

# The Drain is just for Rain



**Light industrial Small and Medium Enterprise  
environmental management for  
the protection of stormwater quality**

**Summary report**

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South East Regional Centre for Urban Landcare

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A full version of this report is available electronically from the South East Regional Centre for Urban Landcare (SERCUL).

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## Introduction

SME environmental management is generally reported as being inadequate around the world (Studer *et al.*, 2006; Walker and Redmond, 2006; Vives, 2006; Hillary, 2004). In Australia, Small and Medium Enterprises (SMEs) constitute the vast majority of businesses and their involvement in environmental management is an important step towards achieving sustainable development (Schaper, 2002). However, SMEs are a diverse group and are well known to be difficult to engage (Peters and Turner, 2004). There is considerable debate regarding appropriate mechanisms for engaging SMEs in environmental management, with some studies identifying regulation as a crucial driver in SME environmental management (Revell and Blackburn, 2004; Studer *et al.*, 2006). However, it is acknowledged that SMEs do not tend to surpass regulatory standards (Patton and Worthington, 2003), and that regulation alone is unlikely to lead to the protection of the environment (Petts *et al.*, 1999).

The South Eastern Regional Centre for Urban Landcare (SERCUL) has recently engaged Perth light industrial Small and Medium Enterprises (SMEs) in a study of environmental risk management perceptions and practices. The South East Regional Centre for Urban Landcare is a not-for-profit, community managed and incorporated organisation. SERCUL functions as a community information, advice and advocacy centre for natural resource management. SERCUL receives funding from, and collaborates with, the government and private sectors for the management and delivery of programs related to natural resource management. SERCUL was formed in 2003 through the collaboration of 4 major community landcare groups and acts as a resource and administration centre for many smaller groups. SERCUL's operational area covers 13 southern metropolitan Perth local government areas south of the Swan River to Armadale and across to Rockingham.

The SERCUL project focussed on the effect of Local Government Authority (LGA) Environmental Health Officer (EHO) contact with light industrial SMEs in a voluntary, education and support role for the protection of stormwater quality. The research was titled the 'SERCUL industrial survey and inspection project' and is referred to as the 'SERCUL SME project' in this document. SERCUL has collected data regarding the environmental management awareness, perceptions and practices of SMEs in 8 light

industrial areas, located in 5 Local Government areas in southern Perth, Western Australia, from September 2005 to May 2007. The project was collaboratively implemented with the City of Canning, City of Armadale, City of Rockingham, City of Cockburn and the Town of Kwinana. A Local Government Environmental Health Officer was present with a SERCUL officer at each of the 445 SME interviews conducted. Interviews were conducted with 268 businesses in the initial stage and 177 businesses in the evaluation stage.

The intent of the SERCUL SME project was to;

- stimulate local attention and debate in the field of light industrial SME environmental management;
- examine local SME barriers to environmental management;
- examine potential education interventions for the protection of stormwater quality; and,
- test the acceptance of Local Government when engaged with light industrial SMEs in environmental management.

## **Research objective**

The overarching objective of this study was;

To examine the effect of voluntary contact with Local Government Environmental Health Officers on light industrial Small and Medium Enterprise environmental risk management for the protection of stormwater quality.

In addressing this objective, the research addresses three key questions:

- i. What are the barriers to improvement in SME environmental risk management?
- ii. Does education influence SME environmental risk management?
- iii. Do SMEs perceive Local Government as suitable change agents for improving light industrial environmental risk management?

## Major conclusions

- A face-to-face site-specific approach helps to address the diversity of SME activities, their inability to identify environmental hazards and risks in the workplace, and lack of awareness of environmental impacts.
- The level of SME environmental outcomes achieved is likely to be directly related to the level of the regulators/auditors communication and technical skills in being able to personally engage business owner/managers, because SME awareness of environmental impacts is low.
- A range of strategies is required that acknowledges different SME beliefs, values, and motivators for different innovation adopter groups, including a specific approach for Laggards.
- The recorded barriers to environmental management of 'likely costs' and the related barrier of 'lack of market demand' were potentially more significant barriers than indicated by the SME participants.

