to address these issues, doing so from scratch is extremely time consuming. There is always the danger of councils 're-inventing the wheel' as they try to grapple with the same issues.

2.3 Addressing the Issues

Prioritising programmes: The tools are specifically designed to assist councils to organise the numerous possible initiatives into a balanced, structured programme and establish a set of priorities relevant to their community.

Interconnectedness of waste streams: The tools will cover disposal options for liquid wastes and enable communities to assess the ways in which reductions in volumes and in contaminant levels can contribute towards the objectives of the Zero Waste Strategy.

Planning the unknown: One of the foundations of the Strategy is to build the drivers for Zero Waste in the community so that the community will meet and overcome developments and obstacles as

they arise. This is achieved through undertaking initiatives in five key areas that address the dynamics of change management.

2.4 Council's Role in Zero Waste Planning

The Zerowaste Action Planning (ZAP) system assumes that council is the lead agency in driving the process of waste minimisation. Councils currently have responsibility for managing waste so it is logical that councils lead the way with attempts at waste diversion from landfill.

The key point to remember in viewing the ZAP tools is that the initiatives that are proposed are those that council (or council contractors) are directly responsible for undertaking. Councils do not have the authority to direct private agencies or persons to undertake any of the initiatives involved in a strategy such as this. However, as has been discussed, councils will not be successful in their attempts to achieve Zero Waste without the full support of all sectors of the community.






Therefore, much of the Strategy consists of methods by which councils can successfully influence and engage all sectors of the community in the process of waste minimisation. This includes providing the leadership, the resources, the incentives, and the information that will enable the community to participate fully and drive the change.

3 Zero Waste Strategy Tools

3.1 The Five Keys to Zero Waste

The thrust of the Zero Waste Strategy is that Zero Waste to landfill will need to become an idea that is embraced in the hearts, minds, and actions of everyone. To assist in the implementation of a Zero Waste to landfill strategy, the vast range of waste minimisation initiatives have been divided up into five interdependent key areas in which councils must take action. These five key areas are described in the table below.

Five Keys to Zero Waste

	<u>Full Title</u>	<u>Icon</u>	<u>Key effect on Zero Waste Process</u>
1.	Take Direct Action		Action creates conviction
2.	Change the Rules		Ensuring the path of least resistance heads in the right direction
3.	Foster New Ideas		Creativity engaged for positive outcomes
4.	Communicate and Educate		Everyone is included
5.	Monitor and Feedback		Reality Check

The division of the waste minimisation initiatives into the 5 key areas is an important step for several reasons:

- It identifies different initiatives that operate in the different five key areas.
- It encourages co-operation rather than competition between initiatives in one key area against those in another key area.

- It emphasises that to sustain a Zero Waste to landfill strategy, a selection of initiatives have to be chosen that mutually operate in all five key areas.

All five keys are necessary to achieve the goal of Zero Waste to landfill. A correct balance of actions is necessary to keep the process healthy. The table below illustrates potential consequences if one of the keys is insufficiently implemented.

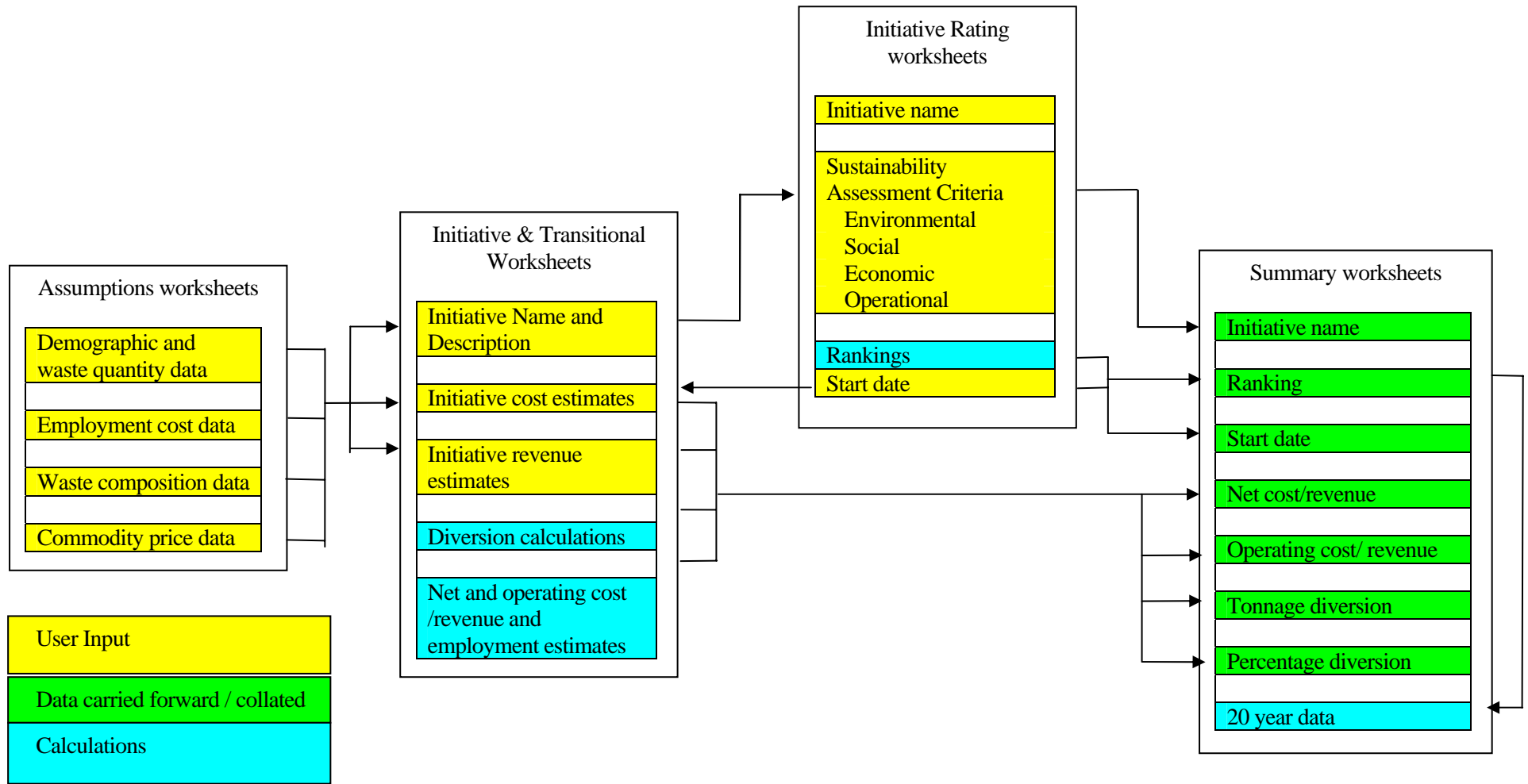
Balancing the Five Key Areas

The Five Key Areas					Potential Consequences
Direct Action	Rules	Ideas	Communicate & Educate	Monitor	
*	*	*	*	*	Ongoing change towards Zero Waste
	*	*	*	*	Frustration, scepticism
*		*	*	*	Slow progress, little change
*	*		*	*	Large obstacles, reduced commitment
*	*	*		*	Lack of community support, resistance
*	*	*	*		Lack of direction, lack of commitment

3.2 ZAP Software and User Guide

The ZAP system is made up of five Excel Workbooks. The figure on the following page illustrates how these five workbooks fit together. The separate Appendices contain the ZAP User Guide written to accompany the ZAP software. The five Excel Workbooks are titled:

- 1) Assumptions Workbook
- 2) Initiatives Workbook
- 3) Transitional (Residual Waste Actions) Workbook
- 4) Initiative Ranking Workbook
- 5) Summary Workbook.



Map of Zerowaste Action Planning (ZAP) Tool

4 ZAP Council Case Studies

4.1 General

Maunsell and Waste Not offered the opportunity to a number of New Zealand councils to trial the ZAP tools as part of the SMF project. A variety of 'levels of service' were offered to the councils to reflect the extent of 'ZAP analysis' the council required.

These ranged from, for example, council providing the project team with input data to develop the ZAP spreadsheets on the Council's behalf and to undertake a prioritising ranking session for the Council to 'tweak' later, or for the Council to work more closely with the project team, participate in a ranking session and contribute input data and ideas in developing the tools and producing an overall implementation plan. Waste Not and Maunsell trialled the ZAP tools with the following four district councils:

- Rodney District Council
- Kawerau District Council
- Tauranga District Council
- Rangitikei District Council.

Two separate projects were undertaken with both Rangitikei and Rodney District Councils using the ZAP system. The experiences that were had with each of the councils are documented in the following sections.

4.2 Tauranga District Council

Tauranga District Council (TDC) and Western Bay of Plenty District Council (WBOP) adopted a joint Waste Management Plan in October 2001. The TDC / WBOP Waste Management Plan's vision is: *"Sustainable waste management that protects the environment for present and future generations by rigorously promoting waste minimisation to achieve a Zero Waste target by 2015"*.

In late 2002, John Palmer (then Tauranga District Council Manager of Waste Services) expressed interest in the SMF-funded Zero Waste Strategy project. His intent was to use the ZAP tools to help develop an implementation plan to support the TDC's Waste Management Plan. He cited the Rodney District Council Zero Waste Plan as the type of implementation document that they were looking to produce.

Tauranga District Council engaged Waste Not and Maunsell to undertake a ZAP assessment which had the following four stages.

1. Gathering Information on Current Situation.
2. Input Information into ZAP Tools.
3. Hold a Ranking Session.
4. Summarise Outputs.

Waste Not and Maunsell met with Nick Roozenburg (Solid Waste Engineer) and Heidi Pettersen (Zero Waste Co-ordinator) from TDC in January 2003 to go over the necessary ZAP input information. Important waste management sites were visited and documents reviewed. Information that was gathered included:

- Population and demographics data
- Location, capacities, and costs of existing waste facilities – transfer stations, landfills, drop-off centres etc.
- Descriptions of existing waste services (including cost data) including kerbside collections, recycling schemes, composting operation, hazardous waste collection/drop-off facilities, and school/business waste education/minimisation programmes
- Local contacts and champions (businesses, community groups, schools)
- Waste sources and composition data, including biosolids quantity data
- Proposed future facilities and associated costs
- Large waste producers – industry sectors, geographical areas
- Future economic plans for the city (e.g. growth, tourism, retirement).

Data was entered into the ZAP ‘Assumptions Workbook’ and ‘Initiatives Workbook’ by Waste Not and Maunsell to provide Council with initial estimates for further manipulation. Data included population and demographic estimates, commodity price estimates, labour costs, waste composition data, and rough cost figures for approximately 50 waste minimisation initiatives.

The TDC / WBOP Waste Management Plan has twenty-seven policies listed under the following areas:

- Waste Reduction
- Reuse
- Recycling
- Recovery
- Waste Collection and Treatments
- Disposal

The ZAP waste minimisation initiatives were modified where applicable to reflect the various policies listed in the TDC Waste Management Plan. For example, the policy statement relating to ‘Recycling Targets’ corresponded with the ZAP waste minimisation initiative ‘Goals’ under the Monitor and Feedback grouped initiatives.

During this stage of the project, it was recognised that the ZAP Tools were lacking a function to allow councils to incorporate existing waste management / disposal infrastructure and services (e.g. cleanfills, transfer stations, litter collection and refuse collection services) into the overall framework. This gave rise to the development of the ‘Transitional (Residual Waste Actions) Workbook’ to allow these types of services to be accounted while having the ability to alter the spending on these services/infrastructure every five years to reflect possible changes as other waste minimisation initiatives are implemented. Tauranga District Council’s Waste Management Plan had a number of policies relating to ‘Residual Waste Actions’ and these were incorporated into the new workbook accordingly.

A ranking session was held with Council staff and Councillors in April 2003. The purpose of the session was to use the ZAP ‘Initiatives Ranking’ spreadsheets to help prioritise future TDC Zero Waste projects. Participants were provided with ranking sheets prior to the session so they would be familiar with the sustainability criteria and the types of initiatives and key areas that needed to be scored and ranked.

During the session, a suggestion was made by one of the attendees to incorporate into the ranking spreadsheet an unweighted score total. This would allow weighted scores to be compared with unweighted scores (raw scores) so that the significance of the chosen weightings could be considered in regards to the overall ranking outcomes. The ZAP Initiative Ranking spreadsheet was subsequently modified to include this suggestion.

The outcomes from the ranking session and the data that had been incorporated into the ZAP Assumptions Workbook, Initiatives Workbook, and the Transitional Workbook were provided to TDC for their review and consideration. The ZAP Summary Workbook provided overall costs, employment creation potential, and diversion quantities for Council to consider. It was noted that many of the outcomes were dependent on the assumptions made and cost data chosen.

4.3 Rodney District Council

The Solid Waste Management Plan adopted by Rodney District Council in December 1999 was the fifth review of the Strategy, first adopted in 1974. Its principle goal was "To reduce the amount of solid waste generated and going to Redvale and other landfills". Using a theme from the government waste management policy, the Council agreed that "as far as practicable, NZ waste generators should meet the costs of the waste they produce". From this lead the SWMP took a non interventionist stance. Unlike many other local authorities, the Council did not provide the following services:

- Collection and disposal of household and trade waste.
- Provision of any regular kerbside recycling collections.
- Collection and disposal [periodic or otherwise], of inorganic materials.
- The provision of Council owned or operated sanitary landfills.

On 6 December 2001, the Council adopted the goal of "Zero Waste to Landfill by 2020". Waste Not Limited and Meritec were engaged by the Council to assist with the development of a comprehensive and practical strategy that would guide the community towards that goal.

The first task was to produce a draft outline of the strategy document that could be used for discussion purposes at an Environment Committee workshop at the end of January 2002. It was decided that the new Draft Waste Solid Waste Minimisation Plan would be developed using Dunedin City's Zero Waste Strategy as a basis. To prepare the draft outline, it was necessary to gather and analyse background information, and select and calculate rough-order costings for appropriate waste minimisation initiatives. These data were used as input for the ZAP spreadsheet model.

The objective of the workshop was to reach decisions on:

- Waste minimisation initiatives and costs for inclusion in the 2002/3 Annual Plan.
- Funding needs to be shown in the Long-Term Funding Strategy
- Adoption of the SWMP to enable implementation by July 2002.

At the workshop, Councillors assessed the selected initiatives against the sustainability criteria in the ZAP system in order to prioritise the initiatives in the Rodney context. These initiatives then formed the basis of the draft Zero Waste Plan for Rodney District.

The draft Plan was structured around specific waste streams (e.g. residential inorganic). Waste reduction initiatives in each of the five Key Areas are given for each specific waste stream. The Plan also contains an 18-year comprehensive implementation programme for the 49 Zero Waste

initiatives. The Plan suggested a 3 year work programme which, if implemented, could bring about a 54% reduction in solid waste to landfill in the district.

The draft Zero Waste Plan was considered by the Council and then put out for community discussion and comment. The Plan was adopted by Council in July 2002.

The first major waste reduction undertaken by the Council was the trialling and implementation of a kerbside recycling system. A district-wide system, encompassing all urban and rural properties, was introduced in August and September 2003.

Although the aims and options set forth in the Plan remained valid, there was still significant work required to translate these into a feasible implementation strategy, which took into account the resources available and the need to address existing waste management challenges in the district. To this end, the Council again engaged Waste Not to assist in the development of such a strategy. It was intended that this strategy would be an in-house working document and would not be intended for publication or public dissemination.

The immediate objectives of the second project were to model a number of practical scenarios and assist in the production of a draft implementation strategy document. Most importantly, with the detailed costings of the prioritised initiatives in the spreadsheet model, scenarios could be developed that would fit within the “envelope” of resourcing available through the Council’s Annual Plan.

