**Brisbane City Council**

**Environmental Benchmarking Study**

**Undertaken as a contract project connected to a Doctoral Thesis**

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## 1) Introduction and Background

### a)    Purpose of the Benchmarking Study

The Brisbane City Council (BCC) Environmental Benchmarking Study reports on the outcomes from the first two years of BCC's administration of the *Environmental Protection Act 1994* (EPA). The Study assessed BCC's effectiveness in delivering environmental outcomes from the EPA through:

- inspections to determine changes made by licensed environmentally relevant activities (ERA's) in order to comply with new environmental requirements;
- analysing  changes to environmental risk of those ERA's;
- applying statistical techniques to infer the results of these risk assessments to ERA categories and licence grades (green or standard); and
- evaluating industry responses to a range of BCC's pollution prevention initiatives.

### b)    The Environmental Protection Act

The object of the EPA is to "protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends" (EPA, Section.4). The EPA establishes a circular, four-phase process to meet this object. The four phases are:

- establishing the state of the environment and defining environmental objectives;
- developing effective environmental strategies;
- implementing environmental strategies and integrating them into efficient resource management; and
- ensuring accountability of environmental strategies (S. 4(2))

This project contributes to Phase 1, by providing benchmarks for the status of pollution prevention systems in Brisbane in 1995 and 1997, for selected ERA's. It also addresses Phase 4, by reporting on the outcomes and effectiveness of various pollution prevention initiatives adopted by BCC.

Queensland Local Governments have worked to bring about the object of the EPA since 1995, through the licensing of ERA's. These activities will or may release a contaminant into the environment when they are carried out. ERA's are specified by

Regulation as either devolved or non-devolved, and as either Level 1 or Level 2. Local Governments are the administering authorities for all devolved ERA's in their local area. Level 1 ERA's require a licence and pay an annual licence fee, and level 2 activities require only a one off approval (EPA, Sections 38-40).

## c)     Regulatory Gaps

The process of implementing the EPA through the licensing of devolved activities has been hampered by several significant regulatory gaps. In particular, BCC and other administering authorities have operated for over two years with neither the Environmental Protection Policies (EPP's), nor on-the-spot fines available as regulatory tools.

The EPP's were to have identified environmental values to be protected or enhanced through implementation of the EPA. EPP's were also expected to be the source of compliance standards and measures designed to protect the environment, or minimise the possibility of environmental harm (EPA, Section 25). The Water, Air and Noise EPP's each commenced shortly before this report was written. There is however, little influence of the EPP's in any environmental outcomes reported on, since there had been no time for BCC to incorporate EPP issues into their licensing strategies.

It is significant for Local Government administering authorities, that the final EPP's do not provide simple, clear compliance standards that would be directly meaningful for operators of devolved ERA's. This implies a role for Local Governments in interpreting the practical meanings of standards, and communicating this to operators of devolved ERA's. Where Local Governments or their clients value consistency in application of environmental laws between local government areas, this creates an additional responsibility of negotiating and communicating compliance details between Local Governments.

On-the-spot fines were intended as a small-scale, simple enforcement tool to be applied for one-off, minor offences. Although theoretically available, according to Regulation, at the time of writing this report, on-the-spot fines have not yet emerged in practice. This has left a critical gap in the enforcement armory of Local Government administering authorities, since this level of enforcement would be appropriate for many of the small-scale environmental offences relevant to devolved ERA's. The absence of on-the-spot fines has meant that the EPA has already come to be seen by many licensees as weak legislation, that punishes those who invest to comply with its

requirements, by failing to control those who do not. (This issue is expanded on in the findings presented in Section 6b below).

The fact of these regulatory gaps means that the potential effectiveness of the EPA can not yet be assessed. It must be recognised that many of the problems and concerns raised by licence holders are due to these regulatory gaps. There is no evidence that they stem from problems inherent in the EPA itself, in the range of ERA's requiring licensing, or in the implementation strategies adopted by BCC.

**d)**     **Regulatory Review**

The *Environmental Protection (Interim) Regulation 1995* (the current Regulation), which specifies devolved ERA's (among other things) expires on 1 March 1998. At the time of writing, its replacement Regulation had not yet been finalised.

The Department of Environment (DoE) has released a Regulatory Impact Statement, for the proposed replacement Regulation. Among the proposed changes is an ability for administering authorities to determine whether activities should be classified as Level 1 or Level 2 ERA's. In the continued absence of clear, practical standards that are meaningful at the scale of devolved ERA's, such a change would almost certainly increase any inequities and inconsistencies within and between administering authorities.

This possibility suggests the need for studies such as this to review the way that the current system of environmental regulation is working, and in particular to examine progress towards a level playing field for environmental standards. In addition, studies of the progress of ERA's toward pollution prevention can contribute to debate about appropriate standards, and risk assessment criteria to policy makers.

This Study addresses the goal of reviewing the impact of the current Regulation within Brisbane. It also makes materials available, which could assist similar reviews elsewhere. To this end, Appendix 1 includes a detailed description of the Study methodology, with an evaluation of its strengths and weaknesses. Detailed descriptions of results are provided in Appendix 2. Appendix 3 contains copies of all administrative tools developed through the course of the Study.

### e)   Environmental Risk Assessment

In preparing to replace the current Regulation, DoE commissioned consultants PPK to develop an Issues Paper on the application of risk management principles to the existing and future licensing of ERA's under the Environmental Protection Act. A model for the assessment and review of risks associated with existing and future ERA's was developed and applied in an elementary form to the existing Schedule of ERA's as a result of the PPK study.

Similarly, this Study has applied risk management principles to the existing licensing framework for licensing ERA's, and provides a model that could be applied to risk assessment in the licensing context. However, it differs from the PPK approach in several key ways.

- It is narrower in scope than the PPK study, assessing only eight environmentally relevant activities for one Local Government area (although these include 80% of all ERA's in the administering authority with most ERA's)

- It has assessed the environmental risk potential for industry sectors by measuring the pollution potential of a representative sample of individual activities, enabling assessment of the actual environmental risk of activities.

- It has used statistical methods to infer findings to the industry sectors as a whole.

- Its methodology facilitates recognition of different risk levels not only between, but also within ERA groups, and different weightings for environmental risk areas (such as air, water and noise) within industry sectors.

- It recognises that an outcome of environmental Regulation may be environmental risk reduction by operators of licensed activities. Using this observation, it has benchmarked the *potential* environmental risk of activities, and also their *1995* and *1997* risk levels, finding significant differences between each of these benchmark measures.

- It has augmented this risk assessment by recording ERA operator responses to environmental regulation.

These factors make this a grounded and applied study that has been able to test, rather than rely on assumptions about the pollution potential of ERA's, and their operators' responses to new environmental requirements.

## 2) The Environmental Protection Act in Brisbane City Council

This section outlines some critical components of BCC's pollution prevention initiatives relevant to the EPA. It focuses on those aspects of BCC's ERA licensing framework that are of direct relevance to the Benchmarking Study. Each of the pollution prevention initiatives described below have either been used in the development of administrative tools for this Study, or have been evaluated through the course of the Study, or both.

### a)      Establishing Standards: Operators Environmental Guidelines

Early in 1995, BCC started discussions with potential EPA devolved licence holders in Brisbane to design initiatives that might contribute to the success of an environmental licensing program. These early meetings suggested that small business operators placed high value on clear, achievable standards for pollution control. BCC responded by establishing an Industry Advisory Committee for each industry sector, and by commencing the development of *Operators Environmental Guidelines*[1] (OEG's) for each ERA.

The OEG's, and the standards identified within them are one of the main tangible outcomes from the Industry Advisory Committees' work. New drafts of OEG's have been presented to committees for comments, which have then been incorporated into them.

The OEG's have also had broader input. Where DoE had produced an equivalent guideline, that guideline was also considered in drafting the OEG. Interstate standards covering similar environmental issues were also incorporated when available. Also, in most cases, the relevant OEG was provided to operators of ERA's as a supporting document to their licence. This has meant that industry has had over two years, and many opportunities to comment on the issues and standards raised by the OEG's, and in many cases have taken up this offer.

Because of this history and the extensive consultative process applied to their development, as well as their relevance to BCC's licensing program, the OEG's were used as the basis for environmental compliance checklists used in this Study. Each

checklist was drafted from the OEG's, and then provided to relevant BCC staff, and piloted on site at an ERA at least once before being finalised. The final checklists themselves are presented in Appendix 3, and Appendix 1.1.6 evaluates the survey design, including these checklists.

The environmental risk ratings allocated to individual ERA's as part of this Study are based on the completed checklists. This means that there has been a heavy reliance on the OEG's in this Study. In turn, this means that the Study methodology and therefore its findings rely heavily on the quality of the OEG's, and their effectiveness in highlighting relevant environmental risks from ERA's. It is therefore worth noting at this point that the range of comments and criticisms made of the OEG's during the survey process have supported, rather than refuted their use as the basis of the environmental assessment of premises (see Appendix S.1.1.6).

### b)        Threat of Enforcement

Despite the absence of on-the-spot fines, BCC has put in place several mechanisms to ensure that environmental regulation is supported by a threat of enforcement to push resisting polluters into compliance. These have included communicating penalties under the EPA to ERA operators, and attempting to publicise and use available enforcement options.

BCC has attempted to inform ERA operators of the serious penalties in the EPA for committing environmental offences. These have been explained directly to operators during inspections, and in written advice, in letters and on licence application and renewal forms.

An example is provided by the spray booth requirements developed after consultation within their Industry Advisory Committee. BCC threatened to close operators who failed to ensure that all large paint jobs were conducted in a spray booth by October 1996. This enforcement action could have been achieved using an Environmental Protection Order, which is one of the available regulatory tools. Significant effort was put into ensuring that this requirement was known to the entire industry. The threat has not yet been carried out however, and the frustration of those operators who have complied with spray booth requirements is evident in this Study's findings.

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[1] Previously called Operators Compliance Guidelines

## c)      Encouragement and Reward

BCC also attempted to provide a system that encouraged good environmental performance and rewarded those operators who achieved a high level of compliance. BCC developed and put in place a graded licensing system, and a cleaner production industry assistance scheme.

An element of the graded licensing system is its delivery of lower licence fees to good environmental performers. Operators who can demonstrate that their small size (two or fewer full time employees) results in a significantly lower environmental impact than is the average for their industry sector can halve their licence fee under the 'small' licence system. Operators who demonstrate Brisbane's best practice in environmental management for their industry sector, regardless of size, are eligible for a 'green' licence, which also incurs only half the normal annual licence fee. Operators who are both 'green' and 'small' pay only one quarter of the standard ERA fee.

As well as reduced licence fees, green licence holders receive a certificate to show they hold a green licence. This can be displayed, or used in marketing, as evidence that an independent assessment of the operation has recognised its outstanding environmental achievements. Most green licence holders display their certificate in view of customers in the workshop office.

The industry assistance scheme was available on request to any ERA operator. It included an environmental audit by BCC staff, and a report on opportunities for that business to simultaneously save money and improve their environmental performance. Just fewer than 300 businesses took part in the industry assistance scheme.

## d)      Other Written Information

BCC has produced a range of written information to encourage and inform the adoption of environmental protection measures. These have included licence application and renewal forms, licence conditions, the pollution solutions newsletter, as well as the OEG's that were described above.

BCC has attempted to assist operators by making its licence application and renewal forms simple, easy to use, and valuable to them. Licence application forms provided to

operators at the start of EPA licensing included an industry-specific checklist that covered common potential contaminants for particular industry sectors. Renewal forms were designed to constitute an environmental management system, and so assist compliance with one of the common licence conditions (to develop such as system).

Licence conditions followed the general structure developed by DoE, but were designed to be simple and clear where possible. Conditions were sent out with a licence certificate, and in most cases an OEG. BCC staff have been aware for some time that many operators were not sure of the difference between these sets of documents, or of the legal significance of the licence conditions.

BCC published its first *Pollution Solutions Newsletter* early in 1997 as an update on EPA news and compliance issues for licence holders. Two editions had been published and mailed out to licence holders prior to this Study.

## e)	Contact on Site

BCC also conducts inspections of ERA's before issuing licences, and at various times after a licence has been issued. This contact with ERA operators on site has been used for the range of services listed below.

- Identify and discuss potential pollution issues directly with those responsible for their management.
- Give suggestions about ways of addressing the issues.
- Check compliance with requirements.
- Discuss issues regarding standards, licence conditions and other requirements.
- Assist operators to interpret or fill in forms, or help with other administrative matters.
- Undertake green licence assessments.
- Explain details of BCC's pollution prevention initiatives.
- Undertake enforcement action.

**f)      Contact off Site**

Off-site, BCC held a *Pollution Solutions Expo* in 1997, in addition to a range of public meetings, advisory committee meetings and other forums. The Expo enabled ERA operators to inspect the range of pollution control technologies available in various areas. Stallholders reported great success in securing sales of these technologies during and after the Expo.

## 3) Study Methods

The Study used a survey to quantify benchmarks for environmental risk among ERA's, the environmental outcomes from the first two years of EPA implementation and the effectiveness of BCC's pollution prevention initiatives.

The overall survey strategy was to:

• Estimate environmental risk for the industry sectors by:

• selecting a statistically valid sample of ERA's to ensure that findings accurately represent entire industry sectors;

• undertaking site inspections to identify compliance levels of businesses within the sample, in terms of their overall pollution potential, and the environmental management systems they had in place in 1995 and 1997;

• convert these pollution potentials into environmental risk ratings for each business surveyed;

• use this to determine the potential, 1995 and 1997 environmental risk for the industry's surveyed, and to quantify changes to environmental performance; and

• evaluate the effectiveness of BCC pollution prevention initiatives by;

• discussing BCC's pollution prevention initiatives with business operators, to record their views on the importance, and effectiveness of these initiatives and related strategies; and

• recording and reporting on other comments made by respondents during the course of the survey.

The survey was designed for consistency with BCC's environmental licensing program, and related pollution prevention initiatives. This was to ensure that the findings were directly relevant and applied to particular Council services. Consistency was achieved by using BCC documents and other resources as the basis for survey design, and by providing survey components to relevant Council staff for comment.

If feasible, a further goal was to incorporate into survey design, the production of additional administrative tools to assist Council with ongoing pollution prevention work.

Details of the survey methodology are provided in Appendix 1.

## a)        Selecting Industry Sectors

BCC selected eight industry sectors for inclusion in the Study. Table 1 below identifies these sectors, and shows the total number of licensed ERA's in the *population*[2] of each industry sector. It also explains why each sector was included in the survey.

**Table 1: Industry Sectors and Reasons for Inclusion**

| ERA # | Description | Population size | Reason for Inclusion |
|---|---|---|---|
| 22 | Abrasive Blasting | 31 | Considered to have high pollution potential |
| 24 | Boiler Making/Engineering | 202 | Numerous ERA, very similar issues to ERA 25. Reduction in level of environmental regulation currently being considered by the State Government for this ERA. |
| 25 | Metal Forming | 264 | 3rd most numerous ERA, very similar issues to ERA 24. Reduction in level of environmental regulation currently being considered by the State Government for this ERA. |
| 26 | Metal Recovery | 42 | Considered to have high pollution potential |
| 28 | Motor Vehicle Workshop | 1408 | Most numerous ERA. |
| (discrete subset of ERA 28) | Spray Painting/Panel Beating | 179 | Previous study identified high pollution potential. Clear standards for pollution reduction were set for this subgroup within ERA 28. |
| 51 | Printing | 181 | Industry-led changes thought to dominate motivations for pollution reduction. Considered to be a low risk industry sector. Reduction in level of environmental regulation currently being considered by the State Government for this ERA. |
| 60 | Concrete Batching | 41 | High pollution potential, with strong pollution prevention initiatives driven by industry association |

Industry sector was defined in terms of ERA category with two exceptions. Boiler making/engineering (ERA 24), and metal forming (ERA 25) were combined, and are collectively referred to as 'metal working' throughout this report. This reflected the great similarity in environmental risk and pollution prevention opportunities between those industry sectors, which in practice are extremely difficult to distinguish. ERA 28 (motor vehicle workshops) was divided into spray painting/panel beating, and other motor vehicle workshops, since the environmental risks, and pollution prevention opportunities of these ERA sub-groups are very different. Both of these exceptions are consistent with BCC's OEG's. For simplicity, the spray painting/panel beating sector is referred to simply as spray painting throughout the report.

2936 ERA's were operating in Brisbane at the time of the Study. This means that the survey findings relate to a substantial 80% of total ERA's.

