Evaluation of Future Options for the ZWSA Household and Farm Chemical Collection Program and for the Household Hazardous Waste Collection Depot at Dry Creek

Final Report

for

Zero Waste South Australia

asterisk one

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Note

The views expressed in this report do not necessarily reflect those of Zero Waste SA. Zero Waste SA cannot guarantee the accuracy of the report, and does not accept liability for any loss or damage incurred as a result of relying on its accuracy.

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Executive Summary

The Zero Waste South Australia (ZWSA) Household and Farm Chemical Collection Program has been running since March 2004, and the Dry Creek Depot - since 1990. ZWSA has recognised that some changes to both programs are desirable, which would more fully reflect the true costs of appropriate recycling or disposal of surplus household and farm products containing hazardous components, and encourage industry to adopt extended producer responsibility (EPR) measures for those products.

ZWSA has identified a number of potential future options that may introduce economies into these programs, and has appointed Asterisk One Consulting to evaluate these options, as well as any additional options that may emerge in the course of this examination.

The study involved the review of collection and financial data from the operation of the current program over its duration, and discussions with a number of stakeholders. These included senior management of ZWSA, the EPA, a number of selected metropolitan and rural Councils, and a number of operators of facilities that could potentially host permanent collection centres for some or all of the target materials. This information was analysed and compared with those for other jurisdictions including Victoria, New South Wales, and other international programs. Using a performance and financial modelling tool developed for the evaluation of the NSW Clean Out Program, and further adapted for the design of a Household Chemical Collection Program for the state of Tasmania, a number of options for the future of the ZWSA HHW program were evaluated.

The ZWSA program to date has achieved excellent results, with participation rates higher than in similar programs in NSW and Victoria, and very high per capita quantities of materials delivered in country collections. Over 40% of these high quantities consisted of used oil, for which government-funded used oil collection facilities are already installed in many rural and Metropolitan Councils.

The opportunity for members of the public to attend collections (as measured by the number of collection days per 1,000 population) is numerically higher in country areas than in Metropolitan Adelaide. This is counteracted by the greater distances that country populations have to travel to collection points. In view of the fact that country areas have already had the benefit of the government-funded ChemCollect program, and now also have an opportunity to dispose of chemicals under an industry-funded EPR program, ChemClear®, it is recommended that ZWSA reviews the balance between city and country collections in this program.

The overall average cost of the ZWSA program (excluding staff salaries, but including GST) is $3.50 per kg collected. This is comparable with the $3.28 per kg achieved for the "CleanOut" program in NSW in 2004-05 (which did not include distant country areas), but considerably higher than the $1.90 per kg achieved by the Sustainability Victoria program over the same period. Sustainability Victoria does not, however accept materials from farmers, have a limit on the maximum container size of 20 litres, and like the NSW Clean Out Program do not have the distances to travel compared with South Australia. Fixed costs of collections per kg in the Far country of South Australia are double those for the Metropolitan area ($2.81 per kg vs $1.41 per kg). The total costs of country collections

amount to $1.05M out of the combined expenditure of $1.71M for Stages 1, 3 and 4 (or 61.5%), while these areas account for only 50% of the collected quantities of materials and 21% of participants. Much of this difference in cost arises from the fact that agricultural chemicals comprise a significant proportion of the materials received at country collections, and are more expensive to treat and dispose of.

Evaluation of options

We have used our Household Chemical Collection Program Predictive model to evaluate some of the options identified by ZWSA for the program.

Evaluation of the effectiveness, and strengths, opportunities, weaknesses and threats in relation to the various scenarios or options requires assessment of the capacity of each to achieve the objectives of the program. These objectives include:

- Reduction in risk to public health, environment and waste and recycling industry workers. This is best represented by the total quantity of material collected, particularly the more hazardous types of materials such as pesticides, chlorinated solvents and heavy metals. Collecting these materials reduces the likelihood they are inappropriately disposed of – on to land, to sewer, or in solid waste, posing risks to the environment, and workers, plant and infrastructure in these industries; or stored for long periods of time on site, where they may contaminate the environment or pose a risk to public health and safety.
- Promotion of increased awareness of the dangers associated with hazardous materials and the move to the use of less hazardous products, stimulation of reuse of materials, and stimulates awareness of waste minimisation.
- Satisfaction of community expectations of better waste management and greater industry responsibility
- Financial sustainability, providing a reduction in cost whilst maintaining recovery of materials. This is measured using the total cost of the program, with consideration being given also to value for money – ie. the cost per kg collected or kg collected for each dollar spent.
- Continuation of high public engagement and a high level of participation. This can be assessed using the total participation in the program.

The following scenarios were evaluated:

Baseline – This scenario uses the combination of collection sites and number of days at each site from the Chemical Collection Program for Stage 3; participation rates, types of material, and quantities of material per participant from the program overall (all four stages); and costing estimates from the current contract and most recent Stage (4).

Scenario A – with the intent of developing a Chemical Collection Program that would cost less than $500,000 per annum, this scenario is based on visiting each LGA once every three years. Each LGA collection event is only one day with the following exceptions: Flinders Ranges (2 days), Loxton Waikerie (2 days), Wattle Range (2 days), Coorong (2 days), Elliston (2 days), Lower Eyre Peninsula (2 days), Mid Murray (3 days), Yorke Peninsula (2 days).

In this and subsequent scenarios, the Dry Creek facility is not included, as it is considered to be 'additive', that is, retaining Dry Creek Depot would simply add to the total cost, total participation and total materials collected.

Scenario B – with the intent of developing a Chemical Collection Program that would cost less than $800,000 per annum, this scenario is based on visiting each LGA once every two years. The number of collection days spent in each LGA is the same as for Scenario A.

Scenario C – This scenario is based on visiting each LGA once every year. The number of collection days spent in each LGA is the same as for Scenario A.

Scenario D – This scenario models costs, participation and quantities collected only for the collection of High Volume Low Toxicity (HVLT) materials at permanent (7 days a week) drop-off locations in the metropolitan area. Site locations are as outlined in Table 21, Section 3.1, although two variations are considered – five permanent sites and three permanent sites. This scenario does not include any collections in non-metropolitan areas.

Scenario E – This scenario models costs, participation and quantities for the collection of all chemicals – that is, both High Volume Low Toxicity (HVLT) and Low Volume High Toxicity (LVHT) materials – at four sites (as outlined in Table 25, Section 3.2) in the metropolitan area used on a regular basis 3 times per year (ie. a total of 12 single day collection events each year). This scenario does not include any collections in non-metropolitan areas.

Scenario F – This scenario models costs, participation and quantities for the collection of all chemicals at six one day collection events held on a regional basis (as outlined in Section 3.4) in the metropolitan area. This scenario does not include any collections in non-metropolitan areas.

Scenario G – This scenario models costs, participation and quantities for the collection of all chemicals at a single permanent (7 days per week) drop-off point in the metropolitan area, and a single permanent drop-off point in the non-metropolitan area. No other collections are included.

Current program format

Table E1 provides a comparison of scenarios comprising continuing collection at temporary sites (Scenarios A, B and C) with the Baseline. It can be seen that kg collected per dollar spent (kg per $) is very similar overall, with the Baseline perhaps having a marginal advantage because of the inclusion of Dry Creek, which has a higher kg per $ than the program of temporary collections. The full risks of the operation of Dry Creek are not being costed, however, and the full costs of operations not being borne by ZWSA. It can be seen that Scenario C – collection at temporary sites in each LGA every year is similar in almost every respect to the total for the Baseline that includes Dry Creek, with the added advantage that all 67 LGAs are being included, rather than just the 33 that were included in Stage 3.

In continuing a program of temporary collections the **reduction in risk** to public health, the environment, and waste and recycling industry workers depends very much on the quantity and types of chemicals collected, which in turn corresponds to the size of the program and the expenditure on it. The three scenarios outlined here show a range of options in this regard depending on the funds available.

In a similar way, continuing **high public engagement** – represented by participation in the program – really depends on the number of collections, again proportional to the size of the program and expenditure. We recommend improved education at temporary collections, along the lines of that used in King County, Washington, USA to **increase awareness** of the dangers associated with hazardous materials and to promote the move to the use of less hazardous products. **Greater industry responsibility** can be supported if there are fewer collections in the country, as recommended in the report, generating an increased demand for ChemClear though appropriate promotion.

Table E1: Comparison of temporary collection scenarios with the Baseline

Characteristic	Baseline			Scenario A	Scenario B	Scenario C
	Stage 3 temporary collection program	Dry Creek	Total	Collection at temporary sites in each LGA every 3 years	Collection at temporary sites in each LGA every 2 years	Collection at temporary sites in each LGA every year
Participation	5,800	1,200	7,000	2,400	3,600	7,100
Quantity	348	45	393	132	199	397
Quantity as % of baseline				34%	51%	101%
Cost	**$1,260,000**	**$120,000**	**$1,380,000**	**$475,000**	**$715,000**	**$1,425,000**
Cost per kg	$3.62	$2.67	$3.51	$3.60	$3.59	$3.59
kg per $	0.28	0.38	0.28	0.28	0.28	0.28

Metropolitan collection options

Several of the scenarios that have been modelled deal only with collection of chemicals in the metropolitan area. Tables E2 and E3 provide a comparison of these scenarios. It can be seen that using a program of six one day collections per year on a regional basis (Scenario F) provides the best kg per $, even better than using four regular sites open 3 days per year (Scenario E). This is because of what might be called the familiarity factor – with a regular site, it is observed that overall participation decreases because people know they can come back at another time.

The two variations of Scenario D provide an opportunity for very high participation, and significant quantities of material collected – at a cost. Providing permanent drop off points ultimately results in higher overall costs because of the availability of the collection point, the resulting participation, and the quantity of material collected. Providing only 3 drop off points, therefore, results in lower costs, and of course, less material collected. Value for money (kg per $) is high, mostly because of the lower cost of disposal for HVLT materials, although surprisingly not as high as Scenario F, which includes all chemicals.

Providing only 3 drop off points gives a higher kg per $ because of the lower capital costs. These options, by separating HVLT and LVHT materials, also provide a means of supporting increased awareness the dangers of HHW through appropriate communication materials.

Providing a permanent drop-off point for all chemicals in the metropolitan area (Scenario G), for example at West Torrens, provides a good balance between total cost and value for money. Not as much material is collected as in collection at temporary sites every year (Scenario C), collection at regular sites (Scenario E) or collection at regional sites (Scenario F), but the total costs are lower. Value for money (kg per $) is comparable to collection at regular sites, and marginally better than for Dry Creek.

Table E2: Comparison of various metropolitan collection scenarios

Characteristic	Scenario A Collection at temporary sites in each LGA every 3 years	Scenario B Collection at temporary sites in each LGA every 2 years	Scenario C Collection at temporary sites in each LGA every year	Scenario E 4 Regular sites each 3 days pa	Scenario F 6 Regional sites each 1 day pa	Scenario G Permanent drop-off point for all chemicals.
Participation	2,000	3,000	5,900	4,850	5,600	3,400
Quantity	75	113	225	194	225	137
Quantity as % of Scenario C	33%	50%	100%	86%	100%	61%
Cost	**$195,000**	**$295,000**	**$585,000**	**$500,000**	**$460,000**	**$350,000**
Cost per kg	$2.60	$2.61	$2.60	$2.58	$2.04	$2.55
kg per $	0.38	0.38	0.38	0.39	0.49	0.39

Table E3: Comparison of various metropolitan collection scenarios

Characteristic	Scenario D 5 permanent drop-off points for HVLT only	Scenario D 3 permanent drop-off points for HVLT only
Participation	9,550	6,300
Quantity	300	200
Cost	**$760,000**	**$485,000**
Cost per kg	$2.53	$2.43
kg per $	0.39	0.41

Non-metropolitan collection options

Continuation of collections in country and regional South Australia is a high priority for ZWSA. Table E4 provides a comparison of scenarios dealing with collections in non-metropolitan areas. It can be seen that these options provide less value for money in terms of quantity collected because of the distances travelled in country areas, and the higher proportion of agricultural chemicals collected, which are more expensive to treat and dispose of. In some respects, though, this can be considered money well spent to ensure equal access for country residents to the programs, and the determining factor is the availability of funding. Clearly providing a permanent facility at Wakefield provides better value for money, but for a limited number of people. This scenario does however, detract slightly from supporting greater industry responsibility by providing a service that is duplicated to some extent by the ChemClear program.

Table E4: Comparison of various non-metropolitan collection scenarios

Characteristic	Scenario A Collection at temporary sites in each LGA every 3 years	Scenario B Collection at temporary sites in each LGA every 2 years	Scenario C Collection at temporary sites in each LGA every year	Scenario G Permanent drop-off point for all chemicals at Wakefield
Participation	400	600	1,200	152
Quantity	57	86	172	23
Quantity as % of Scenario C	33%	50%	100%	13%
Cost	**$380,000**	**$420,000**	**$840,000**	**$55,000**
Cost per kg	$4.91	$4.88	$4.88	$2.39
kg per $	0.20	0.20	0.20	0.42

Summary of evaluation conclusions

Scenarios for metropolitan and non-metropolitan collections as outlined above can be combined in an additive fashion for participation, quantities of materials collected and total program costs.

Providing a program of six one day collections per year on a regional basis provides the best outcomes for the metropolitan area. Providing a permanent drop-off point for all chemicals does give a replacement for Dry Creek, with increased participation and quantity collected, but not with the same effectiveness in terms of quantity collected and participation as the regional collection program.

The use of permanent drop-off points for HVLT is possible, but still requires the provision of collection points or events for all chemicals. The accessibility provided by such points does result in higher costs, and value for money is not as great as for the program of regional collections. These options do, however, provide a very high level of community engagement. Increasing awareness and extended producer responsibility are matters that are fairly similar across all options, and can be dealt with appropriate communication materials and activities associated with each.

It is recommended that ZWSA therefore consider continuing the program with collection at temporary sites on a regional basis in the metropolitan area, and collection at temporary sites in non-metropolitan areas (at a frequency depending on available funding). Establishment of three permanent drop-off facilities for HVLT could be considered depending on funding. Establishment of a permanent facility in Wakefield is not recommended.

Dry Creek

It is recommended that the use of the Dry Creek Depot be discontinued in its present format. The site should be cleared of all but essential structures, and used as a vacant site for day collections by a contractor (in the same way as other sites).

Marketing and education

It is recommended that the "branding" of the ZWSA program be stepped up, particularly through increased used of street signage and banners. A connection in householders minds between the hazardous waste collection service and the ZWSA brand can generate broadly based community support that will more effectively ensure ongoing funding for the program. It is also recommended that the education aspect of the program be strengthened, with householders being encouraged to buy smaller quantities of products.

Interaction with other programs

It is considered that ZWSA can stimulate greater demand for the emerging industry EPR program, ChemClear®, by more strongly promoting the program at the same time as undertaking country collections. South Australia is the only State that has not contributed funds to the ChemClear® program to collect so-called "Group 2 chemicals" (historical, not currently registered products, or products not made by members of industry associations), partly because of the high level of service the ZWSA collection program is able to provide. It is recommended that ZWSA increase pressure on ChemClear through stimulating market demand, and through negotiation to achieve an increased level of service that would justify the contribution of such funding.

It is also recommended that ZWSA approach the Australian Paint Manufacturers Federation for specifically South Australian partnership arrangements for collecting post-consumer paint.

1 Introduction

The Zero Waste South Australia (ZWSA) Household and Farm Chemical Collection Program has been running since March 2004, and, during the period since its inception to the end of June 2007, 132 collections were held within 75 Local Government Areas and in areas covered by the Outback Areas Community Development Trust. A total of 681 tonnes of hazardous materials has been received from the public during that time.

The Dry Creek Depot has been in existence since 1990 and is currently operated by the EPA and funded by ZWSA. The depot is open to the public for three hours each month, plus four weekend days per year and provides an alternative opportunity for householders and farmers to surrender unwanted chemicals.

The Draft Hazardous Waste Strategy published by the South Australian EPA in October 2005 supports the continuation of the ZWSA Household and Farm Chemical Collection Program, as long as it is provided free of charge to householders and farmers only, and hazardous waste from businesses is not accepted. The Draft Strategy also calls for a review of the operations of the Dry Creek Depot.

ZWSA plans to continue the Household and Farm Chemical Collection Program in its current form until the end of the 2007-08 financial year. However, it has been recognised that the State Government's involvement in the safe collection and disposal of household and farm chemicals should:

- more fully inform consumers about the real costs of the household products they purchase (including environmental and social costs), so as to influence consumers' attitudes towards making a conscious effort to purchase products with less hazardous content;
- encourage industries that manufacture household and farm chemical products to adopt extended producer responsibility (EPR) measures for those products;
- send out a price signal that leads to changed behaviour with regard to these products on the part of both householders and industry.

ZWSA has identified a number of options for both the Household and Farm Chemical Collection Program and the Dry Creek Depot that may achieve economies in both programs. Asterisk One were engaged to evaluate these options (as well as any additional options that may emerge in the course of the study).

Our study involved the review of collection and financial data from the operation of the current program over its duration, and discussions with a number of stakeholders. These included senior management of ZWSA, the EPA, a number of selected metropolitan and rural Councils, and a number of operators of facilities that could potentially host permanent collection centres for some or all of the target materials. We have analysed this information and compared the results with those for other jurisdictions including Victoria, New South Wales, and other international programs. Using a performance and financial modelling tool developed for the evaluation of the NSW Clean Out Program, and further adapted for the design of a Household Chemical Collection Program for the state of Tasmania, a number of options for the future of the ZWSA HHW program were evaluated. This report presents the results and recommendations from this research and analysis.

2 Analysis of current programs

2.1 Household and farm chemical collection

The Household and Farm Chemical Collection Program provides a free collection service in metropolitan and rural areas of South Australia for a wide range of chemicals. Up to the end of August 2007, 134 collections within 80 council areas and the Outback Areas Community Development Trust have been undertaken, collecting over 700 tonnes of hazardous materials from the public.

The purpose of the program has been to support the aims of Zero Waste SA by eliminating waste or its consignment to landfill, to advance the development of resource recovery and recycling and to reduce the risk to public health, the environment and to waste and recycling industry workers by reducing the quantities of these materials being stored on properties or disposed of inappropriately.

The program has been designed to provide, as much as possible, equal access to the collection service by residents of both metropolitan and rural areas, and support increased awareness of the dangers associated with hazardous chemicals. It has also operated effectively with significant cooperation from local councils, with collections supported by strong promotion and marketing, and council staff attendance at collection events.

2.1.1 Basic program statistics

The ZWSA Household and Farm Chemical Collection Program commenced in March 2004, initially with a pilot program in four Local Government Areas (LGAs) in the Metropolitan area ("Stage 1"). The pilot program was subsequently extended to four LGAs on the Eyre Peninsula (Kimba, Cleve, Franklin Harbour and Whyalla – the so-called "Stage 1 Extension"[1]).

Following the success of the pilot, the program was expanded, and continued until the end of the calendar 2006 year. Table 1 shows key program statistics for various stages of the program since March 2004. For the purposes of clarity and analysis, the following terminology has been adopted throughout this report to categorise collection locations: **Near Country** is defined as rural areas within about a 100km radius of Adelaide – eg Barossa, Light, Victor Harbor, etc. **Far Country** are rural areas beyond about a 100km radius of Adelaide. **Regional centres** include predominantly urban centres in regional areas, such as Port Augusta, Port Pirie, Whyalla and Mount Gambier.:

By the end of Stage 4, almost every LGA in South Australia has had a collection event (comprising one or more collection days), and a relatively small number of LGAs has had two events during this period. A complete tabulation of all LGAs, showing the number of events and collection days in each appears in Appendix 2.