## Literature review

An extensive review of international small and medium enterprise (SME) research literature indicates that;

- SME environmental management is generally inadequate around the world (Vives, 2006, Williamson *et al.*, 2006, Studer *et al.*, 2006).
- SMEs demonstrate a generally positive environmental attitude and poor awareness of environmental impacts (Williamson *et al.*, 2006; Hitchens *et al.*, 2003; Tilley, 1999).
- The small and micro enterprise categories (defined in Australia as less than 20 and less than 5 employees respectively) are considered difficult to engage in research and, therefore, are often overlooked (Condon, 2004; Peters and Turner, 2004; Spence and Lozano, 2000)
- SMEs have a distinctly different operating culture to large organisations (Murillo and Lozano, 2006; Vives, 2006; Schaper, 2002).
- SMEs are a very diverse and disparate group (Walker and Redmond, 2006; Hillary, 2004).

A comprehensive literature review and methodology are available in the full report which can be obtained from SERCUL by request.

## **Methodology**

The research design consisted of:

- A semi-structured interview format for face-to-face delivery to improve the response rate and enable a broader discussion about environmental issues during the interview.
- A survey technique utilising closed and specific questions to allow a precise estimation of time requirements, and the collection of data that can be easily compared.
- An initial survey and audit, and an evaluation survey and audit approximately 12 months following, conducted by a SERCUL officer and LGA Environmental Health Officer.
- A stormwater awareness survey (SAR) measuring participants' knowledge regarding stormwater contaminants and obligations to protect stormwater quality (initial survey).
- A survey of participants' barriers to environmental management and their preferred environmental information and communication sources (initial survey) and their perceived most useful environmental information sources (evaluation survey).
- An environmental risk management audit and inspection (MRR) assessing management practices and appropriate infrastructure for the protection of stormwater quality.
- The supply of environmental education materials:
  - a generic SME environmental information pack to all participants;
  - an optional paint stencilled prompt on the stormwater inlet; and
  - an optional personalised industry-specific environmental management pack.
- A non-probability sampling procedure which targeted small and micro light industrial businesses in particular.
- Participation in all components of both the initial and evaluation stages of the project was voluntary.

## **Results**

### **Characteristics of the business**

- A high response rate (85% initial stage, 73% evaluation stage).
- Predominantly small and micro business (>88%).
- Most businesses were from one of five business types; mechanical and vehicle repairs, vehicle depots, engineering and fabrication and, chemical manufacture or storage.
- Most businesses had been at their current premise less than 10 years, many less than 5 years.
- Half of the businesses were members of an industry group, and less than a quarter were licensed by a government organisation.
- The evaluation group were representative of the initial group.

### **What participants thought**

- Main barriers to environmental management were lack of information, lack of government assistance, lack of environmental expertise, likely costs and lack of market demand.
- Main preferences for environmental information and communication (pre-intervention) were face-to-face discussion, Local Government audits, legal compliance checklists, and best management practice guides.
- Most useful environmental information sources (post intervention) were premise inspection, awareness of stormwater regulations, environmental risk management survey, and SME generic environmental management information fact sheets.
- The vast majority of businesses found the survey and audit useful and stated that Local Government visits improved their environmental management.
- Awareness of stormwater protection was generally high, although this was not necessary reflected in management practices that protected stormwater quality.

### **Participant's practices prior to the interventions (initial audit)**

Less than one quarter of businesses:

- Had adequate environmental policies and documentation of practices (<21%).

More than one quarter of business:

- Had a comprehensive waste minimisation approach (34%).
- Had acceptable emergency spill procedures and equipment (32%, 34%).
- Had acceptable wastewater treatment (46%).

More than half of businesses:

- Were observed to be discharging contaminants to the stormwater system (58%).
- Had acceptable storage of waste materials (64%).
- Had acceptable general housekeeping practices (60%).

More than three quarters of businesses:

- Were recycling some materials (90%).
- Had acceptable storage of raw materials (91%).