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[2] In statistical terms, a 'population' is the complete set of all observations about a particular characteristic. In this Study, the 'population' is the total of all environmentally relevant activities from the eight industry sectors included in the Study. The 'populations' of businesses within each industry sector, and of green licence holders are also referred to in the report, and membership of these populations overlap. 'Population' is used in its statistical sense throughout this report. Other statistical terms are defined when first used.

## b)       Sample Selection

A stratified[3] random sampling technique was used to derive a representative sample from selected industry sectors. All green licence holders were included in the sample[4]. Selecting the entire population of this small group enabled detailed statistical analysis about its properties. Beyond this, where possible, 3 businesses were included in the sample for each of the other characteristics considered for stratification (small licence holders and different BCC regions).

Other than this, the sampling strategy was to choose at least three businesses with each characteristic, if sufficient. Otherwise, businesses were randomly chosen, proportional to the population. The characteristics of the final sample, compared with the populations of the industry sectors and licence features, are provided in Table 2 below.

**Table 2: Sample Characteristics**

| Industry (**sample**/*population*) | Standard | Green | Small | G & S | Totals |
|---|---|---|---|---|---|
| Abrasive Blasting | **5** | **0** | **0** | **0** | **5** |
| | *31* | *0* | *0* | *0* | *31* |
| Metal Recovery | **16** | **0** | **1** | **0** | **17** |
| | *41* | *0* | *1* | *0* | *42* |
| Boiler Making/ Engineering | **23** | **1** | **2** | **0** | **26** |
| | *198* | *2* | *2* | *0* | *202* |
| Concrete Batching | **7** | **0** | **0** | **0** | **7** |
| | *41* | *0* | *0* | *0* | *41* |
| Metal Forming | **19** | **1** | **1** | **0** | **21** |
| | *262* | *1* | *1* | *0* | *264* |
| Motor Vehicle Workshops | **39** | **14** | **6** | **7** | **66** |
| | *1370* | *14* | *14* | *10* | *1408* |
| Panel Beating/ Spray Painting | **20** | **3** | **4** | **0** | **27** |
| | *172* | *3* | *4* | *0* | *179* |
| Printing | **13** | **6** | **3** | **2** | **24** |
| | *170* | *6* | *3* | *2* | *181* |
| Sample Totals | **143** | **25** | **17** | **9** | **193** |
| *Population Totals* | *2285* | *26* | *25* | *12* | *2348* |

The other variable considered in the stratified sample was the BCC region in which the activity was located. BCC has four regions, with markedly different proportions of ERA's as shown in Figure 1 below.

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[3] Stratified random sampling techniques systematically select sample points to ensure a spread across essential independent variables (in this case industry type, licence grade and region). Individual sample points are randomly selected within the constraints of the selected independent variables.
[4] Not all were available at the nominated time for the survey, and so the number of green and small licence holders actually included was less than the total number of businesses holding those licences. Similar reductions in the numbers of businesses surveyed occurred in each sample group.

**Figure 1: Population Characteristics by Region**

Legend:
- Abras Blst (1%)
- Conc Batch (2%)
- Met Recov (2%)
- Printing (7%)
- Pnl Beat/Spr Pnt (8%)
- Blr Mak/Eng/Met Frm (20%)
- Motor Vehicle Workshop (60%)

Chart (stacked bar): Total (y-axis, 0–900) vs Region (x-axis: South West, North East, South East, North West)
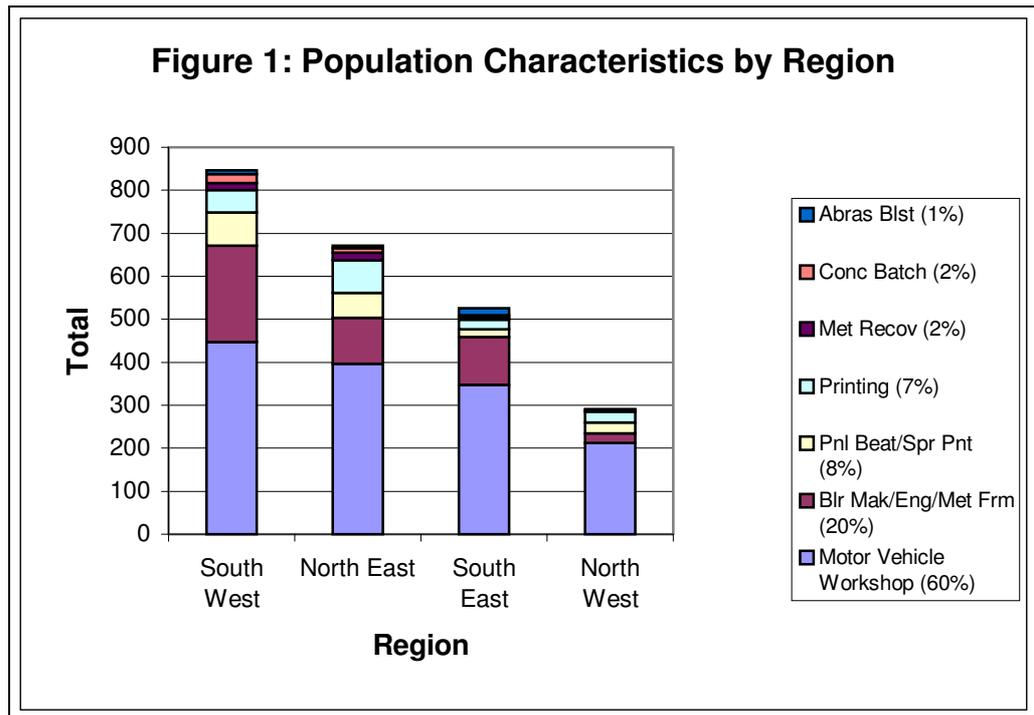
## c)        Survey Design

The survey was designed to be completed in less than half an hour on site, including a site inspection and interview. A quick survey was desirable to avoid disrupting work schedules of licence holders, and to increase the likelihood that they would participate. In addition, it enabled a quick time frame for the overall Study.

The survey was in three parts. Part 1 recorded the region, licence grade, industry type and size of surveyed businesses. These included the business' licence grade and size, as well as address and other details. Part 2 encompassed the inspection pro-forma, and was specific to each industry sector. Part 3 was repeated exactly for each business surveyed, and contained interview questions on BCC's pollution prevention initiatives.

### i)        Risk Assessment

The checklists developed from OEG's were the basis of the risk assessment. Information gathered during site assessments included:

- which environmental risk issues were relevant to an individual business, for which environmental risk areas (and only relevant issues counted towards the score for potential environmental risk);
- environmental management systems that were in place prior to 1995;

- environmental management systems that had been put in place between 1995 and 1997 in response to new environmental requirements;

- whether these environmental improvements had involved a cost to the operator; and

- what the cost of the improvements was.

## (1)　　　　Environmental Risk Areas

As well as identifying particular risks associated with individual businesses, the survey coding identified the area of environmental impact to which the risk was related. Six environmental risk areas were identified. These were based on information about environmental impact areas from the OEG's. The environmental risk areas are defined in Table 3 below, which also provides examples of common risk issues and management practices.

**Table 3: Environmental Risk Areas**

| Risk Area | Definition | Example of Environmental Risk | Example of Management Practice |
|---|---|---|---|
| Site contamination | A practice that causes site contamination | Potential liquid contaminants stored uncovered, on dirt surfaces, in open or damaged containers, in vehicle movement areas. | Potential liquid contaminants kept in a secure, sealed, covered, bunded area away from through traffic. |
| Stormwater Pollution | A practice that causes contaminants to enter the stormwater system | Liquid spills left on covered surfaces, or hosed off into stormwater drains. | Absorbent, non-flammable material kept on site and used to clean up spills immediately. |
| Excess Trade Waste | A practice that exceeds trade waste requirements for discharge to sewerage | Greasy/oily equipment washed down and oily water or cleaning solvents discharged directly to sewer | Waste solvents collected by licensed contractor, and pre-treatment of oily waters before discharge to sewer. |
| Air Pollution | A practice that releases contaminants into the air, with a risk of air pollution | Two pack paints sprayed outside appropriate spray booth. | Two pack paints sprayed inside appropriate spray booth. |
| Risk of Environmental Accident | A practice that carries a risk of causing an accident with environmental consequences | Cutting using oxy-acetylene torches where sparks may reach flammable or combustible materials. | Cutting area away from all flammable materials, including oil, grease, rubber etc. |
| Noise Pollution | A practice that causes noise pollution above standards set for noise. | Noisy equipment not muffled or silenced, and used outside of specified hours for industrial noise near noise-sensitive areas. | Noisy equipment used away from noise-sensitive areas, or muffled, and used within specified hours for industrial noise. |

## (2)　　　　Calculating Environmental Risk

The assignment of environmental risk scores to the potential pollution issues was based on the environmental risk classification used by BCC in its green licence assessments. Each potential pollution issue was classified according to its likelihood, and the expected consequences of a pollution event. Table 4 shows qualitative

measures of likelihood, Table 5, the consequences, and Table 6, the risk rating derived by evaluating these two dimensions in relation to an individual pollution issue.

**Table 5: Qualitative Measures of Likelihood**

| Level | Descriptor | Description |
|-------|------------|-------------|
| A | Almost certain | The event is expected to occur in most circumstances |
| B | Likely | The event will probably occur in most circumstances |
| C | Moderate | The event should occur at some time |
| D | Unlikely | The event could occur at some time |
| E | Rare | The event may occur only in exceptional circumstances |

**Table 5: Qualitative Measures of Consequence or Impact**

| Level | Descriptor | Outcome Description | Example Detail Description |
|-------|------------|--------------------|--------------------------|
| 1 | Catastrophic | Disaster with potential to lead to collapse | Toxic release off-site with long and short term environmental impacts, very costly cleanup |
| 2 | Major | Critical event which, with proper management, will be endured | Off-site pollution release with short term and cumulative environmental impacts, costly cleanup |
| 3 | Severe | Significant event which can be managed under normal procedures | On-site release contained with outside assistance, environmental nuisance caused, some cleanup needed |
| 4 | Minor | Consequences can be readily absorbed but management effort is still required to minimise impact | On-site release possibly contained, no clean-up needed, possibly some cumulative environmental impacts |
| 5 | Insignificant | Not worth worrying about | No perceivable environmental impacts |

**Table 6: Risk Assessment Matrix**

| Consequences (Low to High) | Risk Score | | | | |
|----------------------------|------------|----|----|----|-----|
| Likelihood | 5 | 4 | 3 | 2 | 1 |
| A (almost certain) | 8 | 16 | 32 | 64 | 128 |
| B (likely) | 4 | 8 | 16 | 32 | 64 |
| C (moderate) | 2 | 4 | 8 | 16 | 32 |
| D (unlikely) | 1 | 2 | 4 | 8 | 16 |
| E (rare) | 1 | 1 | 2 | 4 | 8 |

Risk ratings allocated to different pollution issues are presented in Appendix 3.

The score for potential environmental risk was calculated as the sum of risk scores for all relevant pollution issues. The 1995 risk score for a business was calculated as the sum of risk scores for all pollution issues where effective management systems were

not in place in 1995. The score for 1997 was the sum of risk scores for pollution issues not controlled at the time of the inspection.

A characteristic of these risk assessment criteria is that an environmental risk score of zero was possible. If there were no relevant pollution issues, or if all relevant pollution issues within any environmental risk area were being effectively managed either in 1995 or 1997, then the sum of risk scores for that area was zero.

Two other risk measures were derived from the benchmark environmental risk scores. These were *environmental improvements* (the 1995 minus the 1997 score), and *relative risk* (potential minus 1997 risk scores). The environmental improvements score measures BCC's effectiveness in delivering environmental outcomes. Relative risk shows how different the actual environmental risk of ERA's in 1997 is from their potential pollution if no management systems were in place. This measure indicates the validity of basing a licensing system on potential environmental risks, rather than actual risk.

## ii)       Effectiveness of Initiatives

15 double-barreled questions about the importance and effectiveness of BCC pollution prevention initiatives made up the part of the survey that examined industry response to pollution prevention initiatives. Respondents were asked to rate the initiatives on a scale of one to five, along the following lines:

- 1 - either totally unimportant or totally ineffective;
- 2 – unimportant or ineffective;
- 3 – neither;
- 4 – important or effective; and
- 5 - critically important or completely effective.

A large gap between the scores for the importance and effectiveness of an issue indicated that Council was not meeting the expectations of its clients in some way. For example, an effectiveness score of 5, with an importance of 1 for an issue indicates that a critically important issue is being ineffectively implemented. In contrast, a 1 for importance with a 5 for effectiveness shows an over-emphasis in an unimportant area. A score of 4,4 showed an important initiative being delivered effectively.

As well as being analysed individually, questions in Part 3 were grouped into three initiative areas. These were:

- the threat of, or actual enforcement (the big stick) (a combination of 3.1, 3.3 and 3.11);

- incentives and rewards (the carrot) ( from 3.5, 3.6, and 3.8); and

- written information (questions 3.4, 3.2, 3.14 and 3.12).

**iii)**    **Comments**

During the course of the survey, unsolicited comments made by respondents were recorded. These were combined with responses to the two open-ended survey Questions 3.16 (other driving forces behind pollution prevention actions), and 3.17 (other things Council could do to help businesses reduce pollution risk). Common responses and comments were grouped into categories of similar issues, along the lines of the four areas assessed in survey questions on the importance and effectiveness of initiatives.

# 4) Environmental Benchmarks

This section presents the results of environmental risk analysis. This gives benchmark information on each of the industry sectors, and for each environmental risk area in terms of potential, 1995 and 1997 environmental risks. A snapshot of the relationship between these measures is provided by Figure 2.



Figure 2: Mean Environmental Risk Benchmarks
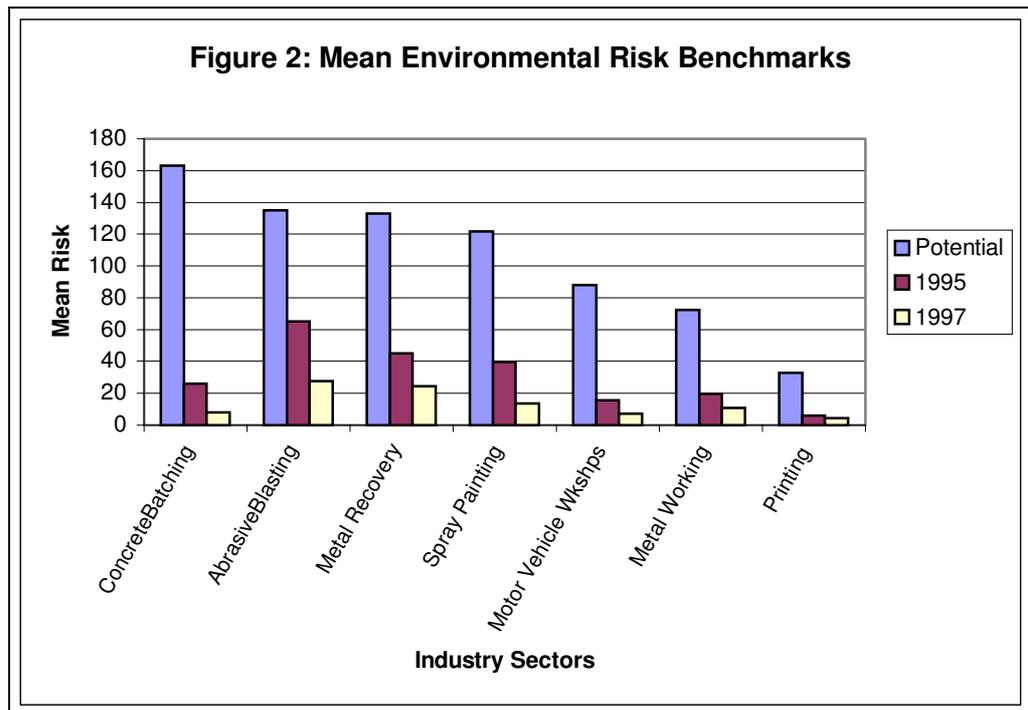
## a)        Potential Environmental Risk

Potential environmental risk for a business is defined in this Study as the sum of environmental risk scores that are relevant to a particular business.

Table 7 below, shows the comparisons of potential environmental risks between industry sectors. Looking along rows gives a snapshot of areas in which an industry sector has higher environmental risks than others. Looking down columns gives a snapshot of risk areas where there is evidence that a sector has lower environmental risks than others do. The term 'overall' was used when there was evidence of different overall risks between sectors.

