MANAGING THE RISKS

OF

PRIVATE SECTOR PARTICIPATION

IN THE PROVISION OF WATER SERVICES

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A research report submitted to the Faculty of Management, University of the Witwatersrand, Johannesburg in partial fulfilment of the requirements for the degree of Master of Business Administration.

Johannesburg, February 2000.

ABSTRACT

Water services in South Africa are provided by the public sector. The present situation is characterised by a large backlog in service delivery, inefficient management and operation of existing services systems, and limited financial resources available to remedy the situation.

Developing countries around the world have engaged the private sector to provide management services and project finance. In South Africa good progress has been made in preparing the sector for private sector participation (PSP). However, to date only a few examples of PSP exist, indicating that there are constraints to PSP in the sector. The literature and international experience indicate that the main constraints are the management of and the access to finance. This research set out to obtain a deeper identify the constraints to PSP in the provision of water services in South Africa, focussed on the identification of risks and the access to finance. The research comprised a literature review, an analysis of international and national cases and interviews with a range of stakeholders from across in the sector.

The research results lead to the conclusion that the main constraints to PSP are the perception of legal and regulatory risks, socio-political risks and market risks. The access to private sector finance is constrained by these and the financial risk in the sector, not by limited resources. As a contribution to managing the risks of PSP in the provision of water services, an integrated risk management framework is developed to guide and focus risk management in the sector.

DECLARATION

I declare that this research report is my own, unaided work. It is being submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university.

Bas Elisa Willem Wijers

February 29, 2000.

DEDICATION

To

Shahpar and Oskar,

my father,

and in loving memory of my mother.

ACKNOWLEDGEMENTS

In undertaking this research I received the much appreciated encouragement and support from many people. The completion of this report would not have been possible without them. I gratefully acknowledge their contributions. In particular, I wish to thank:

Ms Sue Kell, my research supervisor, for her guidance and support well beyond duty throughout the research process, and for her generous sharing of knowledge on converting data into information and her contribution towards the structure of this research;

The representatives of the stakeholders who participated in this research. Their gift of time, and sharing of insights and opinions, formed the backbone of this research, and provided a wealth of information and abundant food for thought;

My wife Shahpar and son Oskar for their forbearance and continued support during the entire period of my studies and research;

My fellow students of Wits Business School MBA PT 97/99, in particular my syndicate members, for their encouragement during the research process and generous sharing of their business experiences and insights, which formed an invaluable part of my learning experience and leave me with fond memories of this unique experience;

Mrs Wendy Jones and Ms Sue Kell, who took on the challenge of proof reading this report, and editing out my imperfections in style, use of the English language, and the odd "double Dutch" expressions;

The Almighty God for His blessings.

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GLOSSARY

Bilateral agency	An institution established by one country to promote trade.
BOO	Build-own-operate; when a private organisation builds, owns and operates a service infrastructure facility.
BOOT	Build-own-operate-transfer; when a private organisation builds, owns, operates a service infrastructure facility and then transfers it to another entity after a specified period of operation.
BLT	Build-lease-transfer; when a private organisation builds a service infrastructure facility, leases it for use and then transfers it to another entity after a specified period of use.
BOT	Build-operate-transfer; when a private organisation builds, operates and transfers a service infrastructure facility to another entity.
BTO	Build-transfer-operate; when a private organisation builds, transfers the service infrastructure facility to another entity.
Commercial risk	Events, the occurrence or non-occurrence of which have the potential to affect the technical or economic feasibility of a project which are non-political in nature.
Concession	An agreement between a project company and the host government

Country risk	The risk that the country's government will default in its contractual undertaking with the project.
Currency risk	The difficulty encountered by a foreign borrower or foreign affiliate in making future payment due to a currency other than the currency in which the revenues are earned.
Debt service	Periodic payment of principal and interest on loans, bonds, notes and other direct debt instruments.
Developing country	A non-industrialised country with a GNP of less than $499.
Exchange controls	Procedures established by a government to allow conversion of local currency to foreign, hard currency in an orderly manner that promotes policy goals.
Exchange rate	The amount of currency that can be bought or sold for a specific amount of another currency.
Force majeure	An event outside of the reasonable control of the effected party to a contract, which it could not have prevented by good industry practices or by the exercise of reasonable skill and judgement.
Full recourse	A finance structure that requires the borrower and its owners to repay all debt loaned to the borrower, usually through the use of guarantees.
Limited recourse	A lending arrangement under which repayment of the debt is recourse to the owners of the borrowing entity in the event of certain defaults, but in general the lenders rely on the project cash flow for debt repayment.