Beginning in October 2003, the project team collated data related to initiative costings and the ZAP spreadsheet models were used to develop an initial scenario. The model was then presented to Council and input sought to refine the data and the information to the point where a working scenario could be established. Training and support in the use of the spreadsheet models had been provided to the Council Zero Waste Officer to enable ongoing refinement and establishment of alternative scenarios in-house.

At the time of writing, the Zero Waste Officer is using the spreadsheets to assist in the further development of alternative scenarios. When this process is completed, the project team will produce a final three-year Zero Waste Implementation Plan for Rodney District Council.

4.4 Rangitikei District Council

Although Rangitikei District Council is not a Zero Waste Council, Peter Duncan (Asset Manager, Rangitikei District Council) was interested in using the ZAP tools to assist with the Council's decision-making processes regarding waste minimisation initiatives. The Zerowaste Action Planning Tools (and the associated sustainability assessment criteria) were used to assist the Council with the following two separate projects:

1. Sustainability Assessment of Waste Minimisation Options.
2. A ZAP Analysis on Rangitikei District Council's overall waste management strategy.

In early 2002, Maunsell used the ZAP tools framework to undertake a 'sustainability assessment' on four waste minimisation options that Rangitikei District Council was investigating. The options all represented 'Take Direct Action' initiatives (e.g. composting and recycling facilities) and Maunsell scored and ranked these four initiatives using the sustainability criteria as used by the ZAP tools. The four options considered were:






- Option 1: Green waste composting facility
- Option 2: Green waste facility and recycling drop off facilities
- Option 3: Composting facility (including green waste, food wastes, and special wastes) and recycling drop-off facilities
- Option 4: Continued landfill disposal.

Option 2 produced the highest sustainability score. In addition, Maunsell demonstrated that by implementing other waste minimisation initiatives from the 'Change the Rules', 'Foster New Ideas', 'Communicate and Educate' and 'Monitor and Feedback' key areas at the same time as the 'Take Direct Action' initiatives, a significant increase in the diversion potential could be achieved. This potential diversion potential could be achieved without significant increases in overall costs relative to the capital costs required for the 'Take Direct Action' initiatives.

In mid-2003 Maunsell made an overall assessment using the ZAP Tools to produce a ZAP strategy framework for Rangitikei District Council. The assessment involved using input data provided by the Council, making various assumptions and cost estimates, and carrying out the ranking session on behalf of the Council.

The ZAP tools and a draft user guide were then presented to Council for their consideration and further use. A summary of the ranked initiatives and starting years is presented in the table on the following page.

ZAP Assessment Outcomes for Rangitikei District Council

Rank	Direct Action 	Change the Rules 	Foster New Ideas 	Communicate & Educate 	Monitor & Feedback 
1.	Composting (Year 1)	Polluter Pays (Year 1)	Zero Waste Awards (Year 1)	Leadership and Lobby (Year 1)	Recycling Targets (Year 1)
2.	Construction and Demolition (Year 2)	Landfill Levy (Year 4)	Zero Waste Project Funding (Year 2)	Buy Recycled and Recyclable (Year 2)	Reporting Back (Year 2)
3.	Resource Recovery Centre (Year 5)	Landfill Bans (Year 3)	Zero Waste Pilot Schemes (Year 3)	Festivals and Events (Year 3)	Participation Surveys (Year 3)
4.	Kerbside Recycling Collections (Year 2)	Differential Disposal Pricing (Year 1)	Educational Courses (Year 1)	Media Coverage (Year 1)	Triple Bottom Line Reporting (Year 5)
5.	Recycling Drop-off Facilities (Year 1)	Container Deposits (Year 5)	Research and Development (Year 5)	Waste Minimisation Education (Year 1)	Waste Analysis Data (Year 2)

4.5 Kawerau District Council

In early April 2002, Kawerau District Council engaged Waste Not to assist with the development of a comprehensive and practical strategy that would guide the community towards its goal of 'Zero Waste to landfill'. A principal motivation for the community was the need to either close or upgrade the existing landfill by 2005.

The immediate objective of the project was to produce a draft strategy document to be presented to a Council meeting at the end of April 2002. The aim of the draft plan was to provide a clear set of actions that would move the Council significantly towards its waste minimisation goal. The objective over the three-year period covered by the plan would be to achieve a 70% diversion rate from landfill based on current volumes.

The high diversion rate was decided upon on the basis that it would be possible to transport the residual waste to a landfill in a neighbouring region with only a small increase in total annual waste management costs. Successful implementation of the plan would allow the district to avoid approximately \$2,000,000 of capital works needed to upgrade the landfill and produce significant long term savings.

Development of the plan drew heavily on the framework devised for the Dunedin strategy project, selecting from the range of identified initiatives, and using the five key areas concept to balance the proposed action plan. The spreadsheet tools developed for the Dunedin waste strategy were supplemented with an early version of the initiative costing tool.

Working closely with Tom McDowall, Manager Operations and Services, Kawerau District Council background information was gathered on existing waste services, district demographics, and the current waste stream. As there were no existing audit data on the current waste stream, estimates and assumptions based on the available data relating to vehicle numbers and volumes was used as the basis for further analysis.

After analysis of the background information, appropriate waste reduction initiatives were selected and preliminary costings formulated using the spreadsheet tool. These initiatives were prioritised and the three-year plan formulated. The actions for each key area are given in the table below.

Key area	Year	Initiative
Direct Action	Year One	Upgrades to Resource Recovery Centre Introduce kerbside recycling for commodities (Paper, cardboard, glass, plastics) Introduce kerbside collection of organic waste Reduce size of kerbside collection receptacle Focus on Council controlled waste streams
	Year Two	Special and Hazardous waste reduction
	Year Three	Install transfer station and weighbridge Introduce Cleaner Production Initiatives Introduce litter bin recycling
Change the rules	Year One	Revise gate charges (differential pricing) Waste management contract incentives
	Year Two	Purchasing and contract policies
	Year Three	Investigate polluter pays options

Foster new ideas	Year One	None
Foster new ideas	Year Two	Fund waste minimisation projects
	Year Three	Awards for waste minimisation
Communicate	Year One	Public consultation Education material and programmes Helplines Info sharing
	Year Two	Promote home composting
	Year Three	None
Monitor and Feedback	Year One	Waste audit goals
	Year Two	Reporting back
	Year Three	None

The draft plan was accepted by the Council as presented and put out for public consultation.

Appendix 1 – ZAP User Guide Notes

Zerowaste Action Planning System (ZAP)

User Guide

Prepared for
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Manatū Mō Te Taiao

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1. Purpose of the Tools

The Zerowaste Action Planning (ZAP) tools have been developed in response to the need for careful planning and strategy development associated with implementing the principles of Zero Waste at a local level. As with any new way of thinking there is a demand for new disciplines to be developed to put the ideas into practice.

Zero Waste is a concept that has rapidly caught on in New Zealand and other countries around the world. It is a radical framework for approaching the problem of waste in our society. Where waste management has traditionally sought to ‘manage’ the symptoms of our resource inefficient society, Zero Waste is an approach that says we need to progressively address the causes of waste. Zero Waste is the recognition that by focusing on managing waste, we will consign ourselves to providing only the ambulance at the bottom of the cliff, and that we need to radically re-think our concepts of waste and resource use.

The ZAP system is a set of spreadsheet based tools based around specially developed integrated planning and organisational concepts. The spreadsheet tools cannot be properly understood or applied in isolation from the conceptual framework (refer Appendix A).

The tools are intended to be used and applied by local authorities in planning and developing an integrated Zero Waste strategy. The body of this document provides guidance on how the tools can be used. Appendices provide further detail on the conceptual Zero Waste framework and the use and practical application of different elements of the system.

These tools have been developed and tested by Waste Not Consulting and Maunsell Limited (formerly Meritec), with input and assistance from Dunedin City Council, Rodney District Council, Kawerau District Council, Tauranga District Council, and Rangitikei District Council. External peer reviewers were also engaged to critique the tools.

Funding for the development of the tools has been provided by the Ministry for the Environment through the Sustainable Management Fund and by the Zero Waste New Zealand Trust.

2. The Five Keys

2.1 Introduction






The ZAP system is a set of Excel spreadsheets into which basic data on different possible waste minimisation initiatives can be inputted. The spreadsheets have been designed to collate and summarise the data so that the overall impact of the programme can be seen.

The ZAP system provides a framework within which to place different waste minimisation initiatives and a method for assessing the possible impacts a hypothetical programme may have. It will help users work through the myriad of possible options that are available, and to see the possible effects different combinations of those options could have on the short and long term viability of a Zero Waste programme over a one to twenty year timeframe.

The ZAP system is not intended to provide a magic box that will spit out the ‘right’ answer. It does not guarantee a good result but does significantly cut down the time that it will take to come up with a workable, balanced plan that will have a good chance of success.

2.2 The Five Keys to Zero Waste

For the ZAP tools, waste minimisation initiatives have been divided into the five key areas outlined in the table below. Appendix A explains these key areas in further detail.

<u>Key Area</u>	<u>Icon</u>	<u>Key effect on Zero Waste Process</u>
1. Take Direct Action		Action creates conviction
2. Change the Rules		The path of least resistance heads in the right direction
3. Foster New Ideas		Creativity engaged for positive outcomes
4. Communicate and Educate		Everyone is included
5. Monitor and Feedback		Reality Check

The division of waste minimisation initiatives into five key areas is an important step for several reasons:

1. It identifies different initiatives that operate in the different five key areas.
2. It encourages co-operation rather than competition between initiatives in one key area versus those in another key area.
3. It emphasises that to sustain a Zero Waste to landfill strategy a selection of initiatives have to be chosen that mutually operate in all five key areas.

All five keys are necessary to achieve the goal of Zero Waste to landfill. The essential feature of these keys is that they all function to give life to the process, but only together can they achieve that. For example, if council only implements direct action initiatives but there is little activity in other areas, council will find itself “doing all the work” with a reluctant or resistant community failing to contribute. Similarly, if a focus is put on communication and education with insufficient attention to other elements it is likely that council will end up with a motivated but frustrated public.

The diagram below illustrates potential consequences if one of the keys is insufficiently implemented.

The 5 Key Areas					Potential Consequences
Direct Action	Rules	Ideas	Com. & Educate	Monitor	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Ongoing change towards Zero Waste
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Frustration, scepticism
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Slow progress, little change
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Large obstacles, reduced commitment
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Lack of community support, resistance
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lack of direction, lack of commitment

Action in all five areas is essential if the programme is to work. The correct balance of action is necessary to keep the process healthy. A methodology for determining how the different elements of the programme may fit together is discussed in the following section.

3. Overview of the ZAP System

3.1 Introduction

The ZAP system is a set of spreadsheet based tools with two primary functions:

1. To assist in the prioritisation of a wide range of waste minimisation initiatives using a range of sustainability criteria, including environmental, social, and economic
2. To analyse and compare the effects of hypothetical waste minimisation programmes on a range of variables, including cost, employment creation, and waste reduction.

3.2 Advantages

The principle advantage of the ZAP system is that it establishes a sensible and logical framework in which to consider the different possible options for achieving Zero Waste. This saves a lot of time, effort, and debate. It means that councils do not have to reinvent the wheel, but can develop their own tailored programme that is going to be consistent with other programmes. The ZAP system puts everything on a common Triple Bottom Line footing for assessment – which ensures that each initiative is treated equally. This helps resolve the problem of ‘pet’ projects, whereby some projects that may be favoured by people within an organisation are given undue priority, or where different peoples’ ‘pet’ projects are forced to compete with each other.

The ZAP system interfaces with the latest SWAP classifications, and can receive input from Life Cycle Analysis (LCA) tools such as WISARD. The tools are based on linked Excel spreadsheets, and so the interface will be familiar to users and can run on most computers. Using available software has also meant development costs are kept to a minimum.

3.3 Limitations

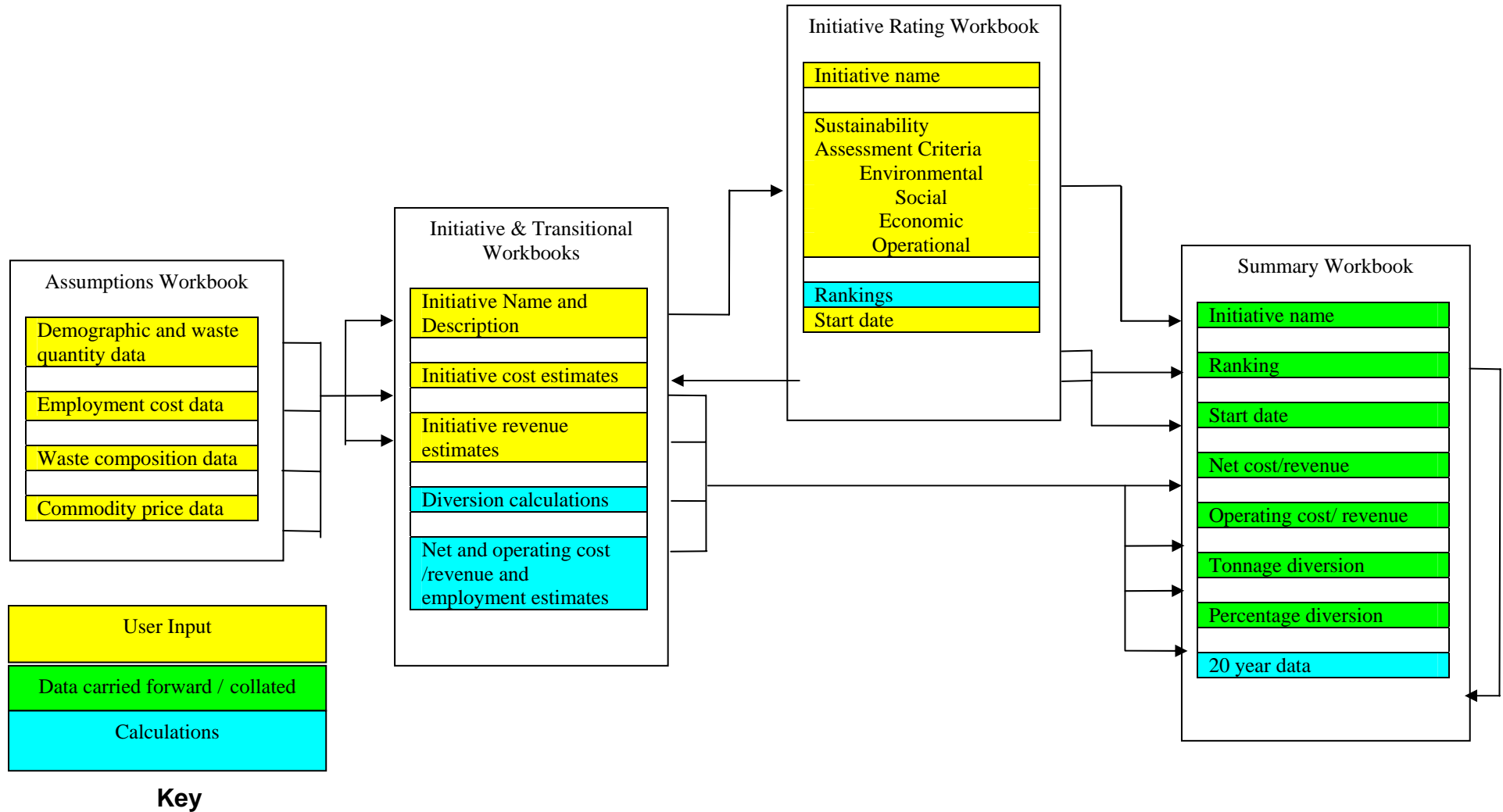
As alluded to earlier, the ZAP system is not an instant cure, and does not remove the need for some serious thinking and planning. It is not designed to handle dozens of different scenarios and cannot take into account all possible future permutations or interactive effects from combinations of initiatives. It is a broad strategy tool and, once the strategy work has been completed, there is still a need to undertake detailed implementation planning before taking action. In other words, it will not tell you things like what brand of greenwaste shredder to purchase or how many workers you will need to process 5000 tonnes of demolition waste.

