

THE VICROADS APPROACH TO OUTSOURCING OF SURVEY AND PHOTOGRAMMETRY SERVICES

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ABSTRACT

Due to changing government attitudes, many of the survey and photogrammetry services provided by public sector organisations, including VicRoads, have had to change to outsourcing of those services. The methods used to determine the best way of achieving this result are discussed.

This paper outlines the current services provided by the Land Information and Survey (LIS) Department at VicRoads, and then outlines the level and type of outsourcing. The process and outcomes of those processes are discussed, with the subsequent impact on both VicRoads staff and the private sector. Mention is also made of the ongoing process of outsourcing survey and photogrammetry services at VicRoads.

1. INTRODUCTION

VicRoads is a Victorian State Government statutory authority responsible for all matters relating to roads, their design, construction, maintenance and use. VicRoads operates with a decentralised structure with head office in Melbourne, seven regional offices and a number of construction project offices.

The photogrammetry team is located within the Land Information and Survey Department (LIS). The team conducts aerial and terrestrial projects as well as being involved in satellite and airborne multispectral remote sensing projects, usually in conjunction with academic institutions.

Since the late 1980s, as a result of changing government attitudes towards the role of the public sector, there has been an increasing emphasis on more private sector involvement in what were previously public sector operations. Consequently many functions of public sector utilities have been either outsourced, corporatised, or privatised.

1.1 Definitions

Outsourcing: is the contracting out to the private sector of all or part of a public sector business, with the contract managed by staff of the public sector business.

Corporatisation: is the separation of certain sections of a public sector operation into a separate business entity still owned by the government. This business entity must be operated on a fully commercial basis.

Privatisation: is the complete sale of a public sector business, or part of it, to private sector interests or in a public share float.

2. BACKGROUND INFORMATION

2.1 Policy background

2.1.1 Government policy: It was the Government's stated policy prior to the 1992 election that VicRoads concentrate on core activities and contract or divest to the private sector all feasible activities.

The policy objectives of the Victorian government were to:

- reduce state debt and therefore its need to borrow;
- create greater efficiency in the public sector and reduce costs;
- reduce the size of the public sector;
- increase competition in the public sector;
- use the private sector to create wealth and jobs.

The newly elected conservative government set out guidelines for outsourcing which included:

- the strategic framework within which decisions in relation to outsourcing or sales of VicRoads services or businesses were to be made;
- the steps for evaluating and implementing an outsource or sale proposal;
- information to assist in the effective management of each stage of the outsource or sale process.

2.1.2 VicRoads policy: VicRoads had used contractors and consultants to provide road construction works and vehicle registration and licensing services for many years. This also applied to LIS services. As a means of reducing costs and improving customer service, over the last few years VicRoads has made increasing use of the private sector to provide services such as new vehicle registration, registration renewal collections, roads maintenance, property maintenance, printing, and survey services. VicRoads has also had to review its services on an on-going basis to ensure that its services are

delivered in the most cost-effective manner.

VicRoads' functions and objectives are set out in the Transport Act (1983). Its fundamental responsibility is to ensure that these objectives are met and services are provided in the best possible way. This does not necessarily mean that VicRoads must always deliver these services itself. Its responsibility is to efficiently ensure the long term viability of the road system and its use.

In 1993, the Corporate Management Group (Chief Executive Officer, Directors, and General Managers) identified services within VicRoads which could be candidates for outsourcing. One of these was survey and photogrammetry services.

2.2 The Land Information and Survey Department functions

The Department's survey and photogrammetry service is concerned with developing major projects, general engineering and cadastral surveys in support of land acquisition and disposal, control and feature surveys and photogrammetry work to enable planning, design and construction to proceed.

Regional and project staff carry out similar work on local programs, day to day construction supervision and set out. This is usually adequate for normal operations, with larger or one-off projects requiring assistance from head office or outside contractors.

The areas of survey and photogrammetry service which fell within the outsourcing guidelines were as follows:

Cadastral (Title) surveys:	Land acquisition
	Land disposal
	Land definition
Engineering surveys:	Control surveys
	Feature surveys
	Construction surveys
	Photogrammetry

along with their direct management.