Non-recourse	A lending arrangement under which repayment of the debt is non-recourse to the owners of the borrowing entity and the lenders rely on the project cash flow for debt repayment.
Performance bonds	Surety obligations issued by commercial banks or insurance companies for an entity to guarantee the performance of a contract according to performance requirements.
Political risk	Financial exposure to uncertainty as a result of politically or socially generated changes.
PPP	Public Private Partnership
Project company	A special purpose entity that develops, owns and operates a project.
Project debt	Funds borrowed by the project company from any of various debt sources.
Project equity	Funds and other assets contributed to the capital of the project sponsor to provide the capital needed for the project.
Project financing	The arrangement of debt, equity, and credit enhancement for the construction or refinancing of a facility in a capital intensive industry, in which lenders base credit appraisals on the projected revenues from the operation of the facility.
Project sponsor	An entity that develops a project and owns, in whole or in part, a project company.
PSP	Private Sector Participation

Syndication	Credit being made available by two or more lenders to the borrower, each with pre-defined amounts.
Transfer risk	The difficulty encountered by foreign borrowers or foreign affiliates in converting local earnings into a foreign currency, as a result of exchange controls imposed by the government.

Chapter 1 INTRODUCTION

1.1 RESEARCH BACKGROUND

Countries around the world need to invest large sums of money in infrastructure development in order to stimulate sustainable economic growth, and contribute to increased quality of life of the people. Developing countries in particular are under pressure to expand their basic infrastructure, which includes water supply and sanitation services.

The World Bank estimates that developing countries require capital investment in the order of US$ 600 billion over the next decade to provide basic water supply and sanitation services to their entire populations. In addition the existing infrastructure and systems in these countries generally are poorly managed, evidenced by inefficient operation, high water loss, low recovery rates and overstaffing.

Water supply and sanitation services are traditionally the responsibility of the public sector, as the capital investment for such infrastructure is large, and governments are regarded as having a social obligation to provide some basic level of service. However, the public sector in developing countries usually is not in a position to finance the large investment required, nor to manage the increasing demand for water supply and sanitation services effectively. The participation of the private sector is therefore needed to provide both additional investment capital and management expertise.

In places where the private sector does provide a service where no public service is available, the cost to the consumer of this service may be many times higher. This as a result of the lack of economies of scale, for example, where water is trucked into a village, and the profit motive of the often small entrepreneurs involved. As this usually occurs in the rural and low income areas, the result is often that the poor pay much more for their basic services than does the higher income population for a more sophisticated service.

Private sector participation (PSP) in the provision of public services aims to harness the advantages of access to additional investment capital and management skills, while minimising the disadvantages of higher prices. This is achieved through different forms of PSP, ranging from the minimum participation of a management contract to full privatisation.

The present situation in South Africa is characterised as follows:

- There is a vast backlog in the provision of water and sanitation services to the urban and rural areas of SA. An estimated 11 million people (nearly a quarter of the total population) lack adequate water supplies, and an estimated 19 million people lack proper sanitation facilities. The capital cost of eliminating these service deficiencies is estimated at R50-

80 billion over a 10 year period in the urban areas (depending on service levels), and R12-17 billion for basic services in the rural areas (Jackson,1997). The total backlog in water and sanitation services is thus estimated at R60-100 billion over a 10 year period.

- The requisite finance cannot be supplied from government sources alone, and to date financial markets have been unwilling to finance water supply and sanitation services unless they are efficient and cost effective, and the ability to recover costs is demonstrated.

- The White Paper on Water Supply and Sanitation Policy (Department of Water Affairs and Forestry, 1994) states that "*...the private sector represents a vast resource which must be harnessed to contribute to the implementation of this policy.*" There is thus a clear political mandate for the participation of the private sector in the provision of water supply and sanitation services.

- The Municipal Infrastructure Investment Framework (Department of Housing and the Ministry in the Office of the President, 1995) stresses the need for improving efficiency and effectiveness in service delivery, and proposes that communities consider a choice in delivery mechanisms. It views local government as the structure to oversee the delivery and financing of services, which does not imply that local government must be the delivery agent.