### **Stormwater management (initial audit)**

- 96% of business did not pre-treat stormwater, in any form, before release to soakwells, or piped networks to compensation basins connected to wetlands, rivers and/or the ocean.
- 92% of businesses believed they were adequately protecting stormwater quality.
- 58% of businesses were observed to be discharging contaminants to the stormwater system.
- Hydrocarbons and detergents, resulting from industrial activities, were the most common contaminants of stormwater, although a variety of other contaminants were observed.

### **Participant's response to the interventions (evaluation audit)**

- All business types improved their environmental risk management for the protection of stormwater on average (mean).
- All environmental management risk categories showed a degree of improvement on average (mean).

- Environmental risk management practices generally moved away from high risk towards low risk, although most businesses retained at least one high risk activity.

### **Areas of environmental risk management improvement (evaluation audit)**

Major improvement:

- Emergency spill preparedness

Moderate improvement:

- Treatment of wastewater
- Elimination of discharge of contaminants to the stormwater system
- Comprehensive landfill minimisation

Minor improvement:

- Storage of waste materials
- Policies and documentation

### **Effect of the education interventions (evaluation audit)**

- Interventions delivered face-to-face were considered most useful by participants.
- Printed materials, drain stencilling, government licensing, industrial neighbours, and industry group membership did not appear to have a significant influence on participant's environmental management practices.

A comprehensive presentation of results is available in the full report which can be obtained from SERCUL by request.

## **Discussion**

### **Major findings**

- Where possible, voluntary participation in environmental programs develops SME trust, and a diversity of SME management responses, which can encourage beyond legal compliance outcomes improving the cost effectiveness environmental programs.
- The group at consistent high risk to contaminate stormwater are likely to be the most cost effective to target.
- An SME lack of awareness of their own environmental impacts obscures their perceived need to change their environmental practices.
- Lack of market drivers for environmental management are likely to be understated barriers to improving environmental practices.
- Face-to-face site-specific problem solving was considered the most effective method of communication for behaviour change.
- LGAs were accepted by SMEs as appropriate environmental management change agents.

### **Environmental risk management**

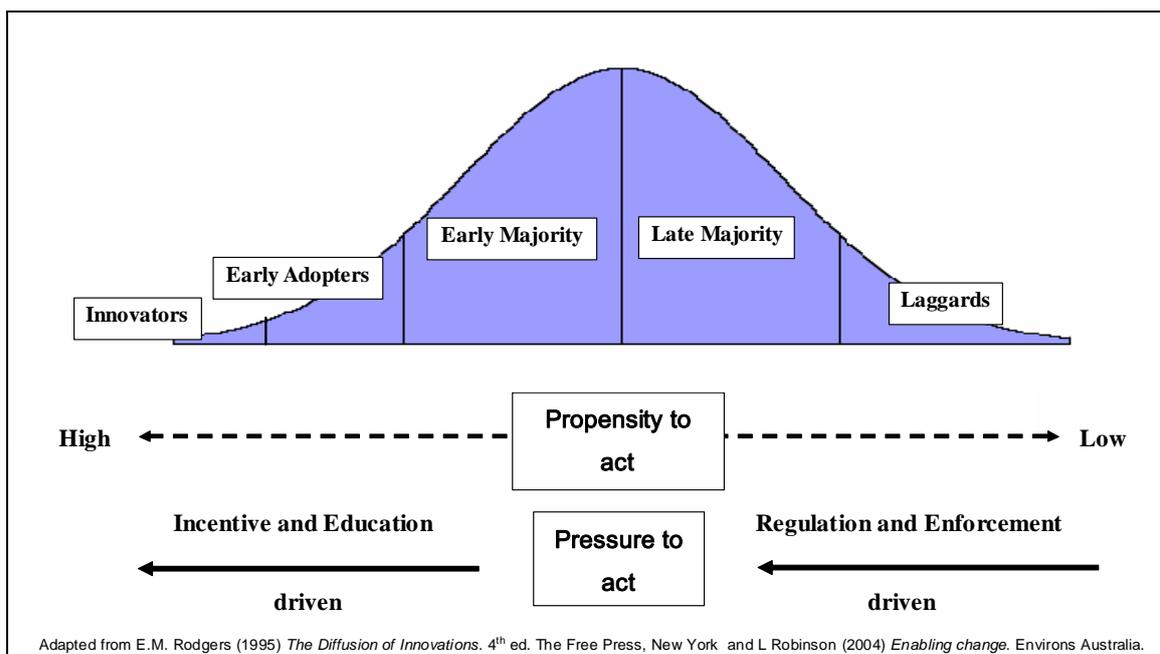
Although positive, the approach used in the SERCUL SME project did not result in immediate and substantial SME implementation of pollution prevention measures for the protection of stormwater quality. On average all business types and all audit categories improved, however, evidence of on-site discharge of contaminants, considered the best indicator of legal compliance in this data, did not improve dramatically (25% of businesses eliminated on-site discharge to stormwater).