[1] For the purposes of the analysis in this report, Stage 1 and Stage 1 Extension have been rolled up together as "Stage 1"

Table 1: Program dates, Stages, Nos of LGAs, participants and quantities collected

Stage	Dates	No of LGAs participating				Partici-pants	Gross tonnes collected
		Metro	Far country	Near country	Regional centres		
1	Mar – Jul 04	4	3	0	1	2,046	66.0
2	Aug 04 – Jun 05	8	9	6	0	3,329	177.7
3	Jul 05 – Jun 06	8	19	2	4	5,857	345.7
4	Jul – Nov 06	2	3[2]	3	0	1,239	92.1
Total						**12,471**	**681.5**

In December 2006, the Board of Zero Waste South Australia suspended the operation of the program until the end of the 2006-07 financial year, and has directed that an independent review of the program be carried out to examine various options as outlined in the Introduction to this report. This is that review.

The program has now been re-started and will run until the end of the 2007-08 financial year (with a reduced budget), pending the recommendations of this review.

2.1.2 Analysis of program characteristics

There are a number of characteristics or indicators that can be used for assessing performance of programs of this type:

1. **Participation Rate**. This is defined as the number of participants attending a collection in a given LGA per 1,000 population of that LGA. This statistic may not be a totally accurate measure of participation rate, given that, in the city, participants may come to the collections from neighbouring LGAs. It is, nevertheless, a useful parameter, and has been used by us to characterise collections in other jurisdictions.

2. **Average quantity brought in by each participant**.

3. **Average quantity collected per collection day**.

4. **Average quantity collected in each LGA per head of population** of that LGA. This is a measure of the amounts of target materials potentially held (and surrendered) in a given area.

5. **Total quantity of material collected** – by LGA, region or Stage (typically expressed in tonnes or kilograms). This is an absolute measure of the amount of materials removed from the environment.

[2] 2 LGAs plus the Outback Area

6. **Total number of participants** – by LGA, region or Stage. This is an absolute measure of the response to the program.

7. **Total number of collection days** – by region.

8. **Number of collection days per 1000 population**. This factor is a measure of the "exposure" of the public to the collections (or opportunity to attend collections) in those LGAs where collections were held.

9. **Average or longest distance participants have to travel** to the nearest collection site.

10. **Percentages of various materials** brought in, particularly "HVLT" (High Volume Low Toxicity) materials such as paint, used oil, car batteries and gas cylinders, and "LVHT" (Low Volume High Toxicity) materials such as pesticides.

The results for these indicators are presented and discussed below.

Participation Rate

Table 2 and **Figure 1** show participation rates in the program in the four types of area considered. Generally this statistic runs very high in South Australia compared with other states (typically 3 participants per 1,000 population at NSW collections, 5 per 1,000 in Victoria and an average of 8.3 per 1,000 in this program). The high participation rate in the program is a measure of its success, excellent management and organisation and the high degree of cooperation that exists between ZWSA and the Local Governments concerned. It also reflects the higher average number of collection days per LGA in this program compared with other jurisdictions.

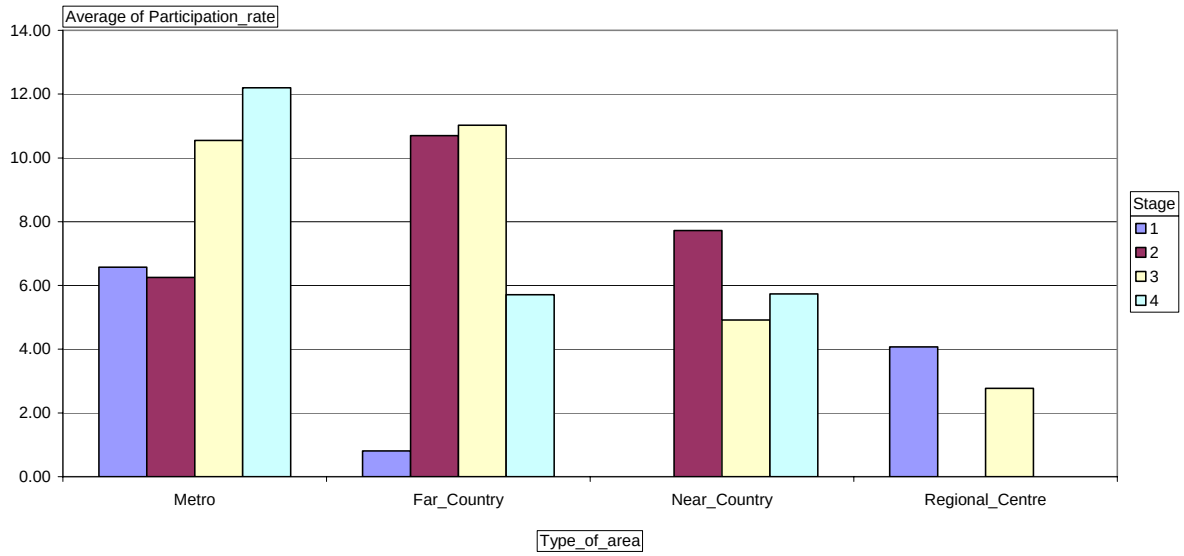
It can be seen that participation rates in Stages 2 and 3 in the Far country matched or exceeded those in the city. Participation in the Far country dropped off somewhat in Stage 4, probably because of the type of area covered in Stage 4 (the Outback), and because of the decision to cease program operation part way through the year.

Participation rates in the Near country are intermediate between those in the city and the Far country, while participation rates in the regional centres are the poorest, reflecting the urban character of those centres.

Table 2: Average participation rates (participants per 1000 LGA population)

Type of area	Stage 1	Stage 2	Stage 3	Stage 4	Overall
Metropolitan	6.57	6.25	10.55	12.20	8.41
Far country	0.81	10.70	11.02	5.70	9.57
Near country	-	7.72	4.92	5.73	6.67
Regional centres	4.07	-	2.77	-	3.03
Total all areas	**4.10**	**8.37**	**9.54**	**7.34**	**8.32**

Figure 1 ZWSA Household and Farm Chemical Collections
Average participation rate by area type



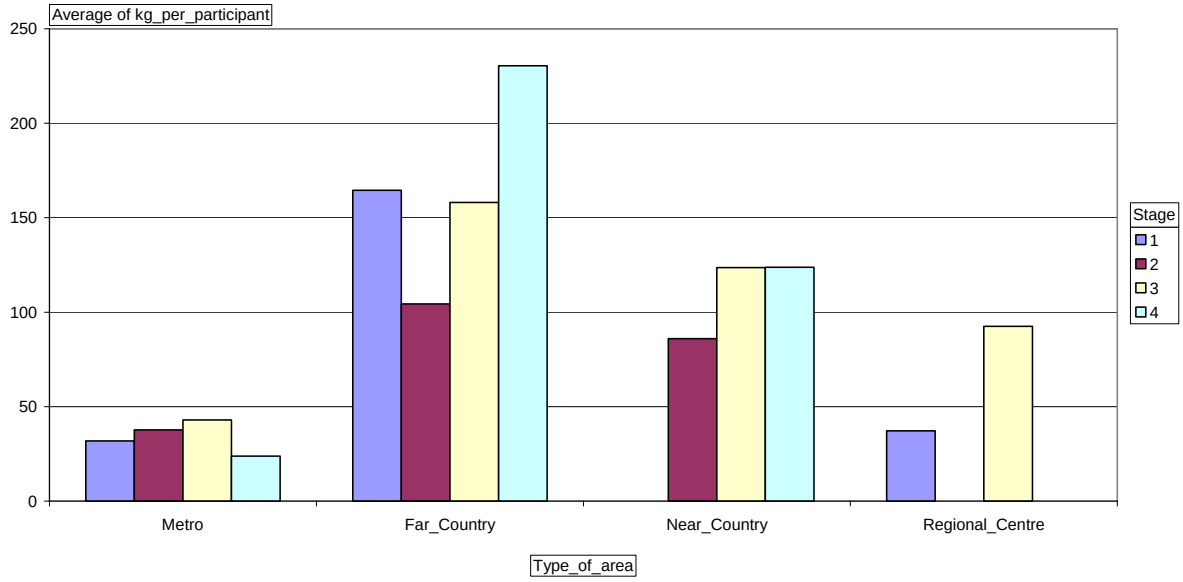
Quantity brought by each participant

Table 3 and Figure 2 show the average quantity brought to the collections by each participant for the four area types. It can be seen that in the city this average runs at about 40 kg (very close to the average achieved in other jurisdictions), however in the Far country this increases to a very high 150 – 200 kg per participant. It can be seen from Table 10 and Figure 7 that a large proportion of materials brought to the collections in the Far country is, in fact, used oil.

Table 3 Average quantity brought in by each participant (kg)

Type of area	Stage 1	Stage 2	Stage 3	Stage 4	Overall
Metropolitan	31.8	37.8	42.9	23.9	37.3
Far country	164.5	104.4	158.0	230.4	150.8
Near country	-	86.0	123.6	123.8	103.1
Regional centres	37.2	-	92.6	-	81.5
Total all areas	**82.3**	**76.4**	**120.1**	**138.8**	**104.0**

Figure 2 ZWSA Household and farm Chemical Collections
Average kg per participant by area type



Quantity collected per day

Table 4 (which we have not graphed) illustrates the difference in daily quantities collected in the city, Far country, Near country and regional centres, with a city collection day yielding on average 3 – 4 times as much as a country collection day.

Table 4: Quantity collected per day – all Stages (tonnes)

Type of area	Total quantity collected per day – all materials	
	Average	Range
Metropolitan	12.6	4.2 (Adelaide Hills) – 31.6 (Mitcham)
Far country	2.9	0 (Cleve) – 11.4 (Mt Remarkable)
Near country	4.4	0.8 (Kangaroo Island) – 15.8 (Barossa)
Regional centres	2.8	0.4 (Port Pirie) – 6.0 (Port Lincoln)

Average quantity collected per head of population served

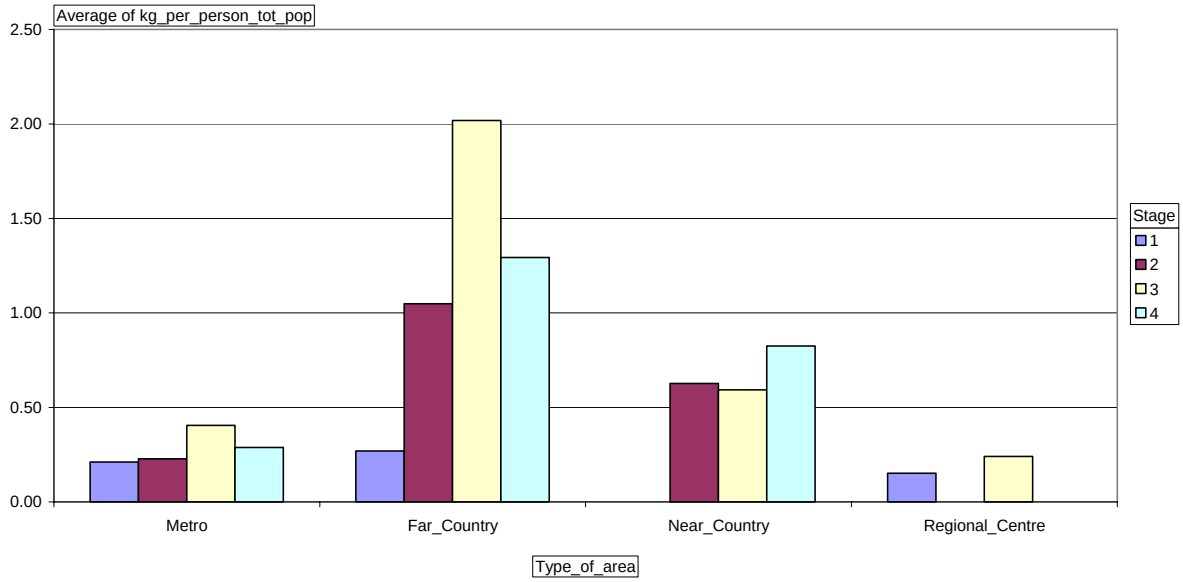
Table 5 and Figure 3 show the average quantity collected in each LGA (in kg) per head of population of that LGA. This factor is a measure of the quantities of target materials held (and surrendered) in each LGA, and illustrates that Far country areas hold vastly more of these materials than the city. Near country is intermediate between Metropolitan and Far country areas, while regional centres are have very similar quantities per head of population to the city.

This statistic typically runs at about 0.1kg/1,000 for the NSW "CleanOut" campaign (which is largely metropolitan) and 0.23kg/1,000 for Victoria (which is both metropolitan and rural), compared with the massive 0.94kg/1,000 (on average) for this program. This clearly illustrates that this program is, proportionately, removing vastly greater quantities of potentially hazardous materials from the environment, compared with other States.

Table 5: Average quantity collected per head of population served (kg)

Type of area	Stage 1	Stage 2	Stage 3	Stage 4	Overall
Metropolitan	0.21	0.23	0.40	0.29	0.29
Far country	0.27	1.05	2.02	1.29	1.54
Near country	-	0.63	0.59	0.82	0.67
Regional centres	0.15	-	0.24		0.22
Total all areas	**0.23**	**0.65**	**1.33**	**0.87**	**0.94**

Figure 3 ZWSA Household and Farm Chemical Collections
Average kg per total LGA population- by area type



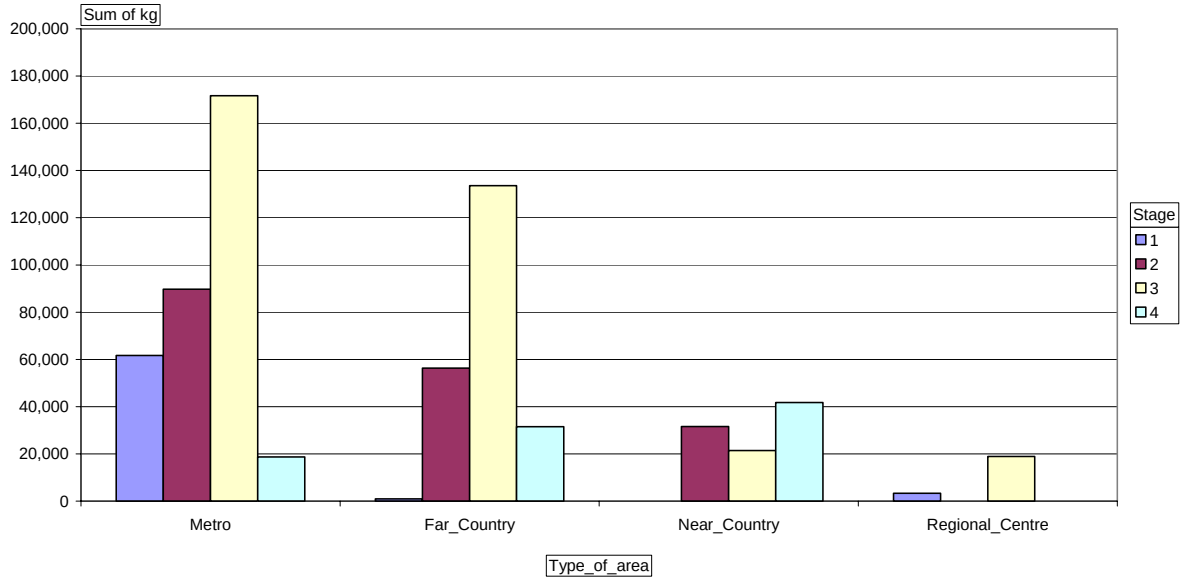
Total quantities collected in each stage

Table 6 and **Figure 4** show the total tonnes of all materials collected in each area by Stage. It can be seen that, in Stage 3 at least, the total quantity collected in the country almost equalled that collected in the city. This fact may be seen as a justification of the emphasis given the country areas in the program, particularly since a considerable proportion of the materials collected in the country were the more toxic materials, such as pesticides and insecticides. The total quantities collected in the regional centres was low, both because of the low number of these centres, the low participation rate in them and city-like quantities delivered by each participant.

Table 6: Total tonnes collected (tonnes gross)

Type of area	Stage 1	Stage 2	Stage 3	Stage 4	Overall
Metropolitan	61.7	89.7	171.7	18.7	341.8
Far country	1.0	56.4	133.6	31.6	222.6
Near country	-	31.6	21.4	41.8	94.8
Regional centres	3.3	-	19.0	-	22.3
Total all areas	**66.0**	**177.7**	**345.7**	**92.1**	**681.5**

Figure 4 ZWSA Household and Farm Chemical Collections
Total kg collected - by area type



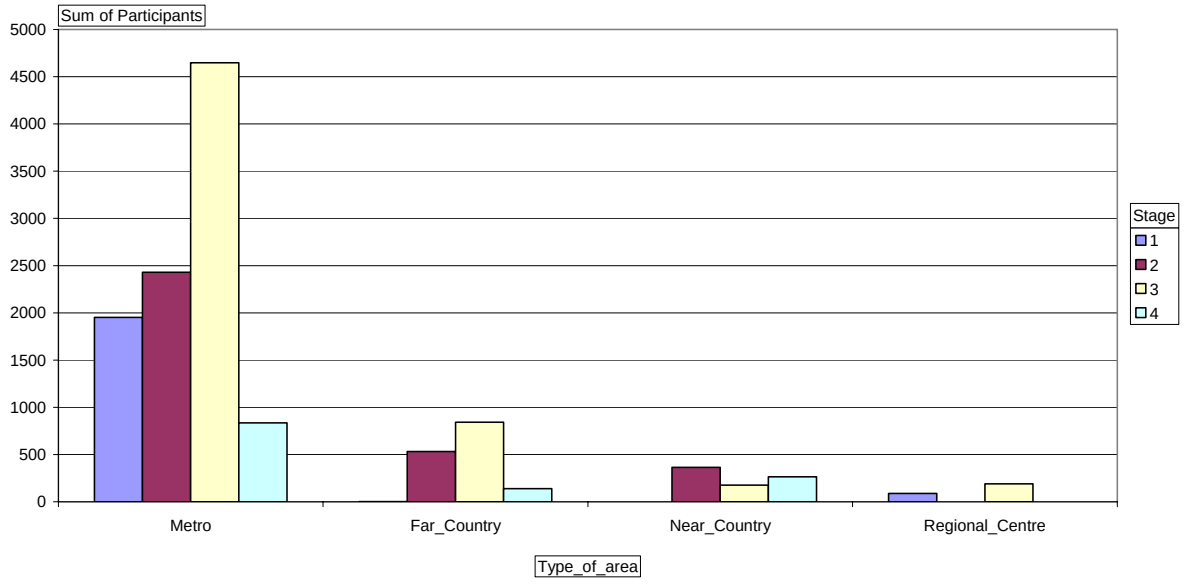
Total participants in each stage

Table 7 and Figure 5 show the total number of participants in each type of area by Stage. This clearly illustrates the vastly greater number of patrons in the city, compared with either the Far country, Near country or regional centres. Metropolitan Adelaide is where the vast majority of the demand for the collections occurs.

Table 7: Total participants

Type of area	Stage 1	Stage 2	Stage 3	Stage 4	Overall
Metropolitan	1,953	2,429	4,648	836	9,866
Far country	3	534	842	138	1,517
Near country	-	366	176	265	807
Regional centres	90	-	191	-	281
Total all areas	**2,046**	**3,329**	**58,57**	**1,239**	**12,471**

Figure 5 ZWSA Household and farm Chemical Collections
Total participants by area type



Collection days in each stage

Table 8 (not graphed) shows the total number of collection days in the program by Stage and by type of area. It illustrates the emphasis given in the program to date to country areas, with 110 out of the total 141 collection days in the program to date (78%) being run in the country.