The introduction of PSP in the provision of these services is a multidimensional exercise that requires careful management to ensure sustainable success. The issues involved can be classified into institutional, social and economic issues as follows:

- **Institutional and Legal Issues**

  These include the institutional and regulatory framework and stakeholder participation

- **Economic / Financial Issues**

  These address factors such as the commercial risk and profit potential, improved service quality versus increase cost of service, commercial exploitation of a monopolistic situation, the economic impact of PSP (macro and micro), and demand and supply elasticity and the use of tariffs as a method for managing water demand.

- **Social Issues**

  These address concerns such as the improved efficiency of operation versus potential job loss, and the fact that clean water and basic sanitation facilities are acknowledged human needs and rights.

1.2 RESEARCH PROBLEM

Despite the identified need for investments, the considerable body of knowledge that exists on PSP in the water services sector internationally as well as nationally, the political mandate, and an institutional framework to accommodate private sector participation in the provision of essential services, the scale of PSP in this sector in South Africa has been restricted to a few recent examples. This leads to the conclusion that there are other factors which have limited PSP in this sector to date. The questions that need answering are:

What are the constraints on PSP in the provision of water supply and sanitation services in South Africa, and what are the associated risks to the stakeholders?

1.3 RESEARCH OBJECTIVES AND SCOPE

The research question posed cannot be answered on the basis of the presently available knowledge and information. The objectives and scope of the research therefore are:

- to identify the factors and issues that constrain PSP in the water service sector in South Africa,
- to identify and evaluate the management of risks associated with PSP as perceived by the sector stakeholders, and
- to assess South Africa's ability to finance developments in the water services sector.

The aim of this research is to assess the state of the art of private sector participation in water supply and sanitation services in South Africa. The scope is to establish the latest thinking on private sector participation in municipal services, evaluate case studies from around the world to learn from experience elsewhere, and apply the learning points to the South African environment, and assess how South Africa can finance development and stimulate investment in this industry. This research highlights the issues to be addressed in order to open the water sector to PSP to enable the public sector to address the current backlog in service provision in the sector.

1.4 KEY ASSUMPTIONS

PSP in the provision of water services is a fairly recent development in the South African water sector. In this early stage of development, it was assumed that research seeking a deeper understanding of the concept and appreciation of the context was more pertinent than providing measurements or quantification.

Researching a range of stakeholders across the sector will provide specific stakeholder risk profiles. Integrating these across the sector will provide a sector risk profile, assumed to be representative of the sector and its risks and constraints.

The research differentiates between risks and constraints as two different concepts. It was assumed that, with some explanation, the interviewees are able to distinguish between the two.

1.5 REPORT OUTLINE

The report seeks to establish the constraints to PSP in the water services sector in South Africa, by evaluating the management of risks associated with PSP in the provision of such services and the financing of water services projects. Following this introductory chapter the report contains a further six chapters, followed by a glossary, references and bibliography, and eight appendices.

Chapter Two provides an overview of the literature relating to the topic under investigation and consists of six sections: an analysis of the water services industry, describing some of the important characteristics of the sector; a description of the various options of private sector participation (PSP) in the provision of water and sanitation services and their key characteristics; a global perspective of PSP in the water services sector, which briefly describes case studies from around the world from both developed and developing countries; an overview of the relevant risk management theory; an overview of the state of the industry in South Africa including an analysis of the present situation with regard to PSP in the sector; and lastly, an evaluation of the literature reviewed and concluding research need.

Chapter Three presents the research questions to be explored based on the research problem and the literature review.

Chapter Four explains the methodology employed to conduct this research. The research is largely qualitative in nature, and investigates the opinions of respondents using an introductory questionnaire followed by a standardised, non-scheduled interview, and a case study analysis. The responses of the questionnaires were analysed using descriptive statistics and frequency analysis, while the interview responses were content analysed. The case study comprised a content analysis of various references pertaining to the Nelspruit water services concession. The findings of both methods were triangulated to obtain answers to the research questions.

Chapter Five contains the results of the data analysis, which are presented in terms of the research questions posed in Chapter Three, and summarises the information gleaned in answer to the research problem.

Chapter Six constitutes an interpretation of the research results presented in Chapter Five. The results are evaluated and discussed in conjunction with the issues raised in the literature review for each of the secondary research questions. This is followed by an integrated answer to the primary research question concerning the constraints to PSP in the water services.