3.4 Description

The tools comprise the five separate workbooks listed below and described in more detail in the following sections. A map of how the workbooks fit together is presented on the following page:

1. Assumptions Workbook
2. Zero Waste Initiatives Workbook
3. Transitional (Residual) Workbook
4. Initiative Ranking Workbook
5. Summary Workbook.

Map of ZAP: The flow of data in the ZAP workbooks



3.5 Assumptions Workbook

Composition	Commercial	Residential	Total	Notes
Paper				
Recoverable	8.7 %	4.9 %	14 %	Data from 1996 WAP Composition (Table 11)
Non-Recoverable	%	%	0 %	
Subtotal	8.7 %	4.9 %	14 %	
Sanitary				
Recoverable	1.2 %	0.8 %	2 %	Conversion to new SWAP classifications based on typical secondary proportions
Non-Recoverable	%	%	0 %	
Subtotal	1.2 %	0.8 %	2 %	
Plastic				
Recoverable	4.9 %	2.2 %	7 %	
Non-Recoverable	%	%	0 %	
Subtotal	4.9 %	2.2 %	7 %	
Glass				
Recoverable	1.7 %	1.4 %	3 %	
Non-Recoverable	%	%	0 %	
Subtotal	1.7 %	1.4 %	3 %	
Ferrous Metal				
Recoverable	2.9 %	2.0 %	5 %	
Non-Recoverable	%	%	0 %	
Subtotal	2.9 %	2.0 %	5 %	
Non Ferrous Metal				
Recoverable	0.2 %	0.1 %	0 %	
Non-Recoverable	%	%	0 %	
Subtotal	0.2 %	0.1 %	0 %	
Putrescible				
Recoverable	22.3 %	21.4 %	44 %	Includes all organic, Green, and soil classifications
Non-recoverable	%	%	0 %	
Subtotal	22.3 %	21.4 %	44 %	
Rubble & concrete				
Recoverable	5.7 %	1.3 %	7 %	
Non-Recoverable	%	%	0 %	
Subtotal	5.7 %	1.3 %	7 %	
Timber				
Recoverable	11.4 %	2.5 %	14 %	
Non-Recoverable	%	%	0 %	
Subtotal	11.4 %	2.5 %	14 %	
Rubber				
Recoverable	0.9 %	0.5 %	1 %	
Non-Recoverable	%	%	0 %	
Subtotal	0.9 %	0.5 %	1 %	
Textiles				
Recoverable	1.7 %	1.1 %	3 %	

The Assumptions Workbooks consists of four worksheets into which the user records local information about populations, demographics, number of households, waste tonnages, waste composition data, and local recycling commodity prices. The Initiative and Transitional Workbooks pick up data from these spreadsheets, where applicable. Appendix D lists the type of information that could help to build a comprehensive picture of a community’s waste composition, management and control.

3.6 Zero Waste Initiatives Workbook

Leadership & Lobbying Date: #####

Description: Provision of a strong voice and leadership in favour of Zero Waste at a local, regional and national level. Presentations to identified groups.

Year of Implementation: 1 Finish year: 20

Item	Cost	Units	Cost/Income for Initiative	Amount accruing to Council	Amount accruing to ratepayer	Employment in Council	Employment in Other
Initial capital costs (one)	\$ -	20	\$ -	\$ -	\$ -		
Capital costs (over Xyrs)	\$ -	20	\$ -	\$ -	\$ -		
Capital costs (over Xyrs)	\$ -	20	\$ -	\$ -	\$ -		
Interest on Capital	\$ -	7.5%	\$ -	\$ -	\$ -		
Labour #1	\$ (75,600.00)	0.13	\$ (9,450.00)	\$ (9,450.00)	\$ (1.35)	0.13	0.00
Labour #2	\$ (56,700.00)	0.13	\$ (7,087.50)	\$ (7,087.50)	\$ (1.01)	0.13	0.00
Labour #3	\$ (30,240.00)	0.00	\$ -	\$ -	\$ -	0.00	0.00
Equipment operation#1	\$ 2,000.00	1.00	\$ (2,000.00)	\$ (2,000.00)	\$ (0.29)		
Equipment operation#1	\$ -	1.00	\$ -	\$ -	\$ -		
Contract Costs	\$ -		\$ -	\$ -	\$ -		
Subtotal			\$ (18,537.50)	\$ (18,537.50)	\$ (2.65)	0.25	0.00

Item	Income	Units	Benefit	Benefit	Benefit
Commodity Sales	\$ 4,905.69	1.00	\$ 4,905.69	\$ 4,905.69	\$ 0.70
Income from Sales	\$ -	1.00	\$ -	\$ -	\$ -
User Charges	\$ -	1.00	\$ -	\$ -	\$ -
Levy	\$ -	1.00	\$ -	\$ -	\$ -
Other Income	\$ -	1.00	\$ -	\$ -	\$ -
Subtotal	\$ 4,905.69		\$ 4,905.69	\$ 4,905.69	\$ 0.70
Rate Requirement	\$ -		\$ (13,631.81)	\$ (13,631.81)	\$ (1.95)

Item	Commercial Waste			Residential Waste			Initiative (tonnes)	Council (tonnes)	Ratepayer	Price/tonne	Income potential
	%	tonnes	Reserves Bal.	%	tonnes	Reserves Bal.					
Paper	2.6	169.8	1%	10.2	675.9	1%	8.5	8.5	0.001	\$ 30.00	\$ 253.71
Sanitary	0.4	23.3		1.5	96.6		0.0	0.0	0.000	\$ -	\$ -
Plastic	1.4	93.2	1%	5.6	372.9	1%	4.7	4.7	0.001	\$ 130.00	\$ 605.97
Glass	0.9	59.9	1%	3.3	219.7	1%	2.8	2.8	0.000	\$ -	\$ -
Ferrous Metal	2.0	129.9	1%	7.6	506.1	1%	6.4	6.4	0.001	\$ 40.00	\$ 254.37
Non Ferrous Metal	2.0	129.9	1%	7.5	499.4	1%	6.3	6.3	0.001	\$ 560.00	\$ 3,523.94
Putrescible	5.2	346.3	1%	21.6	###	1%	17.8	17.8	0.000	\$ 15.00	\$ 267.69
Rubble	7.4	492.8		3.2	213.1		0.0	0.0	0.000	\$ (5.00)	\$ -
Timber	9.2	612.6		4.0	266.4		0.0	0.0	0.000	\$ (5.00)	\$ -
Textiles	1.2	76.6		1.1	69.9		0.0	0.0	0.000	\$ (35.00)	\$ -
Rubber	0.9	59.9		0.8	53.3		0.0	0.0	0.000	\$ -	\$ -
Hazardous	0.6	40.0		0.2	13.3		0.0	0.0	0.000	\$ (120.00)	\$ -
Totals	33.6	###	0.0	66.5	###	0.0	46.4	46.4	0.007		###

Estimated Diversion of Initiative: 0.7% (46.4 tonnes)

Savings from avoided disposal: \$ 1,084.21

The Initiative Workbook is used to estimate costs, incomes, and diversion potential for the Zero Waste / waste minimisation initiatives the user chooses to implement as part of the council's programme. The workbook has the capacity for up to sixty different initiatives to be considered. These initiatives are split into the five key areas mentioned earlier and approximately 50 possible initiatives are included as a starting point. The Summary Workbook uses these data to calculate possible initiative costs, landfill savings, and employment potential.

3.7 Transitional (Residual Waste Actions) Workbook

The screenshot displays two pages of an Excel workbook titled 'Transitional Workbook.xls'. Both pages are for the initiative 'Provision of Transfer Stations'.

Page 1 Data:

- Initiative Name:** Provision of Transfer Stations
- Description:** The Council will ensure that transfer stations are available for public use.
- Year of Implementation:** 1 (Start), 20 (Finish year)
- Cost/Income for Initiative:**

Item	Cost	Units	Cost	Amount accruing to Council	Amount accruing to ratepayers	Employment in Council (FTE/Yr)	Employment in Other (FTE/Yr)
Initial capital costs (one)	\$ -	20	\$ -	\$ -	\$ -		
Capital costs (over Xyr)	\$ -	20	\$ -	\$ -	\$ -		
Capital costs (over Xyr)	\$ -	20	\$ -	\$ -	\$ -		
Interest on Capital	\$ -	7.5%	\$ -	\$ -	\$ -		
Labour #1	-\$ 75,600.00		\$ -	\$ -	\$ -		
Labour #2	-\$ 56,700.00		\$ -	\$ -	\$ -		
Labour #3	-\$ 30,240.00		\$ -	\$ -	\$ -		
Equipment operation#1	Operating budget (exc)	1.00	\$ 300,000.00	-\$ 300,000.00	-\$ 42.86		
Equipment operation#1			\$ -	\$ -	\$ -		
Contract Costs			\$ -	\$ -	\$ -		
Subtotal			-\$ 300,000.00	-\$ 300,000.00	-\$ 42.86		
- Funding/Income:**

Item	Income	Units	Benefit	Benefit	Benefit
Income from Sales	\$ -	1.00	\$ -	\$ -	\$ -
Income from Sales	\$ -	1.00	\$ -	\$ -	\$ -
Income from Sales	\$ -	1.00	\$ -	\$ -	\$ -
User Charges	\$ -	1.00	\$ -	\$ -	\$ -
Levy	\$ -	1.00	\$ -	\$ -	\$ -
Other Income	\$ -	1.00	\$ -	\$ -	\$ -
Subtotal			\$ -	\$ -	\$ -
Rates Requirement			\$ -	\$ -	-\$ 42.86
- Operating Profit/Loss:** \$ -
- Diversion:**

Diversion	Commercial Waste		Residential Waste		Initiative (tonnes)	Council (tonnes)	Ratepayers (tonnes)	Price/tonne	Income potential
	%	tonnes	%	tonnes					
Paper	2.6	675.9	10.2	675.9				\$ 30.00	\$ -
Sanitary	0.4	23.3	1.5	96.6				\$ -	\$ -
Plastic	1.4	93.2	5.6	372.9				\$ 130.00	\$ -
Glass	0.9	59.9	3.3	219.7				\$ -	\$ -
Ferrous Metal	2.0	506.1	7.6	506.1				\$ 40.00	\$ -
Non Ferrous Metal	2.0	499.4	7.5	499.4				\$ 560.00	\$ -
Putrescible	5.2	216.0	21.6	216.0				\$ 15.00	\$ -
Rubble	7.4	213.1	3.2	213.1				-\$ 5.00	\$ -
Timber	9.2	266.4	4.0	266.4				-\$ 5.00	\$ -
Textiles	1.2	76.6	1.1	69.9				-\$ 35.00	\$ -
Rubber	0.9	59.9	0.8	53.3				\$ -	\$ -
Hazardous	0.6	40.0	0.2	13.3				-\$ 120.00	\$ -
Totals	33.6	66.5	66.5	66.5					\$ -

Page 2 Data:

- Initiative Name:** Provision of Transfer Stations
- Description:** The Council will ensure that transfer stations are available for public use.
- Year of Implementation:** 1 (Start), 20 (Finish year)
- Cost/Income for Initiative:**

Item	Cost	Units	Cost	Amount accruing to Council	Amount accruing to ratepayers	Employment in Council (FTE/Yr)	Employment in Other (FTE/Yr)
Initial capital costs (one)	\$ -	2	\$ -	\$ -	\$ -		
Capital costs (over Xyr)	\$ -	2	\$ -	\$ -	\$ -		
Capital costs (over Xyr)	\$ -	2	\$ -	\$ -	\$ -		
Interest on Capital	\$ -	7.5%	\$ -	\$ -	\$ -		
Labour #1	-\$ 75,600.00		\$ -	\$ -	\$ -		
Labour #2	-\$ 56,700.00		\$ -	\$ -	\$ -		
Labour #3	-\$ 30,240.00		\$ -	\$ -	\$ -		
Equipment operation#1	Operating budget (exc)	1.0	\$ 150,000.00	-\$ 150,000.00	-\$ 1.0		
Equipment operation#1			\$ -	\$ -	\$ -		
Contract Costs			\$ -	\$ -	\$ -		
Subtotal			-\$ 150,000.00	-\$ 150,000.00	-\$ 1.0		
- Funding/Income:**

Item	Income	Units	Benefit	Benefit	Benefit
Income from Sales	\$ -	1.0	\$ -	\$ -	\$ -
Income from Sales	\$ -	1.0	\$ -	\$ -	\$ -
Income from Sales	\$ -	1.0	\$ -	\$ -	\$ -
User Charges	\$ -	1.0	\$ -	\$ -	\$ -
Levy	\$ -	1.0	\$ -	\$ -	\$ -
Other Income	\$ -	1.0	\$ -	\$ -	\$ -
Subtotal			\$ -	\$ -	\$ -
Rates Requirement			\$ -	\$ -	-\$ 1.0
- Operating Profit/Loss:** \$ -
- Diversion:**

Diversion	Commercial Waste		Residential Waste		Initiative (tonnes)	Council (tonnes)	Ratepayers (tonnes)	Price/tonne	Income potential
	%	tonnes	%	tonnes					
Paper	2.6	675.9	10.2	675.9				\$ 30.00	\$ -
Sanitary	0.4	23.3	1.5	96.6				\$ -	\$ -
Plastic	1.4	93.2	5.6	372.9				\$ 130.00	\$ -
Glass	0.9	59.9	3.3	219.7				\$ -	\$ -
Ferrous Metal	2.0	506.1	7.6	506.1				\$ 40.00	\$ -
Non Ferrous Metal	2.0	499.4	7.5	499.4				\$ 560.00	\$ -
Putrescible	5.2	216.0	21.6	216.0				\$ 15.00	\$ -
Rubble	7.4	213.1	3.2	213.1				-\$ 5.00	\$ -
Timber	9.2	266.4	4.0	266.4				-\$ 5.00	\$ -
Textiles	1.2	76.6	1.1	69.9				-\$ 35.00	\$ -
Rubber	0.9	59.9	0.8	53.3				\$ -	\$ -
Hazardous	0.6	40.0	0.2	13.3				-\$ 120.00	\$ -
Totals	33.6	66.5	66.5	66.5					\$ -

The Transitional (Residual Waste Actions) Workbook is made up of approximately six worksheets which relate to the management of residual refuse (e.g. refuse collection, transfer stations, litter collections). These services / infrastructure will be necessary until true Zero Waste is reached. The ‘Transitional’ initiatives are kept separate, however, as they do not fit into the five key areas and they do not create waste reduction. The structure of these sheets is similar to the worksheets in the Initiative Workbook except that they also allow for a reduction in their use over time to be taken into account.