3. THE REVIEW PROCESS

A review of the Department was carried out by a VicRoads project team conforming to the guidelines for outsourcing. The review covered the following areas:

- analysis of the work involved;
- identification of work areas and staff groups affected;
- analysis of functions and roles of these areas and groups;
- assessment of present and future work loads and customer requirements;
- identification of capabilities, interest and potential of other public and private agencies to assume part or whole of the work load;
- assessment of possible levels of outsourcing, and factors affecting these;
- development of recommendations and proposed course of action.

Some points to especially note are as follows.

3.1 LIS work areas and staff groups

Originally the review process was only to include LIS Department staff. However, it was found that a similar number of staff in the regions and projects were also providing survey services. This directed the review team to examine the operations of all areas, and to hold discussions with regional and project managers as both customers and suppliers. The process was complicated by the concurrent downsizing and reorganisation of VicRoads in general.

Regions and projects had already started to use consulting surveyors to supplement in-house resources, as had LIS Department.

3.2 Other government department survey organisations

Several government agencies had substantial survey resources in the past but many no longer have any capability due to these organisations being broken into smaller organisations, or corporatised in preparation to be sold on the open market.

The only agency that could possibly have provided assistance to VicRoads was the Office of the Surveyor General (OSG) in the Department of Finance (formerly Survey Mapping Victoria). The OSG has a similar regional structure to VicRoads.

The main charter of the OSG is to provide small scale mapping (1:25,000 scale), geodetic control surveys, and cadastral surveys for Crown Land. Any major linking of LIS Department and OSG was not considered viable. However, joint venture work which fitted OSG' charter was a very viable option.

3.3 The private sector

The private survey and photogrammetry industry in Victoria is made up of several groups.

3.3.1 Survey firms

- a large number of firms offering basic survey skills mainly in the engineering field to support builders etc, and not capable of any work to satisfy statutory requirements of cadastral surveying (ie. no licensed surveyors). These firms are located in both city and country areas.
- a large number of small firms which make up the membership of the consultant surveyors of Victoria (ACSV). These firms are located in Melbourne and most larger regional centres. They usually have licensed and professional surveyors and have developed expertise in specific areas such as high rise building developments, and basically exist to support the land development industry.
- a number of large firms mainly engaged in land development and usually covering a range of surveying disciplines, including planning and engineering. Some are members of ACSV. Many have offices interstate and are continually increasing their use and development of technology now that this is not being done to the same extent in

government agencies.

The first group was capable of performing only limited works for VicRoads, being unsuitable for cadastral or surveillance work.

The second and third groups were considered capable of providing a wide range of services to VicRoads provided they were given sufficient time and work to develop their expertise in VicRoads' particular requirements.

3.3.2 The photogrammetric firms: Their professional association, the Association of Aerial Surveyors Inc (AASA), represents almost all firms in Australia which can provide photogrammetric services. These firms have been able to develop in both the national and international arena, thus being capable of a greater range of work than other parts of the survey industry, mainly because it is a national body, and therefore less affected by the fragmentation of its market into state groups. Members of AASA have also contributed their technical expertise to new developments and made use of new technology and equipment, such as analytical and softcopy photogrammetry workstations.

This then placed them in a very good position to undertake any of VicRoads' photogrammetric tasks to the standard that VicRoads requires. However, it was considered necessary by management for VicRoads to retain the technical capacity and resources in photogrammetry to monitor any outsourced work to these firms.

4. THE OUTSOURCING OPTIONS CONSIDERED

In the course of the review of the LIS Department, a number of options were considered. These included the following:

- no change from the present levels of contracting out of survey and photogrammetry services;
- a general increase to some median level of outsourcing without substantially disrupting operational practices;
- outsourcing to the point where in-house maintenance of skills and development of expertise were the only limitations on the amount of outsourcing;
- outsourcing of all survey and photogrammetry services to the limit of operational convenience;
- staff buy-out of some of the survey and photogrammetry services;
- increased use of other government agencies;
- a total sell-off of all survey and photogrammetry services.