Chapter Seven presents the conclusions drawn from the research, considers its limitations, and suggests areas for further research.

These seven chapters are followed by a glossary of terms, and the references and bibliography used as part of this research, which includes the personal communications that took place during this research. The eight appendices contain detailed information referred to in chapters 4 and 5 of this report.

Chapter 2 LITERATURE REVIEW

2.1 INTRODUCTION

Research into the management of risk associated with private sector participation (PSP) in the provision of water services involves a wide range of topics. To cover all of these in some depth is not within the scope and timeframe of this research. The literature review for is thus focussed on selected key areas of particular interest, specifically:

1. Industry analysis: Water supply and sanitation services.
2. Private sector participation options for the industry.
3. Global perspective of PSP in the provision of water supply and sanitation services.
4. Risk management theory
5. South African situation analysis

The conclusion of the literature review identifies the key issues in the management of risk associated with PSP in the water sector and identifies literature gaps and research needs.

2.2 INDUSTRY ANALYSIS

Water and sanitation have special features that must be taken into account when considering private sector participation in this sector (World Bank, 1997b):

- Water is essential to life, and access to it needs to be ensured for all, with special attention to the poor.
- Broad access to water and sanitation yields important public health and environmental benefits.
- Water and sanitation are critical to economic and urban development.
- Systems for allocating scarce raw water resources among alternative uses - urban consumption, irrigation, industry - are often underdeveloped or incompatible with efficient use of these resources.
- Water and sanitation systems are characterised by a high degree of "natural" monopoly, which is a situation where economies of scale are so significant that costs are minimised only when the entire output of an industry is supplied by a single producer.
- Water and sanitation are naturally well suited to local management, and in many countries responsibility for service provision is decentralised to the provincial or municipal level.
- Many water and sanitation system assets are buried underground, so that obtaining accurate information about their whereabouts and state of repair is costly.

2.2.1 Water As A Social Concern

A primary concern of governments is to ensure that water is available to all citizens - at a price they are able and willing to pay (Department of Water Affairs and Forestry, 1994). In many developing country cities the water and sanitation utilities are often inefficient because of a lack of capacity to manage, operate and maintain the infrastructure, and inadequate due to investments not keeping up with the demand for services. As a result, often the very poor lack connections to the utility's supply system and must instead buy water from tankers or other sources for very high prices (often 10 to 40 times the utility's price) or physically fetch it themselves from the nearest water source.

With the expectation of efficiency gains from private sector involvement, comes the concern that prices will be beyond reach for the poorest citizens. This requires the establishment of a policy framework to ensure access to water and sanitation for low-income groups. (World Bank, 1997b).

2.2.2 The Public Benefits Of Water Services

Water and sanitation services yield public and private benefits. The former include the reduction of the incidence of waterborne disease and the improvement of the general environment. Individual consumers' standards of living are clearly raised by water and sanitation services, especially sewerage services (Department of Water Affairs and Forestry, 1986).

To encourage private sector participation, crucial decisions need to be made about who is responsible for providing and funding desired health and environmental benefits. (The demand of low-income households for health- and environment-improving water and sewerage services should not be underestimated). Private operators will need to be safeguarded against unrealistic demands to provide goods and services for which neither the government not the customers are willing to pay. However, an arrangement for private sector participation is unlikely to be politically acceptable unless it protects essential social interests (World Bank, 1997b).

2.2.3 The Role In Urban And Economic Development

Water infrastructure plays a crucial role in urban and economic development. So, where the private sector is responsible for new investment to extend the system, governments have a legitimate interest in ensuring that such investments reflect public priorities. Clear targets for coverage can be specified in the concession contracts. However, the targets need to be realistic, taking into account the concessionaire's financial capacity and customers' ability to afford connections to the system (Development Bank of Southern Africa, 1998).

2.2.4 The Complexities Of Managing Water Resources

Water resources exist in interconnected hydrological systems in which one user's behaviour can affect all other users. Whether sufficient water is available for urban use will depend on the overall availability of water and on prior use rights established by other users - such as farmers and hydropower companies. Similarly, the level and quality of sewage treatment by an urban utility will affect the availability and quality of water for downstream users - whether industries, farmers, or other towns (Department of Water Affairs and Forestry, 1986). Regimes for allocating water resources among these competing users and policies to control the quality of the available water can determine the operational efficiency of urban utilities and the feasibility and cost of different options for private sector participation.