3.6 Initiative Ranking Workbook

Sustainability Assessment - Key 1 - Take Direct Action Date: *****

Assessment performed by: _____

DIRECT ACTION

Initiative	Environmental				Social				Economic				Other				RAW TOTAL	WEIGHTED TOTAL		
	Resource Conservation	Landfill Volume Reduction	Easy quick gains	Toxicity/pollution potential	Community Involvement	Employment Potential	Public Profile of problem	Creates Incentives	Builds infrastructure	Economic Impact	Net Cost/Revenue	Risk of failure	Cross Media Risk	Baseline Data Value	Fosters Innovation					
1 Cleaner Production	4	4	3	4	2	1	2	3	9	1	3	3	7	4	3	3	5	16	45	57
2 Commercial Recyclables	3	2	2	3	2	2	2	2	8	2	2	1	7	2	3	3	11	31	43	
3 Composting	3	5	5	4	3	4	4	3	15	4	3	3	16	3	2	2	13	50	77	
4 Construction & Demolition	4	5	5	3	1	3	3	3	9	5	3	3	19	3	2	3	13	49	72	
5 Council Waste Streams	2	2	4	3	2	1	4	2	8	1	3	3	7	4	2	3	13	35	50	
6 Environmental Management	2	1	2	2	2	1	2	3	9	1	3	2	6	5	2	2	14	28	38	
7 Event Recycling	3	2	3	3	4	2	3	2	13	3	2	2	11	3	2	4	11	38	55	
8 Kerbside Recycling Collections	4	3	3	3	5	3	5	3	19	3	3	2	12	3	4	5	15	49	67	
9 Kerbside Recycling - Organic	3	4	1	4	4	3	3	2	14	3	2	1	10	1	3	3	9	37	52	
10 Litter Bin Recycling	3	3	4	3	4	1	4	2	14	4	2	3	15	3	3	2	11	44	65	
11 Recycling Drop-off Facilities	3	3	4	3	4	1	4	2	14	4	2	4	16	3	3	2	11	46	67	
12 Resource Recovery Centre	4	5	1	3	5	3	4	4	19	5	3	3	19	2	3	3	11	52	68	
13 Special and Hazardous Waste	2	1	1	5	2	1	4	3	11	2	1	2	8	4	2	2	13	33	47	
14 Waste Exchange	3	2	2	3	4	2	2	3	13	1	3	3	7	4	1	4	11	37	47	
15 Waste Minimisation Partners	1	2	2	2	1	2	2	2	4	3	3	3	4	4	3	3	9	22	27	
16 Zero Waste Business Park	2	2	1	3	2	2	4	2	7	4	4	2	15	3	5	7	7	34	42	
17 Land Application of Biosolids	3	4	3	2	1	1	3	2	7	2	2	3	9	2	3	2	9	36	47	
18 DA Spare 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
19 DA Spare 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20 DA Spare 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
21 Landfilling all Material	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Summary Table:

Initiative	RAW SCORE	WEIGHTED SCORE	Ranking
1 Resource Recovery Centre	52	77	1
2 Composting	50	72	2
3 Construction & Demolition	49	68	3

User Notes: 1. Top level numbers can be changed by user after assessing

The Initiative Ranking Workbook consists of seven worksheets. Its purpose is to allow the range of possible initiatives to be subjected to a ranking process to help determine a logical, desired order for implementation.

The ranking system allows subjective judgements to be made on each initiative according to Environmental, Social, Economic, and Operational criteria. The criteria used and the weightings applied have been structured to favour types of initiatives that are likely to be important in the early stages of a Zero Waste programme. This means that the ranking that results does not indicate that one initiative is ‘better’ than another but that it should have a higher priority (time wise) for implementation. Initiatives that build infrastructure, make large or easy environmental gains, or create community buy-in are likely to score well.

The ranking system is designed to be used both by professionals and by councillors or community board members inputting into a group exercise. The numbers applied can be reworked until consensus is achieved. Once a priority ranking has been obtained with the tools, this can be used as a basis for planning and start (and finish) years can be assigned to each initiative. Appendix E shows an example of the type of information that could be provided to those who are to participate in a ranking exercise.

3.8 Summary Workbook

Cost per Year over 20 Years		Date: 30-Oct-02								
		Year of programme								
		1	2	3	4	5	6	7	8	9
Take Direct Action										
1	Composting	\$ (60,628.10)	\$ (40,628.10)	\$ (40,628.10)	\$ (40,628.10)	\$ (40,628.10)	\$ (40,628.10)	\$ (40,628.10)	\$ (40,628.10)	\$ (40,628.10)
10	Litter Bin Recycling	\$ (62,164.05)	\$ (52,164.05)	\$ (52,164.05)	\$ (52,164.05)	\$ (52,164.05)	\$ (52,164.05)	\$ (52,164.05)	\$ (52,164.05)	\$ (52,164.05)
7	Recycling Drop-off Facilities	\$ 312.43	\$ 10,312.44	\$ 10,312.44	\$ 10,312.44	\$ 10,312.44	\$ 10,312.44	\$ 10,312.44	\$ 10,312.44	\$ 10,312.44
4	Construction & Demolition	\$ -	\$ (35,195.54)	\$ (10,195.54)	\$ (10,195.54)	\$ (10,195.54)	\$ (10,195.54)	\$ (10,195.54)	\$ (10,195.54)	\$ (10,195.54)
2	Kerbside Recycling Collections	\$ -	\$ (90,281.90)	\$ (75,281.90)	\$ (75,281.90)	\$ (75,281.90)	\$ (75,281.90)	\$ (75,281.90)	\$ (75,281.90)	\$ (75,281.90)
5	Cleaner Production	\$ -	\$ -	\$ (33,610.46)	\$ (33,610.46)	\$ (33,610.46)	\$ (33,610.46)	\$ (33,610.46)	\$ (33,610.46)	\$ (33,610.46)
8	Council Waste Streams	\$ -	\$ -	\$ (9,992.39)	\$ (7,992.39)	\$ (7,992.39)	\$ (7,992.39)	\$ (7,992.39)	\$ (7,992.39)	\$ (7,992.39)
9	Event Recycling	\$ -	\$ -	\$ -	\$ (18,238.90)	\$ (15,238.90)	\$ (15,238.90)	\$ (15,238.90)	\$ (15,238.90)	\$ (15,238.90)
6	Resource Recovery Centre	\$ -	\$ -	\$ -	\$ -	\$ (148,011.38)	\$ (138,011.38)	\$ (138,011.38)	\$ (138,011.38)	\$ (138,011.38)
14	Waste Exchange	\$ -	\$ -	\$ -	\$ -	\$ (24,774.90)	\$ (19,774.90)	\$ (19,774.90)	\$ (19,774.90)	\$ (19,774.90)
12	Special and Hazardous Waste	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (65,453.53)	\$ (65,453.53)	\$ (65,453.53)	\$ (65,453.53)
17	Land Application of Biosolids	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (21,788.50)	\$ (16,788.50)
11	Environmental Management	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
3	Kerbside Recycling - Organic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
15	Commercial Recyclables	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13	Zero Waste Business Park	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
16	Waste Minimisation Partners	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal		\$ (122,479.71)	*****	*****	*****	*****	*****	*****	*****	*****
Change the Rules										
7	Differential Disposal Pricing	\$ (18,302.11)	\$ (8,302.11)	\$ (8,302.11)	\$ (8,302.11)	\$ (8,302.11)	\$ (8,302.11)	\$ (8,302.11)	\$ (8,302.11)	\$ (8,302.11)
9	Polluter Pays	\$ (25,281.09)	\$ (20,281.09)	\$ (20,281.09)	\$ (20,281.09)	\$ (20,281.09)	\$ (20,281.09)	\$ (20,281.09)	\$ (20,281.09)	\$ (20,281.09)
13	Waste Contract Incentives	\$ 9,305.17	\$ 12,305.17	\$ 12,305.17	\$ 12,305.17	\$ 12,305.17	\$ -	\$ -	\$ -	\$ -
6	Landfill Base	\$ -	\$ -	\$ (2,486.26)	\$ 2,513.74	\$ 2,513.74	\$ 2,513.74	\$ 2,513.74	\$ 2,513.74	\$ 2,513.74
8	Landfill Levy	\$ -	\$ -	\$ -	\$ (3,899.16)	\$ (899.16)	\$ (899.16)	\$ (899.16)	\$ (899.16)	\$ (899.16)
1	Bylaws for Non-Compliance	\$ -	\$ -	\$ -	\$ -	\$ (15,975.61)	\$ (7,975.61)	\$ (7,975.61)	\$ (7,975.61)	\$ (7,975.61)
2	Container Deposits	\$ -	\$ -	\$ -	\$ -	\$ 857.99	\$ 857.99	\$ 857.99	\$ 857.99	\$ 857.99
5	Full Cost Accounting Landfills	\$ -	\$ -	\$ -	\$ -	\$ (7,848.76)	\$ (2,848.76)	\$ (2,848.76)	\$ (2,848.76)	\$ (2,848.76)
3	Extended Producer Responsibility	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,862.49	\$ 1,862.49	\$ 1,862.49	\$ 1,862.49
10	Purchasing and Contract Policies	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (24,828.02)	\$ (21,828.02)	\$ (21,828.02)
4	Full Cost Accounting - Commodities	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
11	Rates Relief	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
14	Waste Operator Licensing	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
12	Tax Incentives	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

The Summary Workbook consists of eleven worksheets that collate data from the other workbooks to show the total amount of waste diverted by all the initiatives (% and tonnes), the total net cost of the initiatives, the employment creation potential, the likely costs and cashflow over the 20 year life of the programme, and the diversion rates over the 20 years of the programme.

This allows users to see quickly what the likely effect of the programme they have decided upon will be. Users can then go back and adjust rankings, assumptions, and scenarios until a combination is arrived at with which they are satisfied. If desired, a number of different scenarios can be generated based on different assumptions and then these scenarios compared.

4 ZAP Instructions

3.2 General

The ZAP tools have been developed to make inputting and calculation of data as easy and as accurate as practical for the purpose. All user modifiable cells are white. All other cells have been write-protected. These cannot be modified without first removing the cell protection. It is not recommended that this be done except by experienced users. Light green cells contain the results of calculations performed by the spreadsheets. Macro function buttons have been included on some of the spreadsheets to allow the user to perform certain operations.

Composition		Commercial	Residential	Total
Paper	Recoverable	%	%	0.0 %
	Non-Recoverable	%	%	0.0 %
	Subtotal	0.0 %	0.0	0.0 %

Mid green: text and background cells	White: user modifiable	Light green: calculation
--------------------------------------	------------------------	--------------------------

All user modifiable data can be changed at any time. This allows adjustments and corrections to be made and different assumptions to be trialled to see the effect on the overall result.

Once all data inputting has been completed, results can be viewed and different scenarios tried until a satisfactory result is reached. If desired, the results of different scenarios can be saved and compared. It is suggested that a complete set of workbooks be saved in a separate folder for each scenario in order to avoid Excel referring to worksheets from the wrong scenario.

Step 1: Input Data into the Assumptions Workbook

The assumptions workbook allows an individual council or region to input baseline data. This information is picked up by the other spreadsheets where applicable. It is essential that these worksheets are filled out correctly. The accuracy of the information will affect the accuracy of the scenarios that are developed.

Appendix D lists the information that will be required and that will help interpretation of results. There are “notes” fields beside each data entry field that allows the user to enter the source of the data or assumptions or calculations made to arrive at the data that has been entered.

There are four worksheets in the Assumptions Workbook:

- Demographic and Waste Data
- Cost Data
- Waste Composition Data
- Commodity Price Data

Begin by entering data into the **Demographic and Waste Data** sheet. Please note that all data is annual data and all waste data is on a tonnage basis. It is essential that all data use consistent units of measurement throughout the ZAP system. The fields for total number of ratepayers and residential and commercial waste tonnages must be completed.

Next enter data into the **Cost Data** sheet. There are fields for personnel costs, landfill costs, and cost of capital.

- **Personnel Costs:** This information is used to calculate costs of labour for initiatives throughout the ZAP system. Enter an hourly rate that reflects the total cost of a position for the chosen level of employee. Three levels of employee are provided for.
- **Landfill Costs:** This is used by the system to calculate avoided costs of disposal. Although this will clearly vary according to the volumes involved, an average cost that reflects the full life-cycle cost (including for example, construction and aftercare costs) should be entered. This figure should not just be the gate charge unless this figure accurately represents the full life-cycle cost.
- **Cost of Capital:** Enter in the standard amortisation period for capital. This will be used as a default setting in the worksheets but can be changed in each worksheet to reflect a more accurate period for that item. Next enter the interest rate to be used for calculating the annual cost of capital. The same rate will be assumed to apply for all years of the selected Zero Waste programme. Finally enter the annual rate of inflation to be used for calculating the inflation adjusted figures in the selected Zero Waste programme

Next enter data into the **Waste Composition** worksheet. It is crucial that waste composition data is entered in the form that the spreadsheet requests it. The data must be in the 12 primary classifications used in the Ministry for the Environment’s Solid Waste Analysis Protocol (SWAP). The spreadsheet requires percentage data which is split between residential and commercial sources. The data should be expressed as percentages of the total waste stream.

For example, Paper may make up 12% of the total waste stream of which 5% is from residential sources and 7% from commercial sources. Some calculations from existing waste composition data may be necessary to arrive at the correct figures. The spreadsheets also allow for a proportion of “recoverable” and “non-recoverable” material from each waste stream to be entered if this is available. Such data is not required by the spreadsheet but will help in estimating diversion rates for each initiative in the initiative sheets.

Finally enter the Commodity Price data. The classifications used for commodity prices are the same 12 SWAP classifications used for waste composition data. It is assumed that commodity price data applies only to those parts of each material stream that are deemed ‘recoverable’ rather than to the entire material stream. The spreadsheet asks for a high and a low price and uses the average of these to calculate potential income from recovered materials. Expected transport costs can also be entered. The commodity price and transport cost figures should reflect realistic prices for handling and sale of materials in your region.

Step 2: Input Data into the Initiative Workbook

a) General

There are 63 sheets in the Initiative workbook divided into the five key areas. All sheets are identical except that the data is grouped within the five key areas when it is collated by the ZAP system. It is therefore important to keep initiatives within their correct key area group. Data entered into the Initiative worksheets forms the heart of the system. It is here that decisions must be made regarding the scope of the service that is likely to be implemented for each initiative included in the programme.

b) Initiative Name

The ZAP system contains default initiative names for approximately 50 possible initiatives. These initiative names can be used as they are, altered as required or changed completely. The ZAP system will pick up any changes to the initiative name and reflect it in the other workbooks. (NB: In order for new initiative names to be picked up throughout the system it is necessary to press the “ranking” function button in the corresponding worksheet in the “Initiative Ranking Workbook”).

c) Initiative Description and Features and Assumptions

These are text fields that allow users to note the scope of the service that has been costed and the assumptions that have been used in the calculations.

d) Initiative Cost Data

These fields allow the user to enter a variety of rough order costs for the initiative. The following types of costs can be entered: One-off (establishment) costs, Capital costs that can be amortised over a set period, Labour costs, Equipment operation costs, and Contract costs. All costs are intended to be rough order costs, and hence a high level of detail is not called for. The spreadsheets allow for a single type of initiative (e.g. Provision of compost bins to households) or a group of initiatives (e.g. all composting initiatives) to be costed and entered into the spreadsheet, depending on the level of detail that is desired.

Notes on cost data:

One off capital costs are included in the first year of the programme in the cashflow projections (Summary Workbook), and are amortised over the specified period in the 20 year cost projections.

Capital costs are amortised over the specified period in both the cashflow and 20 year cost projections.

Interest on capital. The spreadsheet allows the option of including the cost of capital based on the interest rate specified in the Assumptions Workbook. This should be selected for each initiative.

Operational Costs and Council Costs. An initiative can be undertaken either directly by council or contracted out. This option can be selected on each worksheet, and the ZAP programme will calculate the implications for council and operational budgets. If the initiative is to be contracted out the “contract costs” field should be filled out with the budgeted figure for the contract.