Table 8: Total collection days[3]

Type of area	Stage 1	Stage 2	Stage 3	Stage 4	Overall
Metropolitan	5	9	15	2	31
Far country	3	21	41	12	77
Near country	0	12	4	8	24
Regional centres	2	0	7	0	9
Total all areas	**10**	**42**	**67**	**22**	**141**

Collection days per 1000 population

Table 9 and **Figure 6** show a statistic defined as the "number of collection days per 1000 population" for the four stages of the program for the four types of areas covered. This factor is a measure of the "exposure" of the public to the collections (or opportunity to attend collections) in those LGAs where collections were held.

Table 9: Number of collection days per 1000 population of those LGAs where collections were held

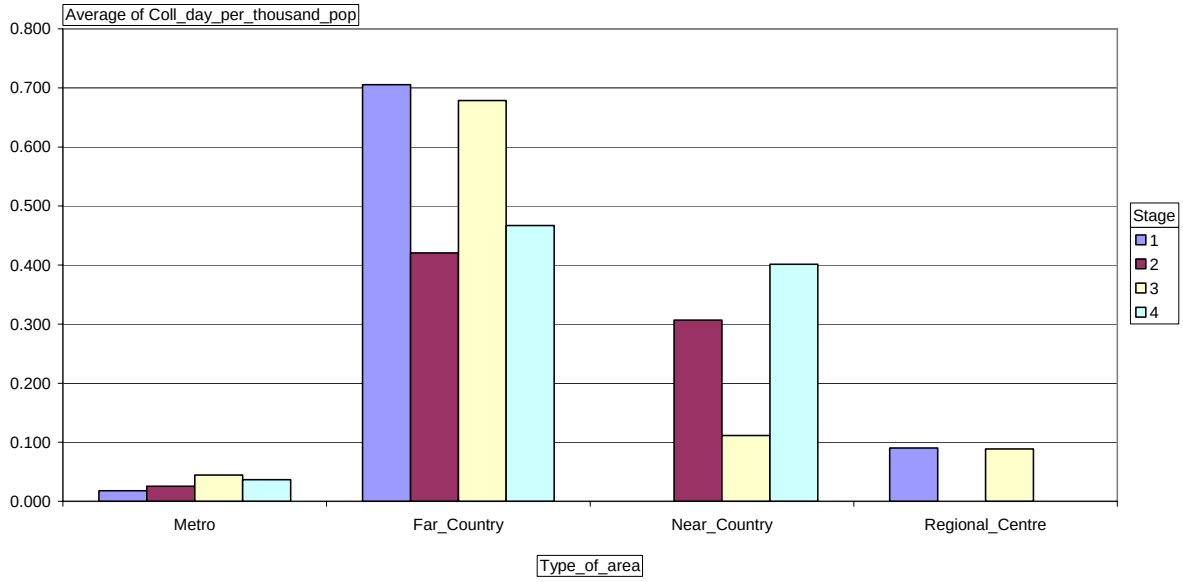
Type of area	Stage 1	Stage 2	Stage 3	Stage 4	Overall
Metropolitan	0.018	0.025	0.044	0.037	0.032
Far country	0.705	0.421	0.679	0.467	0.594
Near country	-	0.307	0.112	0.401	0.297
Regional centres	0.090	-	0.089	-	0.089
Total all areas	**0.285**	**0.253**	**0.419**	**0.335**	**0.342**

[3] This Table reports the total number of collection DAYS, not the total number of "events". Thus an event (such as the one in Onkaparinga in Stage 1) with collections being held at two locations on the same day is counted as 2 collection days.

It can be seen that this factor is approximately 0.032 per 1000 population on average in the city (that is, 1 collection day for approximately 30,000 population), and up to 0.7 per 1,000 population (ie. 1 collection day per 1,400 population) in the Far country. That means the opportunity for a householder to attend collections in those LGAs which hosted the program is some 20 times greater in the Far country than in the city. This is, of course, counteracted by the far greater distances that country householders/farmers have to travel to a collection point, as discussed further below.

The number of collection days per 1,000 population in the Near country and regional centres are intermediate between those in the city and Far country.

Figure 6 ZWSA Household and Farm Chemical Collections
Average number of collection days per 1000 population for host LGAs by area type



Types of materials collected

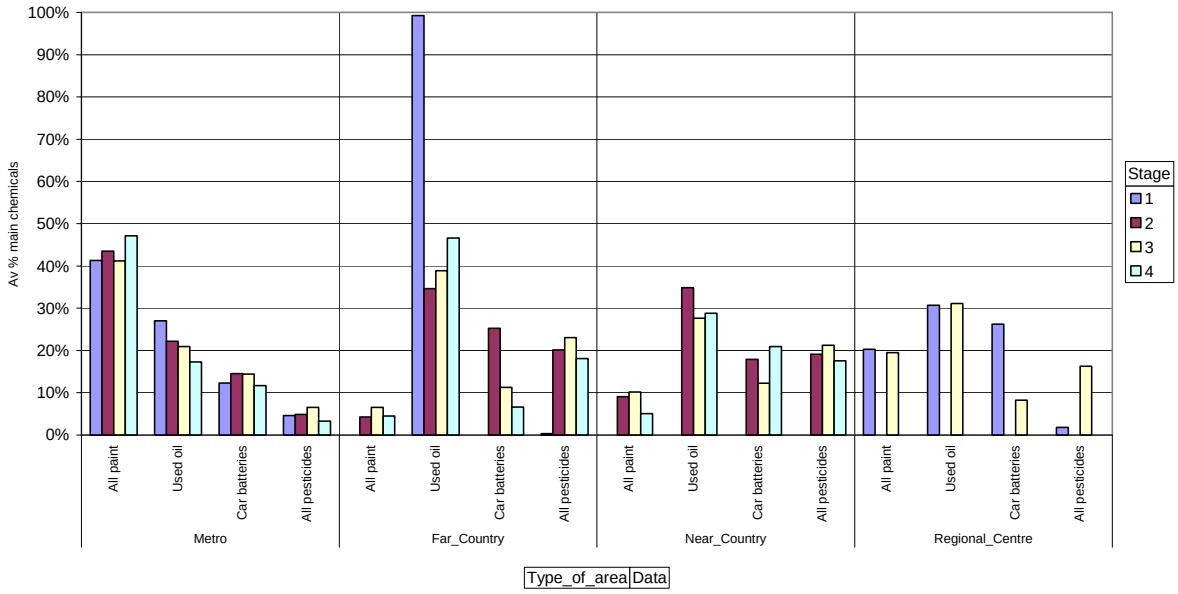
Table 10 and Figure 7 show the average percentages of four main types of materials – paint, used oil, car batteries and pesticides – collected in the four types of area by Stage. It can be seen that paint, oil and batteries together represent about 80% of all materials collected in the Metropolitan area. This is very much in line with results in other jurisdictions. In the Far country, however, paint, oil and batteries together represent only 60% of the total, with paint quantities being much lower than in the city. Pesticides represent a much higher percentage of the total quantities in country areas, as is to be expected.

In the Far country, used oil, on average, represents approximately 40% of all materials collected[4], whereas it is only about 20-25% of the total in the city.

Table 10: Percentages of main materials collected (%)

Type of area	Paint	Used oil	Lead-acid batteries	Pesticides	Total of paint, oil & batteries
Metropolitan	42.6%	22.2%	13.8%	5.3%	78.6%
Far country	5.5%	40.3%	14.4%	21.1%	60.2%
Near country	8.2%	31.9%	17.7%	19.1%	57.8%
Regional centres	19.6%	31.0%	11.8%	13.4%	62.4%
Overall - all areas	**18.6%**	**32.6%**	**14.6%**	**15.2%**	**65.8%**

Figure 7 ZWSA Household and farm Chemical Collections
Major types of materials collected - by area type



[4] Discounting the anomalous result for Stage 1, which has been influenced by a single collection – that at Kimba – where nearly 100% of the material brought in was oil.

Distance travelled by participants (accessibility)

Table 11 is a tabulation of all country LGAs that have had multiple-site collections. This table shows maximum estimated distances that a participant in each LGA may need to travel to a collection site under present arrangements, compared with the maximum estimated distances if there were fewer sites.

It can be seen from Table 11 that there is a potential for reducing the number of country sites from the overall program without causing excessive inconvenience to participants (maximum distances travelled would not increase at all in some cases, or would only increase by moderate amounts in many others). Populations of the various centres have been taken into consideration in constructing Table 11. Figure 8 and Table 12 compare the highest, average and lowest distances travelled out of all the LGAs.

Table 12: Highest, average and lowest travel distances in current and modified program for country LGAs

Maximum distance travelled (km)	Current program	Modified program
Highest	90	105
Average	43	55
Lowest	18	26

Figure 8 - Travel distances in Country LGA's

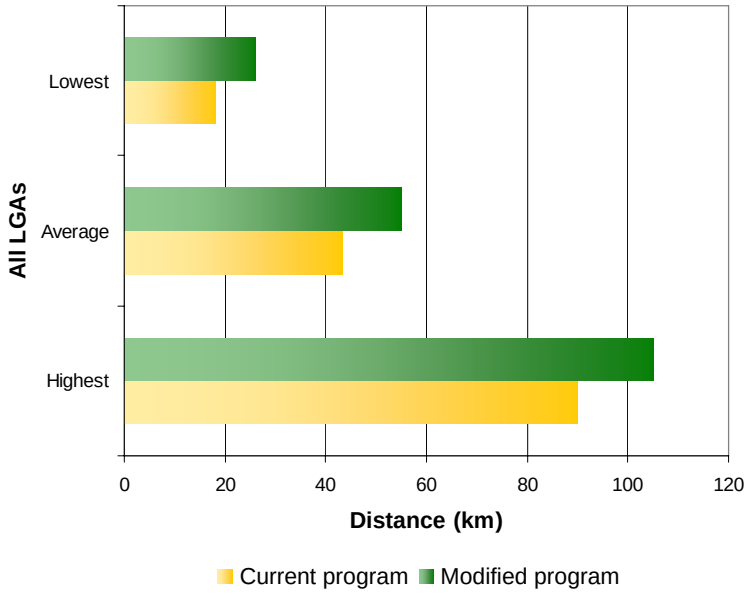


Table 11: Maximum travel distances in country LGAs with multiple collection sites – under current program arrangements and a modified program with a reduced number of sites

LGA	Current program				Possible modified program			
	No of sites	Locations	Max travel distance, km	Comments	No of sites	Locations	Max travel distance, km	Comments
Alexandrina	2	Goolwa Strathalbyn	35	From W boundary of LGA to Goolwa	1	Strathalbyn	50	From W boundary of LGA to Strathalbyn
Barossa	2	Tanunda Mt Pleasant	28	From W boundary of LGA to Tanunda	1	Tanunda	38	Mt Pleasant to Tanunda
Barunga West	2	PtBroughton Bute	28	From SE of LGA to Bute	1	Bute	47	From N of LGA to Bute
Berri Barmera	2	Berri Barmera	18	From SE corner of LGA to Berri	1	Berri	26	From NW corner of LGA to Berri
Clare and Gilbert Valleys	2	Clare Riverton	24	From S of LGA to Riverton	1	Auburn	42	From N of LGA to Auburn
Coorong	3	Tailem Bend Coonalpyn Meningie	54	SE corner of LGA to Coonalpyn	2	Tailem Bend Coonalpyn	55	Meningie to Tailem Bend
Elliston	2	Elliston Lock	65	Port Kenny to Elliston	2	Elliston Lock	65	Suggest no change from present arrangements
Flinders Ranges	2	Hawker Quorn	35	From mid-LGA to either Hawker or Quorn	2	Hawker Quorn	35	Suggest no change from present arrangements
Goyder	4	Hallett Burra Robertstown Eudunda	35	From N of LGA to Hallett	1	Burra	67	From N of LGA to Burra
Kangaroo Island	3	Parndana Kingscote Penneshaw	66	From extreme W of LGA to Parndana	1	Kingscote	105	From extreme W of LGA to Kingscote
Light Regional	2	Kapunda Freeling	44	SW corner of LGA to Freeling	1	Freeling	48	NE corner of LGA to Freling

Table 11: Maximum travel distances in country LGAs with multiple collection sites – under current program arrangements and a modified program with a reduced number of sites

LGA	Current program				Possible modified program			
	No of sites	Locations	Max travel distance, km	Comments	No of sites	Locations	Max travel distance, km	Comments
Lower Eyre Peninsula	2	Coffin Bay Cummins	90	NW corner of LGA to Coffin Bay	2	Coffin Bay Cummins	90	Suggest no change from present arrangements
Loxton Waikerie	2	Loxton Waikerie	75	SE corner of LGA to Loxton	2	Loxton Waikerie	75	Suggest no change from present arrangements
Mallala	2	Mallala Two Wells	23	From W of LGA to Mallala	1	Mallala	28	From S of LGA to Mallala
Mid-Murray	4	Morgan Truro Cambrai Mannum	50	From E boundary of LGA to Cambrai	3	Morgan Truro Mannum	55	From mid-LGA to Mannum
Mt Gambier & Grant	2	Mt Gambier PtMcDonnell	40	From NW corner of LGA to Mt Gambier	1	Mt Gambier	40	NW corner of LGA to Mt Gambier would still be the longest distance (Pt McDonnell to Mt Gambier is shorter)
Murray Bridge	2	Murray Bdge Mypolonga	37	From E boundary of LGA to Murray Bridge	1	Murray Bdge	37	From E boundary of LGA to Murray Bridge would still be the longest distance (Mypolonga to Murray Bridge is shorter)
Narracoorte - Lucindale	2	Narracoorte Lucindale	35	From N boundary of LGA to Narracoorte	1	Narracoorte	60	From W boundary of LGA to Narracoorte
Northern Areas	4	Georgetown Jamestown Laura Spalding	30	From N boundary of LGA to Jamestown	1	Jamestown	63	From S boundary of LGA to Jamestown
Port Pirie	2	Port Pirie Crystal Br'k	35	From S boundary of LGA to Crystal Brook	1	Port Pirie	50	From S boundary of LGA to Port Pirie

Table 11: Maximum travel distances in country LGAs with multiple collection sites – under current program arrangements and a modified program with a reduced number of sites

LGA	Current program				Possible modified program			
	No of sites	Locations	Max travel distance, km	Comments	No of sites	Locations	Max travel distance, km	Comments
Southern Mallee	2	Lameroo Pinnaroo	40	From W boundary of LGA to Lameroo	1	Lameroo	40	Max distance unchanged if Pinnaroo collection is eliminated (distance from E boundary of LGA to Lameroo same as from W boundary)
Streaky Bay	3	Streaky Bay Wirrulla Poochera	50	From S boundary of LGA to Streaky Bay	1	Streaky Bay	65	Wirrulla to Streaky Bay
Tatiara	3	Padthaway Bordertown Keith	70	From N of LGA to Bordertown	1	Bordertown	70	Max distance unchanged if 1 collection held in Bordertown. Distance from Keith or Padthaway to Bordertown is shorter.
Wakefield (Stage 2)	3	Hamley B'dge Balaklava Blyth	41	From W boundary of LGA to Blyth	1	Balaklava	60	From N boundary of LGA to Balaklava
Wakefield (Stage 4)	3	Brinkworth Snowtown Owen	34	From centre of LGA to either Brinkworth or Owen	1	Balaklava	60	From N boundary of LGA to Balaklava
Wattle Range	4	Beachport Millicent Kalangadoo Penola	30	From N boundary with Fox/Coles Hundreds of Narracoorte-Lucindale LGA to Millicent	2	Penola, Millicent	35	Beachport to Millicent
Yorke Peninsula	4	Maitland Yorketown Minlaton Warooka	55	From Southernmost tip of LGA to Warooka	2	Maitland, Yorketown	75	From Southernmost tip of LGA to Yorketown
Total of all LGAs	**70**				**36**			

2.1.3 Program costs

The overall costs of the ZWSA Household and Farm Chemical Collection Program since inception are shown in Table 13.

Table 13: Program Costs

Year ending	Corresponding program "Stage" (approximate)	Overall program cost, including GST, excluding ZWSA staff salaries[5] $000
June 2004	1	165
June 2005	2	669
June 2006	3	1,176
May 2007[6]	4	375

Cost data for Stages 1, 3 and 4 of the program has been provided by ZWSA broken down by individual LGA and further subdivided by the following headings:

- Up-front costs, including printing of brochures and some marketing costs (Jon Lamb Communications)[7]
- Transport cost (per km) paid to the Contractor for country collections
- Consumable items (container liners, buckets, drums etc)
- Equipment hire by the contractor, eg forklifts
- Contractor labour
- Disposal costs for the collected chemicals.

(Note: this breakdown was not available for Stage 2).

Of the above costs, we have classified the first five items as "fixed" costs. As an approximation, it could be said that these costs would have been incurred had not one kg of chemicals been collected at a given site (this is not strictly true, as "consumables" are a variable cost, but the impact of this is small, and this approach is a convenient way of looking at the costs of a collection program that we have used in other jurisdictions).

Disposal costs are a true variable cost, and depend on the quantity and types of chemicals collected.

[5] Source: ZWSA Business Manager, GL Inquiry Account Code Detailed Report for each year. For consistency with Table 13, we have added GST and deducted ZWSA staff salaries in Table 13.

[6] Data not yet available for the full year

[7] The bulk of the marketing expenditure was borne by the individual Councils

These costs have been summarised in Table 14 below by Stage and by type of area (ie. Metropolitan, Far country, Near country and regional centres).

There is a slight discrepancy between the costs in Tables 13 and 14; the main reason for this is that some of the Stage 1 expenditure is included in the 2004-05 financial year in Table 13. There may be minor items that have not been included in Table 14, but the differences are not significant.

It can be seen from Table 14 that the total costs of country collections (Far country, Near country and Regional Centres taken together) amount to $1.05M out of the total expenditure of $1.71M for Stages 1, 3 and 4, ie. 61.5% of total program costs, whilst accounting for only 50% of the collected tonnes (Table 6) and 21% of participants (Table 7). Much of this difference in cost arises from the fact that agricultural chemicals comprise a significant proportion of the materials received at country collections, and are more expensive to treat and dispose of.

Table 14: Fixed and variable costs of Stages 1, 3 and 4 by area type ($'000s, including GST, excluding staff salaries)

Area | Cost Type	Stage 1	Stage 3	Stage 4	Total (Stages 1, 3 & 4)
Metropolitan				
Fixed costs	97.1	220.6	38.0	355.7
Disposal costs	65.9	211.7	25.2	302.7
Total costs	**163.0**	**432.3**	**63.1**	**658.4**
Far country				
Fixed costs	24.0	336.0	107.3	467.3
Disposal costs	0.3	185.8	47.1	233.2
Total costs	**24.3**	**521.8**	**154.4**	**700.5**
Near country				
Fixed costs	-	35.0	66.7	101.7
Disposal costs	-	37.5	68.3	105.8
Total costs	**-**	**72.5**	**135.0**	**207.5**
Regional Centres				
Fixed costs	21.4	74.8	-	96.2
Disposal costs	2.4	43.5	-	45.8
Total costs	**23.8**	**118.3**	**-**	**142.0**
Total all areas				
Fixed costs	142.4	666.5	212.0	1,020.9
Disposal costs	68.6	478.4	140.6	687.6
Total costs	**211.0**	**1,144.9**	**352.6**	**1,708.5**

Table 15 shows these costs expressed in dollars per kg of collected chemicals. The totals for Stages 1, 3 and 4 are presented graphically in Figure 9.