Prospective private operators will need assurance about future access to raw water supplies and about the quality of such supplies, which will affect water treatment costs. Other water users will require protection from the effects of utility operations, such as the depletion of ground water or surface water resources, and the pollution of these resources by untreated or partially treated sewage.

2.2.5 Natural Monopoly

Monopoly occurs where consumers of a service can buy it from only one supplier. Natural monopoly occurs where it is only feasible for one supplier to exist in the market, because of the level of output required to achieve economies of scale (the more services provided, the lower the costs of providing each additional unit of service). This means that if a new entrant tries to compete with the existing supplier, it can do so only at a higher cost. The provision of water supply and sanitation services requires large capital expenditure, and therefore the barriers to entry are significant. In the case of a natural monopoly, government either regulates private production or undertakes the production itself (Mohr & Fourie,1995).

Private sector participation can improve performance if the private partner has strong technological management skills. However, sustaining the improvements in performance depends on more than the characteristics of the company that runs the utility, it requires competitive pressure on the utility (Pybus, 1995). Competition comes naturally to few areas of the water and sanitation business. Monopoly is reinforced by the fact that there are no substitutes for water in many of the purposes for which it is used.

Monopolies, whether public or private, often yield lower productive and allocative efficiency than competitive firms. Their output, service standards, and investment in capacity all tend to be lower than under competitive conditions, while their prices tend to be higher. Pybus (1995) points out that to achieve the operational efficiency and investment goals governments need to create an environment which maximises competitive pressures on the utility. A regulatory regime is required that provides incentives for a monopoly utility to act as though it were operating in a competitive market.

2.2.6 The Trend Toward Decentralisation

Two features of water make its supply a "local" service that can be administered in a decentralised way: water is expensive to transport over long distances, and it is cheap to store. In many countries the provision of water and sanitation services is the responsibility of local governments: in the past decade a growing number of national governments have decentralised water and sanitation, shifting management of services to the lowest feasible level i.e. sometimes the province, but more often the municipality. The size of a utility's jurisdiction may range from a few hundred consumers to many millions (World Bank, 1997b).

This predominantly local responsibility has two important consequences for designing private sector arrangements for water and sanitation. The first relates to scale. Except in major cities, the majority of water and sanitation utilities are quite small. These small utilities do not offer opportunities for exploiting economies of scale, are generally unattractive to the private sector, and typically lack the skills and resources to act as strong partners in introducing private sector participation (World Bank, 1997b).

The second relates to the likely involvement of more than one level of government in decisions about private sector participation and its implementation. The World Bank (1997a) points out that national governments take an interest in the decisions of lower levels of government, and have the capacity to make or break local deals. Private investors in local projects may look to national governments for guarantees against some project risks, and more than one local government may be involved. In metropolitan systems several municipalities may have to "pool" their rights into a joint body able to function as a counterpart to a private contractor.

2.2.7 The Information Problems Of Buried Assets

Contracting with the private sector for the provision of water and sanitation services, or monitoring the provision of these services by the public sector, is complicated by the fact that information about water and sanitation systems can be difficult and costly to come by. A large share of water and sanitation assets are buried underground, making it difficult to assess their condition and value. In many developing countries accurate information on asset conditions is not available. This affects the choice of an arrangement for private sector participation and can certainly complicate contract specification and the subsequent monitoring of the private company's performance (World Bank, 1997b).

2.3 PRIVATE SECTOR PARTICIPATION OPTIONS

Private sector participation (PSP) in the management of public water and sanitation services is considered to be one of the most significant developments within the water industry in the last 20 years. Its aim is to introduce modern commercial management systems and practices in an effort to improve the provision of these essential services. "Private Sector Participation" is a general term covering a range of options for involving the private sector in the service provision.

Governments are turning to the private sector for help in developing and delivering water and sanitation services, to take advantage of private sector skills and know-how, improve the efficiency of service delivery, and gain access to finance for new investments. Experience in countries that have entered into arrangements for private sector participation shows that, if well designed, these arrangements can bring improvements in the quality, availability and cost-effectiveness of services (World Bank, 1997b). However, private sector participation on its own does not solve the problems in the water and sanitation sector. It requires a partnership between government and the private sector. The nature of this partnership must be carefully defined, as it determines the rights, responsibilities, and risks entailed for each partner. The key issue is the selection of the private sector option best suited to local circumstances.