The lowest three rows in Table 7 show the proportion of businesses surveyed, that recorded zero for specified environmental risk areas.

Table 7 : Pairwise Comparisons of Potential Environmental Risk

| Areas of Greater Environmental Risk by Industry Sector → | Areas of Lesser Environmental Risk by Industry Sector ↓ | | | | | | |
|---|---|---|---|---|---|---|---|
| | Abrasive Blasting | Metal Working | Concrete Batching | Metal Recovery | Motor Vehicle Workshops | Spray Painting | Printing |
| **Abrasive Blasting** | | **Overall**, Contam, Trade Waste | Contam | Contam | Contam | Contam | **Overall**, Contam, Storm water |
| **Metal Working** | Accident | | Accident | | Accident | Storm Water, | **Overall,** Storm Water, Accident |
| **Concrete Batching** | Storm Water, Accident | **Overall**, Storm Water, Trade Waste, Air | | **Overall**, Storm Water, Air | **Overall**, Storm Water, Air | **Overall**, Storm Water | **Overall**, Storm Water, Trade Waste, Air, Accident |
| **Metal Recovery** | Storm Water, Accident | **Overall,** Contam, Storm Water, Trade Waste | Contam, | | **Overall**, Contam, Storm Water, Air, Accident | Contam, Storm Water | **Overall,** Contam, Storm Water, Trade Waste, Air, Accident |
| **Motor Vehicle Workshops** | Storm Water, Accident | Storm Water, Trade Waste | Contam | Noise | | Storm Water, Noise | **Overall**, Storm Water, Trade Waste, Accident, Noise |
| **Spray Painting** | Accident | **Overall**, Trade Waste, Air, Accident | Accident, | Air, Accident | **Overall**, Contam, Air, Accident | | **Overall**, Storm Water, Trade Waste, Air, Accident |
| **Printing** | | Trade Waste | | | | | |
| **Risk areas where at least half risk scores are zero** | | Trade Waste | | | | | Storm Water |
| **Risk areas where at least three quarters of risk scores are zero** | | Trade Waste | | | | | Storm Water |
| **Risk areas where all risk scores are zero** | | | | | | | Storm Water |

Results of the pairwise comparisons are discussed in detail by industry sector in Section 7 below.

Table 8 shows pairwise comparisons for 1995 environmental risk. Again, the results from comparisons are discussed in by industry sector in Section 7.

1995 environmental risk levels were calculated as the sum of all potential pollution issues that were not being effectively managed in 1995. In many cases, the variation within industry sectors in 1995 was greater than the variation between categories.

**Table 8: Pairwise Comparisons of 1995 Environmental Risk**

| Areas of Greater Environmental Risk by Industry Sector → | Areas of Lesser Environmental Risk by Industry Sector ↓ | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Abrasive Blasting** | **Metal Working** | **Concrete Batching** | **Metal Recovery** | **Motor Vehicle Workshops** | **Spray Painting** | **Printing** |
| **Abrasive Blasting** | | | | | | | **Overall,** Storm Water |
| **Metal Working** | | | | | | | |
| **Concrete Batching** | | | | Noise | Air | | Noise |
| **Metal Recovery** | | Contam, Storm Water | **Overall,** Contam, Storm Water | | | Storm Water | **Overall,** Contam, Storm Water |
| **Motor Vehicle Workshops** | | | | | | | |
| **Spray Painting** | | | **Overall,** | Air | Air | | **Overall,** Air |
| **Printing** | | | | | | | |
| **Risk areas where at least half risk scores are zero** | Accident | Trade Waste, Accident, Noise | Trade Waste, Accident | Air, Accident, Noise | Air, Accident, Noise | Accident, Noise | Storm Water, Accident, Noise |
| **Risk areas where at least three quarters of risk scores are zero** | | Trade Waste, Accident | Trade Waste, Accident | Accident, Noise | Accident | Accident | Storm Water, Noise |
| **Risk areas where all risk scores are zero** | | | Trade Waste, Accident | | | | Storm Water |

## c)      1997 Environmental Risk

Table 9 shows pairwise comparisons for 1997 environmental risk. 1997 environmental risk levels were calculated as the sum of all potential pollution potential issues that were not being effectively managed in 1997. A box plot for total environmental risk 1997 is shown in Figure 3a. Variation in environmental risk was still greater within than between many sectors at the time of the survey.

**Table 9: Pairwise Comparisons of 1997 Environmental Risk**

| Areas of Greater Environmental Risk by Industry Sector → | Areas of Lesser Environmental Risk by Industry Sector ↓ | | | | | | |
|---|---|---|---|---|---|---|---|
| | Abrasive Blasting | Metal Working | Concrete Batching | Metal Recovery | Motor Vehicle Workshops | Spray Painting | Printing |
| **Abrasive Blasting** | | | | | | | **Overall,** |
| **Metal Working** | | | | | | | |
| **Concrete Batching** | | | | Air, Noise | Air, Noise | Noise | Noise |
| **Metal Recovery** | | Contam, Storm Water | Contam, Storm Water | | **Overall,** Contam, Storm Water | Contam, Storm Water | **Overall,** Contam, Storm Water |
| **Motor Vehicle Workshops** | | | | | | | |
| **Spray Painting** | | | | | | | |
| **Printing** | | | | | | | |
| **Risk areas where at least half risk scores are zero** | Contam, Storm Water, Trade Waste, Accident | Contam, Storm Water, Trade Waste, Air, Accident, Noise | Contam, Storm Water, Trade Waste, Accident | Trade Waste, Air, Accident, Noise | Contam, Storm Water, Trade Waste, Air, Accident, Noise | Contam, Storm Water, Trade Waste, Accident, Noise | Contam, Storm Water, Trade Waste, Accident, Noise |
| **Risk areas where at least three quarters of risk scores are zero** | | Storm Water, Trade Waste, Accident, | Storm Water, Trade Waste, Accident | Accident, Noise | Storm Water, Trade Waste, Air, Accident, Noise | Trade Waste, Accident, Noise | Storm Water, Trade Waste, Accident, Noise |
| **Risk areas where all risk scores are zero** | | | Trade Waste, Accident | | | | Storm Water |

# 5) Improving Environmental Performance

## a)        Environmental Improvements, 1995-1997

Table 10 shows risk reductions by industry sector between 1995 and 1997. Regression analysis augmented the box plots in data analysis for environmental improvements. These results not distinguish between those who did not improve because they were already complying, and those whose lack of improvement indicates continued non-compliance.

The lowest three rows of Table 10 show the proportion of businesses that did not reduce pollution risk in particular environmental risk areas.

These results are discussed in detail by industry sector, and for green licence holders in Section 7 below.

**Table 10: Pairwise Comparisons of Environmental Risk Reductions, 1995-1997**

| Areas of Smaller Environmental Improvements by Industry Sector → | Areas of Greater Environmental Improvements by Industry Sector ↓ | | | | | | |
|---|---|---|---|---|---|---|---|
| | Abrasive Blasting | Metal Working | Concrete Batching | Metal Recovery | Motor Vehicle Workshops | Spray Painting | Printing |
| Abrasive Blasting | | | | | | Air | |
| Metal Working | | | | | | Overall, Storm Water, Trade Waste, Air | |
| Concrete Batching | | | | | | Air | |
| Metal Recovery | | | | | | Overall, Air | |
| Motor Vehicle Workshops | Trade Waste, | | | | | Overall, Trade Waste, Air | |
| Spray Painting | | | | | | | |
| Printing | | | | | Storm Water | Overall, Storm Water, Trade Waste, Air | |
| Risk areas where at least half have not improved | Air, Accident, Noise | Contam, Storm Water, Trade Waste Air, Accident, Noise | **Overall,** Contam, Storm Water, Trade Waste Air, Accident, Noise | Trade Waste Air, Accident, Noise | Storm Water, Trade Waste Air, Accident, Noise | Contam, Storm Water, Trade Waste Accident, Noise | **Overall,** Contam, Storm Water, Trade Waste Air, Accident, Noise |
| Risk areas where at least three quarters have not improved | Noise | Storm Water, Trade Waste Accident, Noise | Storm Water, Trade Waste Accident | Accident, Noise | Trade Waste Air, Accident, Noise | Accident, Noise | Storm Water, Trade Waste, Air, Accident, Noise |
| Risk areas where none have | Noise | | Trade Waste Accident | Noise | | Accident | Noise |

**b)       1997 Environmental Risk versus Potential Environmental Risk**

The results of a regression analysis undertaken on the relative environmental risk of the industry sectors in 1997, compared to their potential pollution risk showed a significant difference between potential and actual risks for all sectors (p<0.001). Environmental risk ratings for motor vehicle workshops were more different from potential environmental risk than were metal workers, metal recoverers or printers. Environmental risk for spray painters was more different from potential risk than for printers and metal recoverers.

This provides a very strong argument for not designing environmental regulation around the potential environmental risk for an industry sector. There is less than one chance in a thousand that potential environmental risk does not represent actual environmental risk for Brisbane businesses in the sectors surveyed.

There is also a significant difference between the potential and 1997 environmental risk for both green and standard licence holders (p<0.001). Green licence holders have a significantly lower environmental risk compared to their potential risk, than standard licence holders do. This confirms that the graded licence system is supporting businesses with low pollution potential. It also shows that a system can be put in place that makes this distinction within an industry sector, rather than between industry sectors.

**c)       Environmental Improvements by Risk Area**

Figure 3 below shows risk reductions between 1995 and 1997 by environmental risk area. Regression analyses were also used to investigate these improvements, and these  show which industry sectors were primarily responsible for the environmental risk reductions evident in the graph[5].

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[5] Graphs showing outputs from regression analyses are presented in Figures 5-8 in Appendix 2.

**Figure 3: Risk Reduction by Environmental Risk Area - 1995-1997**
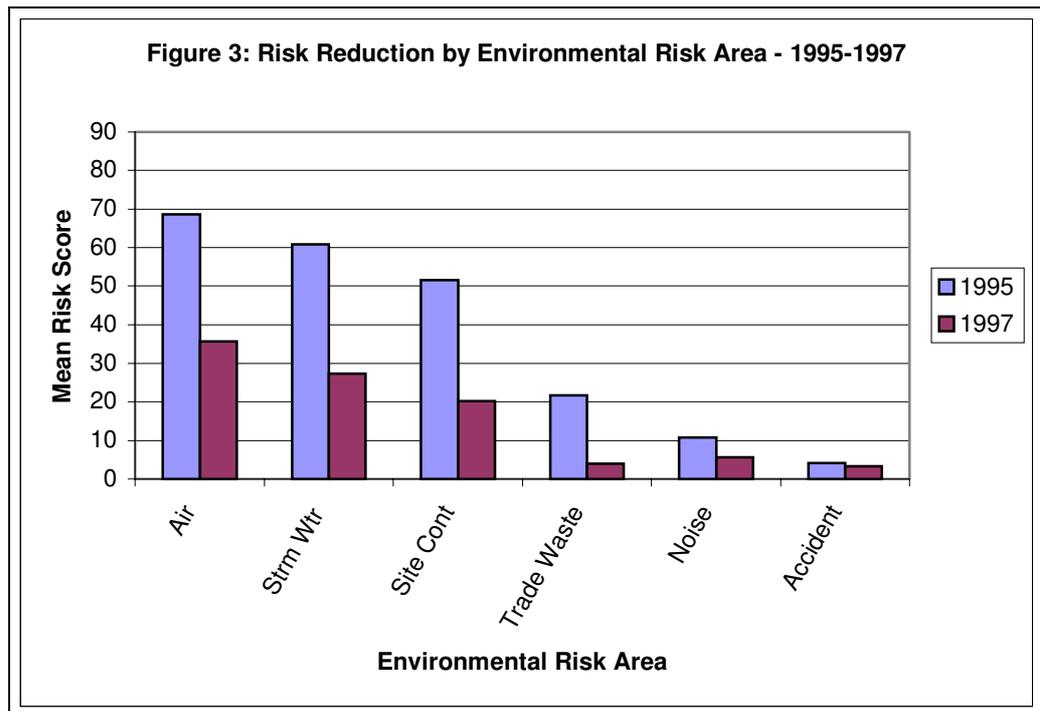
The graph shows nearly a halving of air pollution potential by the sectors studied between 1995 and 1997. The reduction in environmental risk of air pollution was primarily due the spray painting sector, which recorded by far the greatest air pollution risk reductions ($p<0.001$). Metal workers were the only other sector recording significant air pollution risk reductions between 1995 and 1997. For both industry sectors, this improvement was largely due to installation of spray booths, as required by standards set by BCC in relevant OEG's.

Stormwater pollution risk was also halved by the sectors studied between 1995 and 1997. Four industry sectors made significant reductions to the risk of stormwater pollution. They were spray painters, motor vehicle workshops, abrasive blasters and metal workers ($p=0.015$). For spray painters and motor vehicle workshops, these improvements were largely because installed wash bays, and stopped sending wash down waters to the stormwater system. For abrasive blasters and metal workers, the improvements were primarily the result of moving work and storage areas under cover.

Risk of site contamination by the industry sectors studied was more than halved between 1995 and 1997. There was no evidence to suggest different contributions by industry sector to the site contamination improvements evident in the graph. This was partly because BCC had similar requirements for site contamination risk reductions relating to each industry sector. The OEG for all sectors indicated that potential liquid contaminants were to be stored in secure, covered, and often bunded areas, away

from through traffic. This issue was relevant to most businesses, and improvements made to adhere to these requirements were the most common across all sectors. Costs of these improvements were minimal.

Trade waste problems were reduced by three quarters, and were greatest for spray painters, motor vehicle workshops and abrasive blasters (p<0.001). As with stormwater pollution reductions businesses made the biggest improvements in trade waste by installing wash down bays. Each business that had installed such a bay, had met trade waste requirements by incorporating equipment to separate oil or silt from waste water entering the sewage system.

| Recommendation |
| ➢ Communicate the environmental outcomes from EPA compliance to ERA operators, and Brisbane residents. |

## d)      Environmental Investment

Figures 4a and 4b show mean environmental investments between 1995 and 1997 by industry sector. Businesses that made no financial investment in environmental improvements between 1995 and 1997 were not included in the calculation of the means. Because of this, the resulting estimates for individual investments relate only to the proportion of each industry that made investments, which is indicated above the relevant bar.

**Figure 4a: Total Investment by Industry Sector**

**Figure 4b: Mean Investment by Industry Sector**

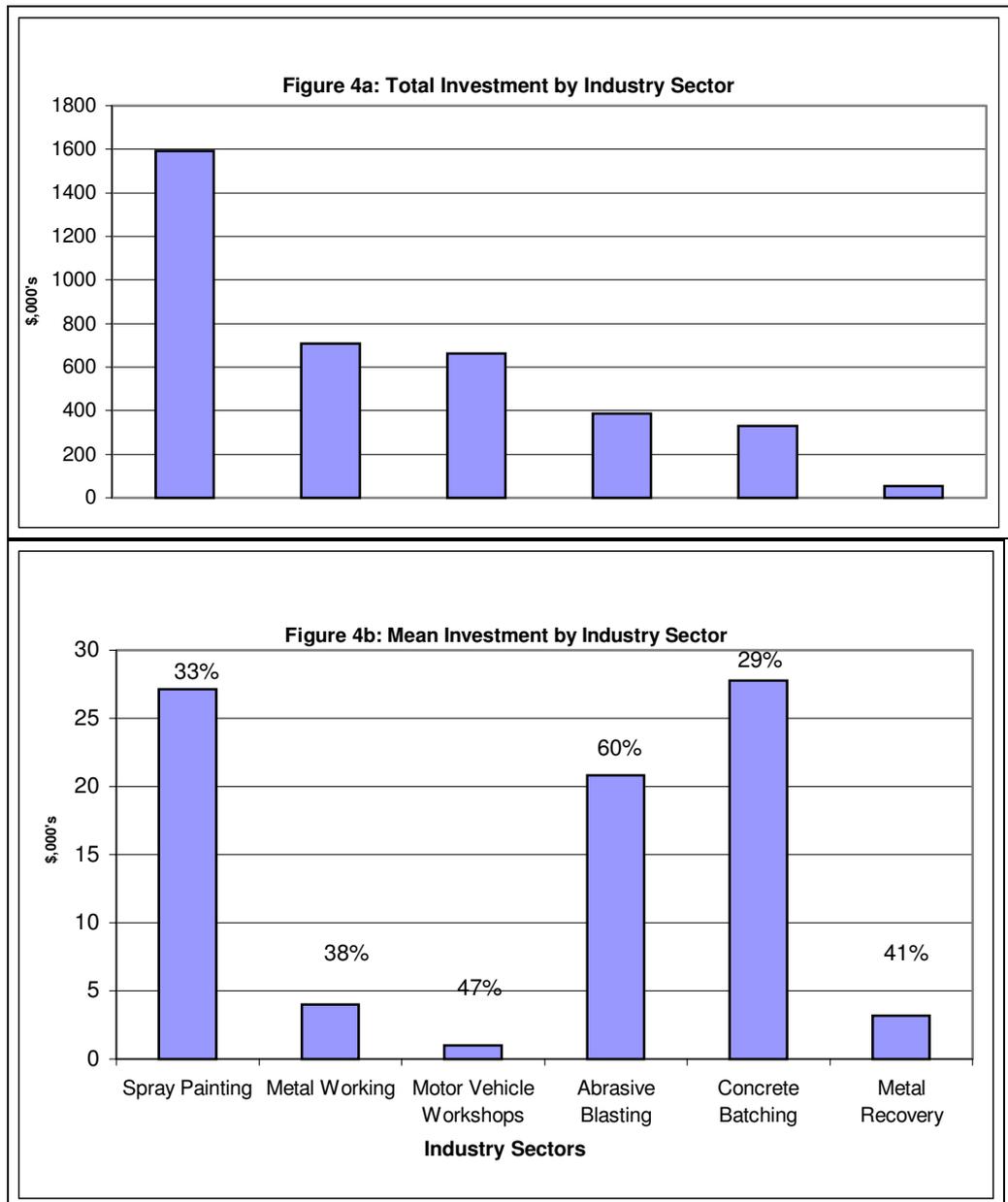Table 11 below shows means and 95% confidence intervals for environmental investment. It shows an overall environmental investment for the industry sectors considered in this Study estimated at $3,734,000[6]. Environmental investments are described in detail for each industry sector in Section 7 of this report.