Labour Costs. The estimated number of full time equivalent persons required for the initiative for each tier of worker should be entered into the appropriate cell. This will be used to calculate potential employment/job creation from the initiative, as well as calculating labour costs.

Equipment operation costs. The cost per unit of equipment and the number of equipment units required should be entered into the appropriate cells.

Contract Costs. If the initiative is to be undertaken by procurement of private sector services the budgeted contract figure should be entered into this cell. This can be based on the estimated costs of the initiative calculated in the worksheet.

Initiative Income Data. Fields are provided for calculating income from the initiative. The following types of income are requested: Income from sales, User Charges, Levies, and Other income. A default entry is provided for calculating income from commodity sales. This is calculated based on the estimated tonnage that will be diverted by the initiative multiplied by the commodity price data entered in the Assumptions Workbook. The worksheet allows the user to select whether each income stream will accrue to council or to the operator.

e) Waste Diversion Data:

Fields are provided for estimating the proportion of each material stream that the initiative will divert. Percentage data should be entered for the proportion of the Residential and Commercial streams that it is expected will be diverted by the initiative. **Please note** that the proportion that will be diverted should be an estimate of what the initiative will **divert on its own, without any supporting initiatives.** For example a **kerbside recycling system** may **divert 50%** of the residential paper stream on its own. The addition of a widespread **public education campaign** could **add another 20%** to the material collected but **this 20% should be credited to the education campaign initiative, not the kerbside collection.** It is recommended that very conservative estimates be made initially. Users should refer to the “Individual % Divert” worksheet in the Summary Workbook to ensure that the diversion figures do not add up to over 100% for any given material stream.

Step 3: Input Data into Transitional (Residual Waste Actions) Workbook

There are ten sheets in the Transitional (Residual Waste Actions) Workbook. The worksheets are essentially the same as in the “Initiatives Workbook” with the one exception being that the workbook allows users to change the data for each 5 years of the programme. This allows changes in the tonnages and costs associated with handling and disposal of residual waste to be entered as more of the waste streams are diverted through the Zero Waste initiatives.

At least the first five years’ data must be entered for each transitional initiative. For subsequent years the worksheet will pick up the previous year’s data by default unless it is changed by the user.

Refer to the “Initiative Workbook” for information on entering data into the transitional workbook.

Step 4: Input Assessments into Initiative Ranking Workbook

There are seven sheets in the Initiative Rating Workbook:

- Direct Action
- Rules
- Foster New Ideas
- Communicate
- Monitor
- Summary Ranking Sheet
- Risk alert sheet.

Note: *If you have made changes to the Initiative Sheet names you have to run the ranking macro for the appropriate sheet (by pressing the ranking button) before the new initiative will be picked up by the summary sheets.*

All five of the Initiative Rating sheets for the Key Areas function in the same way and only differ in the initiatives that are listed for ranking. Down the side of the rating table are the initiatives that are to be considered for your Zero Waste programme. These are entered automatically by the ZAP system when you enter the initiative names in the Initiative Workbook.

Across the top of the rating table are the “sustainability rating criteria”. These are grouped into environmental, social, economic and operational factors. Definitions of each of the criteria are provided in Appendix C. Each of the criteria is weighted to reflect its relative priority in terms of implementation timing (not its absolute importance). Raw and weighted scores are displayed by the ZAP system for comparison.

For each initiative a score between one and five should be entered against each criterion. High scores are good and low scores are bad. Therefore if an initiative will contribute to Landfill Volume Reduction it should receive a high score. Similarly if it does not pose a Pollution Risk it should receive a high score for Pollution Risk.

Once all the fields have been completed press the “ranking” button below the table and the initiatives will be ranked according to their raw and weighted scores in the area below the table. The weighted scores only are displayed by the ZAP system in other areas of the programme.

Once all initiatives in the five key areas have been ranked go to the “*Summary Ranking*” sheet. This displays all of the rankings for all five key areas, and provides for start and stop years to be entered for each initiative. Highly ranked initiatives should theoretically be implemented before lower ranked initiatives, but this will not necessarily be in the same order as the rankings. Once the start and stop years for each initiative have been decided these should be entered into the appropriate field. The ZAP system will only allow values of between 1 and 20 to be entered.

Risk Alert Sheet. Where an initiative scores badly against one of the risk factors identified in the sustainability rating criteria, this is automatically flagged in the risk alert sheet.

Step 5: Summary Workbook

There are 11 sheets in the Summary workbook:

- Summary of Initiatives
- Individual Tonnes Divert
- Individual % Divert
- 20 Yr Cashflow
- 20 Yr Costs
- 20 Yr Cashflow plus inflation
- 20 Yr Tonnes Divert
- 20 Yr % Divert
- 20 Yr Employ Council
- 20 Yr Employ Non Council
- Diversion, Costs by Material

No entry of data is required for the summary workbook. The Summary Workbook displays the outcomes of the data that have been entered in the other parts of the ZAP system. The information that is shown can be used to assess the possible impacts of the system for planning purposes. If the results do not appear to be an accurate reflection of how your Zero Waste system is expected to work, it is a simple exercise to revisit and update assumptions or estimates made in other parts of the ZAP system. This can be done until a satisfactory result is achieved.

A brief explanation of the contents of each worksheet is given below:

Summary of Initiatives. This provides a summary of the outcomes of implementing all initiatives. It includes Diversion, Costs, and Employment for each initiative, for each key area and for all initiatives.

Individual Tonnes Divert. This displays the tonnage diverted by each initiative from each component of the waste stream (material type divided into commercial and residential streams).

Individual % Divert. This displays the percentage diverted by each initiative from each component of the waste stream (material type divided into commercial and residential streams).

20 Yr Cashflow. This displays the cash outlay required to operate the Zero Waste programme for each year of the programme. It includes initial capital expenditure in the first year, interest on capital borrowings (if selected), and excludes avoided disposal costs.

20 Yr Costs. This displays the net cost/revenue for each year of the Zero Waste programme. Capital costs are amortised over the selected period, interest on capital borrowings is included (if selected), and avoided disposal costs are included

20 Yr Cashflow plus inflation. As for 20 Yr Cashflow but with inflation added at the rate selected in the Assumptions Workbook.

20 Yr Tonnes Divert. The tonnage diversion achieved for each year of the programme based on a constant level of waste generation.

20 Yr % Divert. The percentage diversion achieved for each year of the programme based on a constant level of waste generation.

20 Yr Employ Council. The number of council staff directly employed on operation of the Zero Waste programme.

20 Yr Employ Non Council. The number of non-council staff directly employed as a result of the Zero Waste programme.

Diversion, Costs by Material. Shows how each material type is affected by the programme in terms of diversion and costs.

5 Troubleshooting

“When I click a macro button on one of the sheets it says there is a “Run Time Error””

If this occurs, end the macro and try clicking the other macro button on the sheet first, then click the macro button you wished to run.

“The cell formula is not being read from the correct sheet”

You have probably transferred or copied the workbooks to a new location individually rather than as a group. If you do not transfer the spreadsheets together in a folder, Excel will refer back to the original links. Either go back and transfer the spreadsheets together in a folder or remove the cell protection and perform a find and replace function (under the edit menu) to remove the incorrect worksheet references and insert the correct ones. Care must be taken that the worksheet references removed and added are correct. Replace the cell protection when you have completed the exercise.

“The new initiative I entered is not being displayed by the Summary sheet”

Go to the relevant “Initiative Ranking” sheet and click the ranking button.

“What happens if I change the names of the Excel files?”

The data in the five Workbooks are linked together. If you change the names of any of the Excel Workbooks, the Workbooks will still try to pick up the old file names. This means you will need to link the Workbooks with the necessary newly named files. This can be done by opening a Workbook, selecting the Edit Menu and choose ‘Links’ (if not highlighted then the workbook has no links). A box will appear which lists the other spreadsheets that the file links to. Select ‘Change Source’ for each of the files listed and change the file path accordingly. The workbook protection will need to be turned off to activate the box.

Appendix A: Zero Waste Strategy Framework

Introduction to Zero Waste

Zero Waste is a new goal inspired by a new philosophy. Taking a ‘whole system approach’ it seeks to redesign the way resources and materials flow through society. It is a philosophy that promotes waste minimisation and a design principle which ensures that products are made to be reused, repaired or recycled back into nature or the market place.

A Zero Waste strategy is an integral component of a sustainable and green economy. Zero Waste is a new planning approach that requires a sustainable interaction with our natural world. Zero Waste shares and promotes the new global paradigm that encompasses the principles of conserving resources, minimising pollution and developing both employment and local economic self reliance. It aims to achieve a society that uses a minimum of natural resources and energy to create products. Furthermore products that are created will be stewarded from “cradle to cradle” again and again through recycling and reuse. This is a radical departure from current views which at best seek to manage waste from “cradle to grave”. Zero Waste implies that the primary goal of any waste policy should be to eliminate waste rather than ‘manage’ it in waste facilities. It is therefore in line with the wider philosophy of sustainability and a practical initiative towards a sustainable community.

In the words of Warren Snow, one of the leading advocates of Zero Waste:

“What we are attempting is to create a 100% resource efficient society. This means we are giving ourselves 15-20 years to design waste out of the system, create industries around the new materials that will flow into our communities and engineer the systems for returning parts, modular components, materials and whole products back to the source for reintegration into new products or in many cases for repair, reconditioning and/or reconstruction. We have the capacity to create a Zero Waste cyclical society where everything is designed for reintegration either harmlessly into society or back into nature”¹.

Zero Waste is a target for all sectors of society to aim for. It requires governments, communities and businesses to no longer consider wasting the earth’s resources as a viable option.

Zero Waste is a unifying concept or ‘brand’ for a basket of existing and emerging technologies aimed at the elimination of waste. It resets the compass with new tools and new ways of thinking so that normal, everyday activities contribute to the answer rather than the problem. With Zero Waste as their compass communities can achieve a local economy that operates efficiently, sustains good jobs, and provides a measure of self-sufficiency.

¹ Warren Snow, Zero Waste Conference, December, 2000.

Is it possible to achieve Zero Waste?

At first, Zero Waste seems impossible. How could we expect to eliminate all waste and, if we could, wouldn't it be prohibitively expensive? Even if we could afford it, where would we start?

Fortunately, Zero Waste isn't something that we need to invent from scratch. After all, it builds on the longest-running, most successful Zero Waste model of all - nature. Zero Waste calls for the redesign of the current, one-way industrial system into a circular system modelled on nature's successful strategies. Even in our human-made world, many of the building blocks are already in place, with many successful models throughout the world.

Zero Waste is a goal – like the manufacturing goals of Zero Emissions, Zero Accidents and Zero Defects - or like the 'Smoke Free' and 'Nuclear Free' campaign goals. All of these were adopted as 'impossible' targets at the beginning but have since proved their worth by dramatically changing industry and society.

It's important not to get hung up on the 'zero'. No system is 100% efficient. But we know that we can get close. By establishing a goal of zero, public and private organisations can focus creativity and resources on getting closer and closer in a journey of continuous improvement which will completely change the way we think about waste. We will have embarked on a whole new 'materials revolution'. Who won't be celebrating our success in 2015 if we are still working on ways to eliminate the final 5, 10 or even 20% of the waste stream?

The Context of Strategy Development

Effective waste minimisation involves a partnership between Central Government, Local Government, Private Business, and Community Groups, with much of the impetus coming from the general public and grass roots community groups.

1. Central Government is required for national legislation.
2. Local Government is required for local co-ordination and facilitation (creating the local environment for recycling to happen).
3. Private business provides the operational assistance.
4. Community groups provide the non-profit based grass roots involvement in recycling, enabling them to 'reach deeper' into the waste stream, recycling more products.

The present strategy has been written from the viewpoint of Local Government being the active agent in the strategy. All four sectors are clearly seen to have integral roles to play, but this strategy is concerned with operations at a local authority level and how these intersect with those of the other sectors.

Challenges

The factors that have been of key importance in the development of this strategy are as follows:

Zero is a Small Number

Quite simply the Zero Waste target is an ambitious goal. It will not be achieved easily or with a casual, unplanned approach. It will require much effort and careful ongoing course corrections.

No-one has done it before

Because no-one has yet succeeded in achieving Zero Waste, at a municipal level there are no leads to follow. We cannot yet even be certain that it is possible.

Changes to New Zealand legislation and infrastructure

Present legislation and structures are not fully conducive to local authorities who wish to work toward the goal of Zero Waste. The development of a National Waste Minimisation Strategy could precipitate a range of changes that will impact on local authorities Zero Waste programmes. The programmes must therefore be flexible enough to work within existing structures and to accommodate changes to legislation and national structures that may occur in the future.

Outside influence

Many things over which communities have little or no control will impact on the ability of communities to achieve the Zero Waste target. These things include the development of technology worldwide, the influences of the global economy and New Zealand's position within it, immigration, the importation of products, the existence of legislation and incentives that mitigate against the goal, social and cultural influences etc. These outside influences cannot be underestimated. They will continue to ensure that some things remain outside of the ability of communities to change. Strategies to manage and overcome these influences will therefore be essential.

Who knows what the future holds

A lot can change in 15 years. Recycling technologies are advancing rapidly. Many more types of materials can be collected, separated and processed now that was possible 10-20 years ago for example. Similarly, there is a growing trend towards producer responsibility and product take back. Counter to these trends is increasing use of disposable items, multimaterial packaging, and imported goods from second and third world nations with few environmental controls and standards. This means that trying to put forward all the solutions now that will result in Zero Waste in 2015 is simply not possible. Any strategy has to have in place mechanisms for dealing with and incorporating these changes as they happen.

Getting above the 'low hanging fruit'

Between 50% and 80% of the waste stream is currently capable of being diverted from landfill with the proper systems and support. This is a natural initial focus for councils and companies involved in Zero Waste. However once these "easy pickings" have been taken, momentum will be lost unless some of the more intractable parts of the waste stream are tackled.

Sustaining and building momentum

As with any new idea there is a natural initial burst of enthusiasm and energy. Early victories from the “low hanging fruit” will sustain this for a while, but the big danger is that Zero Waste will become something of a flash in the pan, and that people end up deciding it was unrealistic. In order to avoid this, Zero Waste must become something that produces consistent ongoing victories and that is deeply embedded in the functioning of each community.

Consumerism versus Caring

In order to be able to live within the earth’s productive capacity we will have to learn to live more simply and more efficiently. This is counter to the twentieth century trends of ‘more is better’, and of fashion fuelling consumption. A cultural shift from consumption and exploitation to caring and stewardship is perhaps one of the greatest challenges to achieving sustainability. Changing ‘world views’ is essential.

Summary

Zero Waste to landfill by 2015 is an ambitious goal. Achieving it is made more complex by the fact that we do not know what changes will occur in society and in technology - in the ways we think about and do things - that will make the goal either easier or harder to achieve. Planning for Zero Waste is therefore difficult beyond short-term initiatives. If we are to be successful new ways of thinking about the problem are essential. Zero Waste challenges the consumerist ‘world view’.

A Philosophy to Meet the Challenges

The strategy put forward in this document is designed specifically to address the challenges outlined above and provide a comprehensive consistent programme that will work toward the goal of Zero Waste.

Rather than trying to anticipate every type of initiative that will have to be taken to get to Zero Waste, the strategy focuses on how to create the conditions that will bring about Zero Waste to landfill.

The key is to view progress towards the goal of Zero Waste as a dynamic and living process. Living things find ways to adapt and change in response to their surroundings. In the same way striving towards the goal of Zero Waste has to take on a life of its own. All sectors of the community involved in the task need to naturally - almost automatically - find ways around obstacles that present themselves and remain focused on working towards the achievement of the goal. This idea can be presented through the concept of a “Zero Waste Process”.