Governments which seek to involve the private sector in water and sanitation generally have one or more of the following objectives in mind (World Bank, 1997b).

- Bring technical and managerial expertise and new technology into the sector.
- Improve economic efficiency in the sector, in both operating performance and the use of capital investment.
- Inject large-scale investment capital into the sector or gain access to private capital markets.
- Reduce public subsidies to the sector or redirect them from the groups now served to the poor and those not now served.
- Insulate the sector from short-term political intervention in utility operations and limit opportunities for intervention by powerful interest

groups.

- Make the sector more responsive to consumers' needs and preferences.

All forms of private sector participation can be designed to improve technical and managerial capacity. However, the other objectives can only be achieved if the appropriate arrangement for private sector participation is chosen and if the government creates the necessary enabling and regulatory environment.

Throughout the literature six principal types of private sector participation in the water supply and sanitation sector are identified (World Bank, 1997b; Pybus, 1995; Walker, 1993). These are service contracts; management contracts; lease contracts; concession arrangements (longer-term leases), Build-operate-transfer (BOT) *and build-operate-own* (BOO) *contracts;* and *divestiture. The types of* PSP options are briefly described below.

2.3.1 Service Contracts

Service contracts secure private sector assistance for performing specific tasks such as installing or reading meters, monitoring losses, repairing pipes, or collecting accounts. They are typically for short periods, from six months to two years. Their main benefit is that they take advantage of private sector expertise for technical tasks or open these tasks to competition. They leave the responsibility for co-ordinating these tasks with the public utility managers. They also leave the responsibility for investment with the public sector (Pybus, 1995).

Service contracts are the most common form of private sector participation in developing countries. They ensure satisfactory service at a reasonable cost provided there are a sufficient number of qualified contractors to constitute a competitive market. A contractor's performance is easily assessed against the cost of the service clearly stipulated in the contract; this is unlike the general cost allocations that fund many municipal services and may conceal cross subsidies (Walker,1993).

The principal advantage of a service contract is its flexibility. Service contracts can be used to meet a short-term emergency or personnel shortage, or to transfer operational responsibility from the public to the private sector. Service contracts are relatively simple, but must be carefully specified and monitored: if a utility is poorly managed, its service contracts probably will be too. Service contracts are at best a cost-effective way to meet special technical needs for a utility that is already well managed and commercially viable. They cannot substitute for reform in a utility plagued by inefficient management and poor cost recovery (World Bank, 1997b).

2.3.2 Management Contracts

Management contracts transfer responsibility for the operation and maintenance of government-owned businesses to the private sector. These contracts are generally for three to five years. The simplest involve paying a private firm a fixed fee for performing managerial tasks. More sophisticated management contracts can introduce greater incentives for efficiency, by defining performance targets and basing remuneration at least in part on their fulfilment. To be worthwhile, these more complex management contracts must produce efficiency gains large enough to offset the regulatory costs of establishing targets and monitoring performance against them (Walker, 1993).

Specifying clear and indisputable targets is often difficult, especially when information about a system's current performance is limited. Some targets may be beyond the private sector partner's power to achieve and the operator's ability to improve efficiency may depend not only its own efforts to reduce leaks, but also on the resources that the government makes available for rehabilitating pipelines. There is a fine dividing line between operations and maintenance expenditures, for which the private operator is responsible, and capital investment, for which the government is responsible - and both will affect the operator's performance.

Management contracts leave all responsibility for investment with the government, they are therefore not a good option if a government has as one of its main objectives accessing private finance for new investments and, because they do not necessarily transfer any of the commercial risk to the management contractor, they draw little on private sector incentives to reduce costs and improve the quality of services. Management contracts are most useful where the main objective is to rapidly enhance a utility's technical capacity and its efficiency in performing specific tasks, or to prepare for greater private involvement (World Bank, 1997b).

2.3.3 Lease Contracts

Under a lease arrangement a private firm leases the assets of a utility from the government and takes on the responsibility for operating and maintaining them. The lessor effectively buys the rights to the income stream from the utility's operations (minus the lease payment), an thus it assumes much of the commercial risk of the operations. Under a well-structured contract, the lessor's profitability will depend on how much it can reduce costs (while still meeting the quality standards in the lease contract), so it has incentives to improve operating efficiency (World Bank, 1997b).