The following observations can be made about these costs:

- The overall average cost of $3.39 per kg[8] for Stages 1, 3 and 4[9] is comparable with the overall average of $3.28 per kg achieved in the NSW "CleanOut" program in 2004-05, but is considerably higher than the $1.90 per kg achieved by the Sustainability Victoria program over the same period (2004-05). Sustainability Victoria do not, however accept materials from farmers, have a limit on the maximum container size of 20 litres, and like the NSW Clean Out Program do not have the distances to travel compared with South Australia. The NSW Clean Out program does not cover distant country areas and is confined to the Metropolitan, Hunter and Illawarra regions of NSW, so the comparison with NSW is favourable.

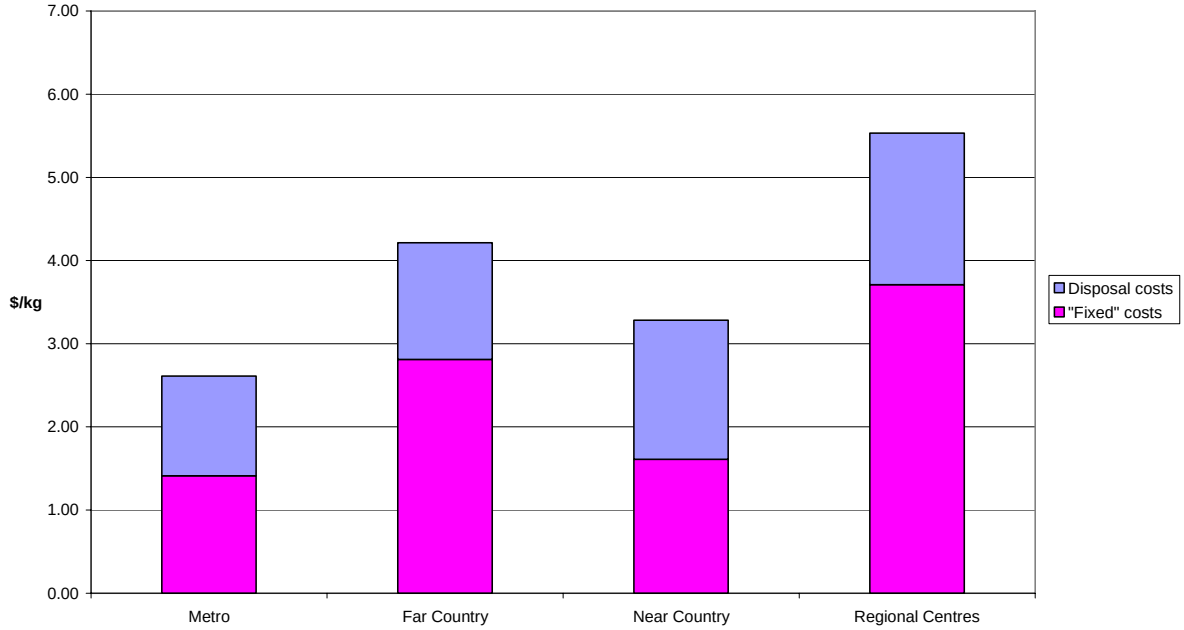
Table 15: Fixed and variable costs per kg of Stages 1, 3 and 4 by area type
($ per kg collected chemicals, incl GST, excl staff salaries)

Area | Cost Type	Stage 1	Stage 3	Stage 4	Total (Stages 1, 3 & 4)
Metropolitan				
Fixed costs	1.57	1.29	2.03	1.41
Disposal costs	1.07	1.23	1.34	1.20
Total costs	**2.64**	**2.52**	**3.37**	**2.61**
Far country				
Fixed costs	24.58[10]	2.51	3.40	2.81
Disposal costs	0.29	1.39	1.49	1.40
Total costs	**24.87**[8]	**3.90**	**4.89**	**4.22**
Near country				
Fixed costs	0	1.63	1.60	1.61
Disposal costs	0	1.75	1.64	1.67
Total costs	**0**	**3.38**	**3.23**	**3.28**
Regional Centres				
Fixed costs	6.40	3.94	0	4.31
Disposal costs	0.70	2.29	0	2.05
Total costs	**7.10**	**6.24**	**0**	**6.37**
Total all areas				
Fixed costs	2.16	1.93	2.30	2.03
Disposal costs	1.04	1.38	1.53	1.36
Total costs	**3.20**	**3.31**	**3.83**	**3.39**

[8] Excluding staff salaries
[9] This figure becomes $3.50 per kg if the costs in Table 12 are used, which include Stage 2.
[10] 'Exception' result due to small number of 'Far country" collections and very low attendances in Stage 1

- Disposal costs per kg are roughly similar in all areas (as is to be expected), although they are higher in the country than in the city, because of the higher proportion of high-cost materials collected (such as pesticides)
- Fixed costs per kg in the Far country of SA are double those for the Metropolitan area ($2.81 per kg vs $1.41 per kg).
- Costs per kg are very high in the regional centres. This is because of the generally very low quantities of materials collected in the regional centres. In particular the very high fixed cost per kg for regional centres depicted in Fig 8 may have been due to the very low quantity collected in the Port Pirie collection in Stage 3, so the calculation has been repeated omitting the Port Pirie result, and it can be seen that, while the result is somewhat lower, it is still much higher than in the Metropolitan collections.
- Overall costs per kg in country areas (Far country, Near country and regional centres) of $3.09 per kg compare favourably with the overall costs achieved in ChemCollect in South Australia (of the order of $4.26 per kg)
- Progressive increases in both fixed and disposal costs per kg are apparent from Stage to Stage.

Figure 9 Achieved "fixed" and disposal costs, $/kg, for different areas (Total of Stages 1, 3 and 4) - Port Pirie omitted



2.2 Dry Creek Household Hazardous Waste Depot

2.2.1 Description of the program

The Dry Creek Hazardous Waste Depot is unique in Australia. It was constructed in the early 1990s in response to a perceived need for such a facility, and has been operating continuously since then. It now forms a complementary program to the ZWSA Household and Farm Chemical Collection Program, providing an alternative opportunity for householders and farmers to surrender unwanted chemicals.

The Depot is open to the public for three hours once a month, plus 3-4 weekend days per year and accepts the same wide range of hazardous materials that are accepted in the ZWSA program. On the days the Depot is open, it is operated by EPA staff, with some assistance from a private sector contractor (Transpacific Industries). The chemicals are stored on site under appropriate conditions until disposal is arranged (except for organochlorine pesticides, for which there is currently, in effect, no disposal route in Australia, and which are, therefore, accumulated in an off-site storage facility until disposal can be effected). The management of the Depot, including the planning and arrangement of appropriate disposal of the collected materials, is totally under the control of the South Australian EPA, but the operation is funded by ZWSA.

Concern has been expressed by the EPA concerning risks associated with the operation of the site, particularly the unattended storage of chemicals in the periods between collections. There have been several break-ins and instances of vandalism at the site. The site is physically very small, and most of it is taken up with structures used for storing the received materials. On opening days, only two vehicles are admitted onto the site at a time, both because of space constraints and to reduce risk in case of an accident. There is usually a queue of several vehicles outside the Depot, which spills onto an adjacent street. This generally does not cause significant problems, since the site is located in a quiet street in an industrial area and there are no residences nearby.

All appropriate regulatory approvals for the Depot's operation are in place, with a possible exception of approval under the Agricultural and Veterinary Products (Control of Use) Act 2002, which has been sought and is awaiting determination. Apart from the concerns about risk mentioned above, there appear to be no other pressures to close the Depot, such as unfavorable publicity or the need for the site for other purposes.

2.2.2 Analysis of program results to date

A detailed record has been kept since November 2002 on the number of participants on each opening day and their postcodes of origin. The results since that date up to and including 3 July 2007 are summarised by area type in Table 16.

It can be seen that a vast majority (over 98%) of the participants came from the Metropolitan area. Although the total number of participants from country areas is small, the distances covered by some of them are quite remarkable–including 13 participants in the period from the Copper Coast (Upper Yorke Peninsula), 9 from the Riverland and one from Cockburn (on the NSW border near Broken Hill).

Table 16: Total participants at Dry Creek since November 2002 by area type

Area of origin of participants	No of participants
Metropolitan	6012
Far country	35
Near country	66
Regional centres	0
Total	**6113**

The total numbers in Table 16 translate to approximately 1,200 participants per year. Attendances on each opening day have been remarkably steady since November 2002 at an average of 80 per event (with a standard deviation of 16.5). There has been no overall upward or downward trend in attendance since November 2002.

The program appears to be well known throughout Adelaide and in rural SA. A common theme in our discussions with Council officials in Eastern and Southern Metropolitan areas has been the unwillingness of householders in these areas to undertake the relatively long journey to Dry Creek. Table 17 supports this view, showing that nearly half the participants at Dry Creek came from Northern Metropolitan areas and the balance from all other areas of Adelaide and the country.

Another frequently-expressed negative comment by Councils has been the very low frequency of opening of the Depot (3 hours per month plus one weekend day every 3-4 months).

Table 17: Percentage of participants at Dry Creek from various parts of the Metropolitan area since November 2002

Area of origin of participants	% of total participants
Metropolitan - North	46.9
Metropolitan - Centre	24.3
Metropolitan - West	4.1
Metropolitan - East	11.1
Metropolitan - South	12.0
Total for metropolitan area	**98.4**
All country areas	1.6%
All areas	100%

In order to determine the extent to which the program is being patronized by repeat attendees, we have requested the EPA to ask participants whether they had used the program before. At the 7 August 2007 opening, only 10% of the participants were repeat attendees, but at the 4 September 2007 collection, this percentage was 28%, suggesting that Dry Creek caters for a substantial proportion of "repeat business".

The quantities of materials brought in on any one opening day are not measured. However, annual quantities of the main categories of materials, determined by movements out of the Depot, have been reported as indicated in Table 18 (Ref 1).

Table 18: Principal materials collected at Dry Creek, 2003-04 year

Material[11]	Quantity
Water-based paint	8,500 L
Solvent-based paint	16,000 kg
Used oil	12,800 L
Lead-acid batteries	2,500 kg
Solvents	3,595 L
Corrosives	1,354 L
Arsenic	98 kg
BCF fire extinguishers	60 kg
Pharmaceuticals	30 kg
Smoke detectors	20 kg

This total translates, very roughly, to 45 tonnes, if it were reported in the same terms as quantities are reported in the ZWSA program. (This is because, though some of the materials collected in the Dry Creek program are bulked and reported in **litres (L)**, the quantities reported in the ZWSA program include the mass of the containers, with the net effect that the two sets of figures could be considered to be roughly equivalent).

It can thus be seen that the Dry Creek Depot collects, on an annual basis, around 30% of what the ZWSA program collected in Stage 2, and around 15% of what the ZWSA program collected in Stage 3 (which was, admittedly, an unusually active year for that program).

We estimate that the total quantity brought into Dry Creek on a typical opening day is around 3.3 tonnes, which is low compared with an average of 12.6 tonnes in the Metropolitan area in the ZWSA collections (but not so surprising, given that the Depot is only open for 3 hours, compared to about 6.5 hours for a ZWSA collection).

[11] Some other materials collected are not included in this Table because they remain in storage at the Dry Creek site.

The average quantity brought in by each participant to Dry Creek is approximately 42kg, which is very much in line with the ZWSA result in the Metropolitan area, and with results of day collections in other jurisdictions.

2.2.3 Program costs

The overall costs of the Dry Creek program since ZWSA has taken over its funding are shown in Table 19.

Table 19: Dry Creek Program Costs

Year ending	Overall program cost, including GST[12] $000
June 2004	141
June 2005	120
June 2006	102
May 2007[13]	91

These costs include EPA and contractor staff salaries and all other costs associated with the collection, storage and disposal of the target materials. Labour costs for EPA staff and contractor staff are typically $35,000 and $10,000 per year respectively, with the balance being disposal and all other costs.

The progressive decrease in the total cost of the operation over the past four years reflects the considerable cost reduction efforts made by the EPA staff, including actions such as bulking up of water-based paints to obtain better disposal rates from disposal contractors.

Taking an average annual cost (including GST) as, say, $120,000 pa equates to a per kg cost of approximately **$2.67 per kg**, which compares favorably with an average Metropolitan cost per kg in the ZWSA program of **$2.61 per kg**.

[12] Source: ZWSA Business Manager, GL Inquiry Account Code Detailed Report for each year. For consistency with Table 13, we have added GST to these numbers. There is no ZWSA staff salary component in Table 18.
[13] Data not yet available for the full year

3 Options – Chemical Collection Program

The Brief for this consultancy defined **six** options for the future of the program:

Option 1 Continuation of the program in its current form;
Option 2 Establishment of permanent drop-off point(s) for HVLT (high volume low toxicity) materials, operated by Councils or by the private sector;
Option 3 Establishment of a number of permanent metropolitan locations for all chemicals;
Option 4 Modification of the existing program to undertake metropolitan collections on a broader regional basis, rather than Council by Council;
Option 5 At-call and telephone booking service;
Option 6 Combinations of the above that meet the program goals and objectives, as specified in the Brief.

In this section we outline the results of specific research into the feasibility of several of these Options, and significant features of each. In the subsequent Evaluation section we model and compare the performance and costs of the options in a number of scenarios.

3.1 Permanent HVLT drop-off points (Option 2)

3.1.1 Metropolitan Adelaide

Option 2 entails the establishment of a number of permanent drop-off facilities for what is generally referred to as High Volume Low Toxicity (HVLT) materials, ie. paint, used oil and lead-acid batteries. We have also included LPG gas cylinders in this category, since, though their volumes collected in this program to date are not large, they are traditionally included in this category in other jurisdictions. We also recommend including fluorescent tubes and bulbs which are now increasingly being used by households to reduce energy consumption and present a risk due to their mercury content. Although manufacturers are reducing mercury content, other jurisdictions do include fluorescent tubes and bulbs in their programs.

Experience from interstate and overseas suggests that the collection of HVLT could be a lower-cost option on a per kg basis compared with holding day collections at temporary sites. To determine the feasibility of this Option, we held discussions with Council officers and facility operators in the following metropolitan LGAs:

City of Mitcham
City of Onkaparinga
City of Tea Tree Gully
City of Port Adelaide Enfield
City of Charles Sturt
City of West Torrens
City of Burnside
City of Playford
City of Salisbury
City of Campbelltown

A summary of potential locations, together with any modifications required at each site to accommodate an HVLT drop-off point, and the estimated cost of these modifications is given in Table 20.

We have identified 12 sites in the Metropolitan area, which could potentially serve as permanent drop-off and storage facilities for HVLT materials. Adequate coverage of the Metropolitan area from the point of view of accessibility and convenience to the public could probably be obtained with no more than **five** such facilities.

The potential sites fall into two categories: Council-owned and privately-owned sites. Many of the privately-owned sites already accept some or all of the HVLT materials **at a charge** to the user, and make a profit on the operation. Thus, assuming that ZWSA would wish that the acceptance of these materials at the newly-established HVLT drop-off point should be free of charge to the householder, some operators have expressed the wish to be reimbursed for any loss of profit from this activity. We have estimated the magnitude of such possible reimbursement in Table 20.

An important characteristic to be taken into account in selecting sites for permanent HVLT drop-off points is the existence of current EPA approvals to accept such materials, and/or the anticipated difficulty of applicants to meet the requirements to obtain such approvals. A further important feature of the sites is their availability to the public on weekends (which is when the greatest patronage is expected). Finally, it should be noted is that there are two possible ways of dealing with used oil: either via bulk tanks (which is more common and more economical) or via skips or crates into which the public stack individual containers of oil and which are then taken away by a contractor and replaced with empty ones (the way this is currently done by Onkaparinga Council). Thus the presence of existing bulk oil tanks is an advantage of some sites.

The desirable site characteristics for potential HVLT sites may thus be summarised as follows:

- Convenient accessibility to major population areas;
- Existing EPA licences in place to accept target materials, or perceived ease of obtaining licence amendments;
- Willingness of the owner and/or operator to accept HVLT materials free of charge, without the need for any reimbursement of lost profit by ZWSA;
- Availability to the public on weekends;
- Presence of an existing bulk tank for used oil.

Table 20 below includes the conformance of each of the sites with these criteria.

Table 20: Opportunities for locating HVLT drop-off facilities within the Adelaide Metropolitan Area

LGA	Council or private facility	Accessibility to the public	EPA licenses in place?	Weekend operation?	Existing bulk oil tank?	Subsidy on HVLT materials required?	Estimated magnitude of subsidies	Modifications required	Estimated capital cost of modifications
Onkaparinga • Council's Field Operations Centre, Railway Road, Seaford Meadows	Council	Good	Yes, for oil only	No	No[14]	No, ZWSA to pay standard collection and disposal fees	-	• Bunded concrete slab and 3-sided roofed shed for all 4 materials • Signage	Shed $ 8,000 Signage $ 5,000 Total $ 13,000
• Lonsdale Recycling Facility (SA Waste Management Pty Ltd, 10 Donegal Rd, Lonsdale)	Private	Good	Yes	Yes	Yes, but needs upgrading or replacing	Yes	• 15 c/litre on used oil • $1 per kg on gas cylinders • 0 on paint • 0 on batteries (leave operator to dispose of batteries as at present).	• Bunded concrete slab and 3-sided roofed shed for paint, batteries and gas cylinders; • Oil tank upgrade desirable; • Signage	Shed $ 7,000 Signage $ 5,000 Oil tank $13,000 Total $ 25,000

[14] They had a Gunnedah Industries bulk oil tank, but have decommissioned it because of OH&S concerns with slippery metal surfaces, etc

Table 20: Opportunities for locating HVLT drop-off facilities within the Adelaide Metropolitan Area

LGA	Council or private facility	Accessibility to the public	EPA licenses in place?	Weekend operation?	Existing bulk oil tank?	Subsidy on HVLT materials required?	Estimated magnitude of subsidies	Modifications required	Estimated capital cost of modifications
Onkaparinga (cont[d]) • Southern Waste Depot (landfill), Maslin Beach	Private	Good for people in far South of Metro area	Yes for oil & batteries, need to extend to paint	Yes	No (they use bulky bins)	No	-	• Provide new oil tank & use existing shed for paint, batteries & cyls • Signage	Oil tank $ 13,000 Signage $ 5,000 Total $ 18,000
• Southern Region Waste Transfer and Recycling Centre (All Bulk Waste, 12 Christie Road, Lonsdale)	Private	Good	Yes for oil, batteries	Yes	No	Yes	• Suggest 15 c/litre on used oil for uniformity with Lonsdale Recycling Facility • $1 per kg on gas cylinders • 0 on paint • 15c per kg[15] on batteries (leave operator to dispose of batteries).	• Signage only (facility would be within existing building). • New bulk oil tank.	Signage $ 5,000 Oil tank $13,000 Total $ 18,000

[15] This is equivalent to $2 per battery currently charged by SRWTR, assuming each battery on average weighs 14kg

Table 20: Opportunities for locating HVLT drop-off facilities within the Adelaide Metropolitan Area