Based on field observations and participant feedback it is expected that SME environmental management would have continued to improve in progressive audits, as business owner/managers accepted a government commitment to improving SME environmental management, and participants recognised that meaningful support was being provided to achieve this. Participants generally communicated a willingness to change but lacked the skills and motivation to identify what to change, and how to achieve the change.

## Consistent high risk

A small group of businesses (15%) were assessed to have high risk environmental management practices in both the initial and evaluation audits. A smaller group (5%) moved from being medium risk in the initial audit, to being high risk in the evaluation audit. The micro enterprises were over represented in the consistent environmental management poor performers. This is not to suggest that all micro businesses have these characteristics, far from it, but it is an observable trend in the data collected. As micro and small businesses represent the vast majority of businesses in Australia (Walker and Redmond, 2006), their collective environmental impact is potentially immense (Mir, in press; Scott, 2000). These results suggest the consistently poor performing micro businesses represent a cost effective group to target due to their disproportionate contribution of stormwater contaminants.

**Figure 1 Diffusions of Innovations model**



The consistent poor performers, or Laggards (Rogers, 2003), can represent not only unmotivated participants in environmental improvement programs, but can also significantly overshadow any outcomes achieved by program participants (generally Innovators and Early Adopters of new innovations illustrated in Figure 1) due to the continued detrimental effects of their activities. This principle is represented below in Table 1.

**Table 1 Cost effectiveness of light industrial SME pollution prevention programs**

<b>Cost effectiveness</b>	=	<b>Outcomes achieved / resources expended</b>
		<b>minus the cost of continued resource depletion and degradation</b>
(i.e. results divided by effort less the detrimental effects of those not participating)		

Further investigation is warranted to establish how to effectively engage the Laggard group in environmental management. Rogers (2003) cites Røling *et al.* (1976) suggesting that when change agents directly contact Laggards and provide assistance appropriate to their needs, the results are often encouraging. Rogers (2003) also suggests that the prejudice of change agents can lead them to avoid Laggards, believing they are traditionally resistant to change and/or irrational. This can become a self fulfilling prophecy by denying the information and assistance that is required for successful adaptation.

To regulate a large number of businesses to legal environmental compliance can be highly resource intensive and return only very modest environmental outcomes (Mir, in press; Gunningham and Sinclair, 2002). The Western Australian Environmental Protection (Unauthorised Discharge) Regulations 2004 (UDR) is a compromise between pollution control and pollution prevention, limiting the legal discharge of many hazardous substances. In practice, the collection of evidence and sustained use of infringement notices can be onerous, limiting the appeal of UDR's to Local Government, who can be given State Government authority for LGA Officers to enforce the legislation. Undoubtedly, the use of UDRs and prosecutions may be the only measure to pressure occasional recalcitrant SME operators to meet minimum legislative environmental standards. However, applying the legislative 'stick' to all light industrial SMEs would be extremely resource intensive, and may only result in the achievement of basic environmental standards. The UDRs do not stipulate requirements to reduce the production of toxic materials, waste, water, energy or raw material usage; increasingly important considerations for industrial activities in a world grappling with the notions of sustainability and sustainable development. Nor is an enforcement approach likely to develop the regulator-regulated relationships of trust

and credibility essential to encourage participation in beyond legal compliance activities (Patton and Worthington, 2003; Petts *et al.*, 1999). Table 2 outlines the potential costs and benefits of approaches to engaging light industrial SMEs in various levels of environmental management.