Leases leave the responsibility for financing and planning investments with the public sector. For new investments the government must raise the finance and co-ordinate its investment program with the operator's operational and commercial program. The operator usually finances working capital and the replacement of equipment with a fairly short productive life (Walker, 1993).

Leases are most appropriate where there is scope for big gains in operating efficiency, but only limited need or scope for new investments. Leases can be used as stepping stones toward more full-fledged private sector involvement through concessions (see next section), but their administrative complexity and the demands they place on governments for commitment are nearly as great as those of concessions. A lease is thus a much bigger first step than a management contract (Pybus, 1995).

2.3.4 Concessions

A concession gives the private partner responsibility not only for the operation and maintenance of a utility's assets, but also for investments. Asset ownership remains with the government, however, and full use rights to all the assets, including those created by the private partner, revert to the government when the contract ends - usually after 25 to 30 years. Concessions are often bid by price: the bidder that proposes to operate the utility and meet the investment targets for the lowest tariff wins the concession. The concession is governed by a contract that sets out such conditions as the main performance targets (coverage, quality), performance standards, arrangements for capital investment, mechanisms for adjusting tariffs, and arrangements for arbitrating disputes (Walker, 1993).

The main advantage of a concession is that it passes full responsibility for operations and investment to the private sector and so brings to bear incentives for efficiency in all the utility's activities. The concession is therefore an attractive option where large investments are needed to expand the coverage or improve the quality of services (World Bank, 1997b).

On the government's side, administering a concession is complex because it confers a long-term monopoly on the concessionaire. The quality of regulation is therefore important in determining the success of the concession, particularly the distribution of its benefits between the concessionaire (in profits) and consumers (in lower prices and better service) (Department of Water Affairs and Forestry, 1994).

An example of a concession operation and financing for water supply is Buenos Aires, Argentina. The city's entire water supply (for over 10 million people) is turned over to one concessionaire. (Walker,1993)

2.3.5 Build, Operate and Transfer (BOT) Contracts

Build-operate-transfer (BOT) arrangements resemble concessions for providing bulk services, but are normally used for greenfield projects, such as a water or waste-water treatment plant. In a typical BOT arrangement a private firm might undertake to construct a new dam and water treatment plant, operate them for a number of years and at the end of the contract relinquish all rights to them to the public utility. The government or the distribution utility would pay the BOT partner for water from the project, at a price calculated over the life of the contract to cover its construction and operating costs and provide a reasonable return. The contract between the BOT concessionaire and the utility is usually on a take-or-pay basis, obligating the utility to pay for a specified quantity of water whether or not that quantity is consumed. This places all demand risk on the utility. Alternatively, the utility might pay a capacity charge and a consumption charge, an arrangement that shares the demand risk between the utility and the BOT concessionaire (Walker, 1993).

BOTs tend to work well if the main problem a utility faces relates to water supply or wastewater treatment, but if the problem is a faulty distribution system or poor collections performance, a BOT is unlikely to remedy it - and may even aggravate it. Where private sector participation is needed both to provide new bulk services (a reservoir or a water or wastewater treatment plant) and to improve the performance of or expand distribution systems, separating these tasks under different contracts and bidding processes may have advantages. Separating the tasks maximises the potential efficiency gains from competitive bidding and reduces the monopoly power given to a single company (World Bank, 1997b).

There are many possible variations on the BOT model, including build-operate-own (BOO) arrangements, in which the assets remain indefinitely with the private partner, and design-build-operate (DBO) arrangements, in which the public and private sectors share responsibility for capital investments. BOTs may also be used for plants that need extensive overhauls, in arrangements sometimes referred to as ROTs (rehabilitate-operate-transfer) (Pybus, 1995).

2.3.6 Divestiture

Divestiture of water and sewerage assets, through a sale of assets or shares or through a management buy out, can be partial or complete. A complete divestiture, like a concession, gives the private sector full responsibility for operations, maintenance, and investment, but unlike a concession, a divestiture transfers ownership of the assets to the private sector, so the nature of the public-private partnership differs slightly. A concession assigns the government two primary tasks: to ensure that the utility's assets, which the government continues to own, are used well and returned in good condition at the end of the concession and, through regulation, to protect consumers from monopolistic pricing and poor service. A divestiture leaves the government only the task of regulation, since, in theory, the private company should be concerned about maintaining its asset base (Pybus, 1995).