LGA	Council or private facility	Accessibility to the public	EPA licenses in place?	Weekend operation?	Existing bulk oil tank?	Subsidy on HVLT materials required?	Estimated magnitude of subsidies	Modifications required	Estimated capital cost of modifications
• Southern Region Waste Disposal Depot (landfill)	Council (Regional Authority)	Good for people in far South of Metro area	Yes for oil	Yes	Yes	Probably not (subject to approval by SRWRA Board)	-	• Bunded concrete slab and 3-sided roofed shed for paint, batteries and gas cyl's; • Oil tank roof • Signage	Shed $ 10,000[16] Signage $ 5,000 Oil tank roof $5,000 Total $ 20,000
• Lonsdale "Carbon Park"	The "Carbon Park" exists only in a conceptual stage. Government and private sector partners are being sought to establish carbon-friendly industries on land owned by Council. Hazardous waste facilities have not so far been considered as part of the plan; however, an HVLT reception facility would be in keeping with the general intent of the site. It is, however, far too early to consider specifics of location, etc.								
Tea Tree Gully • Council's closed landfill in Smart Rd	Council	Good	Yes for oil only	Every second Sunday only. No weekday operation	Yes	No	-	• Bunded concrete slab and 3-sided roofed shed for paint, batteries and gas cylinders • Signage	Shed $ 5,000 Signage $ 5,000 Total $ 10,000

[16] Allows $3000 for site preparation

Table 20: Opportunities for locating HVLT drop-off facilities within the Adelaide Metropolitan Area

LGA	Council or private facility	Accessibility to the public	EPA licenses in place?	Weekend operation?	Existing bulk oil tank?	Subsidy on HVLT materials required?	Estimated magnitude of subsidies	Modifications required	Estimated capital cost of modifications
Charles Sturt • Welland Recycling Centre	Private	Good	Yes	Yes	No	Yes	• Suggest 15 c/l on used oil for uniformity with Lonsdale Facility • $1 per kg on gas cylinders • 0 on paint • There should be a CREDIT to ZWSA of 15c per kg on batteries, as this is what the Welland currently pays householders	• Bunded concrete slab and 3-sided roofed shed for all 4 materials (this assumes using container system for oil as at Onkaparinga Works Depot) • Alternatively, complete new bulk tank assembly for used oil • Signage	If use oil containers as at Onkaparinga Council: Shed $ 5,000 Signage $ 5,000 Total $ 10,000 If oil in bulk: Shed $ 4,000 Signage $ 5,000 Oil tank $13,000 Total $ 22,000

Table 20: Opportunities for locating HVLT drop-off facilities within the Adelaide Metropolitan Area

LGA	Council or private facility	Accessibility to the public	EPA licenses in place?	Weekend operation?	Existing bulk oil tank?	Subsidy on HVLT materials required?	Estimated magnitude of subsidies	Modifications required	Estimated capital cost of modifications
Port Adelaide- Enfield • Integrated Waste Services Wingfield	Private	Good	Yes	Yes	No	Yes	• Suggest IWS be offered a reimbursement of 15 c/litre on used oil for uniformity with Lonsdale Recycling Facility • 0 on gas cylinders • Suggest IWS be offered a reimbursement of 15 c/litre on paint • 0 on batteries	• Bunded concrete slab and 3-sided roofed shed for all 4 materials (this assumes using container system for oil as at Onkaparinga Council Depot) • Alternatively, complete new bulk tank assembly for used oil • Signage	If use oil containers as at Onkaparinga Council: Shed $ 8,000 Signage $ 5,000 Total $ 13,000 If oil in bulk: Shed $ 6,000 Signage $ 5,000 Oil tank $13,000 Total $ 24,000
• WasteCare, Wingfield	Council (group of six)	Good	Yes	Yes	Yes	No	-	Signage only (drop-off point would be located inside existing building)	Signage $ 5,000 Total $ 5,000
West Torrens • Adelaide Waste & Recycling Centre, North Plympton	Council (run by private sector)	Good	Yes	Yes	Yes	No	-	• General tidy-up and integration of area only – use existing shed and existing bulk oil tank • Signage	Signage $5000 General tidy-up $2000 Total $7,000

Table 20: Opportunities for locating HVLT drop-off facilities within the Adelaide Metropolitan Area

LGA	Council or private facility	Accessibility to the public	EPA licenses in place?	Weekend operation?	Existing bulk oil tank?	Subsidy on HVLT materials required?	Estimated magnitude of subsidies	Modifications required	Estimated capital cost of modifications
Salisbury • Council Waste Transfer Station, Research Rd, Pooraka	Council	Good	Yes for oil, gas cyl's & batteries, need to extend to paint	Yes	Yes	No	-	• Modification to existing sheds for paint, gas cyl's & batteries • Signage	Mods to shed $ 6,000 Signage $ 5,000 Total $ 11,000
Burnside • Council Works Depot	Council	Good	No	No	No	No	-	• Bunded concrete slab and 3-sided roofed shed for paint, batteries and gas cylinders • Complete new bulk tank assembly for used oil; otherwise use container system for oil as at Onkaparinga Council Depot • Signage	If use oil containers as at Onkaparinga Council: Shed $ 9,000 Signage $ 8,000 Total $ 17,000 If oil in bulk: Shed $ 5,000 Signage $ 8,000 Oil tank $13,000 Total $ 26,000
Campbelltown • Transfer Station, Virginia Rd, Newton	Council (operated by Whelan Kartaway)	Good	We have examined the transfer station and conclude that it would not be suitable for the establishment of an HVLT drop-off facility						

On the basis of the evaluation in Table 20, we recommend that only the following sites be considered for an establishment of ZWSA-funded HVLT drop-off points:

Table 21: Recommended locations for ZWSA-funded HVLT drop-off points

LGA	Location	Comments / Rationale
City of Onkaparinga	Southern Waste Depot (landfill), Maslin Beach	• Reasonably well located for Southern areas • Require no reimbursement on profit loss • Existing, very well run operations for receiving batteries and gas cylinders
City of Onkaparinga (optional 2nd location)	Council Field Operations Centre, Seaford Meadows	• Closer to centre of Onkaparinga LGA • Require no reimbursement on profit loss • Enthusiasm on part of Council to establish something here • Existing drop-off point for oil • Disadvantage: not open on weekends (but willing to consider weekend opening)
City of Port Adelaide - Enfield	WasteCare facility, Wingfield	• Good location for near-Northern and Central metropolitan areas • Require no reimbursement on profit loss • Existing building, minimal changes required (signage only)
City of West Torrens	Adelaide Waste and Recycling Centre (Solo industries)	• Good location for Western Metro areas, reasonable for East and near-South areas • Require no reimbursement on profit loss • Already accept all HVLT materials • EPA licences in place • Minimal capital cost of any changes required
City of Salisbury	Transfer station, Research Rd, Pooraka	• Reasonable access to Northern areas (not really far enough North, but we were unable to identify a suitable site in City of Playford) • Require no reimbursement on profit loss • Reasonably low cost modifications of existing facilities
City of Burnside	Council Works Depot, Glynburn Road, Hazelwood Park	• Excellent location for Eastern area • Require no reimbursement on profit loss • Willingness of Council to provide this facility • Disadvantage: no weekend operation, but unable to find other suitable location in Eastern suburbs

Figure 10 shows the above six locations projected onto a map of Adelaide. It can be seen that these five or six locations would provide a reasonable coverage of the Metropolitan area. Ideally, a site further North than Salisbury would have been desirable, as also would a location in the near-Southern sector (eg at Mitcham), but unfortunately we have not been able to identify suitable locations in our discussions with Councils and private operators.

Figure 10
Locations of preferred HVLT drop-off points in Metropolitan Adelaide

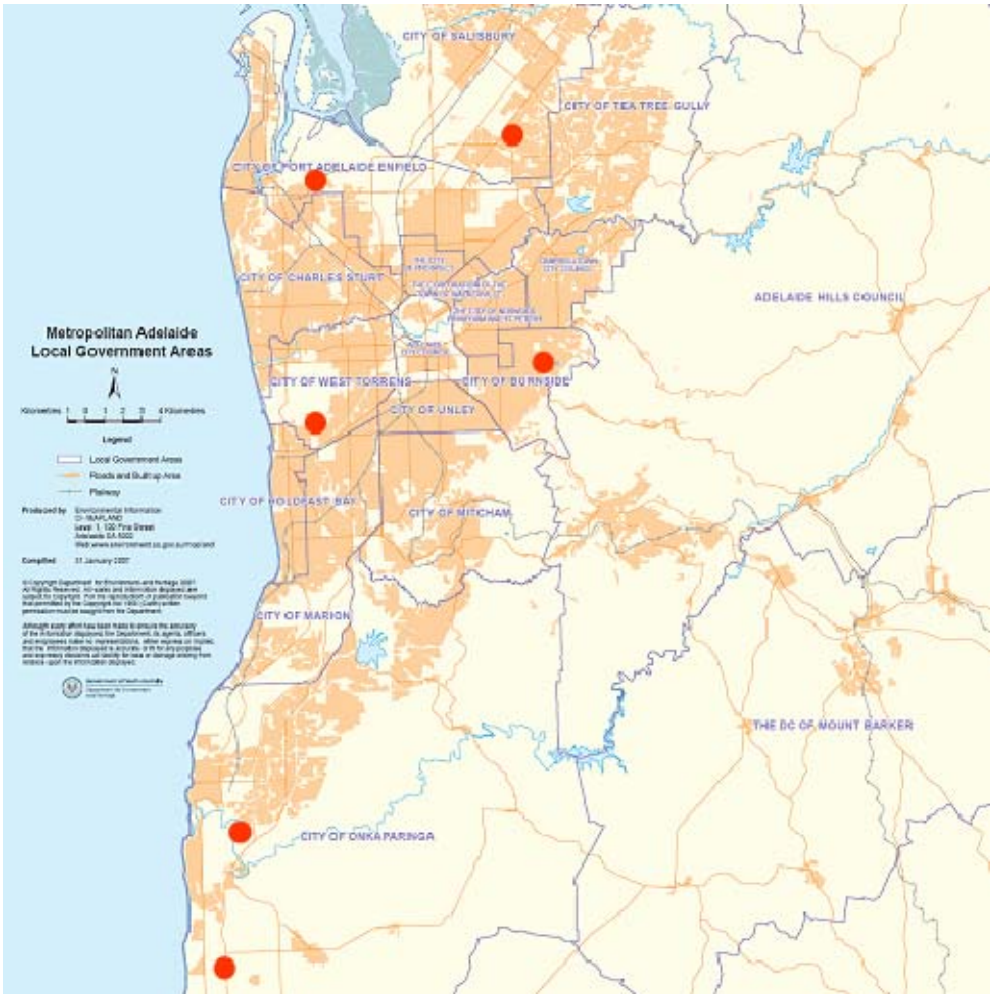


Table 22 shows the estimated annual quantities of the four HVLT materials that might be collected at the permanent drop-off points in the five LGAs listed in Table 21. These quantities have been estimated using the following rule of thumb: it has been observed in the Darebin and Banyule permanent facilities in Melbourne that the annual quantity of the four HVLT materials is about **four** times the quantity collected at a one-day collection within the same area (elsewhere, eg in Geelong, Victoria and in New York State – see Ref 2 – this factor is closer to 2, but we have conservatively assumed it to be 4).

It can be seen that the total quantities thus predicted for the five LGAs far exceed the total annual quantities collected in the Metropolitan area in the ZWSA collections (eg in Stage 3), however this is to be expected, as permanent facilities offer year-round accessibility for householders to drop their unwanted materials, rather than a once-yearly opportunity.

Except for the low quantities of gas cylinders – which is a peculiarly South Australian phenomenon - these quantities are broadly in line with what is currently being collected in the Sustainability Victoria program in LGAs with similar populations.

The corresponding weekly quantities are shown in Table 23.

We would recommend that the containers to be used for collecting and transporting paint (and used oil, where this is to be moved in its original receptacles) should be, if possible, fully-welded steel containers with hinged closures, such as those used in the Sustainability Victoria program. If this is not possible for commercial reasons, then a lined collapsible container, such as the CHEP CB4 may be considered. The type of container used will determine the floor space required for each system, as smaller containers would require more floor space (because more containers would be required per week).

Table 22: Estimated annual quantities of HVLT materials that may be collected at permanent HVLT drop-off points in various LGAs[17] (tonnes gross)

LGA	Total paint	Used oil	Lead-acid batteries	LPG gas bottles
Onkaparinga	23	11	6	0.1
Port Adelaide Enfield	18	10	8	0.2
West Torrens	42	26	15	0.1
Salisbury	20	11	5	0.2
Burnside	59	14	16	0.3
Total	**162**	**72**	**50**	**0.9**
Total collected in metro area in Stage 3 (for comparison)	72	35	25	0.7

[17] These figures are lower than those supplied in our Request for Quotation to Transpacific Industries on 25 July 2007, which erred on the high side. The indicative costs, which have been supplied by TPI in response to the above RFQ have been adjusted by us to correspond to the revised quantities

Gas cylinders may be collected and transported in steel cages or similar non-enclosed containers to ensure compliance with Clause 9.3.2 of the ADG Code.

Lead-acid batteries (which are Dangerous Goods Class 8) may be collected on timber pallets, provided that these are placed within a bunded area at the collection point, that a supply of water is available nearby and that suitable signage is in place to indicate the corrosive nature of the contents.

For the purposes of this report, we have estimated the capital costs of the modifications required at each location on the basis of the estimated weekly quantities of each of the four materials as shown in Table 23 and on the dimension of a 1.2 m^3 steel box, such as those used in Victoria. This results in the weekly number of container movements from each of the six locations as outlined in Table 24.

Table 23: Estimated weekly quantities of HVLT materials that may be collected at permanent HVLT drop-off points in various LGAs (tonnes gross)

LGA	Total paint	Used oil	Lead-acid batteries	LPG gas bottles
Onkaparinga	0.4	0.2	0.12	0.002
Port Adelaide Enfield	0.4	0.2	0.1	0.003
West Torrens	0.8	0.5	0.3	0.002
Salisbury	0.4	0.2	0.1	0.005
Burnside	1.1	0.3	0.3	0.005

Table 24: Estimated weekly numbers of container movements from each location

LGA	Total paint	Used oil	Lead-acid batteries Note 1
Onkaparinga	2	1 Note 2	0
Port Adelaide Enfield	2	0 Note 3	0
West Torrens	4	0 Note 3	0
Salisbury	2	0 Note 3	0
Burnside	5	0 Note 3	0

Notes

1 It is assumed that there would be no movement of lead-acid batteries from each point by ZWSA's contractor – it is assumed that these would be collected directly from each location by a battery recycler.

2 This assumes that oil is moved in containers in the original receptacles in which it is delivered by the public.

3 It is assumed that oil would be handled in bulk from this location.

In addition, based on current low accumulation rates, there would be only an occasional movement of a cage of cylinders from each location.

With ZWSA's approval, we requested a local waste management company to provide an indicative quote for the collection and disposal of paint, oil and gas cylinders from six locations in line with the quantities estimated in Table 23. This quote has been used to calculate the annual costs for this option used in the Evaluation (Section 5) in this report.

In calculating the capital costs in Table 20, we assumed that paint would **not** be segregated into solvent-based and water-based paint at the HVLT drop-off point (it is unreasonable to expect members of the public to segregate paints in this manner, and it would be an impost on the time of the facility host to do so). Thus, paint of both types would be commingled together. Solvent-based paint is Dangerous Goods Class 3 Packaging Group III in accordance with the ADG Code, hence all paint, when commingled together will become Class 3 Dangerous Goods.

Assuming that all HVLT drop-off facilities are serviced weekly by a qualified waste management contractor, the maximum quantities of materials accumulated on site would be the weekly quantities shown in Table 23. All of these quantities are below the threshold for "minor storages" as defined in Australian Standard AS1940 (Ref 8)[18], and thus do not have to be stored in flammable liquid stores. However, certain precautions still apply to minor storages; these include appropriate training of personnel handling flammable liquids, security against unauthorized access and spillage control.

3.1.2 Country Areas

Many country LGAs already have used oil collection facilities in place. Perusal of the Commonwealth Used Oil Recycling website (Ref 3) indicates that 40 of the 49 rural LGAs in the State have used oil collection facilities installed, many at multiple locations.

There would therefore seem to be little point in this program duplicating such facilities.

Experience with this and other programs indicates that, for reasons that are not clearly understood, unwanted or surplus paint is not a high-quantity item surrendered in rural areas (it has been speculated that this relates to the "thrifty" character of country residents, who tend to use up all the paint they purchase, rather than waste it). Therefore, it is not likely that paint drop-off facilities in country areas would collect large quantities of paint.

Lead-acid batteries are already collected by many rural Councils, as they represent a source of revenue. Again, therefore, there would seem to be little point in this program duplicating battery collection facilities.

[18] Table 2.1 of AS1940:2004 defines "minor storages" of Class 3, Packaging Group III materials in detached sheds in factories and warehouses as 1400 litres.

The only other item included in the HVLT category is LPG gas cylinders. We have had limited discussions with country Councils to date and, of these, some interest has been shown by the Barossa Council in possibly accepting gas cylinders. They have requested that guidelines be provided on what such facilities might comprise, and this should be followed up.

On balance, we believe that the prospects for HVLT drop-off facilities being successful in country areas are somewhat limited. Interest in country areas tends to be focused much more on LVHT materials, ie. farm chemicals, and this is discussed in Section 3.5.2 below.

3.2 Regular metro locations for all chemicals (Option 3)

This approach would be to select four strategically-placed locations in the Metropolitan area (probably in the North, South, East and West sectors of Adelaide) where standard one-day collections could be carried out as at present by a qualified contractor. The difference from current operation would be that these locations would always be the same (and not change from year-to-year), so that the public would become accustomed to them. Furthermore, it is envisaged that each location could be open 2-3 times per year, giving a total of 8 to 12 collection days per year in the Metropolitan area.

Table 25 shows the locations that would be most suitable in our opinion for the four sectors of Adelaide, together with an indication of any associated costs:

Table 25: Suitable locations for permanent Metropolitan locations for Option 3

Sector	Location	Comments
South	All Bulk Waste (ABW) facility, Lonsdale	Ideal location for the Southern sector, large drive-through shed. ABW agreeable in principle, would charge site rental fee of only $200 for each occasion
East	Burnside	Ideal location for the Eastern sector, large depot. Council agreeable in principle, would need to be recompensed for staff overtime, estimated at $2,200 per occasion
West	Adelaide Waste and Recycling Centre, North Plympton	Well located for the Western sector, agreeable in principle, would like to be recompensed for staff time, say $2,000 per occasion (estimated by Asterisk One)
North	WasteCare facility, Wingfield	Large facility, separate entrance available to drop-off point, very happy to accommodate this and may not charge any fee

Full costs and performance of this option are again outlined in the Evaluation (Section 5).

3.3 Regional metro collections (Option 4)

This Option comprises holding Metropolitan collections on a regional basis, rather than Council-by-Council. This approach is already starting to be implemented by ZWSA with, for example, a combined collection for the Cities of West Torrens and Marion held in May 2006, a combined collection for the Cities of Holdfast Bay, Marion and West Torrens held on 18 August 2007 and a combined collection for the Cities of Mitcham and Unley planned for November 2007.

The following groups of councils have been formed for this report to model regional metropolitan collections. The most probable collection site is shown in bold. Full costs and performance of this option are again outlined in the Evaluation (Section 5).