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[6] 95% confidence intervals for total investment across all sectors was $995,500-$22,123,000.
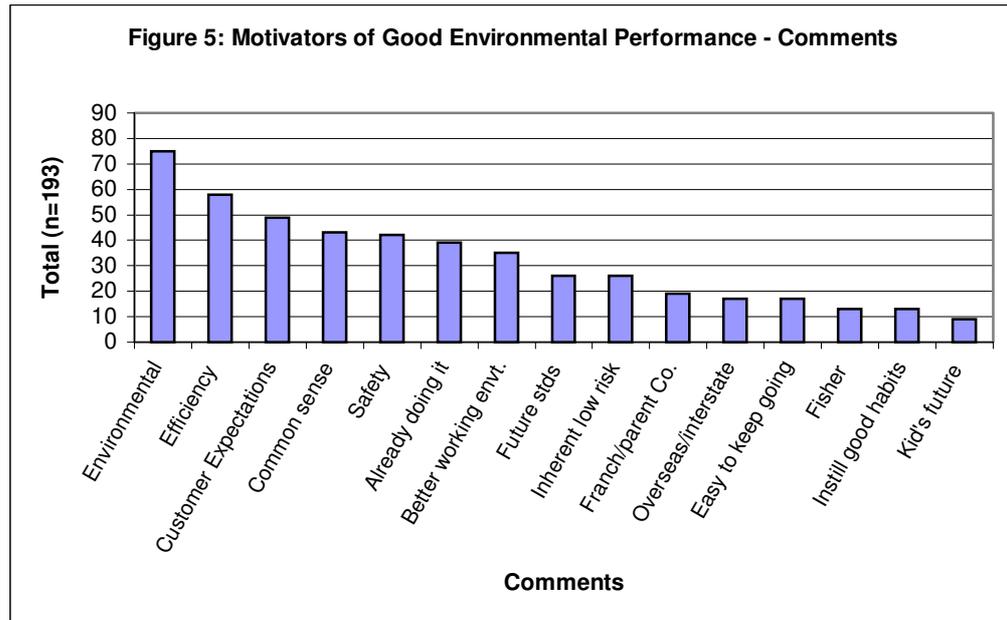
**Table 11 Estimates of Business Environmental Investment**

| Industry Type | % Investing | Sample mean investment | | Estimated investment by population | |
|---|---|---|---|---|---|
| | | Sample lower confidence limit | Sample upper confidence limit | Population lower confidence limit | Population upper confidence limit |
| Abrasive Blasting | 60% | $20,806 | | $387,000 | |
| | | $1,715 | $252,457 | $31,900 | $4,695,700 |
| Metal working | 38% | $3,991 | | $706,700 | |
| | | $1,442 | $11,048 | $255,300 | $1,956,400 |
| Concrete Batching | 29% | $27,780 | | $330,300 | |
| | | $1,432 | $590,072 | $17,000 | $7,016,000 |
| Metal Recovery | 41% | $3,178 | | $54,700 | |
| | | $620 | $16,285 | $10,676 | $280,400 |
| Motor Vehicle Workshops | 47% | $1,003 | | $661,400 | |
| | | $461 | $2,180 | $303,988 | $1,437,500 |
| Panel Beating/ Spray painting | 33% | $27,119 | | $1,593,000 | |
| | | $6,412 | $114,691 | $376,600 | $6,737,000 |
| Totals | | | | $3,734,000 | |
| | | | | $995,500 | $22,123,000 |

## 6) Environmental Initiatives and Motivators

This section describes industry responses to key pollution prevention initiatives adopted by BCC between 1995 and 1997 in terms of their importance and effectiveness. These responses are augmented by other comments made by respondents during the course of the survey.

Figure 5 below shows the range of factors that respondents identified as encouraging them to improve their environmental performance[7].

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[7] The presence of a systematic bias cannot be ruled out as a factor underlying 'environmental' reasons as the main ones given for good performance. This bias would be because the answer to this question followed about half an hour's discussion of environmental issues, which would therefore have been foremost on many people's minds. Despite this, genuine concern for the environment did seem to be present amongst a large number of respondents, and other responses reflect different aspects of such beliefs.

**Figure 5: Motivators of Good Environmental Performance - Comments**

Total (n=193)

Bar chart showing values from highest to lowest: Environmental ~75, Efficiency ~58, Customer Expectations ~49, Common sense ~43, Safety ~42, Already doing it ~39, Better working envt. ~35, Future stds ~26, Inherent low risk ~26, Franch/parent Co. ~19, Overseas/interstate ~17, Easy to keep going ~17, Fisher ~13, Instill good habits ~13, Kid's future ~9

**Comments**

There was a strong sense among business people that environmental improvements were consistent with good business practice. 30% said that good environmental practices increased 'efficiency'. Examples included:

- it was easier to dispose of liquid wastes to a designated, well organised area;

- spray booths and wash bays could designed for a continuous flow through of vehicles (for spray painters);

- keeping the workshop tidy helped with locating tools and equipment; and

- it was easier to ensure compliance by general workers when all potential pollutants had clearly designated areas.

This efficiency was compatible with other elements of good business practice. 26% of respondents said 'customer expectations' of leaving expensive equipment (such as their cars) in a clean workshop, with well presented tradespeople are increasingly important. Most found clean presentation to be much more important in securing trade than was having a green licence. 18% said that a complying workshop was a 'better working environment, and reported that general workers enjoyed their work more in a clean shop. 9% stated that it was 'easy to keep good environmental practice going once it was set up' (although inspections were also considered important, or standards might drop).

22% said that environmental compliance goes hand in hand with workplace health and 'safety'. In many cases this was frustrating to managers,, since it meant twice the red tape, and additional licence fees for issues that translated to similar actions within the workshop. This frustration was often also evident among the 22% who said that

measures that protect the environment are just 'common sense', and the 13% who felt that their operations were 'inherently low risk'. For many, this meant that they saw little benefit from environmental regulation.

Businesses that were already at, or close to compliance before EPA licensing were an interesting group. 20% of respondents said they had not had to make any improvements in order to comply with new environmental requirements, but were 'already doing it'. 14% had made prior environmental investments during expansions or upgrades, in anticipation of future environmental requirements. 10% were franchises, or had parent companies with commitments to high environmental standards. 7% were run by 'fishers', who had independently realised the environmental consequences of allowing contaminants enter stormwater systems. 5% had adopted environmental protection practices in recognition of pollution impacts on their children's future.

9% had previous experience with pollution, and/or pollution control regulations overseas or interstate. These operators universally considered Queensland requirements already to be looser than elsewhere. Any reduction in pollution control legislation would be considered a step backward by these operators.

| Recommendation |
| --- |
| ➢ Acknowledge the range of drivers of good environmental performance by business. Consider promoting benefits of good environmental performance in terms of efficiency, assistance in meeting customer expectations, and creation of better working environments. |

## a)           Initiatives and Motivators Overall

Figure 6 below shows the mean importance and effectiveness of BCC pollution prevention initiatives. These responses are grouped into similar initiative areas for more detailed analysis below. Regression analyses were also undertaken on the grouped issues,.



Figure 6: Mean Importance and Effectiveness of Initiatives
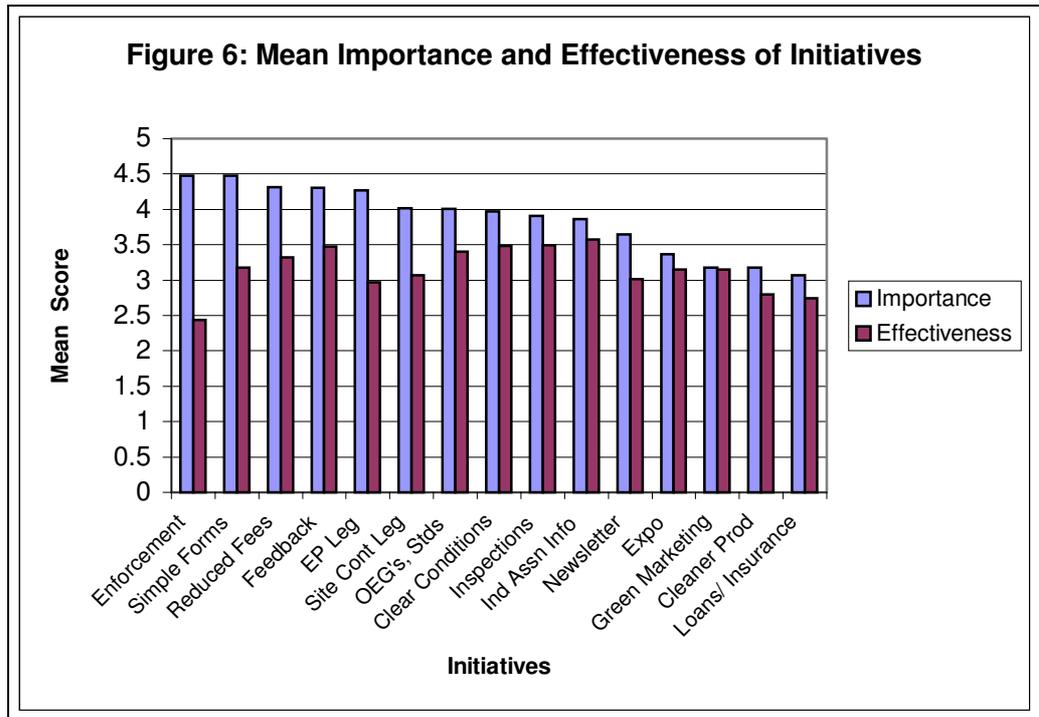
It is worth noting that consistent enforcement was considered both the most important, and the least effective of all initiatives. Simple forms also rated very highly, and received a relatively low effectiveness rating as well. Reduced fees under the graded licensing system rated third for importance, whereas marketing opportunities deriving from a green licence were the third last. Feedback to give businesses certainty about how well they were complying rated fourth on importance, and was considered relatively effective as well. Information from industry associations' had the highest effectiveness rating, but was less important than many Council information sources.

The following sections group responses into five categories:
- unimportant/ineffective;
- unimportant/effective;
- non-committal;
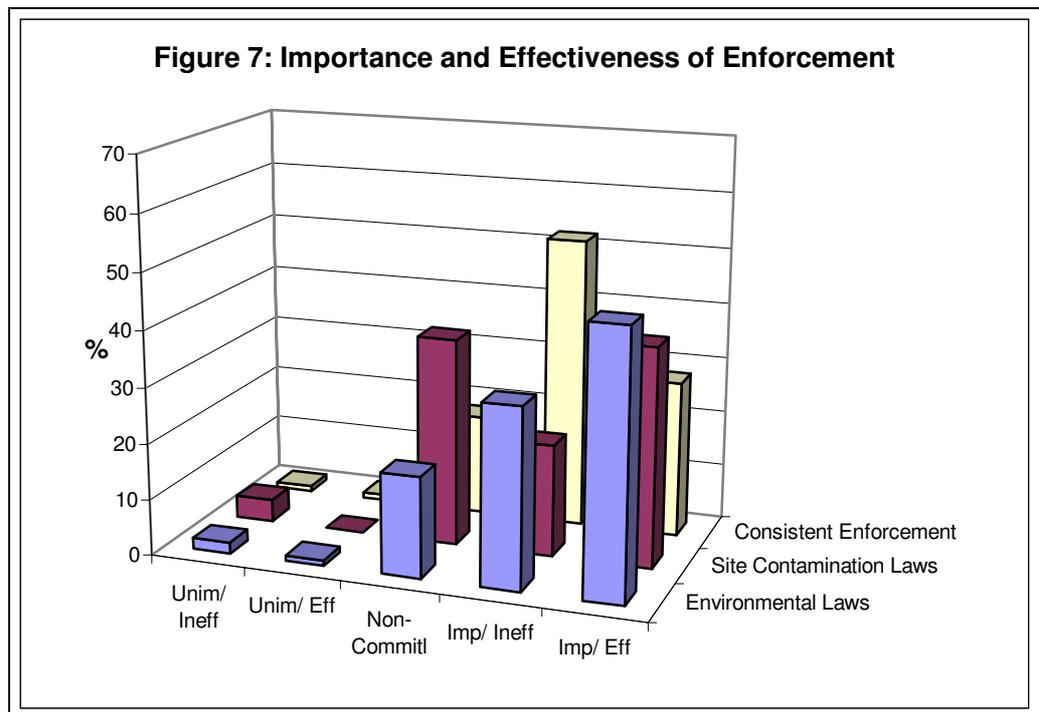- important/ineffective;
- important/effective.

It is worth noting that none of the environmental initiatives received a rating of unimportant but effective, or as unimportant and ineffective. This shows that none the initiatives BCC has chosen to focus on are considered wasteful or unimportant by licensees. This is not to say that everyone considered they were getting enough service for their licence fee. 13% said the licence fee was too high for the service provided.

**b)        Enforcement, 'the big stick'**

Three pollution prevention initiatives were grouped together for analysis of business response to enforcement issues generally. These were responses to:

- environmental laws with strict penalties for polluters;
- site contamination laws making operators responsible for contaminated land; and
- consistent enforcement.

Responses to these issues are shown in Figure 7.



Figure 7: Importance and Effectiveness of Enforcement

The graph shows that the three enforcement initiatives were viewed very differently by business operators. More respondents considered both environmental and site contamination laws to be important and effective than recorded any other response for these issues. However nearly as many were non-committal about site contamination

laws, and many thought that environmental protection laws were important but ineffective.

Regression analysis revealed significant differences between industry sectors, in the importance of enforcement initiatives (p=0.04). Spray painters placed a higher level of importance on enforcement than did metal workers.

There was also a significant difference between industry sectors in the perceived gap between importance and effectiveness of initiatives (p=0.024). This gap was perceived as greater by spray painters than by most other industry sectors, showing that spray painters are the sector most disappointed with BCC's enforcement actions.

In addition, there was a significant difference between views of green and standard licence holders, about the importance of enforcement (p=0.02). Green licence holders placed higher importance on enforcement than did standard licence holders.

Figure 8 shows comments related to enforcement that were made during interviews. These help to explain some of the findings described above. In particular, they shed some light on the complex interactions between small businesses in the same or related industry sectors. These interactions are inherently competitive, since businesses survive through the work they secure above their competitors. This means that expenses that increase financial overheads for a business that is willing to comply with new laws, must also be applied to those who resist such changes, or either the profits, or the market share of complying firms will be reduced.