Until the ‘Zero Waste Process’ comes to life waste reduction activities that get undertaken will require large amounts of ongoing input, and will die if the effort stops. The key to Zero Waste becoming a reality will be assisting all sectors of society to adopt the Zero Waste goal and philosophy and take it to heart. Zero Waste must become something that people work towards in an ongoing and natural manner as part of both everyday and special activities. This requires waste minimisation activities to become mainstream and convenient.

This means creating drivers for Zero Waste in all sectors of the community - outside of council, but also within council culture. The most important part of council's role in giving "life" to the process is to embed the vested interest in ongoing waste reduction in different sectors of the community. The question to be asked will then be "how will this action ensure the ongoing commitment of the community to Zero Waste" as well as "what percentage waste reduction will this achieve?"

This approach not only clarifies and simplifies what council needs to do, but is itself a more effective strategy than one where the burden of activity rests with council. Council is not aiming to do it all by itself but to act as the facilitating agent that assists the community as a whole to do it.

Council needs to engage in initiatives that will move the life of the process forward one step at a time. It must then have the means to assess the effectiveness of those steps and determine when the next set of initiatives need to be taken in order to keep the process alive and healthy.

This leads to consideration of the areas of activity that council needs to engage in to achieve Zero Waste. The suggested activities answer the questions:

- How do we give the Zero Waste process life (and keep it healthy)?
- What types of initiatives are both necessary and sufficient to foster the type of changes in attitude and practice that we are talking about?

Proposed Strategy Options

Introduction

This strategy assumes that councils are the lead agency in driving the process of waste minimisation. Councils currently have responsibility for managing waste and so it is logical that council lead the way with attempts at waste diversion from landfill.

The key point to remember in viewing this strategy is that the initiatives that are proposed are those that council (or council contractors) are directly responsible for undertaking. Council does not have the authority to direct private agencies or persons to undertake any of the initiatives involved in a strategy such as this.

However as has been discussed council will not be successful in its attempts to achieve Zero Waste without the full support of all sectors of the community. Therefore much of the strategy consists of methods by which council can successfully influence and engage all sectors of the community in the process of waste minimisation. This includes providing the leadership, the resources, the incentives and the information that will enable the community to participate fully and drive the change.

The whole thrust of this strategy is that Zero Waste to landfill will need to become an idea that is embraced in the hearts, minds and actions of everyone. To assist in the implementation

of a Zero Waste to landfill strategy the vast range of types of waste minimisation initiatives have been divided up into five interdependent key areas in which council must take action.

1) Take Direct Action

Explanation

These are initiatives that deal directly with the waste stream, such as the introduction of kerbside recycling schemes, the provision of public recycling drop off facilities, or the operation or commissioning of large scale composting facilities. These activities are often given the most emphasis, although in the long term, it is the other key areas of changing the rules, fostering new ideas and communicating and feedback that are potentially more important in creating and maintaining life in the “Zero Waste Process”.

Benefits

- Material is physically diverted from the waste stream
- The actual diversion of material demonstrates that waste reduction is practical
- Council is seen to be leading the way and practising what it preaches
- Infrastructure is established and “kick-started” to enable other businesses and initiatives to be established around council-based initiatives
- The public have practical outlets for their waste

Possible Initiatives

Brief descriptions of the following initiatives are given in Appendix B.

- | | |
|--|----------------------------------|
| • Cleaner Production | • Litter Bins |
| • Commercial Recyclables | • Kerbside Recycling - Inorganic |
| • Composting | • Kerbside Recycling - Organic |
| • Construction and Demolition | • Special and Hazardous Waste |
| • Council Controlled Waste Streams | • Waste Minimisation Partners |
| • Recycling Facilities | • Waste Exchange Database |
| • Event Recycling | • Zero Waste Business Park |
| • Environmental Management Systems (EMS) | |

2) Change the Rules

Explanation

Our behaviour is influenced by our responses to the incentives and disincentives we are faced with. The types of incentives and disincentives that are in place are the “rules of the game”. These rules are the way that society is structured to try and generate the best results according to what is valued. Even with the best of intentions, the best education and communication and a highly motivated population, creating ongoing positive change towards Zero Waste will

be extremely difficult if the right incentives and disincentives are not in place. Incentives and disincentives include economic incentives and disincentives as well as laws and regulations.

In general terms, legal and economic drivers should divert activity away from disposal based solutions to recycling, resource recovery and waste reduction based solutions.

Legal Drivers

Laws stipulate required behaviours and the boundaries of behaviours. These are usually backed up with penalties, which can include fines and reparation. Simply put, the majority of the population is law abiding and, as long as compliance with the laws is not unreasonable, most people will do as the law requires. Laws and regulations are therefore a powerful tool for influencing behaviour. Legal drivers are not restricted to formal legislative initiatives but can include internal policies, structuring of contracts etc. There are two aspects to having the right laws and regulations in place:

- removing legal drivers that promote or support the generation and easy landfill disposal of waste
- introducing legal drivers (e.g. landfill ban on certain materials) that support waste minimisation and the development of alternative solutions.

Economic Drivers

In simple terms, people tend to do what is cheapest or most economically sensible in most situations. This is a powerful driver in our society. It will be hard to make significant inroads into the waste stream if it remains (or is perceived to be) cheaper to send unwanted materials to landfill disposal. Economic tools can include such things as the cost of disposal, accounting practices, the introduction of levies and rates relief and tax incentives. A programme of economic incentives must involve removal of incentives and price structures that encourage waste production, wasteful attitudes and easy landfill disposal and replace these with economic incentives that are consistent with a goal of Zero Waste to landfill.

Benefits

- Creates incentive for developing alternatives to disposal
- Appeals to self interest
- Is the foundation for giving the process a 'life of its own'

Possible Initiatives

Brief descriptions of the following initiatives are given in Appendix B.

- Bylaws for non-compliance
- Container Deposits
- Full Cost Accounting – Commodities
- Extended Producer Responsibility
- Full Cost Accounting - Landfills
- Landfill Bans
- Landfill Differential Pricing
- Waste Operator Licensing/reporting
- Landfill Levy
- Polluter Pays
- Purchasing Contract and Policy
- Rates Relief
- Tax Incentives
- Waste Management Contracts

3) Foster New Ideas

Explanation

We do not yet know all the solutions that will enable us to reach the goal of Zero Waste. Fostering the development of these solutions is therefore critical in the medium to long term. The mechanisms and structures by which new ideas will be developed and nurtured to practical and commercial viability therefore have to be established early. These ideas include technical solutions (For example – ways to recover the currently ‘intractable’ parts of the waste stream) as well as social, economic, political and organisational solutions (for example - fostering of new markets, creation of new organisation structures such as NSW Waste Boards. The fostering of schemes to develop new ideas also has the important function of focusing people’s creative energies and attention on waste reduction and so keeping it salient and ensuring it becomes embedded in the lives of the community. The new ideas may be fostered at the national, regional or local level.

Benefits

- Focuses creative energy of the community
- Raises awareness and profile
- Helps ensure solutions will be developed
- Ability to create inspiration and local pride
- Ability to improve local economic development

Possible Initiatives

Brief descriptions of the following initiatives are given in Appendix B.

- Awards for Waste Minimisation
- Educational Courses
- Funding Waste Minimisation Projects
- Pilot Schemes for Waste Reduction
- Research and Development

4) Communicate and Educate

Explanation

The hearts and minds of all sectors of the community must be behind the concept of Zero Waste if it is to be achieved. This alone may be the single most important success factor. The community includes council, iwi, ratepayers, consumers, business, rubbish and recycling operators, community groups, educational institutions, and environmentalists. Most of the keys suggested in this strategy will in some measure assist in changing people's attitudes and behaviour and engaging them in the process, but the most obvious and direct method is through education and communication.

The community must be informed in an open and straightforward manner, of the need for Zero Waste to landfill, the reasons for council's decision to commit to Zero Waste, and the implications of this commitment. This needs to be done in a consultative manner and needs to be ongoing. A positive relationship with the media will be crucial for this to be successful, and so the media need to be one of the first groups brought into consultation. The council then has to establish lines of communication with key parties to allow ongoing communication of issues as they arise, and to ensure a free and even flow of information.

Benefits

- Directly raises awareness
- Disseminates information
- Provides channels for community feedback and input
- Helps create sense of ownership

Possible initiatives

Brief descriptions of the following initiatives are given in Appendix B.

- Education Material and Programmes
- Buy Recycled and Recyclable Campaign
- Education Material and Programmes
- Festivals and Events
- Helplines – Waste Minimisation
- Information Sharing with councils
- Leadership / Lobby
- Media Coverage
- Public Consultation

5) Monitor and Feedback

Explanation

Monitoring and feedback includes the gathering and dissemination of information about the levels of waste being landfilled, diverted and recovered as well as the success or otherwise of Zero Waste to landfill initiatives.

Monitoring and feedback is what allows us to determine the health of the Zero Waste Process and decide what action is necessary to keep it alive and growing. In many ways the importance of this is easy to overlook, and it may be seen as an add-on that can be treated lightly and not given the attention or funding it needs. In fact a comprehensive monitoring and feedback programme may be the key to the success of the whole Zero Waste strategy.

Monitoring and feedback involves linking the initiatives that are taken with evaluation of those initiatives and the provision of this information to decision makers and the community. By providing a constant stream of information to the community and decision makers the issues are kept salient and in front of people. If people cannot see what is going on they will not be motivated to do anything about it – “out of sight out of mind”.

Zero Waste will become something that people care about when they are given sufficient information on a regular enough basis. Careful thought needs to go into what is measured, how and when it is measured and how it is analysed and reported.

Benefits

- Provides information to track progress to Zero Waste
- Provides information to inform the public and decision makers
- Provides information to manage individual projects
- Provides information to assess and manage the health of the process

Possible Initiatives

Brief descriptions of the following initiatives are given in Appendix B.

- Goals
- Participation Rate Surveys
- Reporting Back
- Waste operator Licensing / Reporting
- Waste Analysis Data
- Triple Bottom Line Reporting

Summary

The essential feature of the above 5 keys to Zero Waste is that they all function to give life to the process, but only together can they achieve that. For example, if council only implements direct action initiatives but there is little activity in other areas, council will find itself “doing all the work” with a reluctant or resistant community failing to contribute. Similarly, if a focus is put on communication and education with insufficient attention to other elements it is likely that council will end up with a motivated but frustrated public.

Principles for Zero Waste Implementation

The road to Zero Waste is a long one and will involve extensive and wide ranging changes. It is therefore likely that most, if not all, initiatives will have to be implemented at some stage (including possible initiatives we have not thought of yet). This means it is a question of when to implement initiatives, rather than which initiatives to implement. The following broad principles have been developed and are used for the weightings applied in the ZAP system. These principles should also be used as a common-sense guide when make final determinations regarding the timing of implementing initiatives.

Stage One (Begin in year 1 of programme): Analysis and vision.

1. Take stock of existing infrastructure and systems, education levels etc
2. Determine needs based on waste stream data
3. Work out where you want to go using 5 keys & multi-criteria prioritisation
4. Assess gaps

Stage Two (Begin in years 1 & 2 of programme): Address urgent issues.

1. Short term actions to support existing initiatives,
2. Address issues with contracts, zoning/consents etc that are under consideration in the next 1-2 yrs
3. Secure funding/resources and appropriate administrative structures for implementation of plans

Stage Three (Begin in years 1 to 3 of programme): Get the basics underway, secure community involvement/political involvement/build infrastructure/get runs on the board.

1. Develop plan and initiate systems to gather baseline and progress data
2. Address gaps in infrastructure: drop-off /consolidation / processing/ markets
3. Determine where easy short term gains can be made and put measures in place
4. Involve the community at an early stage to foster sense of ownership
5. Initiate one or two high profile, 'flagship' projects

Stage Four (Begin in years 2 to 5 of programme): Address system issues.

1. Address incentive structures
2. Address largest waste streams
3. Revise contracts to include incentivisation
4. Address next level of wastes (medium cost/moderate volumes/some profile or toxicity issues)

Stage Five (Begin in years 3 to 10 of programme): Address Intractables.

1. Introduce EPR
2. Fund on going research
3. Address collection and processing of next level of wastes (expensive/small/low profile/low toxicity)

Appendix B: Initiative Definitions



Cleaner Production

Delivery of Cleaner Production programmes to the business community, to facilitate, educate and encourage waste reduction and improve efficiency.

Commercial Recyclables

Collecting recyclables from commercial and industrial properties.

Composting

Large-scale facilities for garden waste; 'in vessel'/ worm composting for food waste/ special organics; small-scale composting/ worm farms for homes, schools etc.

Construction and Demolition Recycling

Ensuring provision of facilities to process construction and demolition waste materials for recycling, such as timber, steel, concrete etc.

Council Controlled Waste Streams

Implement waste minimisation initiatives in areas and facilities controlled by council and council owned companies.

Environmental Management Systems (EMS)

Introduce an Environmental Management System to enable council to systematically assess its environmental performance.

Event Recycling

Develop protocols, facilities and infrastructure to ensure events are serviced for waste reduction and recycling.

Special and Hazardous Waste Reduction

Minimise special and hazardous waste as a separate component of the waste stream.

Kerbside Recycling - Inorganic

Collecting inorganic waste (paper, cardboard, glass, metal, plastics etc) from residential properties at kerbside.

Kerbside Recycling - Organic

Collecting organic waste (garden, kitchen etc) from residential properties at kerbside (refer to Composting).

Litter Bins - Recycling

Installation of recycling receptacles in public areas to collect recyclables. Modify bins to multi-compartment for recycling, composting and residual waste.

Recycling Drop Off Facilities

Small scale recycling depots (generally un-staffed) where the public can deposit their recyclables into marked bins.

Resource Recovery Centres

Development of resource recovery centres including recycling, reuse, composting and educational facilities.

Special and Hazardous Waste Reduction

Minimise special and hazardous waste as a separate component of the waste stream.

Waste Exchange Database

'On-line' waste exchange database where the public and business can advertise for

removal, retrieval, or exchange. Access by internet, phone or hard copy.

Waste Minimisation Partners

Active support of waste minimisation partners including community organisations and businesses.

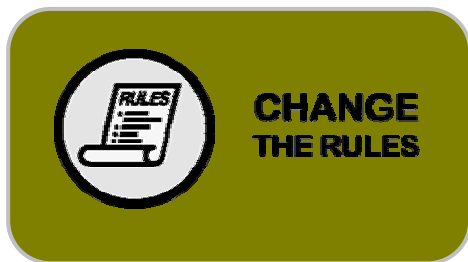
Zero Waste Business Park

Establish a serviced area adjacent to the landfill entrance, with facilities for helping establish recycling businesses.

Land Application of biosolids

Application of biosolids to forestry or appropriate use in line with the Guidelines for the Safe Application of Biosolids to Land in New Zealand and relevant legislation and regulations.

Subtotal = 17



These can be implemented at either a local, regional or national level.

Polluter Pays

'User charges' for waste disposal so that waste generators pay true cost, with incentives to reduce waste.

Differential Disposal Pricing

Different landfill prices for different components of the waste stream eg: recycling and composting material charged less than residual waste for disposal.

Landfill Levy

A charge imposed on waste entering landfill in addition to the cost of landfilling, which is collected and distributed by an organisation to facilitate waste minimisation and education.

Landfill Bans

Local government bylaws to stop the landfilling of defined parts of the waste stream, after alternative recycling or composting methods implemented.

Bylaws for Non-Compliance

Bylaws imposed by local government, so that businesses and individuals who fail to meet legal requirements can be fined.