Playford	**Tea Tree Gully**	**Port Adelaide Enfield**
Gawler	Campbelltown	Charles Sturt
Salisbury	Norwood PSP & Walkerville	Prospect
Burnside	**West Torrens**	**Onkaparinga**
Adelaide Hills	Holdfast Bay	Mt Barker
Unley	Marion	
Mitcham		

3.4 At call and telephone booking service (Option 5)

The only major system of this nature known to us is the one operating in the City of London (Ref 4). Under this system, householders may book a collection for a maximum of 50kg (or 50 litres) of chemicals, including most flammable, toxic or corrosive substances, but excluding explosives, gas cylinders and radioactive wastes. The householders need to pre-book the service and provide a detailed list of chemicals to be collected. Stringent requirements have to be met with regard to the packaging of the waste and its storage prior to the collection. The European Commission Household Hazardous Waste Study (Ref 5) reports that this is a very high cost system, with costs in the range of 37 to 120 euros per kg ($AUS 60 to 190 per kg). It is a user-pays system, with some of the cost being recovered from the householder.

A similar system has been operated in the Newcastle, NSW, region by Hunter Water, with much more modest costs of around $10 per kg being reported (Ref 6). However, even this lower cost is far in excess of the costs currently being incurred in the ZWSA collections, and it is therefore recommended that this concept not be proceeded with in South Australia.

3.5 Permanent drop-off points for all chemicals

An option not specified in the brief that we believe is worth evaluating is the establishment of permanent drop-off points for all chemicals currently included in the ZWSA program. Such a facility could be open to the public 7 days a week. Providing such a facility for all chemicals would mean, by definition, including "LVHT" materials, ie. the wide range of chemicals that are typically collected either at Dry Creek or in the ZWSA collections (many of which are relatively hazardous). The ability to receive, correctly segregate and store such materials requires specialised chemical knowledge, which, however, may be acquired with appropriate training.

The feasibility of doing so is assessed below for both a metropolitan and a country site.

3.5.1 Metropolitan Adelaide

Establishment of a permanent facility where householders could drop-off all types of chemicals 7 days a week would have the advantage over the Dry Creek Depot of being available to the public on a continuous basis, rather than infrequently, and could serve the whole of the Metropolitan area (and particularly the Southern and Eastern suburbs, where residents are often reluctant to travel to Dry Creek). One possible site is the Adelaide Waste and Recycling Centre at North Plympton.

To estimate the annual quantity of LVHT chemicals that might be collected at such a facility, we have used two different approaches: one was to take the quantity of these materials that were collected at the Stage 3 West Torrens/Marion collection and use the "four times" factor referred to in Section 3.1.1. This yields the quantities shown in the first column of Table 26. However, if the North Plympton facility becomes the only facility accepting these materials (assuming that Dry Creek is closed, as recommended elsewhere in this report), then it would be more appropriate to consider the whole of the Adelaide Metropolitan area as the catchment for this facility, and not just the LGAs of West Torrens and Marion. However, in this case, the "four times" factor would probably be excessive, as people may be not as willing to travel to this facility from more distant locations, so we have used a more conservative factor of 1.2 applied to the annual amounts from the whole of Stage 3 from the Metro area. This yields the quantities shown in the second column of Table 26. It is probable that the actual amount will lie somewhere between these two values, so an assumed average is shown in the third column of Table 26.

The corresponding average weekly quantities are shown in Table 27. Assuming that the drop-off facility is serviced (ie. emptied) by a contractor weekly, the quantities in Table 27 also represent the approximate quantities that would need to be stored. Included in Table 27 are the probable types of storage containers that would be used for each chemical type.

Table 26: Estimated annual quantities of LVHT materials that may be collected at a suggested North Plympton facility (kg gross)

Material	Quantity received estimated using West Torrens & Marion catchment and "4 times" factor kg/year	Quantity received estimated using whole of Metro area catchment and "1.2 times" factor kg/year	Assumed for this report Kg/yr
Acids	580	1850	1200
Aerosols, flammable	800	1440	1100
Aerosols, cleaning products	180	470	420
Aerosols, insecticides	150	340	250
Alkali	900	1550	1200
Arsenic compounds, solid	100	360	230
Arsenic compounds, liquid	120	160	140
Coolants	1,800	4,600	3200
Detergents	900	180	540
Fertilisers	2,000	6,300	4200
Flammable liquids	8,500	11,000	10,000
All pesticides – liquid and solid	3,200	12,000	7,600
Total all chemicals	**~20,000**	**~40,000**	**~30,000**

Table 27: Estimated average weekly quantities of LVHT materials that may be collected at a suggested North Plympton facility (kg gross)

Material	Kg/week	Probable storage containers	Estimated container movements per week
Acids	20	Hazmat overdrums	0.5
Aerosols, flammable	20	200 litre drums	0.5
Aerosols, cleaning products	8	Pails	2
Aerosols, insecticides	5	Pails	2
Alkali	20	Hazmat overdrums	0.5
Arsenic compounds, solid	5	Pails	2
Arsenic compounds, liquid	3	Pails	1
Coolants	60	200 litre drums	2
Detergents	10	200 litre drums	0.2
Fertilisers	80	200 litre drums	2
Flammable liquids	200	200 litre drums	5`
All pesticides – liquid and solid	150	200 litre drums	4
Total all chemicals	**580**		**~22**

Figure 11
1-pallet Dangerous Goods storage unit from Haz-Stor Pty Ltd

We recommend that any facility should comprise two small relocatable storage units that would be separate from the rest of current operations on the site, and also separate from any HVLT drop-off point (if one is established at the same site). Suitable storage units are supplied by Haz-Stor Australia Pty Ltd of Springwood, Queensland. One of the storage units would be used for flammable liquids and flammable aerosols. The second one would be used for pesticides and other toxics. A photograph of the portable storage facility is shown in Figure 11. This unit has the capacity to hold four 200 litre drums on a pallet and is fully bunded, vented and provided with signs in accordance with AS1940:2004 for flammable materials and AS4452:1997 for toxic materials of Class 6.1. Its quoted price (including delivery in Adelaide) is $7,238 (incl GST). The materials would be stored inside the storage units within storage containers indicated in Table 26, which, in turn would contain the original receptacles in which the materials has been brought in. An additional small separate storage cabinet would be used for oxidising agents, such as swimming pool chemicals (eg “solid chlorine” or calcium hypochlorite).

Interest in establishing such a facility in the metropolitan area has been expressed by Solo Resource Recovery, who operate the Adelaide Waste and Recycling Centre at North Plympton for the City of West Torrens. A small area of land (approximately 12 x 45m) is available at the North Plympton facility, close to the entrance hut. This area would be more than sufficient to accommodate the storage units of the type envisaged. It may need to be levelled and graded. Suitably-qualified staff are available that could be further trained in the correct handling and segregation processes at a relatively low cost.

This option is evaluated, along with the others, in Section 5 of this report.

3.5.2 Country areas

The main type of LVHT materials likely to be encountered in the country would be farm chemicals. Expertise with handling of farm chemicals is generally far more readily available in the country than in the city. Council employees in the country are more likely have the necessary accreditation (eg by ChemCert) than those in the city.

In our limited discussions with country Councils so far in this project, we were particularly impressed with the expertise and enthusiasm for the program evident in Wakefield Regional Council. We would therefore suggest that the concept of establishing a pilot permanent drop-off facility for all chemicals within Wakefield Regional Council be explored. If successful, it could be extended to further rural LGAs.

The estimated annual quantities of LVHT chemicals that may be collected at a Wakefield facility are shown in Table 28. Assuming that the facility would be "serviced" (ie. emptied) by a contractor three times a year, the facility would need to have the capacity for individual chemicals as shown in Table 29.

We have recently produced a conceptual design for a dangerous goods store for Launceston, Tasmania, with a capacity of 4.6 tonnes gross. The store comprised a 4.2 m[19] high zincalume building with internal dimensions 5.4 x 8.4 metres, on a bunded concrete slab, with internal bunds to segregate different classes of dangerous goods, a capped, ridged roof and an awning. The capital cost of such a building was estimated at $14,600 at the time (including GST). Escalating the costs to 2008, and making an allowance for a reduced capacity, we estimate the capital cost of such a building to be **$12,000**.

It is suggested that a separate storage unit for flammable liquids be included with a total capacity of approximately 200 litres of flammables in small containers.

This option is evaluated along with the others in Section 5 of this report.

[19] The height was to allow forklift handling of pallets inside the building.

Table 28: Estimated annual quantities of LVHT materials that may be collected at a suggested North Wakefield facility (kg gross)

Material	Kg/year estimated using Wakefield catchment and "2 times" factor[20]
Acids	580
Aerosols, flammable	80
Aerosols, insecticides	180
Arsenic compounds, solid	120
Coolants	300
Fertilisers	1,000
Flammable liquids	520
All pesticides – liquid and solid	6,500
Total all chemicals	**9,260**

Table 29: Estimating storage capacity of a suggested Wakefield facility (kg gross)

Material	Max storage capacity	Probable storage containers	Estimated No of container movements per pickup
Acids	190	Hazmat overdrums	5
Aerosols, flammable	25	200 litre drums	1
Aerosols, insecticides	60	200 litre drums	2
Arsenic compounds, solid	40	200 litre drums	1
Coolants	100	200 litre drums	3
Fertilisers	350	CB4	1
All pesticides – liquid and solid	2200	CB4	8
Total all chemicals	**~3000**		

[20] We feel this factor would be more appropriate to a country area such as Wakefield

4 Options – Dry Creek Depot

The consultancy Brief defined **four** options for the Dry Creek Depot (in addition to any role it may have in the broader ZWSA program):

Option 1 Close the Depot;
Option 2 Continue operation in the current format;
Option 3 Change the opening hours and days of operation;
Option 4 Outsource the operation to a qualified contractor.

1. Close Depot

Closing the Depot would reduce the overall ZWSA expenditure by approximately $100,000 per year. It would free up EPA staff to concentrate on their core duties of regulation and enforcement. It would also eliminate the risk of an accident occurring at the site, such as a fire or a spill. On the down side, it would eliminate a regular (monthly) availability of disposal of all household and farm chemicals, including the more toxic ones. Although disposal of LVHT materials would still be available to users through the ZWSA program, it would most likely be less frequent than monthly (particularly in view of the recent budget reductions for the program). This would probably create some unfavorable reaction, particularly among repeat users of the Depot (who, on very limited evidence, appear to number possibly up to 20-30% of all users). However, this could be counteracted by the establishment of a permanent facility for all chemicals, eg at North Plympton, as discussed in Section 3.5.1 above.

A variation to this option is arises from the conclusion that continued storage of materials at the Depot results in an increased level of risk because the site is unattended. The Depot could therefore be cleared of all existing storage structures and used as a vacant site for day ZWSA collections (in the same way as any other site is at present). All collected materials would be removed by the collection contractor at the end of a collection day. Clearing the site of existing structures would increase its capacity as a temporary collection site and removal of collected materials at the end of a collection day would eliminate risks associated with storage. It needs to be ascertained whether this option would be consistent with the EPA's long-term plans for this asset.

As the Depot has been in operation since 1990 and is widely known throughout South Australia an extensive advertising campaign would need to be undertaken to inform the public that this service is no longer available. There is the possibility that chemicals would still be left at the site and this would need to be monitored. It would be prudent to have an alternative site available and operating before ceasing operations at the Dry Creek Depot.

In addition there is a substantial quantity of intractable waste in storage that was generated prior to ZWSA taking over the funding of the depot. Appropriate allocation of the responsibility and liability for ongoing storage and ultimate disposal of these materials would need to be negotiated between ZWSA and EPA where the Depot to be closed and EPA operational support no longer utilised.

2. Continue Operation in Current Form

Continuing operation in the current format requires little comment. The expenditure would remain at the present level, as would the degree of risk.

3. Change Opening Hours and Days of Operation

Reducing the hours and/or days of operation is hardly an option, since these are already very low and are subject of criticism from Local Government and the public. Increasing the hours and/or days of operation is feasible; it would, however, further increase the strain on EPA personnel and the capacity of the site. Changing the opening day from Tuesday to a weekend day (either Saturday or Sunday) may result in a small increase in attendance, but this does not seem likely. The site is already open for four weekend days per year, with typically the same attendance per weekend day as weekdays. As a result material collected, or unit cost of operation is unlikely to change from such a change.

4. Outsource Operation

Outsourcing the operation of the site to a qualified contractor is a very real option and has already been considered by ZWSA. Based on a quote from a local waste management contractor to provide qualified staff to operate the Depot on opening days it has been estimated (Ref 7) that the increase in cost would be of the order of 4% of the total cost, and within the level of year-to-year variation in the cost. The option is attractive, as it would free up EPA staff for other duties and, since the Contractor would be engaged by ZWSA, put the operation of the site totally under the control of ZWSA.

5 Evaluation of Options

5.1 Estimation Model

Asterisk One has developed an estimation model for Household Hazardous Waste collections.

The model uses a combination of historical data and user selection of sites and collection features, types of material accepted, and types of promotion to calculate the number of participants, the mass collected, and the costs of promotion, collection and disposal.

Site variables include sites, regions, collection size, collection number of days and types of materials accepted.

Promotion variables include advertising or mail out.

Analysis of historical data has provided participation rates, mass per participant, advertising costs, and a typical material fingerprint (the proportion of each type of material typically collected).

The model differentiates between the following material types: Paint, Oil, Batteries, Gas Cylinders and Other HHW.

Other inputs include contract costs and escalation factors.

The model gives a snapshot based on the variables selected, and to develop a complex scenario, a number of individual snapshots using the model may need to be created, depending on the number of variables selected for the particular scenario.

This model has been used to determine results for a number of scenarios around the options outlined in the previous sections. These results provide the basis for comparison and evaluation against the criteria specified in the brief.

5.1.1 Overview of scenarios

A number of scenarios have been modelled to determine costs and performance around the options outline in the previous sections. These scenarios are as follows:

Baseline – This scenario uses the combination of collection sites and number of days at each site from the Chemical Collection Program for Stage 3; participation rates, types of material, and quantities of material per participant from the program overall (all four stages); and costing estimates from the current contract and most recent Stage (4).

Scenario A – with the intent of developing a Chemical Collection Program that would cost less than $500,000 per annum, this scenario is based on visiting each LGA once every three years. In the metropolitan area, each LGA collection event is only one day; in non-metropolitan areas the number of days in each LGA is based on the modified program outlined in Table 11.

In this and subsequent scenarios, the Dry Creek facility is not included, as it is considered to be 'additive', that is, retaining Dry Creek Depot would simply add to the total cost, total participation and total materials collected.

Scenario B – with the intent of developing a Chemical Collection Program that would cost less than $800,000 per annum, this scenario is based on visiting each LGA once every two years. Again, in the metropolitan area, each LGA collection event is only one day; in non-metropolitan areas the number of days in each LGA is based on the modified program outlined in Table 11.

Scenario C – This scenario is based on visiting each LGA once every year. Again, in the metropolitan area, each LGA collection event is only one day; in non-metropolitan areas the number of days in each LGA is based on the modified program outlined in Table 11.

Scenario D – This scenario models costs, participation and quantities collected only for the collection of High Volume Low Toxicity materials at permanent (7 days a week) drop-off locations in the metropolitan area. Site locations are as outlined in Table 21, although two variations are considered – five permanent sites and three permanent sites. This scenario does not include any collections in non-metropolitan areas. Scenario D corresponds to Option 2 specified in the brief from ZWSA.

Scenario E – This scenario models costs, participation and quantities for the collection of all chemicals at four sites (as outlined in Table 25, Section 3.3) in the metropolitan area used on a regular basis 3 times per year (ie. a total of 12 single day collection events each year). This scenario does not include any collections in non-metropolitan areas. Scenario E corresponds to Option 3 specified in the brief from ZWSA.

Scenario F – This scenario models costs, participation and quantities for the collection of all chemicals at six one day collection events held on a regional basis (as outlined in Section 3.4) in the metropolitan area. This scenario does not include any collections in non-metropolitan areas. Scenario F corresponds to Option 4 specified in the brief from ZWSA.

Scenario G – This scenario models costs, participation and quantities for the collection of all chemicals at a single permanent (7 days per week) drop-off point in the metropolitan area, and a single permanent drop-off point in the non-metropolitan area. No other collections are included. Scenario G was not specified in the brief but was outlined in Section 3.5.

5.1.2 Modelling outputs

Baseline scenario

The Baseline scenario uses the combination of collection sites and number of days at each site from the Chemical Collection Program for Stage 3; participation rates, types of material, and quantities of material per participant from the program overall (all four stages); and costing estimates from the current contract and most recent Stage (4). The predictions of the model for the **Baseline** scenario are shown in Tables 30, 31, and 32. The predicted total quantity collected and program costs are slightly higher than the actual results for Stage 3 (ie. 346 tonnes, and $1,176,000 respectively) because of the slight variations between the participation rates and quantities per participant assumed and the actuals for Stage 3.

Table 30: Modelling results for Baseline Scenario

Program and Participation

Sites	33
Days	67
Participation rate	6.2
Participants	5,817
Tonnes	348

Expenditure

Promotion	$48,435
Operator	$685,000
Disposal	$522,437
Total	**$1,255,872**

Table 31: Quantities of material likely to be collected in each area for Baseline Scenario

Type	City tonne pa	Far Country tonne pa	Near Country tonne pa	Regional Centre tonne pa	Total tonne pa
Paint	74	7	2	4	87
Oil	39	53	7	6	105
Batteries	24	19	4	2	49
Gas cylinders	0	0	0	0	0
Other HHW	38	53	9	7	107
Total	**175**	**133**	**21**	**19**	**348**
Stage 3 actual	172	134	21	19	346

Table 32: Predicted participation by Location type for Baseline Scenario

Location type	Predicted Participation	Stage 3 Participation	LGA	Days
City	4,604	4,648	Adelaide Hills	4
			Burnside	1
			Holdfast Bay	2
			Marion	1
			Mitcham	1
			Mount Barker	3
			Onkaparinga	2
			Tea Tree Gully	1
Far Country	846	842	Barunga West	2
			Ceduna	1
			Coorong	3
			Copper Coast	1
			Elliston	2
			Flinders Ranges	2
			Goyder	4
			Karoonda East Murray	1
			Le Hunte	1
			Lower Eyre Peninsula	2
			Mid Murray	4
			Mt Remarkable	1
			Naracoorte Lucindale	2
			Orroroo Carrieton	1
			Southern Mallee	2
			Streaky Bay	3
			Tumby Bay	1
			Wattle Range	4
			Yorke Peninsula	4
Near Country	179	176	Alexandrina	2
			Murray Bridge	2
Regional Centre	188	191	Mt Gambier and Grant	3
			Port Augusta	1
			Port Lincoln	1
			Port Pirie	2
Totals	**5,817**	**5,857**		**67**

Scenario A

This scenario is based on visiting each LGA once every three years, using the Baseline model calibrated against Stage 3. The predictions of the model for Scenario A are shown in Tables 33 - 35. Results for each year are shown, together with an annual average over the three years, and metropolitan and non-metropolitan results for this annual average.