The first option was contrary to policy and therefore was not considered. The second option satisfied most criteria, except maybe the need to ensure sufficient work to maintain the industry's involvement on a major scale. The third option satisfied all criteria, but may have exceeded the industry's capacity to absorb all the work immediately, and to develop any extra expertise needed as well as the LIS Department's capacity to redirect resources. The other options exceed the terms of the review, and in the long term would mean the loss of all in-house expertise, while still requiring the Department to evaluate and accept the work produced. This ran contrary

to the process preferred by industry and would cause maximum disruption to operations.

5. LEVELS OF OUTSOURCING

Several factors were considered in determining the preferred levels of outsourcing, which included the following:

- The ability of the industry to carry out the work. A process of testing and evaluation of tasks was carried out to achieve consistent results in accordance with VicRoads standards;
- That sufficient work was provided to the private sector to ensure that they could maintain their expertise and secure a return on their investment. It was necessary to match jobs carefully with particular firms to ensure this ongoing benefit for both parties;
- The availability of funds for the use of consultants as required by the outsourcing policy;
- Whether existing redeployment and voluntary redundancy programs would ultimately achieve the required staff levels. It was clearly not good business sense to have staff ineffectively employed simply to allow immediate outsourcing to occur. The rate at which the private sector could absorb displaced staff and its capacity to do so was also considered;
- The need for the Department to maintain the expertise necessary to conduct the surveys in-house, to develop improvements, and to specify performance and competence standards. This meant that about 4 to 5 work groups should remain in LIS Department plus support staff to maintain a sufficient number of skilled staff and a range of technical challenges. A minimum of one work group in each of the regions should also be maintained. This was considered the level needed to provide attractive and challenging work options for the skilled personnel that remained in the Department;
- VicRoads' ability to outsource sufficient work to maintain the interest of the firms involved. This meant that the total number of firms being offered work should be kept to a reasonable minimum, such that investment in training and development and technology could be realised and that instruction by VicRoads was also maintained at a manageable level. This would control the number of firms allocated to a particular region, and required special attention to jobs in isolated areas where the number of firms was naturally fewer.

6. RECOMMENDATIONS

After consideration of the above options the following was recommended:

- That VicRoads progressively outsource its service functions to a point where, while maintaining in-house skills, a significant proportion of its work should be performed by the private sector. This was determined to be approximately 50% of all work programmed for LIS Department;

- That VicRoads consider further outsourcing to the maximum amount whilst still maintaining in-house skills etc. This would only be considered after observation of the results of the initial outsourcing;
- That regions should continue to outsource at the current levels, i.e. about 35% of local work;
- That all increases in outsourcing would be carried out by LIS Department, who would also be responsible for the resultant redeployment of staff;
- That ongoing discussions take place with the Office of the Surveyor General (formerly Survey Mapping Victoria), on increasing co-operation;
- That opportunities for partnerships with the private sector be identified and explored.

7. THE PROCESS

As a result of these recommendations the following steps were taken:

- all staff were advised of the Department's and VicRoads' intentions;
- the private survey and photogrammetry industry asked to submit expressions of interest and capability statements. This information included staff resumes, lists of the type of equipment used and who would use it, hourly rates for various survey and photogrammetry tasks, and overall costs based on the relevant guide for fees. These guides were those as set out by the Association of Consulting Surveyors Victoria (ACSV) and the Association of Aerial Surveyors (AASA);
- firms were required to bring their insurances, such as professional indemnity insurance, Workcover (workers compensation) and Occupational Health and Safety requirements up to the requirements set by VicRoads;
- all firms were required to prepare a Quality Plan for VicRoads' work and to give details as to the status of their overall quality system;
- the VicRoads standard consultant briefs were revised and brought up to date to match current standards;
- after perusal of the capability statements, a set of six test jobs were to be given to a panel of no more than 18 firms;
- performance was assessed on quality, time and cost;
- each individual job was to be quoted separately each time.

8. THE OUTCOMES

8.1 Award of a period contract for twelve months

After a period of using consultancy agreements on the basis of obtaining three quotations for each job, VicRoads decided to award a formal twelve-month contract to one or more firms in each geographical region, the maximum number of firms per region three to cover the metropolitan regions. This contract had an option for a twelve month extension. Overall, six firms were selected to provide survey services, and two for the provision of state-wide photogrammetry services.