**Table 2 Comparison of intervention types and likely outcomes in light industrial SME environmental management**

Cost of doing nothing	Low (potentially high)
Potential environmental outcomes	Low
Cost of enforcing compliance	High
Potential environmental outcomes	Low
Cost of voluntary beyond compliance engagement	Lower (?)
Potential environmental outcomes	High

### **Awareness of stormwater issues**

Awareness of stormwater contaminants was generally high and this was reflected in the mean Stormwater Awareness Risk (SAR) rating. However, awareness was often inconsistent with practice. Major findings regarding participants' awareness are;

- The awareness of a stormwater contaminant did not predict environmentally responsible behaviour.
- The awareness of a legal obligation to protect stormwater quality did not predict pollution prevention practices.
- A lack of understanding of environmental impacts is likely to be a more significant barrier than a lack of awareness of contaminants.
- It is likely that business owner/managers are unable to identify their (often small) contaminant discharges as part of the problem, and are therefore unable to see themselves as part of the solution.

## **Barriers to environmental management**

The reporting of barriers to environmental management was generally low; no barrier was significant to more than one third (35%) of the participants surveyed. It is possible that the barriers reported by participants were influenced by a lack of awareness of environmental impacts. Participants that were not aware of environmental management issues, could not report barriers to a problem that they did not know existed.

## **Effect of the education interventions**

The results suggest that the environmental risk management of the sample group did improve as a result of the education interventions, although their effect was varied.

- Drain stencilling may have a value as a prompt to facilitate environmental management discussion between staff, and with customers, but not as a stand alone education intervention to improve environmental risk management for the protection of stormwater quality.
- The delivery of printed information needs to be simple and highly targeted for the intervention to be cost effective.
- The SME preference for, and motivating influence of, face-to-face discussion emphasises the importance of human contact and social factors in the adoption of new behaviours.

The perceived usefulness of environmental information sources (evaluation survey) is strongly aligned with the preferred information sources (initial survey). However, the provision of face-to-face communication, and education materials, supplied in the SERCUL SME project should have contributed to addressing the most significant barriers to environmental management reported in the initial survey. However there was not a substantial and immediate improvement in environmental practices suggesting market-based barriers were more significant than stated.

## **Other environmental management information sources**

Other potential factors for environmental risk management improvement external to the SERCUL SME project, such as membership in industry groups, licensing by government organisations and contact with industrial neighbours, were not considered significant in the results obtained. Both industry associations (13%) and neighbours

(14%) were infrequently reported as useful sources of environmental information by the SME participants. This result could help explain the low take-up rate of SME involvement in environmental programs that are delivered through industry-government partnerships (i.e. the Western Australian Green Stamp programs).

Amongst the micro enterprises, those licensed by a government organisation had the highest risk to contaminate stormwater. This is a concern, presumably those businesses are licensed because they handle substances that are more hazardous than the norm. Observations in the field suggest that government organisations tend to license a specific aspect of a business' activities rather than their overall operation. It is important that the licensed premises are included in the routine inspections of all businesses for this reason.

### **Acceptance of LGA involvement in SME environmental management**

SME participants did perceive that LGA involvement improved their environmental management (88%).

While the results suggest that LGAs were perceived as suitable change agents by SMEs, this does not necessarily mean that LGAs are the most suitable, or the only organisation to perform this role; simply that they were accepted in this role by the majority of the SMEs involved in the SERCUL project.

Low SME awareness of environmental impacts suggests that the communication and technical skills of 'Industry Support Officers' are likely to be a major determinant factor in the level of SME environmental outcomes achieved.

It is suggested that the current LGA EHO training and focus on the regulation of food premises is not entirely suitable for encouraging beyond legal compliance environmental management with light industrial SMEs. EHO suitability would improve if training was provided that was less regulatory focussed with more emphasis on support, behaviour change theory and technical problem solving.