**Figure 8: Threat of Enforcement - Comments**
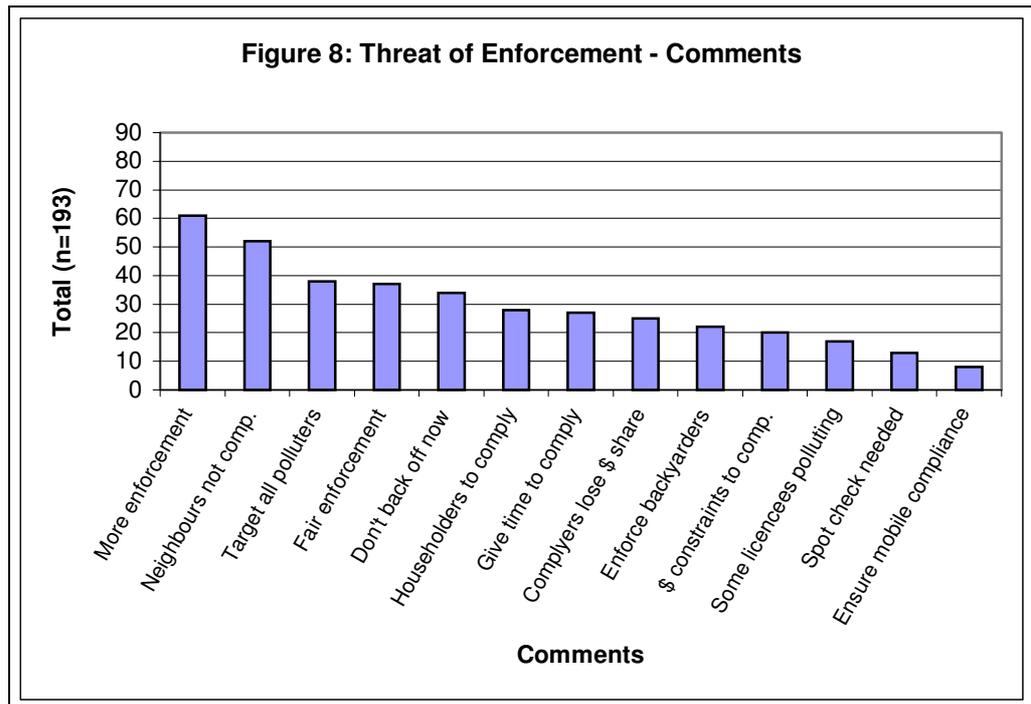


Nearly one third of all people interviewed identified a need for 'more enforcement' of requirements under the EPA. These people emphasised that as much effort needed to be put into publicising such actions, as in undertaking them. They thought a level playing field would not be achieved until BCC is seen to be strongly and consistently enforcing environmental laws.

27% stated that they had 'neighbors that were not complying', although they themselves had taken steps to comply. 19%, mostly those who knew they had not yet fully complied, but had taken some steps to do so commented that 'fair enforcement' was needed. This meant that while they saw a need for such action, they hoped that their 'financial constraints to compliance' (11%), and actions already taken would show both a willingness to comply, and intention to do so in the longer term. Many operators were unclear about EPA flexibility in enforcement options and compliance strategies. In particular, no operators indicated knowledge of Environmental Management Program provisions in the EPA, that can give more time to operators with financial constraints to compliance.

18%, mostly operators who had invested to comply urged governments not to 'back off now', but to expand environmental laws to 'target all polluters' (20%)[8]. Some of these reported being told they were "idiots" for complying, by their non-complying

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[8] Of course equivalent environmental laws do apply, but Department of Environment is the administering authority for non-licensed firms, and enforcement rarely occurs. This is due to the lack of licensing requirements, and because the businesses are so small that their incidents matter only to their neighbors, competitors and the environment.

competitors. According to 13%, complying firms have lost 'market share' due to the increased overhead costs they now face. There was particular concern about whether backyarders (11%), and mobile operators (9%) were complying with equivalent standards as businesses operating from industrial estates.

In addition, 15% voiced frustration about facing when they faced stricter environmental requirements than householders did. A common complaint from the motor industry was that giving a car a brief wash with a bucket and sponge on the street, could incur a penalty, and in some cases cost them their green licence. In contrast, there would be no penalty placed on a householder taking an identical action. Many metal workers kept fewer potential liquid contaminants, in their workshop than would be kept in most houses. They were frustrated by what they saw as onerous requirements for their containment in an industrial estate, compared to what would be required in residential areas.

Several related findings reinforce the importance of these points:

- that the perceived gap between importance and effectiveness of enforcement actions is greater for green, than for standard licence holders (meaning that good operators are most disappointed with enforcement);

- that green licence holders improved their environmental performance more than standard licence holders between 1995 and 1997 (that many have made major investments); and

- that good environmental performance itself provides no marketing advantage for businesses (discussed in more detail in Section 6c below).

Together, these findings show that lack of enforcement of the EPA is currently punishing businesses that have invested to comply with environmental requirements, by failing to control those who have not.

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Recommendations
- Urgently bring in on-the-spot fines to effectively tackle minor pollution incidents.
- Substantially increase enforcement actions taken against polluting businesses.
- Publicise the outcomes of enforcement actions to complying businesses.
- Avoid enforcing 'petty' problems from ERA's (where the incident would not incur a penalty when undertaken by a non-ERA or in a residential dwelling)
- Target backyarders, mobile operators and other harder to find potential polluters. Avoid a focus on frontline shops.
- Inform licence holders about EPA flexibility in achieving compliance. Develop a simple administrative system for Environmental Management Programs to encourage their use by operators with financial constraints to compliance.
- Investigate increasing the scope of enforcement to target all polluting businesses, not just devolved ERA's.

## c)  Encouragement and Reward, 'the carrot'

Three pollution prevention initiatives were grouped together for analysis of business response to encouragement and reward for good environmental performance. These were responses to:

- reduced fees for good environmental performers;
- business opportunities for marketing based on good environmental performers; and
- cleaner production actions that simultaneously save money and protect the environment.

Responses to these issues are shown in Figure 9.

**Figure 9: Importance and Effectiveness of Incentives**
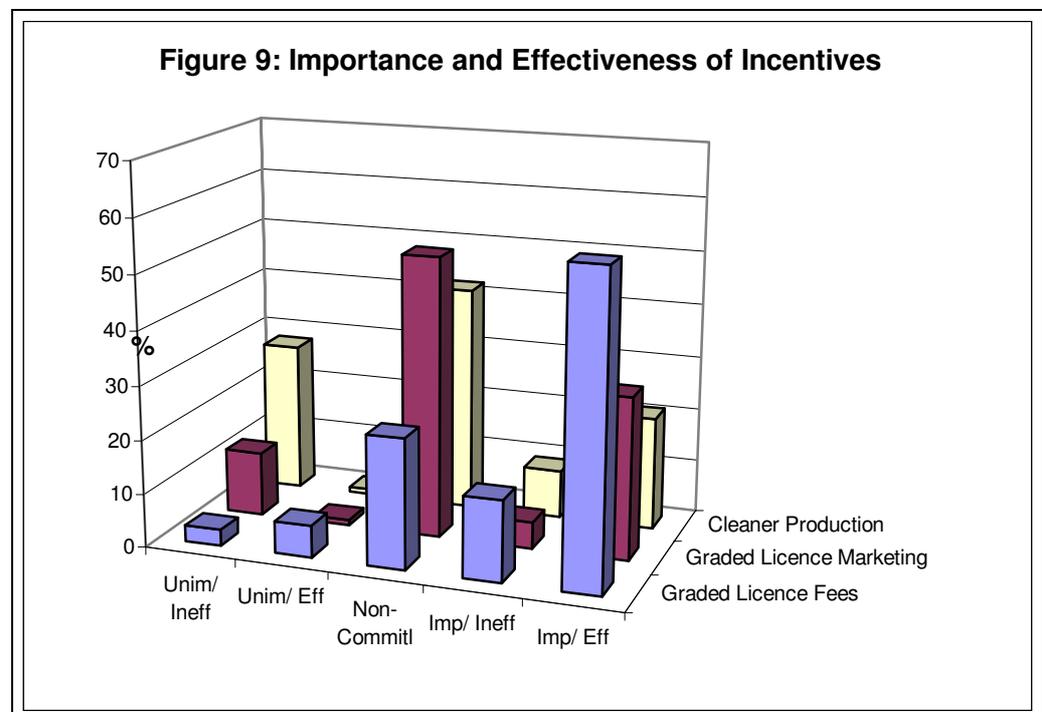


As with the threat of enforcement, responses to the three encouragement and reward issues differed markedly. Reduced fees for good environmental performance was the only issue that the majority of respondents considered both important and effective. Non-committed responses were most often recorded for marketing of good environmental performance and cost savings from cleaner production. Over a quarter of respondents rejected the notion that such savings were possible, calling them unimportant and ineffective. This was more than thought they were important and effective.

Regression analysis showed significant differences between industry sectors in responses to encouragement and reward ($p < 0.001$). Incentives were more important

to motor vehicle workshop operators than to metal workers, concrete batchers and metal recoverers. Spray painters who held green licences placed a higher value on incentives than did standard licence holders within their own sector (p=0.03).

Regression analysis also showed a significant difference between industry sectors in the perceived gap between the importance and effectiveness of encouragement and reward (p<0.001). Motor vehicle workshop operators saw this gap as greater than did metal workers and metal recoverers. The gap was also considered greater by spray painters than by metal workers.

There was also a significant difference between views of green and standard licence holders about the importance and effectiveness of initiatives to encourage and reward good environmental performance (p=0.03). Standard licence holders perceived a bigger gap than did green licence holders. This means that systems for rewarding good environmental performance are working better than those encouraging improvements.

Figure 10 below shows comments about encouragement and reward issues that shed light on some of these findings.



Figure 10: Encouragement and Reward - Comments
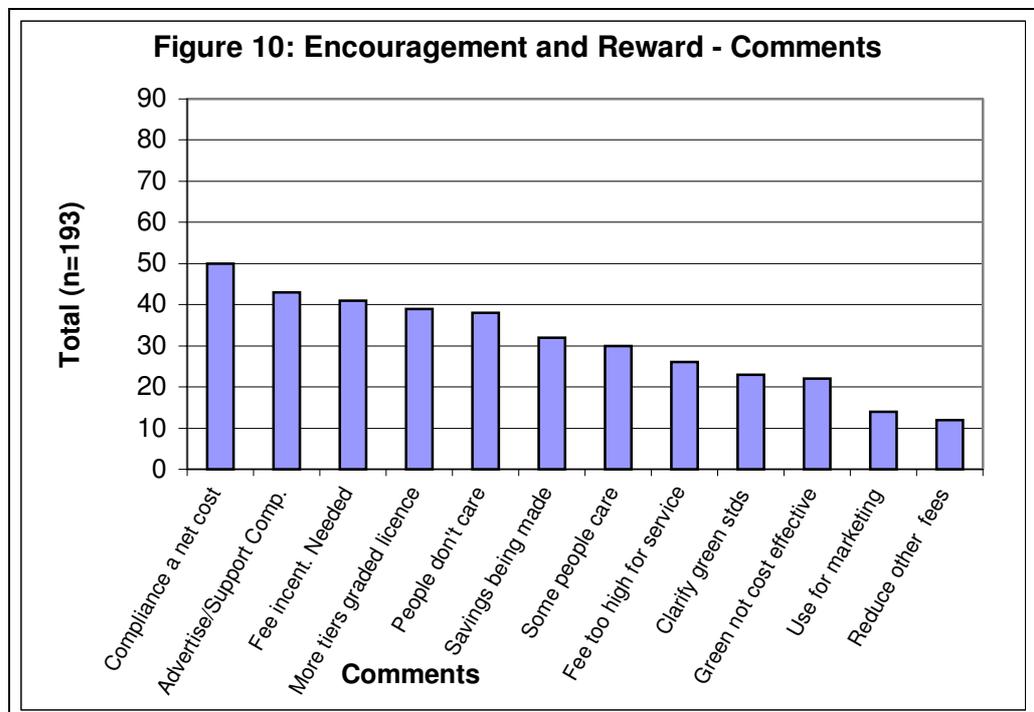
Non-committed responses to the importance and effectiveness of cleaner production is partly explained by the strong perception amongst licence holders that compliance with environmental standards is a net cost (26%). This view makes sense given the

estimated total environmental investment of over $3.7million by just eight industry sectors between 1995 and 1997. However, 17% stated that savings were being made from environmental protection measures, and 22% reported (above), that environmental compliance is 'common sense', and 20% that they were 'already doing it' before the EPA. These latter comments were often made while describing cost effective recycling actions. Taken together, these suggest that business accounting systems probably hide environmental cost savings, rather than that they are not being made.

20% of people commented that 'more tiers' are needed in the graded licence system while 21% gave support for the green licence fee incentives. This is an important point when taken together with the finding that initiatives for encouragement and reward are working less well for standard than for green licence holders. If there were more tiers in the graded licence system, it could encourage more businesses to achieve a higher level of environmental performance. It may also partially reward many operators with low environmental impacts, but for whom it is 'not cost effective to get a green licence' (12%). However action in this area must be considered in relation to comments about 'red tape', making forms less complicated, hard and long (see Figure 12 below).

Non-committed and negative comments about marketing of good environmental performance are partly explained by the comment from 20% that 'people don't care', but contradicted by the comment from 16% that 'some people care'. Many businesses had actually used their green licence in marketing, with no apparent success. The findings certainly show that at present there is no marketing advantage to having a green licence. What they do not show is whether such an advantage is possible in the future, if the public could be made more aware of environmental licensing issues.

> Recommendation
> ➢ Investigate ways of making Cleaner Production more meaningful and accessible to business.
> ➢ Investigate options for expanding and refining the graded licence system by clarifying standards for green licences, incorporating graded licensing into normal licensing inspection and administrative systems, and including more tiers in the system.
> ➢ Develop licence administration systems that quantify environmental performance of ERA's and facilitate publicising of improvements.
> ➢ Raise public awareness of environmental best practice within Brisbane. Publicise environmental improvements made, the green licence system, and how to spot a complying business.

## d)      Written Information

Four pollution prevention initiatives were grouped together for analysis of business response to written information provided by BCC. These were responses to:

- forms designed to be simple, easy to use and valuable to them;

- clear licence conditions;
- the OEG's; and
- the *Pollution Solutions Newsletter*

Responses to these issues are shown in Figure 11.

**Figure 11: Importance and Effectivness of Written Information**
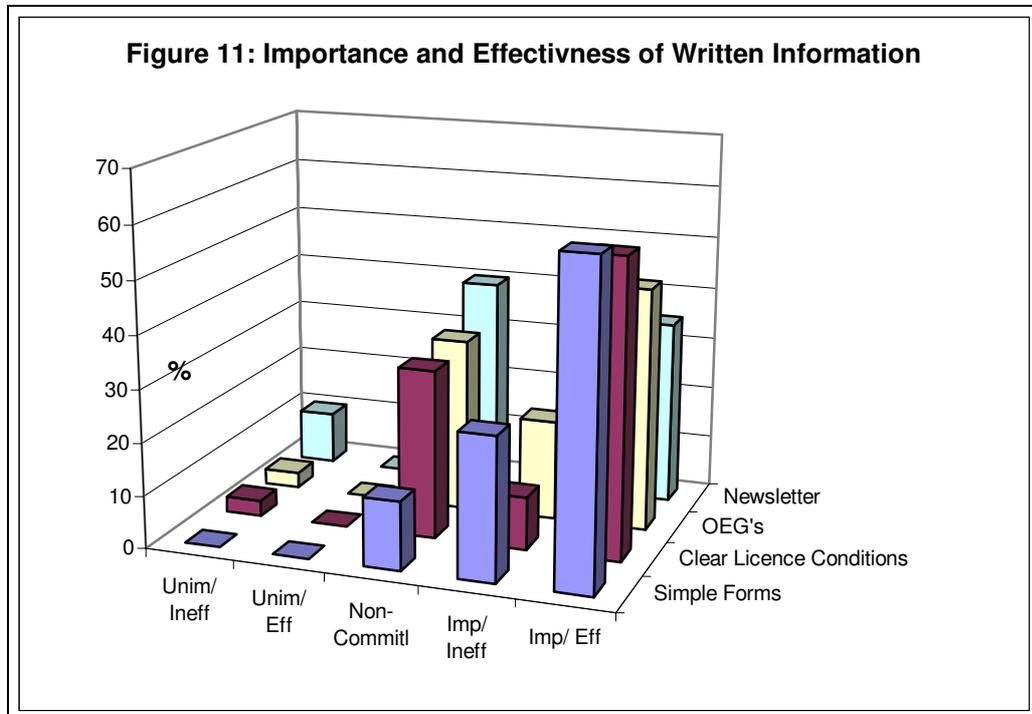


Simple forms, clear licence conditions and the OEG's were all considered important and effective by licensees. Of these, only 'simple forms' had important and ineffective as its next highest rating. The *Pollution Solutions Newsletter* received a predominantly non-committed responses, although more people thought it was important and effective than ineffective.