Table 33: Model results for Scenario A

Program and Participation

	Year 1	Year 2	Year 3	Average	Typical Metro	Typical Non-metro
Sites	21	21	21	21	6	15
Days	23	24	25	24	6	18
Participation rate	3.3	3.4	3.5	3.4	5.2	2.1
Participants	2,770	2,172	2,182	2,375	1,977	398
Tonnes	143	130	124	132	75	57

Expenditure

Promotion	$32,865	$30,849	$30,786	$31,500	$13,994	$17,506
Operator	$238,000	$248,000	$257,000	$247,667	$84,000	$163,667
Disposal	$205,799	$195,640	$184,270	$195,236	$97,102	$98,134
Total	**$476,664**	**$474,489**	**$472,056**	**$474,403**	**$195,096**	**$279,307**
Cost per kg	$3.34	$3.64	$3.80	$3.59	$2.63	$4.87
kg per $	0.30	0.27	0.26	0.28	0.38	0.21

Table 34: Predicted quantities of material likely to be collected for Scenario A

Type	City tonne pa	Far Country tonne pa	Near Country tonne pa	Regional Centre tonne pa	Total tonne pa
Paint	32	2	1	1	36
Oil	17	18	3	1	39
Batteries	10	6	2	0	19
Gas cylinders	0	0	0	0	0
Other HHW	16	18	4	1	39
Total	**75**	**44**	**9**	**4**	**132**

Table 35: Predicted participation by area for Scenario A

Location type	Year 1	Year 2	Year 3	Average
City	2,422	1,725	1,782	1,976
Far Country	253	334	254	280
Near Country	78	54	103	78
Regional Centre	17	59	43	40
Totals	**2,770**	**2,172**	**2,182**	**2,375**

Table 36: Location of collections in each year for Scenario A (one day unless otherwise indicated)

Location type	Year 1	Year 2	Year 3
City	Adelaide Hills Charles Sturt Marion Norwood PSP and Walkerville Port Adelaide Enfield Tea Tree Gully	Burnside Gawler Mitcham Onkaparinga Prospect Unley	Campbelltown Holdfast Bay Mount Barker Playford Salisbury West Torrens
Far Country	Barunga West Clare and Gilbert Valleys Copper Coast Franklin Harbour Cowell Kimba Lower Eyre Peninsula (2 days) Mt Remarkable Orroroo Carrieton Robe Tatiara Wattle Range (2 days)	Berri Barmera Cleve Elliston Goyder Kingston Loxton Waikerie (2 days) Naracoorte Lucindale Outback Areas Southern Mallee Tumby Bay Yorke Peninsula (2 days)	Ceduna Coorong (2 days) Flinders Ranges (2 days) Karoonda East Murray Le Hunte Mid Murray (3 days) Northern Areas Renmark Paringa Streaky Bay Wakefield
Near Country	Barossa Mallala Yankalilla	Kangaroo Island Murray Bridge	Alexandrina Light Regional Victor Harbor
Regional Centre	Port Lincoln	Mt Gambier and Grant Port Pirie	Port Augusta Whyalla

Scenario B

This scenario is based on visiting each LGA once every two years, using the Baseline model calibrated against Stage 3. The predictions of the model for Scenario B are shown in Tables 37 - 40. Results for each year are shown, together with an annual average over the two years, and metropolitan and non-metropolitan results for this annual average.

Table 37: Model results for Scenario B

Program and Participation

	Year 1	Year 2	Average	Typical metro	Typical non-metro
Events	32	31	32	9	23
Days	35	37	36	18	27
Participation rate	3.3	3.5	3.4	5.2	2.8
Participants	3,757	3,367	3,562	2965	598
Tonnes	200	197	199	113	86

Expenditure

Promotion	$48,842	$45,658	$47,250	$20,991	$26,259
Operator	$363,000	$380,000	$371,500	$126,000	$245,500
Disposal	$291,944	$293,765	$292,855	$145,653	$147,201
Total	**$703,786**	**$719,423**	**$711,605**	**$292,644**	**$418,960**
Cost per kg	$3.51	$3.65	$3.58	$2.61	$4.88
kg per $	0.28	0.27	0.28	0.38	0.21

Table 38: Predicted quantities of material likely to be collected in each area for Scenario B

Type	City tonne pa	Far Country tonne pa	Near Country tonne pa	Regional Centre tonne pa	Total tonne pa
Paint	48	4	1	1	54
Oil	25	27	4	2	58
Batteries	16	10	2	1	28
Gas cylinders	0	0	0	0	0
Other HHW	24	26	6	2	59
Total	**113**	**66**	**14**	**6**	**199**

Table 39: Predicted participation by area for Scenario B

Location type	Year 1	Year 2	Average
City	3,201	2,728	2,965
Far Country	368	473	421
Near Country	106	129	118
Regional Centre	82	37	60
Totals	**3,757**	**3,367**	**3,562**

Table 40: Location of collections in each year for Scenario B (one day unless otherwise indicated)

Location type	Year 1	Year 2
City	Adelaide Hills Campbelltown Gawler Marion Mount Barker Onkaparinga Port Adelaide Enfield Salisbury Unley	Burnside Charles Sturt Holdfast Bay Mitcham Norwood PSP and Walkerville Playford Prospect Tea Tree Gully West Torrens
Far Country	Barunga West Ceduna Cleve Copper Coast Flinders Ranges (2 days) Goyder Kimba Le Hunte Loxton Waikerie (2 days) Mt Remarkable Northern Areas Outback Areas Robe Streaky Bay Tumby Bay Wattle Range (2 days)	Berri Barmera Clare and Gilbert Valleys Coorong (2 days) Elliston (2 days) Franklin Harbour Cowell Karoonda East Murray Kingston Lower Eyre Peninsula (2 days) Mid Murray (3 days) Naracoorte Lucindale Orroroo Carrieton Renmark Paringa Southern Mallee Tatiara Wakefield Yorke Peninsula (2 days)
Near Country	Alexandrina Kangaroo Island Mallala Victor Harbor	Barossa Light Regional Murray Bridge Yankalilla
Regional Centre	Mt Gambier and Grant Port Lincoln Whyalla	Port Augusta Port Pirie

Scenario C

This scenario is based on visiting each LGA once every year, using the Baseline model calibrated against Stage 3. The predictions of the model for Scenario C are shown in Tables 42 - 44. Typical results for the metropolitan and non-metropolitan parts of this program are also shown.

Table 41: Model results for Scenario C

Program and Participation

	All Sites	Metro Sites	Non-metro Sites
Events	63	18	45
Days	72	18	54
Participation rate	3.4	5.2	2.8
Participants	7,124	5,929	1,195
Tonnes	397	225	172

Expenditure

Promotion	$94,500	$41,982	$52,518
Operator	$743,000	$252,000	$491,000
Disposal	$585,709	$291,307	$294,402
Total	**$1,423,209**	**$585,289**	**$837,920**
Cost per kg	$3.58	$2.60	$4.87
kg per $	0.28	0.38	0.21

Table 42: Quantities of material likely to be collected in each area for Scenario C

Type	City tonne pa	Far Country tonne pa	Near Country tonne pa	Regional Centre tonne pa	Total tonne pa
Paint	96	7	2	2	108
Oil	50	53	9	4	116
Batteries	31	19	5	1	57
Gas cylinders	0	0	0	0	0
Other HHW	48	53	12	4	117
Total	225	132	28	12	397

Table 43: Predicted participation by area for Scenario C

Location type	Participation
City	5,929
Far Country	841
Near Country	235
Regional Centre	119
Totals	**7,124**

Table 44: LGAs with collections in multiple locations for Scenario C

Location type	Council
Far country	Flinders Ranges (2 days) Loxton Waikerie (2 days) Wattle Range (2 days) Coorong (2 days) Elliston (2 days) Lower Eyre Peninsula (2 days) Mid Murray (3 days) Yorke Peninsula (2 days)

Scenario D

This scenario models the collection of High Volume Low Toxicity materials at permanent (7 days a week) drop-off locations only in the metropolitan area. Two variations are considered – one with five permanent sites (Onkaparinga, West Torrens, Burnside, Salisbury, and Port Adelaide Enfield) and the other with three permanent sites (Onkaparinga, West Torrens, Port Adelaide Enfield). The predictions of the model for Scenario D are shown in Tables 45 - 47.

Table 45: Model results for Scenario D - permanent HVLT drop-off points

Program and Participation

	5 drop-off points	3 drop-off points
Sites	5	3
Participation rate	8.4	20.5
Participants	9,552	6,300
Tonnes	300	198

Expenditure

Promotion	$14,807	$9,468
Facility Operations	$394,168	$245,504
Disposal	$348,611	$229,926
Total	**$757,586**	**$484,898**
Cost per kg	$2.53	$2.45
kg per $	0.40	0.41
Facility Operations Components		
Amortised capital costs[21]	$12,432	$5,567
Facility operating cost[22]	$95,520	$63,000
Additional collection costs	$286,216	$176,938
Total permanent facility costs	$394,168	$245,504

[21] Annual payment based on financing capital costs over 7 years at 7%.
[22] Assumes 15 minutes total operator time per participant for discussion, removal, sorting, and storage.

Table 46: Basis for Annual Collection Cost Estimates for Scenario D

Site	Transport	Container hire				Total collection
		Paint	Oil	Gas cylinder	Total	
Onkaparinga	$69,160	$6,282	$1,570	$528	$8,380	$77,540
West Torrens	$49,400	$3,141	-	$528	$3,669	$53,069
Burnside	$49,400	$3,141	$1,570	$528	$5,239	$54,639
Salisbury	$49,400	$4,711	-	$528	$5,239	$54,639
Port Adelaide Enfield	$39,520	$4,711	$1,570	$528	$6,809	$46,329
Total	**$256,880**	**$21,986**	**$4,711**	**$2,639**	**$29,336**	**$286,216**

Table 47: Capital cost estimates for each site for Scenario D

Site	Capital costs
Onkaparinga	$18,000
West Torrens	$7,000
Burnside	$26,000
Salisbury	$11,000
Port Adelaide Enfield	$5,000
Total	**$67,000**

Scenario E

This scenario models costs, participation and quantities for the collection of all chemicals at four sites (Burnside, Onkaparinga, Port Adelaide Enfield and West Torrens) in the metropolitan area used on a regular basis 3 times per year (ie. a total of 12 single day collection events each year). The predictions of the model for Scenario E are shown in Tables 48 - 49.

Table 48: Model results for Scenario E – Regular sites in metro area only

Program and Participation

	Burnside	Onkaparinga	Port Adelaide Enfield	West Torrens	Total
LGA's included	4	2	7	5	18
Days	3	3	3	3	12
Participation rate	4.3	4.7	3.9	4.2	4.2
Participants	726	916	2091	1114	4847
Tonnes	29	37	84	45	194

Expenditure

Promotion	$7,570	$5,696	$18,130	$10,586	$41,982
Operator	$42,000	$42,000	$42,000	$42,000	$168,000
Disposal	$43,139	$54,428	$124,247	$66,194	$288,007
Total	**$92,709**	**$102,124**	**$184,377**	**$118,780**	**$497,989**
Cost per kg	$3.19	$2.79	$2.20	$2.67	$2.57
kg per $	0.31	0.36	0.45	0.38	0.39

Table 49: Quantities of material likely to be collected for Scenario E

Type	Burnside tonne pa	Onkaparinga tonne pa	Port Adelaide Enfield tonne pa	West Torrens tonne pa	Total tonne pa
Paint	12	16	36	19	82
Oil	6	8	19	10	43
Batteries	4	5	12	6	27
Gas cylinders	0	0	0	0	0
Other HHW	6	8	18	10	42
Total	**29**	**37**	**84**	**45**	**194**

Scenario F

This scenario models costs, participation and quantities for the collection of all chemicals at six one day collection events held on a regional basis in the metropolitan area. The predictions of the model for Scenario F are shown in Tables 50 - 51.

Table 50: Model results for Scenario E – Regional sites in metro area only

Program and Participation

Site	Playford	Tea Tree Gully	Port Adelaide Enfield	Burnside	West Torrens	Onkaparinga	Total
LGA's	3	3	3	4	3	2	18
Days	1	1	1	1	1	1	6
Participation rate	3.0	6.0	4.0	8.0	6.0	3.0	5.0
Participants	612	1128	903	1446	995	529	5613
Tonnes	24	45	36	58	40	21	225

Expenditure

Promotion	$7,284	$6,948	$7,746	$7,801	$6,507	$5,696	$41,982
Operator	$14,000	$14,000	$14,000	$14,000	$14,000	$14,000	$84,000
Disposal	$36,365	$67,025	$53,656	$85,921	$59,123	$31,433	$333,523
Total	**$57,649**	**$87,973**	**$75,402**	**$107,722**	**$79,630**	**$51,129**	**$459,505**
Cost per kg	$2.35	$1.95	$2.09	$1.86	$2.00	$2.42	$2.05
kg per $	0.42	0.51	0.48	0.54	0.50	0.41	0.49

Table 51: Quantities of material likely to be collected for Scenario E

Type	Playford	Tea Tree Gully	Port Adelaide Enfield	Burnside	West Torrens	Onkaparinga	Total
Paint	10	19	15	25	17	9	95
Oil	5	10	8	13	9	5	50
Batteries	3	6	5	8	6	3	31
Gas cylinders	0	0	0	0	0	0	0
Other HHW	5	10	8	12	9	5	48
Total	24	45	36	58	40	21	225

Scenario G

This scenario models costs, participation and quantities for the collection of all chemicals at a single permanent (7 days per week) drop-off point in the metropolitan area (West Torrens), and a single permanent drop-off point in the non-metropolitan area (Wakefield). No other collections are included. The predictions of the model for scenario G are presented in Tables 52 – 54.

Table 52: Model results for Scenario G - permanent drop-off points for all chemicals

Program and Participation

	West Torrens (metro)	Wakefield (country)
LGAs	18	1
Participation rate	3.0	23
Participants	3422	152
Tonnes	137	23

Expenditure

Promotion	$41,982	$1,147
Facility Operations	$102,639	$13,415
Disposal	$202,121	$37,344
Total	**$346,741**	**$51,906**
Cost per kg	$2.53	$2.28
kg per $	0.39	0.44
Facility Operations Components		
Amortised capital costs	$4,639	$2,227
Facility operating cost	$34,220	$1,520
Operator training	$6,000	$3,000
Additional collection costs	$57,780	$6,669
Total facility operations	$102,639	$13,415

Table 53: Basis for Annual Collection Cost Estimates

Site	Transport	Container hire				Total collection
		Paint	Gas cylinder	Other HHW	Total	
West Torrens	$49,400	$7,852	$528	$7,228	$8,380	$57,780
Wakefield	$3,000	$3,141	$528	$5,620	$3,669	$6,669
Total	**$52,400**	**$10,993**	**$1,056**	**$12,848**	**$12,049**	**$64,449**

Table 54: Capital cost estimates for each site

Site	Capital costs
West Torrens	$25,000
Wakefield	$12,000
Total	**$37,000**

5.2 Evaluation

5.2.1 Evaluation criteria

Evaluation of the effectiveness, and strengths, opportunities, weaknesses and threats in relation to the various scenarios or options requires assessment of the capacity of each to achieve the objectives of the program. These objectives, as outlined earlier in this report include:

- Reduction in risk to public health, environment and waste and recycling industry workers. This is best represented by the total quantity of material collected, particularly the more hazardous types of materials such as pesticides, chlorinated solvents and heavy metals. Collecting these materials reduces the likelihood they are inappropriately disposed of – on to land, to sewer, or in the solid waste, posing risks to the environment, and workers, plant and infrastructure in these industries; or stored for long periods of time on site, where they may contaminate the environment or pose a risk to public health and safety.
- Promotes increased awareness of the dangers associated with hazardous materials and the move to the use of less hazardous products, stimulates reuse of materials, and stimulates awareness of waste minimisation.
- Meets community expectations of better waste management and greater industry responsibility
- Is financially sustainable, providing a reduction in cost whilst maintaining recovery of materials. This is measured using the total cost of the program, with consideration being given also to value for money – ie. the cost per kg collected or kg collected for each dollar spent.
- Continuation of high public engagement and a high level of participation. This can be assessed using the total participation in the program.

5.2.2 Current program format

Table 55 provides a comparison of scenarios comprising continuing collection at temporary sites (Scenario's A, B and C) with the Baseline. It can be seen that kg collected per dollar spent (kg per $) is very similar overall, with the Baseline perhaps having a marginal advantage because of the inclusion of Dry Creek, which has a higher kg per $ than the program of temporary collections. The full risks of the operation of Dry Creek are not being costed, however, and the full costs of operations not being borne by ZWSA. It can be seen that Scenario C – collection at temporary sites in each LGA every year is similar in almost every respect to the total for the Baseline that includes Dry Creek, with the added advantage that all 67 LGAs are being included, rather than just the 33 that were included in Stage 3.

In continuing a program of temporary collections the **reduction in risk** to public health, the environment, and waste and recycling industry workers depends very much on the quantity and types of chemicals collected, which in turn corresponds to the size of the program and the expenditure on it. The three scenarios outlined here show a range of options in this regard depending on the funds available.

Table 55: Comparison of temporary collection scenarios with the Baseline

Characteristic	Baseline			Scenario A	Scenario B	Scenario C
	Stage 3 temporary collection program	Dry Creek	Total	Collection at temporary sites in each LGA every 3 years	Collection at temporary sites in each LGA every 2 years	Collection at temporary sites in each LGA every year
Participation	5,800	1,200	7,000	2,400	3,600	7,100
Quantity	348	45	393	132	199	397
Quantity as % of baseline				34%	51%	101%
Cost	**$1,260,000**	**$120,000**	**$1,380,000**	**$475,000**	**$715,000**	**$1,425,000**
Cost per kg	$3.62	$2.67	$3.51	$3.60	$3.59	$3.59
kg per $	0.28	0.38	0.28	0.28	0.28	0.28

In a similar way, continuing **high public engagement** – represented by participation in the program – really depends on the number of collections, again proportional to the size of the program and expenditure. We recommend improved education at temporary collections, along the lines of that used in King County, Washington, USA to **increase awareness** of the dangers associated with hazardous materials and to promote the move to the use of less hazardous products. **Greater industry responsibility** can be supported if there are fewer collections in the country, as recommended in the report, generating an increased demand for ChemClear though appropriate promotion.

5.2.3 Metropolitan collection options

Several of the scenarios that have been modelled deal only with collection of chemicals in the metropolitan area. Tables 56 and 57 provide a comparison of these scenarios. It can be seen that using a program of six one day collections on a regional basis (Scenario F) provides the best kg per $, even better than using four regular sites open 3 days per year (Scenario E). This is because of what might be called the familiarity factor – with a regular site, it is observed that overall participation decreases because people know they can come back at another time.

The two variations of Scenario D provide an opportunity for very high participation, and significant quantities of material collected – at a cost. Providing permanent drop off points ultimately results in higher overall costs because of the availability of the collection point, the resulting participation, and the quantity of material collected. Providing only 3 drop off points, therefore, results in lower costs, and of course, less material collected. Value for money (kg per $) is high, mostly because of the lower cost of disposal for HVLT materials, although surprisingly not as high as Scenario F, which includes all chemicals.

Table 56: Comparison of various metropolitan collection scenarios

Characteristic	Scenario A Collection at temporary sites in each LGA every 3 years	Scenario B Collection at temporary sites in each LGA every 2 years	Scenario C Collection at temporary sites in each LGA every year	Scenario E 4 Regular sites each 3 days pa	Scenario F 6 Regional sites each 1 day pa	Scenario G Permanent drop-off point for all chemicals.
Participation	2,000	3,000	5,900	4,850	5,600	3,400
Quantity	75	113	225	194	225	137
Quantity as % of Scenario C	33%	50%	100%	86%	100%	61%
Cost	**$195,000**	**$295,000**	**$585,000**	**$500,000**	**$460,000**	**$350,000**
Cost per kg	$2.60	$2.61	$2.60	$2.58	$2.04	$2.55
kg per $	0.38	0.38	0.38	0.39	0.49	0.39

Providing only 3 drop off points gives a higher kg per $ because of the lower capital costs. These options, by separating HVLT and LVHT materials, also provide a means of supporting increased awareness the dangers of HHW through appropriate communication materials.