The importance of social factors in organisational and behaviour change highlights the need for an individualised and site-specific approach to SME environmental

management (Stone, 2006; Rogers, 2003). A range of strategies may be required to address the range of values and beliefs that inform practices amongst the diverse and disparate SME 'group' (Hillary, 2004). Particular change agents may be required to engage with particular adopter groups (Rogers, 2003), or highly trained change agents would require a keen understanding of how to appeal to a broad range of the social values in different adopter categories, acknowledging the diverse needs of the SME 'group' (Peters and Turner, 2004).

### **Voluntary participation**

Whilst voluntary participation in environmental management programs risks not being all inclusive (Gunningham and Sinclair, 2002), compulsory participation is also limited, in that businesses may not feel compelled to exceed basic compliance (Pattern and Worthington, 2003). Without voluntary or willing engagement by participants the necessary relationships may not develop to encourage higher level environmental management planning (Van Berkel, 2004; Patton and Worthington, 2003)

Assertions that voluntary participation should be an augment to compliance regulation (Peters and Turner 2004; Gunningham and Sinclair, 2002) are supported by the findings of this study. Further, Revell and Blackburn (2004) believe that SMEs will not be sufficiently motivated to address environmental management without a regulatory driver. However, findings in the studies of Patton and Worthington (2003) and Petts *et al.* (1999) suggest that many businesses are unlikely to move beyond compliance, and that compliance will not be sufficient to protect the environment. These findings highlight the tension and delicate balance to be struck between regulating compliance and voluntary participation in SME environmental management.

### **Sample representativeness**

The study results regarding SME environmental management practices are consistent with other local light industrial SME studies (Walker *et al.*, 2007, Walker and Redmond, 2006; Greenstamp MTA WA, 2004; City of Armadale, 2002; Swan River Trust, 2000), suggesting the non-probability sampling procedure utilised was still reasonably representative of the overall metropolitan Perth light industrial SME population.

## Major conclusions

- A face-to-face site-specific approach helps to address the diversity of SME activities, their inability to identify environmental hazards and risks in the workplace, and lack of awareness of environmental impacts.
- The level of SME environmental outcomes achieved is likely to be directly related to the level of the regulators/auditors communication and technical skills in being able to personally engage business owner/managers, because SME awareness of environmental impacts is low.
- A range of strategies is required that acknowledges different SME beliefs, values, and motivators for different innovation adopter groups, including a specific approach for Laggards.
- The recorded barriers to environmental management of 'likely costs' and the related barrier of 'lack of market demand' were potentially more significant barriers than indicated by the SME participants.

## Recommendations

1. Deliver light industrial SME environmental inspection programs through Local Government, with funding support from State Government.
2. Use environmental risk management tools which encourage a precautionary and beyond compliance approach to the non-prescriptive Environmental Protection (Unauthorised Discharge) Regulations 2004.
3. Focus on face-to-face contact and site-specific problem solving at SME premises.
4. Focus environmental management programs on the development of positive relationships. This will increase the likelihood of future participation in voluntary schemes that promote the reduction of toxics, energy, water and resource use and improves the cost effectiveness of environmental management support programs.
5. Continuously assess SME barriers and motivators to environmental management for an understanding of how to address changing SME priorities and needs.
6. Develop high level training opportunities for Industry Support Officers. The communication and technical skills of the Officers is likely to be the determinant factor in the level of SME environmental outcomes achieved.
7. Provide an initial inspection of all SME premises, including State Government licensed premises, prior to developing audit frequencies based on actual assessed risk.
8. Obtain Green Stamp accreditation for LGA depots as a positive promotional feature demonstrating Councils are 'walking the talk'.
9. Develop targeted strategies for adopter groups, particularly differentiating the approach to 'change of behaviour' versus 'change of belief' groups.
10. Level the playing field so that Laggards are not gaining a competitive advantage by avoiding waste management costs that are a legal requirement. Unregistered and backyard operators also impact on the level playing field, particularly in the automotive industry. Use enforcement where all other options for compliance are not viable.
11. Market environmental accreditations (i.e. Green Stamp) to the customer, encouraging green purchasing that offers an economic incentive to SMEs to perform high quality environmental management.

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