The results of regression analyses show a significant difference between industry sectors in response to written information (p=0.02). Motor vehicle workshops placed higher value on written information than did abrasive blasters or metal workers.

There was also a significant difference between green and standard licence holders, in the importance placed on written information (p=0.015). Green licence holders considered written information from council to be more important than did standard licence holders. When the comparatively greater environmental improvements made by green licence holders compared to standard licence holders is considered, this finding is most likely because qualifying for a green licence required careful consideration of the standards published by BCC.

The comments made during interviews shed more light on these findings. Comments are presented in Figure 12 below.

**Figure 12: Written Information - Comments**
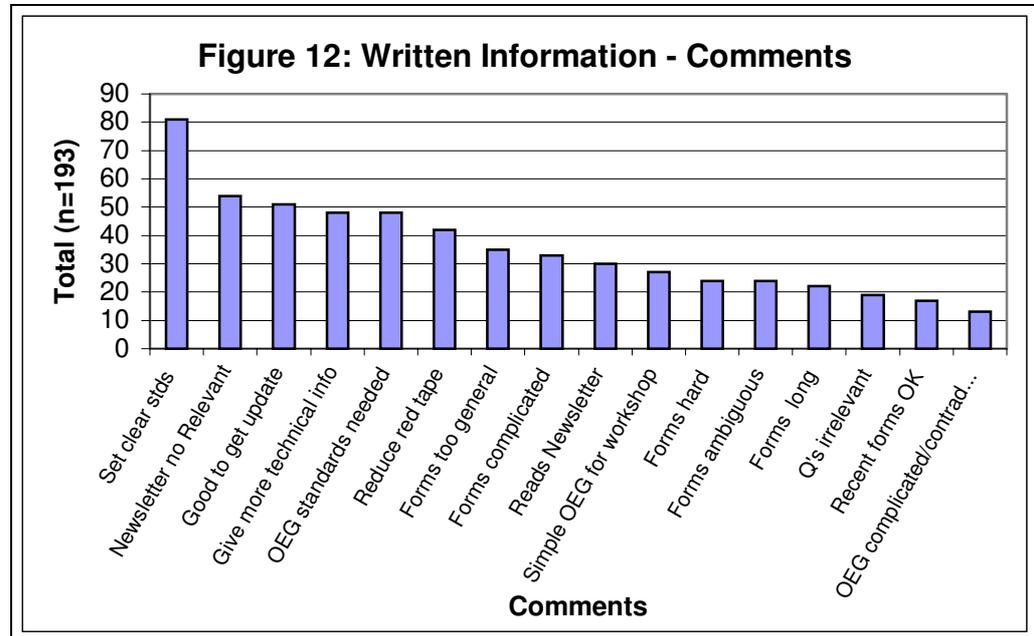


Comments about licence conditions were notably absent. This often reflected operator's lack of familiarity with their conditions, and confusion about some requirements. There was particular confusion about requirements to develop stormwater, waste and environmental management plans. Operators were unaware of these conditions, or did not know how to comply with them.

The finding that motor vehicle workshop operators placed higher value on written information than did abrasive blasters or metal workers could be explained in terms of the relevance of written information provided. Motor vehicle workshops are a big industry sector, with relatively clear and consistent pollution issues. Metal working and abrasive blasting are smaller industry sectors, with much more varied environmental risks between businesses. Operators within industry sectors would have to search harder through the written information provided by council to find anything relevant to their business.

Many business operators commented on a range of difficulties with forms. Many found them too general (18%), too complicated (17%), too hard (12%), ambiguous (12%) long (11%) or irrelevant (10%). Each of these comments were more common than the comment that recent forms were better than the initial forms (9%). These comments are particularly significant since simple forms were considered the second most important BCC initiative.

As well as commenting on problems with written information received to date from BCC, respondents sought additional written information in several areas. In particular, they expressed interest in receiving more technical information about ways to achieve compliance (25%). This was partly because of the high compliance costs facing many industry sectors. Operators wanted to be sure that investments they made would achieve compliance.

OEG's were considered important because they provided the best reference point for 'standards' (25%). However, this effectiveness was reduced since the 'standards were not clear' (42%), partly because they used bureaucratic, rather than trade language. 29% (Figure 14) emphasised that standards must be practical and achievable, which required having a recognisable benefit. This link between actions and outcomes would be particularly important for the 13% who considered their businesses to be inherently low risk.

Many operators commented that a simple, applied OEG designed for placement in the workshop would be useful. This would list only requirements of direct relevance to the particular business, and would be designed to be understood by general workers. Two firms had developed systems like this for themselves. One motor vehicle workshop operator had produced a two page, laminated environmental management plan, including a map, and compliance details. The plan was located in the workshop, and new workers were taken through each point on their first day. A metal recovery operator had developed a large sign listing compliance requirements, that was clearly displayed above the storage area for potential liquid contaminants.

About 16% of respondents reported reading the *Pollution Solutions Newsletter*. 28% commented that it was not relevant to them. Respondents were rarely interested in reading about pollution prevention issues unrelated to their own business. Many had been put off newsletters that displayed pictures of BCC representatives, or complimented BCC actions, and considered this "propaganda" to be irrelevant and sometimes offensive. Support for the newsletter was based on a desire to receive updates in particular areas including:

- any changes to environmental requirements;
- outcomes from enforcement actions;
- their own industry sectors' progress towards compliance; and
- how other businesses had cost-effectively solved common pollution problems.

Recommendations

> ➢ Investigate options for simple, applied standards designed for display in workshops, showing only issues of direct relevance to individual workshops.
> ➢ Consider removing common licence conditions from ERA's if they are confusing to operators, rarely complied with, and have no direct environmental benefits (e.g. stormwater management plan requirements). Investigate other ways of achieving the environmental outcomes these are designed to address.
> ➢ Simplify forms. Remove any information not actually checked by Council staff. Consider reducing annual return form to a simple report on compliance, and changes to environmental risk.
> ➢ Minimise the legal risk in requests for comments from Council. Consider developing administrative procedures (possibly, to be provided on or with annual return forms) where advice or assistance can be requested about compliance issues. Ensure that such a request cannot bring on enforcement action.
> ➢ Clarify compliance standards. Describe them in trade language. Communicate them clearly to industry, give time to comply, check compliance and enforce non-compliance.
> ➢ Communicate environmental outcomes from compliance to industry. Make these meaningful, for example by describing outcomes in terms of protecting fish habitats.
> ➢ Increase the relevance of the *Pollution Solutions Newsletter*.

## e)        Other initiatives

Responses to five other environmental initiatives were investigated in this Study. They were responses to:

- feedback received on compliance levels;

- information received from industry associations;

- inspections;

- the *Pollution Solutions  Expo*; and

- the EPA 's role in securing other business needs.

Figure 13 below shows the responses to these issues.



Figure 13: Importance and Effectiveness of Other Initiatives
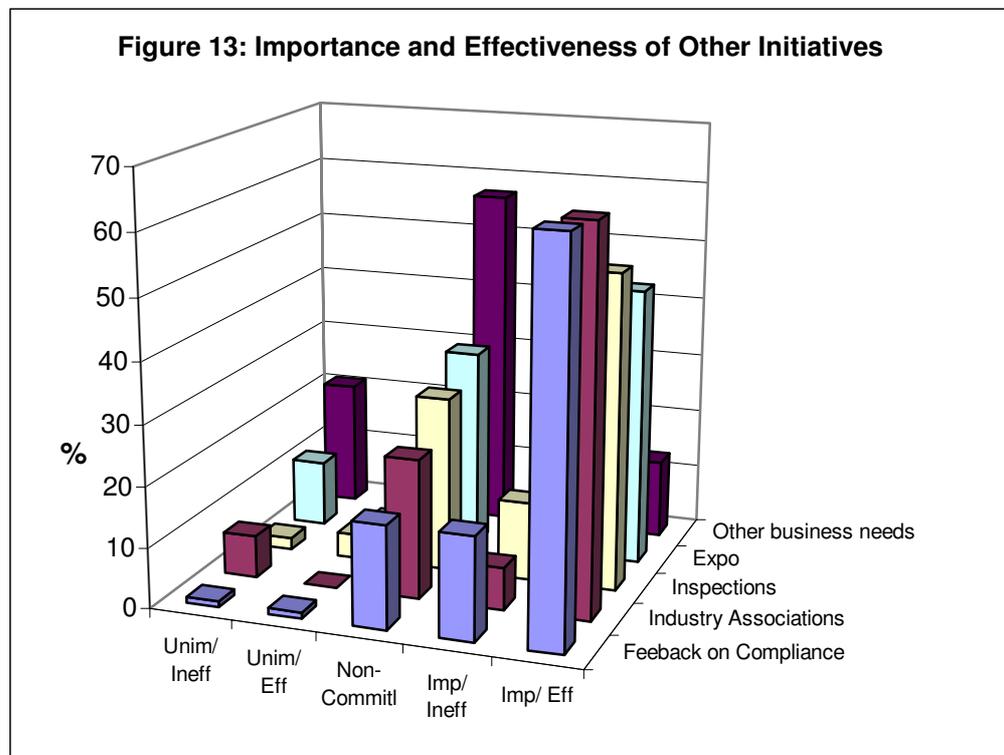
All of these initiatives except securing other business needs were considered important and effective by the majority of operators. Responses were mostly non-committed about the EPA's assistance in obtaining loans or insurance, since most banks and insurance companies do not check environmental licences.

Figures 14 and 15 show comments made about these initiatives, as well as other issues raised about contact between businesses and BCC both on and off site.

**Figure 14: Contact with Council - On Site**

**Figure 15: Contact with Council - Off Site**

Total (n=193)

| Comments | Total |
|---|---|
| Didn't go to Expo | 63 |
| Expo not relevant to me | 38 |
| Better Govt coord. | 32 |
| Events to be relevant | 27 |
| Council insens. bus. | 27 |
| Went to Expo | 18 |
| Slow resp. Green/Small | 16 |
| Events to be local | 14 |
| Council to comply | 10 |
| Gopher' needed | 9 |
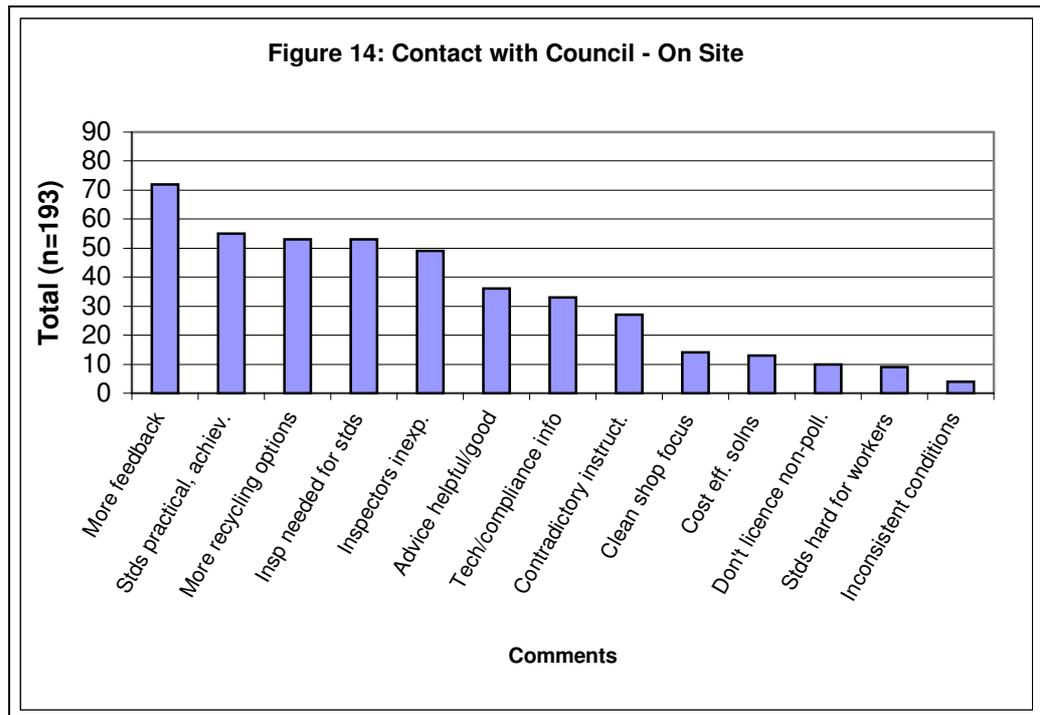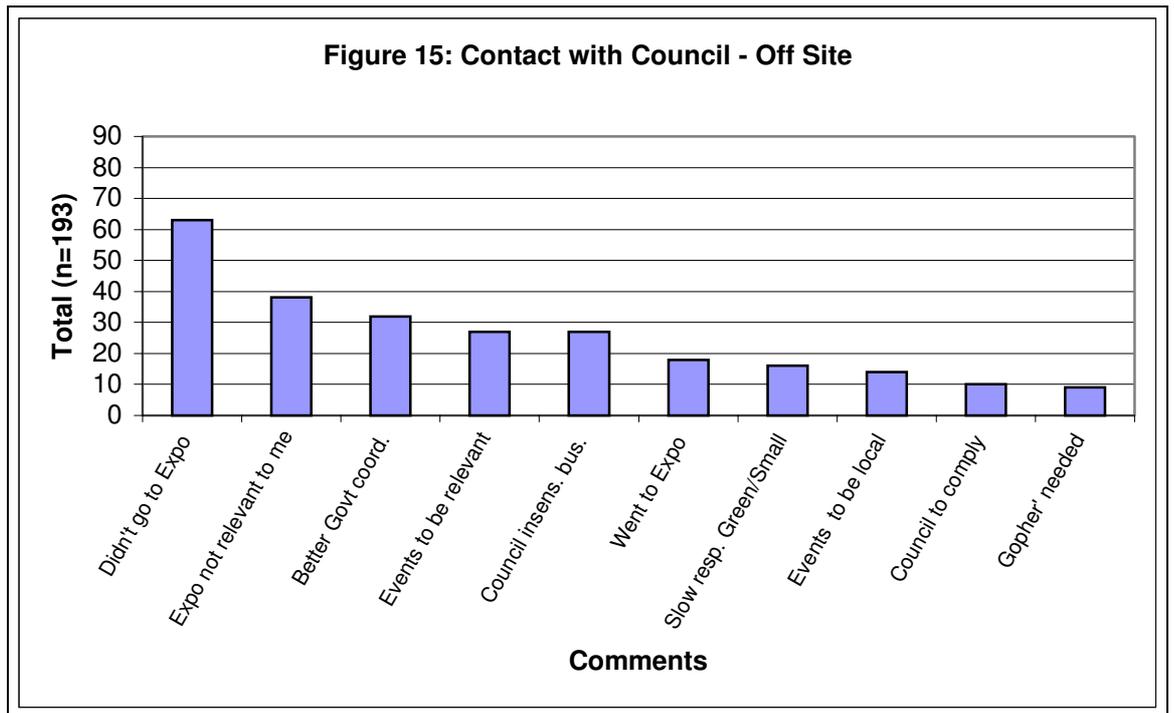
### i)         Feedback About Compliance

Although feedback about compliance was considered both important and effective by the majority of operators of ERA's, 37% wanted 'more feedback'. Many had made environmental improvements that they hoped achieved compliance, and had expected inspectors to return to check that requirements had been met. When no inspection came, it reinforced perceptions of weak enforcement of environmental laws, since BCC would not have known, or apparently cared if requirements had not been fulfilled.

### ii)         Information from Industry Associations

Information from industry associations was considered important and effective in encouraging better environmental performance. It is worth reporting on membership of these groups, since only association members have access to this information. Figures 16a and b show this membership.