Purchasing and Contract Policies

Environmental purchasing policies for all council operations eg: buy recycled or recyclable. Council contractors and suppliers required to adopt similar policies.

Container Deposits

Consumers pay an additional sum on the purchase of the container, which is refunded on return. Creates income and employment.

Full Cost Accounting - Landfills

'Full cost' of landfill disposal to account for landfill siting, operation, closure, and after care.

Waste Management Contract Incentives

Waste management contracts (landfills, refuse and litter collection etc) to 'incentivise' waste reduction and recycling.

Tax Incentives

Central government tax reductions for businesses which achieve specified waste minimisation. Council to lobby.

Rates Relief

Evaluate rates relief policies with a view to providing a rates reduction for communities and organisations that implement on site waste minimisation programs.

Extended Producer Responsibility

Legislation to compel producers to take responsibility for full 'life cycle' of their products and packaging, including final recycling or disposal.

Waste Operator Licensing/Reporting

(Same as for Monitor & Feedback)
Licensing of waste collection operators to regulate and control industry, and to assist in the gathering of waste data.

Full Cost Accounting - Commodities

'Full cost' of commodities to account for all environmental, social and economic effects of the products and processes.

Subtotal = 14



Zero Waste Awards

Awards and ceremonies for educational institutions, community groups and businesses in recognition of contributions to waste reduction.

Zero Waste Project Funding

Grants and interest free loans for funding Zero Waste projects initiated by educational institutions, community groups and businesses.

Research & Development

Research and development with educational institutions and research centres for new systems and technology which increase waste minimisation.

Educational Courses

Establishment of educational courses at all levels (primary, secondary, tertiary) focussed on waste minimisation.

Zero Waste Pilot Schemes

Providing assistance in obtaining funding and provision of sites for the locating of pilot schemes to assess waste reduction viability.

Subtotal = 5



Leadership/Lobby

Provision of a strong voice and leadership in favour of Zero Waste at a local, regional and national level. Presentations to identified groups.

Buy Recycled and Recyclable Campaign

Promote 'Buy Recycled and Recyclable' products. Create database of products and work with retail sector on product promotion.

Media Coverage

Generating local media coverage for key initiatives, Zero Waste activities and results.

Public Consultation

Council public consultation on waste minimisation options. Meetings and consultation with Maori and the community.

Education Material and Programmes

Education material, resources, seminars, and programmes for the community, schools and business about waste minimisation, recycling, composting etc. 'Medium' through brochures, newspaper, radio, TV, internet, email and newsletters.

Festivals and Events

Events focused on waste minimisation, recycling, composting etc. eg: 'recycled art' creations, competitions, etc.

Helplines – Waste Minimisation Advice

Provide a telephone answering service for public enquires. Include technical information, legislative advice and assess level of success of active programmes.

Information Sharing with Councils

Sharing knowledge with other councils, and establish information exchange protocols with councils in the region and other Zero Waste councils.

Subtotal = 8



Reduction Targets

Establish short and medium term goals in respect of diversion and reduction of specific waste streams.

Reporting Back

Comprehensive reports and summaries presenting waste analysis data and progress towards Zero Waste. Required for planning, implementation, assessment and modification of the strategy. 'Medium' through newspaper, radio, TV, internet, email and newsletters.

Participation Rate Surveys

Surveys to determine people's opinions and numbers of people participating in specific initiatives such as kerbside recycling.

Triple Bottom Line Reporting

Replace conventional 'financial bottom line' reporting with 'sustainability' reporting on environmental, social and economic outcomes.

Waste Analysis Data

Surveys of waste stream including composting, recycling and landfill. Carried out in accordance with national protocols, including Waste Analysis Protocol (WAP) surveys.

Waste Operator Licensing/Reporting

(Same as for Change the Rules)
Licensing of waste collection operators to regulate and control industry, and to assist in the gathering of waste data.

Subtotal = 6

Appendix C: Sustainability Assessment Criteria



Environmental benefits from conservation of natural resources, landfill avoidance; and impact of the waste minimisation initiative being assessed.

Environmental

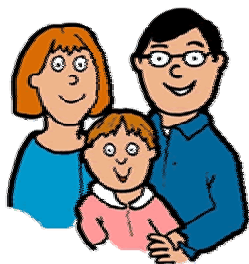
Score: 5 = Good, 3 = Average, 1 = Poor

Resource Conservation:	Indicates resource conservation potential. e.g. reduce mining, logging etc.
Score	
5	Large resource conservation, reducing waste for disposal.
3	Moderate resource conservation, reducing some waste for disposal.
1	Small resource conservation.

Landfill Volume Reduction:	Indicates landfill volume reduction potential eg: - reduce waste to landfill.
Score	
5	Large landfill volume reduction.
3	Moderate landfill volume reduction.
1	Small landfill volume reduction.

Easy or Quick Gains:	Indicates ability of the initiative to deliver significant or rapid tangible results for relatively modest input.
Score	
5	Extremely quick and/or large gains possible with only a small level of input.
3	Moderate gains possible with reasonable level of input.
1	Waste reduction gains only possible with a high level of input over a long timeframe.

Toxicity or Pollution Impact:	Indicates the environmental impact of introducing the initiative.
Score	
5	Significant reductions in the generation and/or discharge of toxins and/or pollutants to the environment.
3	No measurable positive or negative alteration to the discharge of toxins and/or pollutants to the environment.
1	Significant increase in the generation and/or discharge of toxins and/or pollutants to the environment.



Social benefits through community involvement, employment, public awareness and acceptability.

Social

Score: 5 = Good, 3 = Average, 1 = Poor

Community Involvement:	Indicates community involvement potential for participation.
Score	
5	Large community involvement, in an ongoing, and regular basis e.g. weekly.
3	Moderate community involvement, either as a large proportion of the community in an irregular basis or a smaller segment at regular intervals.
1	<i>Small community involvement.</i>

Employment Impact:	Indicates potential to create jobs.
Score	
5	Large employment potential to create jobs in, and related to the initiative.
3	Moderate employment potential to create jobs.
1	<i>Small employment potential.</i>

Public Profile:	Indicates the existing level of public awareness of the waste management issue and the degree to which it is perceived as problematic.
Score	
5	High level of public awareness and demand for action about the waste management issue.
3	Moderate level of public awareness and demand for action about the waste management issue.
1	<i>The waste management issue is not perceived as a concern by the public and there would be little support for taking action.</i>

Creates Incentives:	Indicates the level of incentive for changing undesirable waste management behaviours that the initiative will produce.
Score	
5	The initiative will create significant positive change in public behaviour.
3	The initiative will create moderate positive change in public behaviour.
1	<i>The initiative will create no positive change in public behaviour and may even create additional negative behaviour.</i>



Economic viability of the initiative.

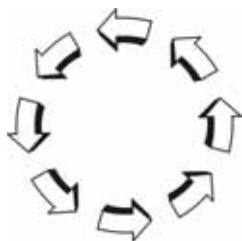
Economic

Score: 5 = Good, 3 = Average, 1 = Poor

Infrastructure Development:	Indicates the degree to which the initiative will develop needed recycling collection, processing, or manufacturing infrastructure or will lead to the development of markets or availability of skills.
Score	
5	Important infrastructure developed that will meet an urgent and large demand.
3	Moderate infrastructure developed.
1	No infrastructure developed, or local infrastructure harmed.

Economic Impact:	Indicates the potential to stimulate economic activity.
Score	
5	Large economic activity generated - widespread.
3	Moderate economic activity generated of limited nature
1	Small economic activity generated.

Net Cost/Revenue:	Indicates the economic viability to generate a profit and be economically self-sufficient.
Score	
5	Large revenue to cost ratio.
3	Medium revenue to cost ratio.
1	Small revenue to cost ratio.



Other weighting criteria important to selected key areas only.

Other (Operational) Score: 5 = Good, 3 = Average, 1 = Poor

Risk of Failure:	Indicates risk of failure potential, economically or environmentally, due to the implementation of 'Take Direct Action', 'Change the Rules' and 'Foster New Ideas' initiatives.
Score	
5	Small risk of failure, either economically or environmentally.
3	Medium risk of failure, either economically or environmentally.
1	Large risk of failure.

Ideas Generated:	Indicates the potential to produce quality ideas to further reduce waste to landfill for 'Change the Rules', 'Foster New Ideas' and 'Communicate & Educate' initiatives.
Score	
5	Large number of ideas generated to assist with waste minimisation.
3	Medium number of ideas generated to assist with waste minimisation.
1	Small number of ideas generated to assist with waste minimisation.

Data Value:	Indicates data value and information quality which can be obtained by implementing 'Change the Rules' and 'Monitor and Feedback' initiatives.
Score	
5	Large data value with accurate information to assist with waste minimisation.
3	Medium data value with average information to assist with waste minimisation.
1	<i>Small data value with inaccurate information to assist with waste minimisation.</i>

Cross Media Risk:	Indicates likelihood of the initiative generating "waste migration" from one form of disposal to another, instead of creating incentive for reduction or recovery (for example illegal dumping, burning, or disposal to sewer taking place instead of landfill).
Score	
5	No risk of cross-media waste migration.
3	A moderate but acceptable risk of cross-media waste migration.
1	Significant risk of cross-media waste migration.

Appendix D: Information required for the ZAP system

General	Detail
Demographics	
Age structure	
Population	Permanent and itinerant
Education	
Ethnicity	
Number of household	Urban/rural split
Number of ratepayers	Urban/rural split
Household Income	
Family Size	
Home ownership and rent	
Employment	
Residents' attitudes and preferences	Council surveys
Key environment, community and interest groups	What groups will be vocal or active either in support or opposition to Zero Waste goals? Are there groups that could be service providers?
Trends for all the above	
Economy	
Industry sectors, by employment and contribution to the economy	Secondary level breakdown required (i.e. types of primary processing fish, meat, wool etc). Note who the major industries are.
Salary and income bands	
Trends for all the above	
Geography	
Land use	
Zoning	
City layout and boundaries	
Waste Management System	
Waste Analysis Protocol Data	As much as possible.
Any non-SWAP waste data	Particularly on industrial waste streams e.g. cleaner production programmes.
Landfills	Size, age, location, ownership, estimated lifespan, materials accepted, leachate collection systems, lining, gas collection systems, problems, consent conditions etc
Landfill fees	Weighbridge and gate fees, economic analysis of operation ie cross subsidies
Transfer stations	Size, age, location, ownership, materials accepted, recycling, storage and recovery systems, problems, consent conditions etc
Transfer station fees	Weighbridge and gate fees
Cleanfills	Number, location(s), monitoring undertaken, materials accepted
Incineration facilities	Size, age, location, ownership, materials accepted, disposal of residual ash, problems, consent conditions etc.

General	Detail
Council (& Council contracted) services offered to residents,	Description of all the services, how they are funded, problems encountered, reasons for the current service mix, plans for future services.
Main refuse operators	Who they are, contact details, history.
Main council refuse and recycling contractors	Who they are, contact details, history, contracts performed, contract renewal dates.
Recycling operators,	Who they are, contact details, history, contracts performed, materials collected.
Local markets/processors of recycled material	Who they are, contact details, what they process, how much volumes etc, sources of materials
Local commodity prices and transport costs	
Composting operations	Who they are, contact details, what they process, how much volumes etc, sources of materials.
Local markets for compost products	Size of household markets, market gardens, agriculture, trends in compost sales, awareness attitudes, prices.
Drop off sites	Locations, materials collected, systems used, volumes, problems, trends etc.
Street litter	Systems, contracts, problems
Illegal dumping	Systems, contracts, problems
Contaminated sites	How many, location, nature of contamination, cleanups scheduled.
Closed landfills	How many, location, problems.
Hazardous waste	Handling facilities, procedures, and producers.
Wastewater Treatment	Generation and disposal of biosolids.
Costs of waste management	Annual figures, broken down by activity e.g. landfill charges, collection charges, overheads etc.
Key personnel	Who are the movers and shakers? Who are the people to know?
Education programmes	What are they, who are they targeted at, how successful have they been?
Plans	
District and Regional plans	Significant issues in relation to waste management
Waste Management Plans	Existing goals and targets
Other	
Areas of potential threat and opportunity in respect of waste management and the goal of Zero Waste to landfill.	

Appendix E: Information for participants in an Initiative Ranking Session

Introduction to the Zerowaste Action Planning (ZAP) system

The ZAP system is a set of spreadsheet based tools into which basic data on different possible waste minimisation initiatives can be inputted. The spreadsheets then collate and summarise the data so that the overall impact of the programme can be seen.

The ZAP system is not intended as an expert system or a ‘magic box’ that will spit out the ‘right’ answer. It is a system that will help people work through the myriad of possible options that are available to them, and see the possible effects different combinations of those options could have on a Zero Waste programme that lasts from anything from one to twenty years. It does not guarantee a good result but what it does do is significantly cut down the time that it will take to come up with a workable, balanced plan that will have a good chance of success. It provides a framework within which to place different initiatives and a method for assessing their possible impacts within a programme.

There are five main parts to the tools:

1. Assumptions Sheets
2. Zero Waste Initiatives Sheets
3. Transitional (Residual) Initiatives Sheets
4. Ranking Sheets
5. Summary Sheets

Once data has been entered into the Initiative and Assumption workbooks, the range of possible initiatives can then be subject to a ranking process to help determine a logical, desired order for implementation. The Ranking system allows subjective judgements to be made on each initiative according to Environmental, Social, Economic, and Operational criteria. The criteria used and the weightings applied have been structured to favour types of initiatives that are likely to be important in the early stages of a Zero Waste programme. This means that the ranking that results does not indicate that one initiative is ‘better’ than another but that it should have a higher priority (time wise) for implementation. Initiatives that build infrastructure, make large or easy environmental gains, or create community buy-in are likely to score well.

The ranking system is designed to be used both by professionals and by councillors or community members inputting into a group exercise. The numbers applied can be reworked until consensus is achieved. Once a priority ranking has been obtained with the tools, this can be used as a basis for planning and start (and finish) years can be assigned to each initiative.

Guide for Zero Waste Action Planning (ZAP) Assessment Exercise

This workshop will focus on working through the Initiative Ranking sheets from the ZAP tools. The following is a guide to help you in filling out the assessment tables in the Initiative Ranking sheets.

You have been provided with 5 sheets that contain tables of initiatives for each of the five key areas. Each of the initiatives listed down the side of the table needs to be given a score against each of the sustainability assessment criteria listed along the top of the table. It is suggested that you work through and score each initiative until the table has been completed (You do not have to fill in the subtotal columns yourself as these will be summed automatically when the data is entered into a spreadsheet at the workshop). The purpose of the exercise is to come to a consensus about **when** each initiative should be implemented. The criteria therefore reflect a combination of what is important in the long term and what is important in the short term.

Each initiative should be assigned a score of between 1 and 5 against each of the sustainability assessment criteria. Remember a **high score is good** and a **low score is bad**. If the criterion is **not relevant**, leave the column **blank**.

To assist you to rate the initiatives against the sustainability assessment criteria, an explanation of each of the criteria and the meaning of the relative scores is given in the attachments. Notes are given for scores of 1, 3, and 5, but this does not mean you have to confine your score to only these numbers. Use a score of 2 for example if you feel that the initiative ranks between a 1 and a 3. If you are uncertain of what is referred to by each initiative, brief definitions are provided in Appendix B.

Figure 1 below gives an example of the table and how it should be filled out.