Providing a permanent drop-off point for all chemicals in the metropolitan area at West Torrens (Scenario G) provides a good balance between total cost and value for money. Not as much material is collected as in collection at temporary sites every year (Scenario C), collection at regular sites (Scenario E) or collection at regional sites (Scenario F), but the total costs are lower. Value for money (kg per $) is comparable to collection at regular sites, and marginally better than for Dry Creek.

Table 57: Comparison of various metropolitan collection scenarios

Characteristic	Scenario D 5 permanent drop-off points for HVLT only	Scenario D 3 permanent drop-off points for HVLT only
Participation	9,550	6,300
Quantity	300	200
Cost	**$760,000**	**$485,000**
Cost per kg	$2.53	$2.43
kg per $	0.39	0.41

5.2.4 Non-metropolitan collection options

Continuation of collections in country and regional South Australia is a high priority for ZWSA. Table 58 provides a comparison of scenarios dealing with collections in non-metropolitan areas. It can be seen that these options provide less value for money in terms of quantity collected because of the distances travelled in country areas, and the higher proportion of agricultural chemicals collected, which are more expensive to treat and dispose of. In some respects, though, this can be considered money well spent to ensure equal access for country residents to the programs, and the determining factor is the availability of funding. Clearly providing a permanent facility at Wakefield provides better value for money, but for a limited number of people. This scenario does however, detract slightly from supporting greater industry responsibility by providing a service that is duplicated to some extent by the ChemClear program.

Table 58: Comparison of various non-metropolitan collection scenarios

Characteristic	Scenario A Collection at temporary sites in each LGA every 3 years	Scenario B Collection at temporary sites in each LGA every 2 years	Scenario C Collection at temporary sites in each LGA every year	Scenario G Permanent drop-off point for all chemicals at Wakefield
Participation	400	600	1,200	152
Quantity	57	86	172	23
Quantity as % of Scenario C	33%	50%	100%	13%
Cost	**$380,000**	**$420,000**	**$840,000**	**$55,000**
Cost per kg	$4.91	$4.88	$4.88	$2.39
kg per $	0.20	0.20	0.20	0.42

SWOT Analysis

An analysis of the strengths, weaknesses, opportunities and threats of each scenario is provided on the pages 68-69.

Conclusions

Providing a program of six one day collections on a regional basis provides the best outcomes for the metropolitan area. Providing a permanent drop-off point for all chemicals does give a replacement for Dry Creek, with increased participation and quantity collected, but not with the same effectiveness in terms of quantity collected and participation as the regional collection program.

The use of permanent drop-off points for HVLT is possible, but still requires the provision of collection points or events for all chemicals. The accessibility provided by such points does result in higher costs, and value for money is not as great as for the program of regional collections. These options do, however, provide a very high level of community engagement. Increasing awareness and extended producer responsibility are matters that are fairly similar across all options, and can be dealt with appropriate communication materials and activities associated with each.

It is recommended that ZWSA therefore consider continuing program with collection at temporary sites on a regional basis in the metropolitan area, and collection at temporary sites in non-metropolitan areas (at a frequency depending on available funding). Establishment of three permanent drop-off facilities for HVLT could be considered depending on funding. Establishment of a permanent facility in Wakefield is not recommended.

SWOT Analysis

Scenario	Strengths	Weakness	Opportunities	Threats
Baseline Program in current format based on stage and including Dry Creek. All other options based on closure of Dry Creek.	High quantity collected. High participation. Strong community engagement, strong council support, established profile for dry creek.	Very high cost, especially in the country. Vulnerability with single contractor. High reliability on small number of specialised staff for the operation of Dry Creek. Storage of materials on site at Dry Creek presents a risk.	Program of sites / days could be approached more consistently or streamlined. Branding - connecting the current high public engagement to ZWSA via the program could be greatly improved.	EPA Staff not available (Dry Creek). Fire or incident at Dry Creek.
Scenario A Collection at temporary sites in each LGA every 3 years	Much lower cost. Fewer days in the country, means greater scope for ChemClear to be utilised. More consistent approach to site / day scheduling.	Much lower quantity collected / participation. With the closure of Dry Creek, there may be some discontent on the part of regular users. Re-direction will require management. Much lower profile / connection with councils and community.	Reduction in risk arising from closure of Dry Creek. EPA staff freed up to attend to core duties from closure of Dry Creek.	Councils will be dissatisfied, in particular in the country because of the currently high number of days per LGA, with the level of service (especially in the context of the recently increased waste levy)
Scenario B Collection at temporary sites in each LGA every 2 years	Middle of the road program. Even and consistent approach to site / day scheduling. Gives opportunity for increased utilisation of ChemClear without relying on it. Maintains connection and profile with councils.	No metro permanent site, and as a result cost per kg is higher than the Baseline (Dry Creek has a cost advantage - but the risks were not being fully costed into the program).		Cost of program overall is still high - may not be acceptable to ZWSA board.
Scenario C Collection at temporary sites in each LGA every year	Consistent, accessible program with high visibility and participation comparable to current program.	Very high cost.		Creates an expectation for level of service that is not sustainable in the long term.

Scenario	Strengths	Weakness	Opportunities	Threats
Scenario D Permanent drop-off points for HVLT only	Very high participation, community engagement, profile, across the metro area.	Other HHW not catered for either in metro or in non-metro areas.	Couple this option with suitable metro / non-metro programs for all chemicals. Cooperation with industry bodies in running HVLT collection centres.	
Scenario E 4 Regular sites each 3 days pa	High participation	Familiarity leads to lower participation rate at each collection. More collection events leads to higher cost.		
Scenario F 6 Regional sites each 1 day pa	High participation. Focused collection events with broadly advertised catchments. Good coverage of metro area.		Cooperation amongst councils leads to collaborative efforts in other activities.	Dissatisfaction in some councils if they aren't selected as the regional site. Will need to be managed.
Scenario G – metro Permanent drop-off point for all chemicals at West Torrens	All chemicals catered for.	Only one site in metro area - overall low participation for the whole. Requires skilled operators (training is available).		Management of site changes and puts site operation in jeopardy via higher costs / decision not to operate. Contractor may not be willing to service the facility.
Scenario G - non-metro Permanent drop-off point for all chemicals at Wakefield	Goodwill in Wakefield and surrounding councils. Lower cost per kg.	Detracts from ChemClear	If it works, could provide a model for a limited number of other collection points in Far Country areas	Management of site changes and puts site operation in jeopardy via higher costs / decision not to operate. Contractor may not be willing to service the facility.

Note that options for the Dry Creek Depot are considered separately to this analysis, and that the implications (in terms of risk profile, participation, quantities of materials collected, and program costs) of a decision on the future of the Depot could be added to any of these scenarios.

6 Branding, marketing and education

There are opportunities to improve branding its program and thus getting it more firmly established in the public view.

For example, the Dry Creek Depot carries no ZWSA branding at all. Similarly, street signage that we saw for the Glynde collection on 14 July 2007 was very sparse and carried no ZWSA branding. Worthwhile improvements are possible in this area. Part of the significant value in undertaking household chemical collection programs is the way in which it supports and complements other waste management and resource recovery initiatives. The link to these other initiatives is more effectively made when the branding and profile of the household chemical collection program can be clearly associated with the organisation responsible for these initiatives. Whilst by no means the most important initiative of ZWSA, the Hazardous Waste Collection program uses the most funds for a single program, and the one that has to date, provided the most opportunities for householders to understand what ZWSA is all about. This opportunity can be better utilised in order to promote the objectives of ZWSA.

ZWSA has also identified the need to increase public awareness of the true costs of dealing with left-over household chemical materials, so as to move towards the goal of true **reduction**, rather than just reuse and recycling.

In this context, we would recommend that consideration be given to stepping up the **education** content of the ZWSA program (rather than mere collection and disposal). We refer to the practice in King County (Seattle, USA), where education officers attend collections and talk to the drivers of vehicles to suggest ways of avoiding left-over products in the future, such as buying less product or using alternative products. Education posters are displayed at the collection, and education materials are handed out to the public. This activity would be very appropriate to ZWSA's role, and could be funded from a part of the savings that can be made by re-balancing the program (as recommended in this report).

A very minor point relating to the program website concerns the photograph used, in which a person is shown apparently sniffing the contents of a clear bottle. Identifying unknown chemicals by smell is an undesirable practice, inconsistent with the general OH&S principle of minimising direct contact with chemicals. It is suggested that the header photograph on the web page be modified to remove the image.

7 Interaction with Other Programs

7.1 ChemClear®

The Brief for this Consultancy referred to the need to consider synergies with Industry programs, such as ChemClear®.

Despite the great success of the ZWSA program in country areas, we feel that it is appropriate now to start transferring the responsibility for the collection and disposal of farm chemicals over to the industries concerned – that is, the chemicals manufacturing/distribution industry and the farming sector itself. It may be true that the ChemClear® program is, perhaps, not yet operating as efficiently as possible. Furthermore, it has strict requirements with regard to the types of chemicals which may be collected (they need to be currently registered by the APVMA and be made or distributed by members industry associations). Nevertheless, with all its shortcomings, ChemClear® is a true Extended Producer Responsibility (EPR) program, and, as such, should be encouraged. This could be achieved by letting the ChemClear® program assume more and more responsibility for its target chemicals by withdrawing the ZWSA program progressively from the rural sector.

The ChemClear® program has received government funding in other States for collecting so-called "Group 2" chemicals, that is chemicals that are not currently registered by APVMA and/or are not made by industry association members. This should be considered in South Australia also, as an alternative mechanism for effectively removing such chemicals from the environment.

7.2 Paint industry

We understand from our industry contacts that the Australian Paint Manufacturers' Federation (APMF) is being forced in some other States (notably NSW and Victoria) to move towards establishing EPR programs for paint. Given that over 40% of the materials collected in Metropolitan Adelaide is paint, it would seem to be very reasonable to make an approach to APMF at this time with the view to exploring possible partnership either with day collections or with possible permanent HVLT facilities.

8 Conclusions

Characteristics of the current ZWSA program

- The average participation rate in the ZWSA program compares very favorably with that in other jurisdictions (typically 3 participants per 1000 population at NSW collections, 5 per 1000 in Victoria and an average of 8.3 per 1000 in this program). The high participation rate is a measure of the success of the ZWSA program, its excellent management and organisation and the high degree of cooperation that exists between ZWSA and the Councils concerned. It also reflects the higher average number of collection days per LGA in this program compared with other jurisdictions.
- Participation rates in the Far country match or exceed those in the city, while those in the regional centres are very much lower, and those in the Near country lie in between.
- The average quantity of materials brought in by each participant in metropolitan Adelaide, at about 40kg, is close to that for other jurisdictions. However in Far country South Australia, this quantity is a very high 150-200 kg per participant, far exceeding quantities experienced in other States. This is another measure of the success of this program.
- Some 40% of the large quantity of materials collected in the country is used oil. The connection between this and the fact that some 40 of the 68 LGAs in the State already have Commonwealth government-funded used oil collection facilities in place should be addressed by ZWSA.
- People in the country have a greater opportunity to attend collections, as measured by the number of collection days per 1000 population. This is counteracted by the greater distances that country participants need to travel to collections. It may be appropriate for ZWSA to review the balance between the number of country and metropolitan collections, given the fact that country areas have had the benefit of the government-funded ChemCollect program (2000 – 2002), and now also have an opportunity to dispose of chemicals under an industry-funded EPR program, ChemClear®.
- The overall average cost of this program (excluding staff salaries, but including GST) expressed per kg of materials collected is $3.50 per kg. This is comparable with the $3.28 per kg achieved for the “CleanOut” program in NSW in 2004-05, but considerably higher than the $1.90 per kg achieved by the Sustainability Victoria program over the same period (2004-05). The NSW program does not include distant country areas.
- Fixed costs per kg in the Far country of South Australia are double those for the Metropolitan area ($2.81 per kg vs $1.41 per kg).
- The total costs of country collections (Far country, Near country and regional centres taken together) amount to $1.05M out of the total expenditure of $1.71M for Stages 1, 3 and 4 (or 61.5%), while these areas account for only 50% of the collected tonnes and 21% of participants.

Dry Creek Depot

- Over 98% of participants in the Dry Creek Depot come from within the Adelaide Metropolitan Area. Nearly half the participants come from the Northern Metropolitan area, and the balance – from other parts of Adelaide.
- Residents of Southern and Eastern Metropolitan areas are reported to be reluctant to utilise the Dry Creek facility; its low frequency of opening has also been expressed as a concern.
- The Dry Creek Depot collects, on the annual basis, around 15% of what the ZWSA program collected at its peak, and is, thus, a significant adjunct to that program.
- The total cost of collecting and disposal of materials via the Dry Creek Depot are approximately $2.40 per kg, which compares favorably with an average Metropolitan cost of $2.61 per kg in the ZWSA program.

Evaluation of Options – Chemical collection program

- Providing a program of six one day collections on a regional basis provides the best outcomes for the metropolitan area. Providing a permanent drop-off point for all chemicals does give a replacement for Dry Creek, with increased participation and quantity collected, but not with the same effectiveness in terms of quantity collected and participation as the regional collection program.
- The use of permanent drop-off points for HVLT is possible, but still requires the provision of collection points or events for all chemicals. The accessibility provided by such points does result in higher costs, and value for money is not as great as for the program of regional collections. These options do, however, provide a very high level of community engagement. Increasing awareness and extended producer responsibility are matters that are fairly similar across all options, and can be dealt with appropriate communication materials and activities associated with each.
- It is recommended that ZWSA therefore consider continuing program with collection at temporary sites on a regional basis in the metropolitan area, and collection at temporary sites in non-metropolitan areas (at a frequency depending on available funding). Establishment of three permanent drop-off facilities for HVLT could be considered depending on funding. Establishment of a permanent facility in Wakefield is not recommended.

Evaluation of Options – Dry Creek Depot

- There is little advantage to storing the collected materials on site at Dry Creek; in fact, if anything, it is a disadvantage, as it leads to an increased risk of possible incident on the site connected with unattended storage of chemicals.
- Outsourcing the collections at Dry Creek to a suitably qualified and licensed contractor would cost only marginally more than the current staffing of the collections by the EPA staff.
- In fact, when other EPA staff time currently expended on managing the Depot is taken into account, significant savings would probably result, and the EPA staff would be able to concentrate on its core duties of environmental regulation and enforcement.

Branding, marketing and education

- Improvements could be made in the way in which ZWSA currently impresses its "brand" on the program so as to make the public more aware of the role of State government in this important initiative.
- The education aspect of the program could also be stepped up, to encourage people to buy smaller quantities of products, such as paint, and to use less hazardous materials.

Links to other collection programs

- South Australia is the only State that has not contributed funds to the ChemClear® program to collect so-called "Group 2 chemicals" (historical, not currently registered products, or products not made by members of industry associations). The reason given by ChemClear® for not seeking such funding is that "ZWSA is doing such a good job in the country".
- It is suggested that an approach be made to Australian Paint Manufacturers' Federation (APMF) to explore possible partnership arrangements, specifically in South Australia, either with day collections or possible permanent HVLT facilities.

9 References

1. Minute from Dr Paul Vogel, Chief Executive EPA to A/Chief Executive ZWSA, EPA 05/9651
2. New York State Department of Environmental Conservation, "Household Hazardous Waste Report 1988 through 1999 Program Review", April 2000, on www.dec.state.ny.us/website/dshm
3. Commonwealth Used Oil Recycling website www.oilrecycling.gov.au/
4. www.cityoflondon.gov.uk/Corporation/our_services/health_safety/household_waste.htm#haz
5. European Commission. Directorate-General Environment, "Study on Hazardous Household Waste (HHW) with a Main Emphasis on Hazardous Household Chemicals (HHC)", July 2002.
6. Asterisk One Consulting. "CleanOut Household Chemical Collections – Sydney, Hunter and Illawarra. Program Review and Comparative Assessment", September 2005.
7. Minute from Colleen J Dobson, Program Manager Hazardous Waste, ZWSA, to Chief Executive ZWSA, February 2007.
8. Australian Standard AS1940:2004 The storage and handling of flammable and combustible liquids.

Appendices

Appendix 1 Acronyms and Abbreviations

ABW	All Bulk Waste (a South Australian company)
ADG Code	Australian Dangerous Goods Code
APMF	Australian Paint Manufacturers' Federation
APVMA	Australian Pesticides and Veterinary Medicines Authority
EPA	Environment Protection Authority of South Australia
EPR	Extended Producer Responsibility
HDPE	High-density polyethylene
HHW	Household Hazardous Waste
HVLT	"High Volume Low Toxicity" materials. Usually this term encompasses paint, used oil, lead-acid batteries and gas cylinders.
IBC	Intermediate Bulk Container
IWS	Integrated Waste Services, a privately-owned waste industry service provider, with a transfer station and recycling facility in Wingfield and a landfill depot at Dublin.
LGA	Local Government Area
LVHT	"Low Volume High Toxicity" materials. Usually this term encompasses all non-HVLT materials collected
NAWMA	Northern Adelaide Waste Management Authority
RFQ	Request for Quotation
SCC	Salisbury City Council
SRWRA	Southern Region Waste Resource Authority
TPI	Transpacific Industries Group Limited
ZWSA	Zero Waste South Australia

Appendix 2 – Number of collection days by LGA

(LGAs with repeat collections over the duration of the program to end June 2007 are highlighted in yellow)

LGA	No of collection days				
	Stage 1	Stage 2	Stage 3	Stage 4	Total
Metropolitan					
Adelaide Hills			4		4
Burnside			1		1
Campbelltown		1		1	2
Charles Sturt		1			1
Gawler		1			1
Holdfast Bay			2		2
Marion	1				1
Mitcham			1		1
Mount Barker			3		3
Norwood Payneham & St Peters + Walkerville		1			1
Onkaparinga	2		2		4
Playford		1			1
Port Adelaide-Enfield		2			2
Prospect		1		1	2
Salisbury		1			1
Tea Tree Gully			1		1
Unley	1				1
West Torrens	1				1
West Torrens + Marion			1		1
"Near Country"					
Alexandrina			2		2
Barossa		2		2	4
Kangaroo Island		3		4	7
Light Regional		2		2	4
Mallala		2			2
Murray Bridge			3		3
Victor Harbor		1			1
Yankalilla		2			2
"Far Country"					
Barunga West			2		2
Berri Barmera		2			2
Ceduna			1		1
Clare & Gilbert Valleys		2		2	4
Cleve	1				1
Coorong			3		3
Copper Coast			1		1

LGA	No of collection days				
	Stage 1	Stage 2	Stage 3	Stage 4	Total
"Far Country" - continued					
Elliston			2		2
Flinders Ranges			2		2
Franklin Harbour	1				1
Goyder			4		4
Karoonda East Murray			1		1
Kimba	1				1
Kingston		1			1
Le Hunte			1		1
Lower Eyre Peninsula			2		2
Loxton Waikerie		2			2
Mid-Murray			4		4
Mt Remarkable			1		1
Naracoorte Lucindale			2		2
Northern Areas		4			4
Orroroo Carrieton			1		1
Outback Areas				7	7
Renmark Paringa		2			2
Robe		1			1
Southern Mallee			2		2
Streaky Bay			3		3
Tatiara		3			3
Tumby Bay			1		1
Wakefield		4		4	8
Wattle Range			4		4
Yorke Peninsula			4		4
Regional Centres					
Mt Gambier (incl Grant)			3		3
Port Augusta			1		1
Port Lincoln			1		1
Port Pirie			2		2
Whyalla	2				2