Figure 16a: Membership of Industry Associations



Figure 16b: Breakdown of Association Membership
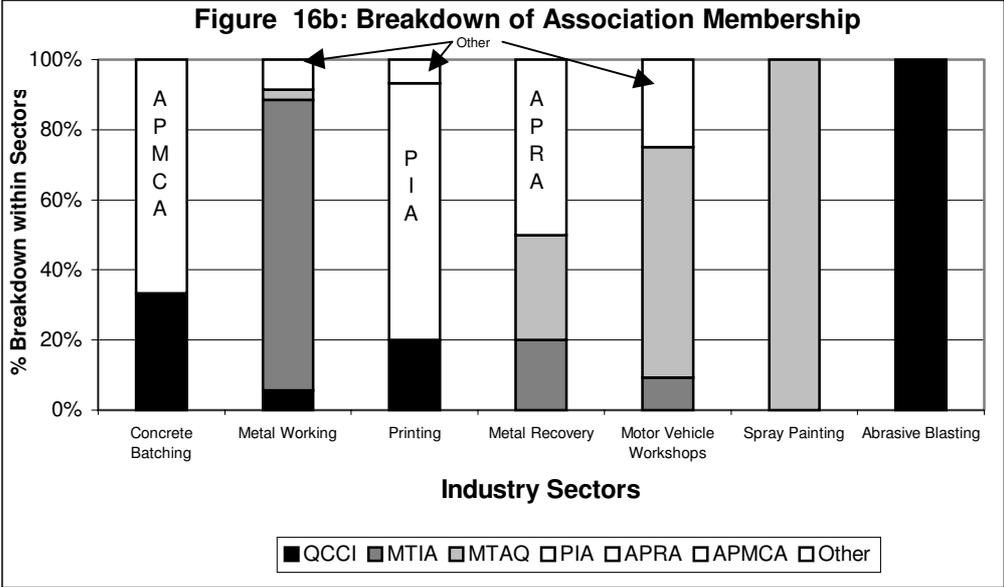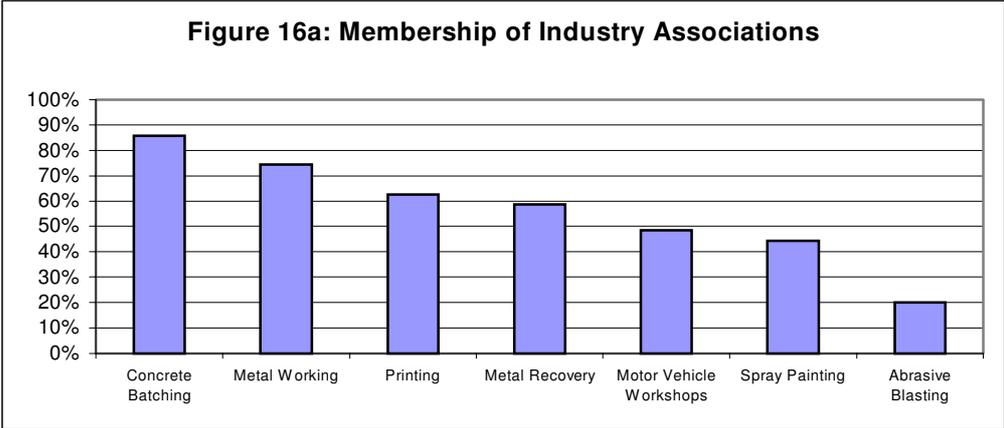
At 85%, concrete batching had the highest membership of Industry associations. 75% of association members belonged to the Australian Premixed Concrete Association (APMCA). The remainder were members of the Queensland Chamber of Commerce and Industry (QCCI).

Metal workers had the second highest association membership at 75%. 85% of these were members of the Metal Trades Industry Association (MTIA). 8% were in QCCI, 5% in the Motor Trades Association of Queensland (MTAQ), and the remainder in other associations.

Over 60% of printers belonged to an industry association. Of these, over 75% were in the Printing Industry Association (PIA), and 20%% members of QCCI.

58% of metal recoverers were association members, and half of these belonged to the Automotive Parts Recycling Association (APRA). The remainder were split between MTAQ and the MTIA.

Nearly 50% of motor vehicle workshops were represented by industry associations. MTAQ represents 60% of these, with 10% in the MTIA and the remainder in other associations.

The 43% of spray painters that belonged to associations were all in MTAQ, and the 20% of abrasive blasters in associations were in QCCI.

### iii)  Inspections

25% of respondents stated that inspectors lacked the necessary experience with industry to:

- recognise pollution issues;
- distinguish between petty and significant issues; and
- suggest technical solutions.

14% of operators complained that they had received contradictory instructions from inspectors. Several of these reported having an environmental improvement approved by one inspector, only to have it rejected soon after by another, while receiving new instructions that required additional investments.

These criticisms were countered by comments from 19% that advice from inspectors had been 'helpful and good'. 27% of operators stated that regular inspections were needed or 'standards would drop'.

### iv)  Pollution Solutions Expo

9% of respondents had attended the *Pollution Solutions Expo*[9]. 20% said that the *Expo* was relevant to others, but not to them. 15% said they might attend a similar event if they could be sure beforehand that products would be relevant to their business. 7% wanted events to be local, and held after business hours (although not on weekends).

The effectiveness of both the *Expo* and *Newsletter* was constrained because business operators were usually only interested in pollution solutions for particular problems facing them when they were in a position to address those problems.

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[9] Proportions of those who had attended were more accurately recorded than those who hadn't attended.

17% commented that it would be better if BCC had technical, compliance information available on request than at events or in newsletters. 7% emphasised that such information must be cost effective. 5% wanted BCC officers to act as 'gophers' in Council, investigating issues and finding solutions for businesses that they became familiar with over time.

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Recommendations
➢ Build up industry experience among inspectors. Consider encouraging skill development by inspectors in related industry sectors (e.g. motor trades versus metal trades). Investigate using trade or other courses, work experience placements in ERA's or other novel approaches to this problem.
➢ Ensure that marketing of the 1998 *Pollution Solutions Expo* details the range of pollution solutions to be presented, and other details to raise the perceived relevance of the event.
➢ Recognise the value to business of having technical, compliance information to support environmental investments available on request from BCC. Consider options for providing such information.

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## f)  Issues Raised by Industry

This section provides additional detail about five important issues raised by businesses, that were additional to those raised about specific BCC initiatives. The issues were:

- coordination within government
- government sensitivity to small business issues
- problems with landlords;
- recycling options; and
- non-polluting businesses

### i)  Coordination within Government

17% of survey respondents raised concerns about lack of coordination within BCC, and between tiers of government. Most coordination issues within BCC related to actions needed to comply with environmental requirements, that were frustrated by conflicting or impeding requirements from other sections within Council. BCC's administrative systems were also criticised as slow, or inadequate by some operators. Coordination issues between tiers of government were mostly about doubling up of environmental requirements between government jurisdictions.

Conflicting or impeding council requirements included constraints on environmental improvements due to planning issues and impediments to installing roofing, wash bays or interceptor traps due to council approval requirements. Conflicting requirements due to planning issues were important because they could lead to high

costs in apparently fruitless areas while legal matters were debated. Approvals caused most frustration when environmental requirements had a real or perceived deadline, that operators could not meet because they had no approval for improvements. In these cases, they sometimes feared facing enforcement action BCC due to no fault of their own.

9% of operators surveyed reported frustration with BCC's slow response to their green or small licence application. Many had waited months for the inspection that might earn them a licence fee reduction. They believed that this slowness was unfairly costing them money each day. This was because they assumed that the fee reductions would apply from the day their fee reduction was approved, not the day BCC received their application, despite their pollution prevention practices having been in place before then.

Many operators were also frustrated that the fee reduction system in effect required an up front payment of fees, that would be recouped later. This was because they were required to pay the full licence fee before they received an inspection for a green or small licence reduction. If they passed this inspection, they received a credit for their licence fees in future years, rather than a repayment of fees already paid. If they received both a green and a small licence, this meant that they had paid for the current year's licence, and the next three years in advance. This was frustrating because:

- it affected cash flow, reducing available funds in the current financial year;
- environmental licensing requirements and licence fees may be subject to change, so some thought the fee may not even be required in the future years already paid for;
- running a small business is difficult, and they had no guarantee that they would survive long enough to use the pre-paid licence fees; and
- they did not believe they would get a refund in the future if it was not required for any of these reasons.

Coordination issues between tiers of government generally affected large companies agencies in other council areas within Queensland or interstate, or some devolved and some non-devolved ERA's. This issue affected a greater proportion of concrete batching businesses than any other ERA studied. Environmental managers from these firms often coordinated licensing for plants all over Queensland, and were frustrated by different forms, different licence layouts and different requirements between administering authorities.

Recommendation
➢ Consider operators' perceptions of governments' attitudes to them, and the complex impacts of

regulation on communities of small business.  Investigate options for assisting, supporting and protecting the rights of small business. This might include giving long term certainty about government requirements, protecting industrial areas from residential development, and providing a simple appeal system (or equivalent), when contradictory requirements are placed on business.

### ii)        Government Sensitivity to Small Business Issues

15% of respondents complained that EPA implementation was insensitive to small business issues. These tended to be the combination of other issues that are mentioned elsewhere in this report. Taken separately they were problematic for businesses. Taken together, they created fundamental problems that might threaten the viability of a firm. Problems that were commonly combined with synergistic consequences included:

- 'down time' required to understand and complete forms;
- costly requirements on licences;
- 'down time' required to research how to meet requirements;
- competing firms that were not ERA's, and had no equivalent requirements, and therefore lower overhead costs;
- general downturn in business due to a poor economic climate; and
- other confusing, expensive or new government requirements to comply with.

Many business operators explained how the combination of issues such as these meant that the dynamics operating between competing firms shifted with the introduction of new requirements. Further changes and resulting uncertainty would most strongly affect responsible businesses struggling to keep abreast of all government requirements. Those firms would be most likely to make an early response to requirements, and be least able to bear the cost if governments backed off, or significantly altered new requirements.

### iii)        Problems with Landlords

Operators in rented premises faced different problems to those that owned their own workshop. Generally, environmental investments were a greater financial risk for renters. Common problems included:

- difficulty getting approval from landlords to install interceptor traps or wash bays, since it would mean cutting into existing floors or other areas;
- financial risks of installing spray booths or other large, expensive equipment, when the long term tenancy was not guaranteed; or

- 'down time' researching how such equipment could be installed, but later removed if required.

It was rare for landlords to support ERA's by installing complying plant and equipment into the workshops they owned.

Recommendation
➤ Investigate options for requiring landlords to provide tenants with infrastructure complying with environmental standards.

## iv)         Recycling Options

27% of respondents requested that BCC develop and communicate more recycling options. This issue was usually raised in relation to wastes that were known by operators to be recyclable, but for which easy recycling options were not available for a range of reasons. These included:

- waste oil in quantities between about 20 and 200 litres. This was the quantity that mobile motor mechanics among others frequently wanted to dispose of. This quantity is too much to take to BCC transfer stations, but not enough for oil recyclers to pick up;

- cardboard waste, especially from spray painters. Many operators had tried, and failed to find cost-effective cardboard recycling options;

- silver recovery from developer and fixer at small printing companies. Quantities of liquid waste containing silver were sometimes too small, or too diluted for metal recyclers to collect, but could be cost-effectively recycled if collected.

Many motor vehicle workshop operators were also impeding recycling mixing incompatible liquid wastes like waste glycols with spent oils. Most seemed unaware of potential problems from these actions, like possible increases in the cost of recycling and liquid waste disposal.

Many businesses had solved recycling problems such as these through voluntary arrangements with other businesses, that could either reuse wastes, or combine them with their own for more efficient disposal. These voluntary arrangements often also extended to using plant and equipment in other workshops, including wash bays and bead-blasting booths.

Recommendations
➤ Investigate recycling options for problem quantities and types of wastes common to different industry sectors.
➤ Check that recyclers are disposing appropriately of mixed liquid wastes, such as glycols and oils. Identify possible roles for council in assisting better separation of liquid wastes.
➤ Promote the practice of combining similar wastes or sharing resources between compatible businesses. Use case study examples to do this, as a way of further promoting complying firms.

### v)  Non-Polluting Businesses

5% of respondents requested that BCC stop licensing non-polluting firms. This is noteworthy for two reasons. First, only this small minority of businesses asked to be removed from licensing requirements. This suggests a high level of acceptance of the value of environmental regulation, despite associated problems.

Second, it is worth noting since actions could be taken to address the problems. Many who made this comment did not clearly fit any particular class of ERA. Some of these had very low pollution potential, and zero environmental risk according to the survey methodology. They could well be taken off council's database of ERA's altogether.

Others clearly fitted ERA categories, but also recorded zero risk. For many of them, current licensing requirements are onerous, and a reduction in requirements would be beneficial. This may not mean being moved off the ERA database, but being reduced from, say, a Level One to a Level Two activity. Such an action would need to be considered in light of business requests for clear standards (so the rule could be applied consistently). Possible benefits from licensing, including inspections, information provision, and (possibly) green marketing would also need to be considered.

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Recommendations
- Develop appeal processes for businesses that consider that they are not ERA's.
- Investigate options for optimising EPA impacts on business, on the basis of the environmental risk of individual operations. This would mean an increased regulatory focus on businesses with high environmental risk, and a reduced focus on those with lower risks.

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## 7) Pollution Prevention Issues and Actions by Industry Sector and Licence Grade

This section summarises essential potential, 1995 and 1997 environmental risk issues, and environmental improvements made by each industry sector.

### a)      Spray Painting

The spray painting industry is characterised by relatively consistent environmental issues between firms, and many technological advances with environmental benefits. Air pollution from dry sanding and spray painting car panels and stormwater pollution from wet rub-downs conducted outside were the biggest potential pollution issues in 1995.

The spray painting industry has felt the greatest impact from EPA licensing requirements of all sectors included in this Study. This was largely because spray booth and wash bay requirements commonly given to spray painters required significant investment by operators. BCC set clear standards for these new environmental requirements, and most previously non-complying spray painters invested to comply. As a result, spray painters made both the highest overall, and the second highest investment for individual businesses. 33% of spray painters made environmental investments averaging $27,119. Total investment for spray painters was around $1.6 million[10].

Between 1995 and 1997, spray painters reduced their environmental risk overall, including significantly reduced environmental risk of stormwater and air pollution, and excess trade waste. Compared to other industry sectors, spray painters' record for environmental risk reduction between 1995 and 1997 included greater:

- overall risk reduction than metal workers, metal recovery, motor vehicle workshops and printers ($p < 0.001$);

- air pollution risk reductions than any industry sector ($p < 0.001$);

- stormwater pollution risk reductions than printers and metal workers($p = 0.015$); and

- trade waste improvements than metal workers, motor vehicle workshops and printers.

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[10] 95% confidence limits for mean individual investments were $6,412-$114,691, and for total investments were $376,600-$6,737,000.

EPA impacts on spray painters were compounded by other current issues facing spray painters. These included:

- it is relatively cheap and easy to set up as a spray painter from home. A compressor and spray gun are the only equipment needed. Because of this, there are many non-complying backyard operators undercutting complying firms in the industry;

- most trade in the spray painting industry is from insurance jobs. Insurance companies typically issue clients with a list of preferred spray painters, and require them to obtain several quotes on jobs. Insurance companies rarely check that these firms have complied with environmental or other requirements. 52% of spray painters surveyed reported that insurance companies sent jobs to their non-complying competitors, including backyard operators with no pollution control equipment, who have much lower overhead costs and undercut the complying firms;

- spray painters widely believe that insurance companies are taking advantage of this situation, intending to establish monopolistic spray companies to take all jobs from those they insure. Spray painters believe that this will lock them out of the market, increase the cost and reduce accessibility of spray painting services;

- the new small, inexpensive car models now commonly driven are more often written off than repaired after accidents. This is because they sustain major damage in most accidents, and contain expensive individual parts;

- the state of the economy at present is such that many people don't have available finance to have minor damage to car panels repaired[11].

Potential environmental risk for spray painters was:

- higher overall than that of metal workers, motor vehicle workshops and printers;

- higher for risk of environmental accident, and risk of air pollution than most other industry sectors; and

- lower overall than for concrete batchers.

In 1995 spray painters:

- had lower stormwater pollution risk than metal recovery;

- higher overall risk than concrete batching and printing; and

- higher air pollution risk than metal recovery, motor vehicle workshops and printers.

At least three quarters of the spray painters surveyed recorded zero risk of environmental accident in 1995, and at least half had zero noise risk.

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[11] These issues were commonly reported by operators, and confirmed by the General Manager of Queensland Paint Supplies, who supplies materials to the spray painting industry sector in much of Brisbane.