8.2 The use of Lotus Notes to facilitate outsourcing arrangements

Initially a paper-based recording system was put in place to keep track of each job for each firm in each region. This required a lot of involvement and input from a co-ordinator in Head Office to keep up to date.

A Lotus Notes database was developed to replace this paper based system. Each job, or separable part had to have a unique contract assignment number, and the database gave the means to automatically generate this number based on the particular firm being used (each firm had a contract number), the business area paying for the job, and the region the job was located in.

Information about each job was entered via a form, with most information selected from keyword lists, such as Local government area, Contractor, etc. The performance section was set up using check buttons to determine an overall 'score' of performance.

The data were displayed in various ways or 'views', with a separate view for each firm, geographical region and project, and special views for such things as overdue jobs.

The advantages of this system were:

- it provided a computerised means of allocating contract assignment numbers for each job;
- it could keep track of individual contractors and their performance;
- it provided means for regional and project staff to have more control over the jobs they were managing, whilst allowing Head Office staff to monitor the overall contract;
- it provided a means of reporting to the Director and the Corporate Management Group on both individual jobs and the overall contract performance, simply by printing various database views.

8.3 A special module of PARMS

A special module was written for VicRoads' payroll and resource management system (PARMS) to handle the invoicing and payment of individual contract assignments.

8.4 MicroStation and InRoads software modules

Additional customised software modules for MicroStation and InRoads developed by VicRoads staff were made available for purchase by any of the contractors. These programs made presentation of the data to VicRoads standard presentation guidelines easier by semi-automating many of the processes. These have subsequently been improved with newer versions of MicroStation which incorporate such things as custom linestyles, allowing special linestyles for vegetation, title boundaries, and services information such as telecommunications and utilities.

This was in addition to some basic non-standard MicroStation modules such as additional font libraries and cell libraries that were given to each contractor as part of the contract.

9. THE IMPACT OF OUTSOURCING ON VICROADS AND THE PRIVATE SECTOR

9.1 The impact on VicRoads

The outsourcing of say 40-50 % of production or the supply component of the LIS Department's work meant a displacement of 11-14 staff, amounting to a reduction of 25% of staff numbers at the time of the review leaving sufficient staff to maintain in-house expertise to manage the work and ensure VicRoads program and statutory requirements were met. This reduction in numbers was achieved by natural attrition, re-deployment or by offering voluntary redundancy packages (VDP).

Naturally that sort of reduction (25%) caused considerable uncertainty on the part of staff in the Department and the regions and projects.

Outsourcing would have led to a change in work processes from conducting surveys to managing the production of surveys. In the case of photogrammetry, this wasn't such a big change, as the section had for some time been contracting out some or all of its work to a level where the final MicroStation design file and InRoads terrain modelling could be completed by VicRoads photogrammetry staff. In fact VicRoads has always contracted out the aerotriangulation component of jobs, as it didn't have any equipment or expertise in that particular area.

Department staff were required to maintain their commitment to a quality system, and at the same time ensure the contractors also worked to quality assurance principles. (Wood 1995)

9.2 The impact on the private sector

As many of the private firms had not done any work for VicRoads, it meant a very steep learning curve for these firms. It required a commitment from them to present survey and photogrammetric data to the standards that VicRoads had set up for its planning, design and construction requirements. This meant considerable investment in hardware and software (MicroStation and InRoads) in order to satisfy these requirements.

The small size of some firms, one group of firms formed a consortium to provide the complete range of services required, and therefore to be able to submit a competitive tender for a contract.

10. CONTRACT PERFORMANCE

10.1 General performance

Extensive consultation took place with each of the firms involved in the contract and with all the regional and project staff involved in administering the contract. Naturally most firms wanted to see the contract extended for a further period of twelve months, especially because of the cost involved in setting up to operate under the contract. This consultation took place during the term of the contracts and at the end of the first

year.

Overall, the response from firms was mixed. Firms which had calculated a low percentage of guide for fees tended to have more problems in reconciling the amount of work involved in each job and quoting for that job. Some of the smaller firms, and this included both of the photogrammetry firms, said they had some difficulties in keeping up with the rate of change of technology, and the impact that had on the format of the data required by VicRoads.