Figure 1

Initiative	Sustainability Assessment Criteria				Subtotal	TOTAL
	Environmental	Social	Economic	Other		
Resource Conservation						
Landfill Volume Reduction						
Easy/quick gains						
Toxicity/pollution potential						
Subtotal						
Community Involvement						
Employment Potential						
Public Profile of problem						
Creates incentives						
Subtotal						
Builds Infrastructure						
Economic Impact						
Net Cost/Revenue						
Subtotal						
Risk of failure						
Cross Media Risk						
Baseline Data Value						
Fosters Innovation						
Subtotal						
TOTAL						

Example data from the table:

1 Cleaner P	1	10	15	10	36	10	1	5	5	21	15	1	5	21	1	1	10	10	22	100
Assigned scored to be filled in	3	2	16	1	2	1	0	3	1	3	2	6	3	0	0	1	25			

Hints

- Put down your best estimate for each initiative that you rate, but **do not be too concerned** with whether or not you have the 'right' answer.
- You may feel that you require more information to accurately score each initiative, but put down the best estimate given the information that you have. The scores can always be adjusted in the light of more information.
- Fill in all the relevant spaces. Do not leave any blanks. If you are unsure put down a moderate score.
- Feel free to discuss your answers with others.

Thank you for taking the time to complete this exercise. It is important for the success of the workshop on (insert date)_____ that you **bring along your completed table**. Your assessments will be compiled during the workshop and used as a starting point for developing a Zero Waste strategy for_____.

Appendix F: Interfacing with WISARD (Life Cycle Assessment Tool)

The WISARD Life Cycle Assessment tool is a further planning tool that is available to councils to help formulate decisions on a waste management and minimisation programme. The tool is designed specifically to assess relative environmental outcomes of different municipal waste management options.

Environmental outcomes are calculated by WISARD against 5 main environmental criteria: Air Acidification, Eutrophication, Global Warming, Resource Depletion, and Energy Consumption. Other environmental parameters are calculated by the model but these are not referred to as frequently.

The WISARD model works by establishing a baseline scenario (usually the status quo) and then running different scenarios to compare the environmental costs and benefits of each scenario. WISARD is capable of calculating a large number of potential variations of 5 different waste management options: Landfilling, Composting, Recycling, Incineration, and Biodigestion. The relative merits of Landfilling versus recycling can be compared as well as comparing the merits of, for example, a recycling drop-off programme versus a kerbside collection scheme.

In order to undertake the calculations a significant amount of data must be gathered and inputted into the model. The developers suggest about 120 hours of work is required to gather the necessary data and a further 24 hours should be set aside to input it into the model.

The ability to compare the relative benefits of different waste management options assists in prioritising waste management budgets, as it can show where the best environmental value can be obtained.

It should be noted that the WISARD tool has been designed to assess options relevant to management of the municipal waste stream only. It is not designed to assess parts of the waste stream that are typically outside of a council's control such as commercial or construction and demolition wastes.

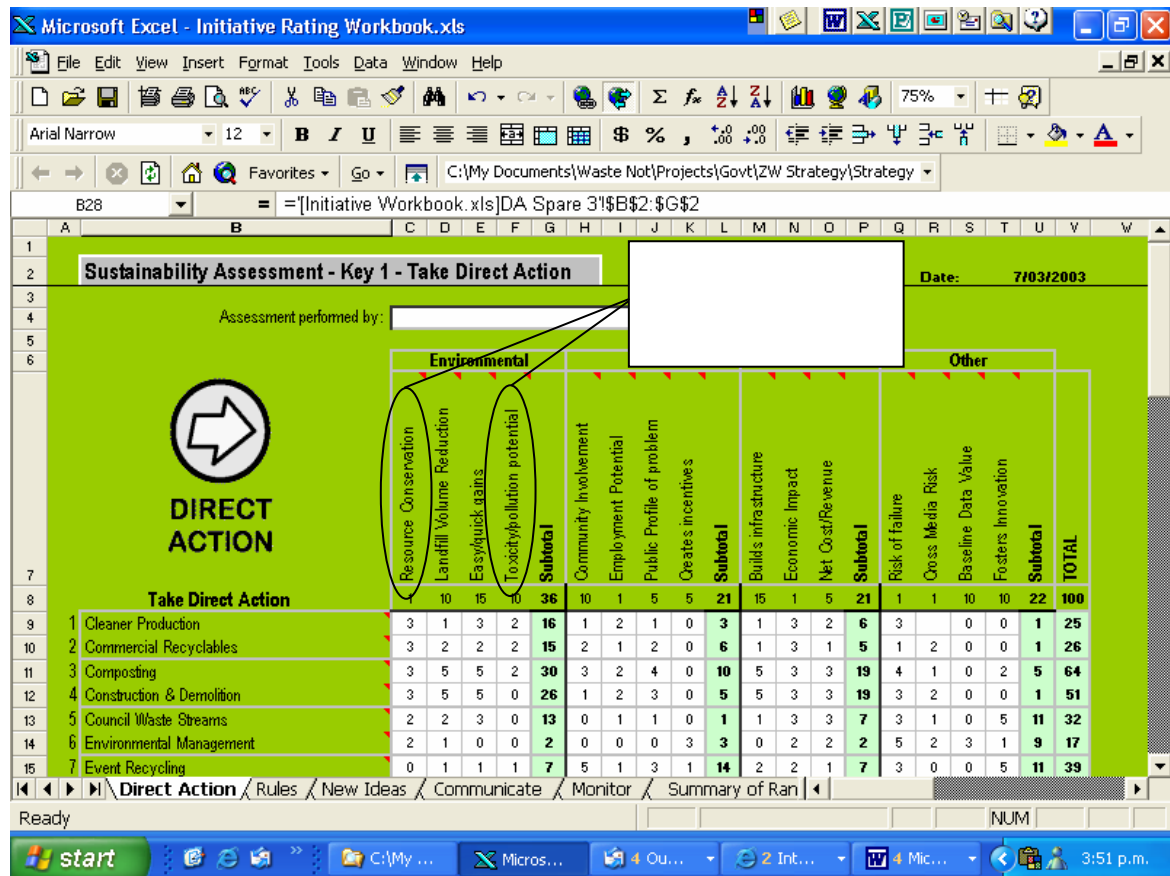
Similarly it should be noted that WISARD is not intended to take into account social or risk factors, and although it includes some cost modelling, it is not intended as a financial planning tool.

Although WISARD has a relatively specific focus there are a number of areas where it can usefully interface with the ZAP system. Some suggestions and guidance on these is given below.

1. Inputting into the "Sustainability Criteria Ranking"

The sustainability criteria ranking includes environmental parameters against which initiatives are assessed. The outputs from WISARD can be used to assist in making these assessments. The two most relevant parameters that WISARD can provide input on are "Resource Conservation" and "Toxicity/Pollution Potential".

WISARD focuses on waste management options such as recycling and composting and these line-up with the “Direct Action” type initiatives in the ZAP system.



Although WISARD provides quantitative data on potential environmental impacts, a judgement is still required as to the relative importance of the different environmental parameters. For example it is up to each user to judge whether impacts from global warming are of more concern than eutrophication in their particular local context. It is suggested that possible “Direct Action” options be run in WISARD and the outputs then ranked. The ranked outcomes can then be used to score each of the relevant initiatives in respect of the “Resource Conservation” and “Toxicity/Pollution Potential” parameters.

2. Assessing the overall impact of your Zero Waste programme.

Once a number of different scenarios have been developed with the ZAP system the potential environmental impacts of these scenarios can be assessed against a baseline scenario using the WISARD system. The advantage of this is that the probable total impact of the combined initiatives can be factored into the WISARD scenarios. Although the ZAP system looks at a large range of initiative types such as incentives, communication and monitoring which can all have an impact on waste reduction rates, the fact is that all material will ultimately be recovered through a “Direct Action” type initiative, reduced at source, or disposed of through a residual system. Using the WISARD tools to assess different scenarios at this stage is likely to result in a more accurate assessment of probable impacts.

Options one and two can both be undertaken if desired.

Appendix G: Liquid Wastes: Inclusion into the ZAP System

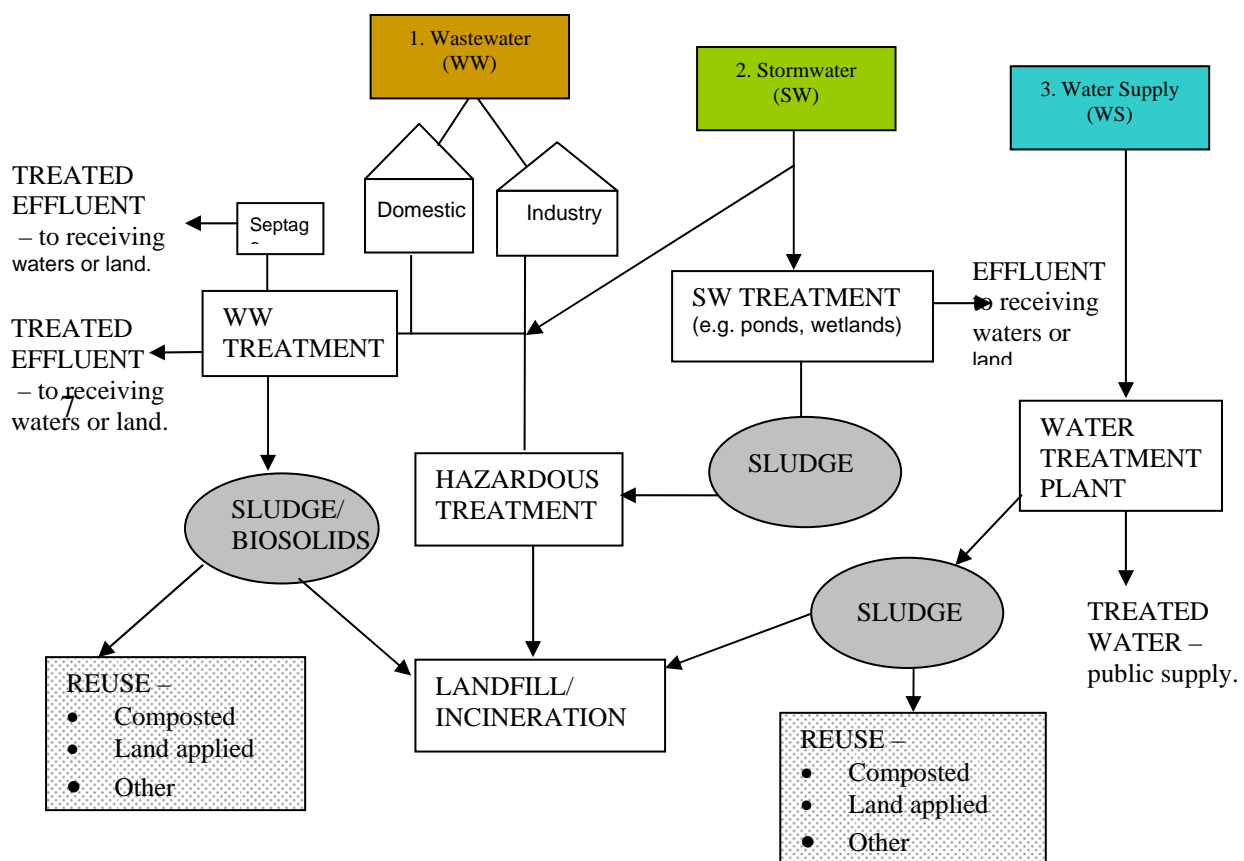
Overview

In order to bring the ZAP tools into line with the Ministry for the Environment’s New Zealand Waste Strategy (2002), it was proposed that solid wastes associated with water services infrastructure (e.g. sludges, biosolids) be included into the ZAP system. This was to reflect Ministry for the Environment’s current waste minimisation directions in regards to liquid wastes.

There are three main treatment processes related to water services in most cities or rural communities. Each of these treatment processes can produce sludge-like by-products.

- Wastewater Treatment
- Stormwater Treatment
- Water Supply Treatment

These services exist independently of each other or as part of an integrated system. The diagram below illustrates the types of treatment processes associated with water services, the types of wastes produced from each and the ultimate disposal/reuse options.



The diversion from landfill of sludges and biosolids produced from water treatment processes is to be promoted by the Zero Waste Strategy. National documents that have a significant influence on national policy and planning in regards to biosolids use and other liquid waste minimisation issues are presented in the table below.

Document	Purpose and Explanation
<p>The New Zealand Waste Strategy (MfE, 2002)</p>	<p>The Strategy sets waste minimisation targets for priority wastes including construction and demolition wastes, hazardous wastes, special wastes and organic wastes, including:</p> <p><i>“By December 2007, more than 95% of sewage sludge currently disposed of to landfill will be composted, beneficially used or appropriately treated to minimise the production of methane and leachate.”</i></p>
<p>Guidelines for the Safe Application of Biosolids to Land in New Zealand (NZWWA, MfE, MoH, MAF, September 2002 – DRAFT).</p>	<p>The guidelines are currently in draft but are designed to provide a national framework which <i>“enables the land application of biosolids in New Zealand... They will also support beneficial use in line with the New Zealand Waste Strategy.”</i></p> <p>Four grades of biosolids are proposed (Aa, Bb, Ba, and Bb) which reflect sludge treatment methods and product quality (e.g. heavy metal concentrations). Only biosolids products that meet the Aa standard will be considered a permitted activity and can therefore be applied to land without a resource consent (provided the regional council includes this activity in the regional plan). All other products require resource consents for application to land.</p>
<p>Sewage and Wastewater Integrated Management (SWIM) Handbook (MfE, June 2003)</p>	<p>This handbook was published in June 2003 and is a guide to good community planning for wastewater management, from fully centralised systems through to combined on-site and centralised systems, and fully on-site systems.</p> <p>This document is not directly related to the management of sludges and biosolids but does provide a framework to assist small communities to identify and evaluate alternatives to sewage treatment and disposal.</p>
<p>Hazardous and New Substances Act (HSNO Act)</p>	<p>The HSNO Act is not directly related to solid wastes associated with water services, but provides a comprehensive health, safety and environmental package to cover all types and classifications of hazardous substances, including wastes. It includes:</p> <ul style="list-style-type: none"> • a consistent, control framework based on performance requirements for hazardous substances and new organisms • a toolbox of regulations to manage hazardous substances.

Changes to the ZAP tools

- 1) Add a “Take Direct Action” initiative to the “Initiative” workbook that targets land application of biosolids.

While there are a number of reuse options for biosolids and/or sludge such as energy capture, reuse of dried sludge in other materials and products (e.g. cement), mixing and/or blending with other materials, these options are also applicable to other waste streams. For example, the use of glass as a sandfill, plastics as a timber replacement material, construction and demolition waste (e.g. wood pellets) as an energy source. The proposed new biosolids initiative, “Land Application of Biosolids” is therefore general in nature and in line with the other “Take Direct Action” initiatives, e.g. Kerbside Collection of Inorganics.

The initiative will cover the application of biosolids to land but exclude composting of biosolids. Composting biosolids is an option currently used by a number of councils and it is assumed that the “Composting” initiative already part of the “Take Direct Action” initiatives will cover biosolids composting.

The “Land Application of Biosolids” initiative will be in accordance with the 'Guidelines for the Safe Application of Biosolids to Land in New Zealand" (NZWWA, MfE, MoH, and MAF, 2002 DRAFT).

- 2) Add a “Sustainability Assessment Criteria” category to the “Initiative Rating” workbook. The addition of this category is intended to help to identify the risk of cross-media migration of waste associated with each initiative. If an initiative scores poorly in this category this indicates that there is a high risk of cross-media migration of waste associated with the implementation of the initiative.
- 3) Add a “Risk Alert” sheet to the “Initiative Rating” workbook. This sheet automatically flags initiatives that have scored the lowest possible score for a selection of risk factors, including cross media migration of waste. This is to ensure that these possible risks are addressed during the planning and implementation of the initiatives.