In 1997 spray painters:

- showed no evidence of higher environmental risk than any other sector for any risk area;
- had lower noise pollution risk than concrete batching;
- had lower site contamination and stormwater risk than metal recovery.

At least three quarters of spray painters surveyed had zero risk of exceeding trade waste requirements, environmental accident and noise pollution. At least half also had zero risk of site contamination and stormwater pollution.

Regarding BCC's pollution prevention initiatives, spray painters:

- placed a higher level of importance on enforcement than did metal workers ($p=0.04$);
- thought the gap between importance and effectiveness of enforcement action was greater than did most other sectors ($p=0.0024$);
- with green licences thought incentives were more important than spray painters with standard licences ($p=0.03$); and
- thought the gap between the importance and effectiveness of encouragement and reward was greater than did metal workers ($p<0.001$).

---

Recommendations
- Enforce spray booth requirements set out in standards, and complied with by most operators.
- Facilitate adoption of EMP's for spray painters with financial constraints to complying with spray booth requirements.
- Increase services to encourage and reward good environmental performance by spray painters.
- Provide technical compliance details, and strategies for achieving efficiencies during upgrades for spray painters preparing to invest in pollution control technologies.
- Request Brisbane residents to report incidents of large spray jobs in residential areas, and take appropriate enforcement action to control these.
- Take measures to ensure that insurance companies only refer jobs to spray painters that comply with environmental requirements.

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## b)      Metal Working

Metal workers are a diverse sector, although this diversity does not run along the lines of current ERA categories. Many have very low environmental risk, storing less potential liquid contaminants on site than would be stored in an average residential dwelling. Others store considerable quantities of hazardous chemicals. They face some difficulties meeting environmental requirements, partly because objects they regularly spray may be too long, or large to fit into a cost and space effective spray booth. Many metal workers also used forklifts to move equipment and chemicals around the work site, and this made bunding requirements difficult.

38% of metal workers made environmental investments averaging $3,991, which was the second lowest individual investment recorded. Their costs were often kept low because they were able to manufacture spill trays and other pollution control equipment on site. The overall investment for metal workers was second highest of all sectors at around $706,700[12].

Metal workers made significant environmental risk reductions overall between 1995 and 1997, and reduced their risk of stormwater and air pollution and excess trade waste. Environmental risk reductions for metal workers was lower than for spray painters, in terms of overall risks (p<0.001), and for stormwater (p=0.015), trade waste (<0.001) and air (<0.001).

Potential environmental risks for metal workers were:

- lower overall than for most other industry sectors
- lower for site contamination, trade waste (three quarters of those surveyed had zero potential risk) and stormwater pollution than most other sectors;
- higher for environmental accidents compared to most other sectors; and
- higher for pollution to stormwater than spray painters and printers.

In 1995 and 1997, metal working:

- did not rate higher for any environmental risk area than any other industry sector; and
- scored lower environmental risks of site contamination and pollution to stormwater than metal recovery.

Three quarters of the metal workers surveyed had zero environmental risk of environmental accident, and exceeding trade waste requirements in 1995. In 1997, this was also true for risk of stormwater pollution.

Regarding BCC's pollution prevention initiatives metal workers:

- placed a lower value on the importance of enforcement than spray painters p=0.04);
- placed a lower level of value on the importance of encouragement and reward than motor vehicle workshops (p<0.001);
- were less concerned about the gap between importance and effectiveness of incentives than spray painters (p=0.03); and

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[12] 95% confidence intervals for mean individual investments were $1,442-$11,048, and for total investments were $303,988-$1,437,500.

- placed lower value on written information than motor vehicle workshops p=0.02).

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Recommendations
➤ Distinguish better between the pollution potential of different metal workers within the industry sector, for the purposes of environmental regulation and standard setting.

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## c)    Motor Vehicle Workshops

Motor vehicle workshops are the most numerous of all ERA's, and represent nearly half of all ERA's licensed by BCC. They have relatively consistent pollution issues, dominated by liquid waste management, storage and disposal. Liquid wastes were often mixed during storage.

Motor vehicle workshops were low individual investors, with 47% making average investments of $1,003. This gave it the third highest investment of all sectors at around $661,400.

Motor vehicle workshops recorded overall risk reductions between 1995 and 1997. This comprised significant reductions in stormwater and air pollution. Environmental improvements between 1995 and 1997 for motor vehicles workshops were greater for stormwater risk reduction than for printers (p=0.015). Common improvements made by motor vehicle workshops included:

- improvements to liquid waste storage, through establishing designated, covered, bunded areas for them;
- reducing the practice of cleaning workshops by hosing grease and other contaminants off floors and into stormwater;
- acquiring non-flammable material to keep on site for prompt cleaning of spilt liquid contaminants;
- installing drip trays under taps of potential liquid contaminants; and
- moving waste battery storage areas under cover and onto spill trays.

Most motor vehicle workshops already had equipment such as covered parts cleaners, and waste liquid and battery recycling practices in place before EPA licensing.

Motor vehicle workshops had a lower overall potential environmental risk than half of the other industry sectors. It had lower potential risk of air pollution than most other sectors, and lower risk of site contamination and environmental accident than half of the other industry sectors.

Motor vehicle workshops did not register higher environmental risks compared to any of the other industry sectors for any risk area in 1995. Motor vehicle workshops had lower potential risk of air pollution than did concrete batching plants and spray painters. At least three quarters of the motor vehicle workshops surveyed had a zero risk of environmental pollution.

In 1997, motor vehicle workshops had lower total environmental risk than abrasive blasters and metal recoverers. At least three quarters of the businesses surveyed had zero risk of environmental accident, stormwater pollution, site contamination, air and noise pollution, showing a big environmental improvement from 1995.

The difference between potential and 1997 environmental risk from motor vehicle workshops was higher than for metal recoverers and printers.

In relation to BCC pollution prevention initiatives, motor vehicle workshop operators:

- placed a higher level of importance on enforcement than metal workers (p=0.004);
- were less concerned about the gap between importance and effectiveness of incentives than motor spray painters (p=0.024);
- rated the importance of incentives as higher than concrete batchers, printers, and spray painters with standard licences; and
- saw a bigger gap between the importance and effectiveness of incentives than metal workers, metal recoverers and printers.

Many operators voiced frustration at environmentalists and others who attack their industry as 'dirty', but drive old cars with high pollution emissions. They see their industry as able to contribute to broad based environmental protection through tuning and servicing cars, to insure they run efficiently. Operators were also frustrated by chain stores such as K-Mart selling oil to the public, and encouraging owners to do their own oil changes and tune-ups. Many operators believed waste oil, oil filters and other recyclable wastes were poorly disposed of because of this.

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Recommendation
➢ Inform Brisbane residents of environmental improvements made by motor vehicle workshops, and the environmental benefits of having cars regularly serviced in complying workshops.

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## d)  Metal Recovery

Metal recovery is an industry sector with relatively few operators comprising two distinct subgroups. These are automotive recyclers and scrap metal yards. The latter

tend to be large operations with big quantities of metal stored outside, for sorting, compression and other recovery actions.

The automotive recycling industry sector is currently undertaking an industry-driven, concerted effort to improve its environmental image and customer service, and thereby increase its potential market. Its environmental claims are legitimate, since these businesses recycle car parts, reducing the need for unnecessary additional manufacturing. Many automotive recyclers are addressing both their environmental and customer service issues by:

- sealing work areas;

- upgrading workshops;

- adopting management practices of draining all potential liquid contaminants from cars, and dismantling them for separate storage of components; and

- joining the 'wreckers hotline' that pools information about locations of specialist car parts in different yards, to increase their availability across Brisbane.

This enables operators to produce car parts immediately, off the shelf rather than search them out, and remove them in the yard when required. Operators say this has increased the range of people willing to purchase parts from the industry, noting particularly that women are now more likely to use their services. The industry-driven name change from 'motor wreckers' to 'automotive recyclers' reflects these advances.

Mean environmental investment by individual metal recoverers for the 41% of businesses that made them was $3,178. Overall investment was around $54,700[13].

Metal recoverers made significant overall environmental improvements between 1995 and 1997 ($p < 0.001$). These included significant reductions in the risk of air pollution and excess trade waste.

Metal recovery had higher total potential pollution risk than metal workers, motor vehicle workshops and printers. It had a higher potential risk of stormwater pollution and site contamination than most other industry sectors.

In 1995, metal recovery had:

- higher overall pollution risk than concrete batching and printing;

- higher risk of stormwater pollution than most other industry sectors;

- higher risk of site contamination than metal workers, concrete batching, and printing;

- lower noise pollution risk than concrete batching and

- lower air pollution risk than spray painting.

At least three quarters of the metal recoverers surveyed had zero risk of noise pollution, and environmental accident. Half also recorded a zero noise pollution risk.

In 1997 metal recovery had:

- lower air and noise pollution risk than concrete batching;

- higher site contamination and stormwater pollution potential than most other sectors; and

- higher overall pollution than motor vehicle and printing workshops.

By 1997, at least half of the metal recoverers surveyed had zero risk of site contamination. The increase in some environmental risk ratings than some other sectors reflected relatively greater changes in those sectors, rather than inaction on the part of metal recoverers.

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Recommendation
➢ Support the industry-led changes being made by automotive recyclers, possibly through marketing.

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## e) Concrete Batching

Of all the ERA's investigated in this Study, only concrete batching plants had required environmental licensing before the EPA commenced. This partly explains their status as an industry with high potential, but relatively low actual pollution risks. The sector faces some difficult inherent environmental problems, including:

- that plants need to be located near 'pour' sites, since concrete will otherwise start to harden before it is laid, so many plants are in inner city areas;

- large pours in city areas are frequently made during night hours to avoid traffic disruption. This means noisy activities are conducted through the night;

- it can be difficult to fully remove lime from stormwater emissions, despite thorough settling and reuse of water. This can result in a very high pH for stormwater leaving the site.

Concrete batching was also the industry most likely to suffer from too much red tape due to similar requirements covering multiple jurisdictions.

Concrete batching sectors made the highest individual investments and lower overall investments compared to other industry sectors. The 29% of concrete batching plants

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[13] 95% confidence intervals for mean individual investments were $620-$16,285 , and for total investments were $10,676-$280,400.

making environmental investments averaged $27,780, with an overall industry investment of around $330,300[14].

The total potential environmental risk from concrete batching plants was higher than for most other industry sectors. This higher overall risk was due to higher risk levels than most other industry sectors for stormwater and air pollution. Their potential risk of site contamination was lower than for half of the other industry sectors.

In both 1995 and 1997, concrete batching plants carried higher risk of noise pollution than metal recovery and printing, and higher air pollution risk than motor vehicle workshops. They had lower total risks than metal recoverers and spray painters in 1995. At least a quarter of the concrete batching plants surveyed had zero risk of damage to the sewage system, and risk of environmental accident in 1995, and also for stormwater pollution in 1997.

## f)    Abrasive Blasting

Abrasive blasting is further from full environmental compliance than any other industry sector considered in this Study. Achieving compliance poses fewer problems for the subset of the industry located in standard sized industrial sheds, working on relatively small jobs. However it is this subset that register the greatest environmental investments, and that have made the greatest attempt to comply. They included most of the 60% of abrasive blasters that made environmental investments averaging $20,806, with an overall industry investment of about $387,000[15].

Another significant component of the industry includes operations located on several hectare sites, blasting and coating extremely large items. Blasting chambers or spray booths to fit these items would need to be custom-built at great expense to operators. The sites of this type that were visited for this Study were covered by layers of waste slag from decades of blasting. One such site was located less than 50 metres from the Brisbane River. During one inspection, a ten metre plume of two-pack paint overspray was viewed in an open area. These were by far the worst examples of pollution observed during the inspections, yet interviewees seemed less concerned about this than operators in other sectors were about far lesser environmental risks.

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[14] 95% confidence intervals for mean individual investments were $1,432-$590,072, and for total investments were $17,000-$7,016,000.
[15] 95% confidence intervals for mean individual investments were $1,715-$252,457, and for total investments were $31,900-$4,695,700.

Abrasive blasters registered environmental improvements in environmental risk of stormwater pollution and excess trade waste.

Potential environmental risk for abrasive blasting was:

- higher overall than for metal working and printing;
- higher site contamination than any other sector;
- higher for excess trade waste than metal working;
- higher for stormwater pollution than printing;
- lower for stormwater pollution than concrete batching, metal recovery and motor vehicle workshops; and
- lower for environmental accidents than most other sectors.

In 1995, environmental risks for abrasive blasting were higher overall, and for stormwater pollution risk than printing workshops. At least half of the abrasive blasting operations surveyed had zero risk of environmental accident.

In 1997, abrasive blasting had higher overall environmental risk than motor vehicle and printing workshops. At least half of the businesses surveyed had zero risk of site contamination and stormwater pollution (although the remainder had very high risk in these areas).

Abrasive blasters placed a lower level of importance on written information from BCC than did motor vehicle workshops (p=0.02). Several interviewees rejected measures proposed in the OEG's as unfair or too difficult, even though the equivalent measures were already in place in most businesses in all other industry sectors surveyed.

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Recommendation
➢ Further investigate pollution potential, and the constraints and opportunities for reducing pollution from abrasive blasting operations.  Consider industry assistance measures and enforcement regimes to increase compliance in the industry consistent with other industries.

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## g)    Printing

Printing is a relatively low risk industry. Many small printers have potential environmental risks very similar to those of an average office. Areas of greater concern included silver recovery and solvent disposal. Solvents are used in small quantities in the printing industry to clean printing equipment. Some solvent generally enters the sewage system during cleaning. Rags laden with solvent are generally left

to dry in open buckets, and either disposed of or laundered and reused. This means that all used solvent is released either into sewer or into the air, and not recovered.

The small quantity of waste silver produced by the sector also makes recovery difficult. Silver is present in waste solutions of developer and fixer. Most small printers produce very small quantities and it is difficult to arrange recovery (as discussed in 6.f.iv above).

Printing had low environmental risk ratings overall, and recorded no significant environmental improvements between 1995 and 1997. This meant that between 1995 and 1997 it's environmental risk increased relative to several other sectors, that significantly decreased theirs.

Printers potential pollution risk was lower overall than all other industry sectors. They had lower potential risk than all other industry sectors in for stormwater pollution, and than most sectors for all other risk issues other than site contamination and noise and environmental accident. All printers surveyed had zero potential risk of stormwater pollution.

In 1995 printing workshops had:
- lower overall risk than abrasive blasting, metal recovery and spray painting;
- lower risk of stormwater pollution than abrasive blasting and metal recovery;
- lower noise pollution risk than concrete batching; and lower air pollution risk than spray painting.

In 1997, printing workshops had:
- lower overall pollution risk than abrasive blasting and metal recovery;
- lower stormwater pollution and site contamination risk than metal recovery; and
- lower noise pollution risk than concrete batching.

## h)    Green Licence Holders

Green licence holders are an industry sector that cuts across the others. As a sector, it has made significant environmental risk reductions, and has had distinctive responses to several of BCC's environmental initiatives.

Green licence holders made greater overall environmental improvements than did standard licence holders between 1995 and 1997 (p=0.005). This included greater environmental improvements than did standard licence holders for air pollution. This suggests that the system is attracting many businesses that are improving environmental performance, not just rewarding those that had high compliance levels before EPA licensing. Businesses that have significantly improved their environmental performance to achieve best practice since 1995 also hold green licences.

The difference between potential and 1997 environmental risk was considerably greater for green than standard licence holders (p<0.001).

Green licence holders placed a higher level of importance on enforcement than did standard licence holders (p=0.02). This is because they are the sector facing the greatest market share losses by competing against non complying competitors who undercut.

Green licence holders also saw a bigger gap between the importance and effectiveness of incentives than did standard licence holders (p=0.03). This suggests that green licence holders are not receiving sufficient benefits from the system. This is partly because marketing advantages from the system have been non-existent.

Green licence holders also placed a higher level of importance on written information provided by BCC than did standard licence holders. Green licence holders tended to have made greater use of OEG's and other materials during their green licence application.

Many business operators reported frustrations with the green licence system. These included:

- 12% wanted clarification of green licence standards;
- some were scared to apply, having been told that those who did received additional, costly compliance requirements;
- continual improvement requirements of green licences were difficult for very low risk industries, where new improvements may not be feasible each year;
- fees effectively paid in advance, since excess payments are not refunded after green licences are issued;
- additional inspections were time consuming;
- 8% complained of slow responses to green or small licence applications.