Most of the firms readily accepted VicRoads conducting audits of their firms and their procedures. In fact some firms were well under way to achieving third party certification for their Quality systems and a number had already achieved this certification.

Some minor problems were encountered when the firms were sub-contracting out work, such as aerial photography or Global Positioning System (GPS) work. These problems related to the amount added on as a management portion when quoting for jobs.

Compared with the surveying contracts, management of the photogrammetry contracts presented fewer problems. This was mainly due to a more realistic tender price and the fact that these firms had been undertaking work for VicRoads as consultants for a number of years.

The benchmark figure was calculated for each firm based on information provided during the tender process, and was used to monitor subsequent quotes for each contract assignment.

The amount of work being contracted out was in the order of 80% for photogrammetry and 49% for survey services. This work was fully contract managed by LIS staff. This amounted to a total of less than \$1,000,000 of contracted work.

At the end of the first year, most of the survey contractors were able to deliver the products and services needed by VicRoads. However, there was a very steep learning curve for most firms. Initially all firms were slow or had difficulties in meeting some of the contractual requirements, such as insurance, quality plans, and Occupational Health and Safety.

10.2 Performance indicators

By using a representative sample of completed jobs done by all firms under the contracts, the following performance indicators were derived. This information was retrieved from the Lotus Notes database.

Timeliness	81.1%	18.9%	
	on time	late	
Re-work needed	59.5%	35.1%	5.4%
	low	high	none
Quality of service	91.9%	8.1%	0%
	very good	satisfactory	deficient
Quality of final product	81.1%	16.2%	2.7%
	very good	satisfactory	deficient
Level of supervision	78.4%	21.6%	0%
	low	medium	high

10.3 Contract management

To enable a proper assessment of the contracts, VicRoads was firm in consistently and literally applying the terms of each individual contract. It was deemed important that each firm be held to their tendered rates or factor, which was the basis of them being awarded the contract in the first place.

However, this type of period contract was costly for VicRoads in term of the amount of time required to set up and administer, and proved to be inflexible and restrictive in dealing with disputes and resourcing works. The benefit was of course that VicRoads only had to deal with a limited number of firms, which minimised the training, document control etc.

Use of this type of contract caused some difficulties with some firms in agreeing on quotations for individual jobs. Some of these problems were caused by both parties coming to terms with the contractual requirements.

Other problems are directly attributable to the very low benchmark factors of some firms. This led to protracted negotiations before any work could commence, even reaching the point where one contractor was instructed to commence work, resulting in a formal dispute. The cost of resolving such a dispute may be disproportionate to the value of the assignment being disputed.

11. FUTURE DIRECTIONS

A significant amount of photogrammetry and surveying services has been delivered under this contract system, and has generally been to acceptable standards. This is due in part to the efforts of LIS Department staff in ensuring that the contracts worked properly, and the commitment of the private sector to make a success of these contracts.

The view expressed in this paper are those of the author and not necessarily those of VicRoads.

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Because of some of the difficulties in both parties resolving differences in estimating the value of contract assignments using the industry scale of fees, VicRoads is assisting the Association of Consulting Surveyors Victoria in revising the scale of fees. This will improve the reliability of future costings.

It is important for VicRoads to have contracting arrangements compatible with what is expected by management in the transition towards more competitive and efficient service delivery arrangements. The type of period contract that has been used to date does not easily satisfy that requirement. What is needed is a register of consultants providing the following advantages:

- consultants who are able to work anywhere in Victoria to meet the needs of VicRoads;
- the ability to add firms to the register at any business areas are responsible for each assignment without centralised management;
- the excessive management responsibilities of multiple period contracts are avoided;
- purchaser of contracted services have a greater choice of firms;
- the developing skills of the existing contractors are likely to be retained and utilised;
- use of standard VicRoads consultancy procedures and documentation.

To ensure that both VicRoads and the contractors gain the most from their investment in equipment and training, the option to extend the period contracts has been taken up for a further twelve months. It is very likely that at the end of this period an effective consultant register linked to other such registers in VicRoads will be established for 1998 and beyond.