Although widely used in other infrastructure sectors, divestitures in the water and sanitation sector had been limited to England and Wales. (Private water companies have long operated in the United States). Given the national economic importance of infrastructure services, governments are generally unwilling to divest water and sanitation assets without introducing safeguards. The UK government retains "safety net" powers to appoint another operator in case a water company fails. It also limits the length of the licenses under which water companies operate (Walker, 1993).

Even though governments may find divestiture ideologically or even constitutionally difficult to contemplate, they should not dismiss it without evaluation. In some circumstances divestiture may be more appropriate than a concession. Where the public sector utility is technically capable, for example, divestiture by sale of shares or management buy-out may produce the required efficiency gains without involving the foreign water conglomerates that typically dominate bids for concessions. It could also help develop local private firms capable of working in water and sanitation. (This strategy is most effective where local financial institutions are well developed) (World Bank, 1997b).

Listing on the stock market can be used as a mechanism for enforcing the principle of natural selection that will ensure the survival of the most efficient. Where there is a monopoly such as water, market forces at least will guarantee it is efficiently run. The key assumption is that stock prices accurately reflect operating efficiency. Take-overs result when a company's poor performance leads to lowering those prices. Once new, efficient management takes over, the company's share prices and capital gains rise (Walker, 1993).

2.3.7 Option Summary

The range of options and their allocated responsibilities are given in Table 2.1.

TABLE 2.1: PSP OPTIONS AND ALLOCATED RESPONSIBILITIES

Option	Asset Ownership	Operations and Maintenance	Capital investment	Commercial risk	Typical duration
Service contract	Public	Public & Private	Public	Public	1-2 years
Management contract	Public	Private	Public	Public	3-5 years
Lease	Public	Private	Public	Shared	8-15 years
Concession	Public	Private	Private	Private	25-30 years
Build-Operate-Transfer	Private & Public	Private	Private	Private	20-30 years
Divestiture	Private & Public	Private	Private	Private	Indefinite

Source: The World Bank (1997b)

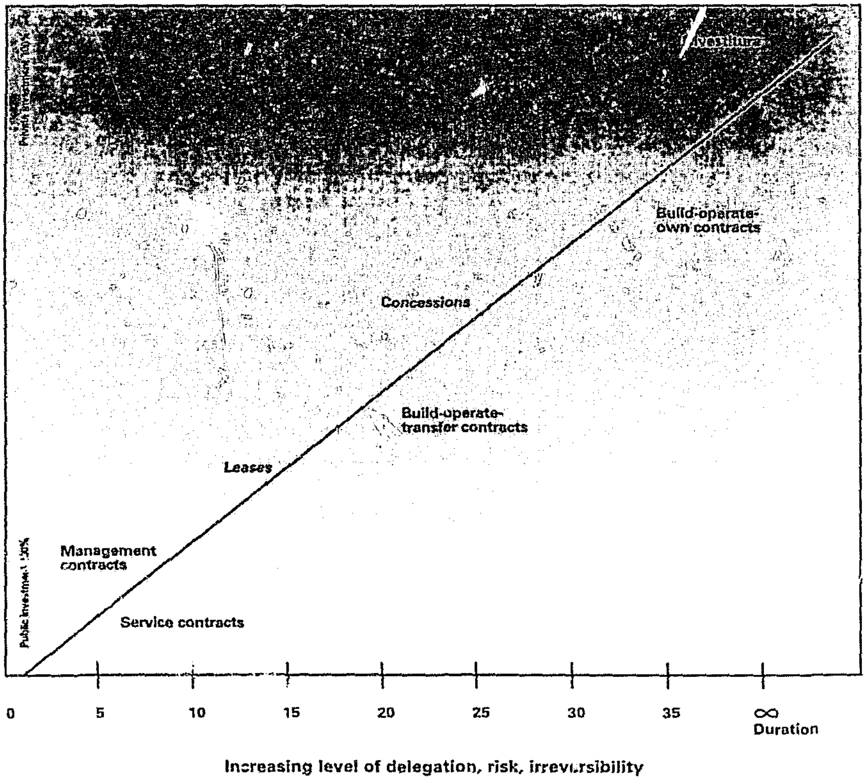
In practice, governments often use hybrids of these options such as:

- management contracts in which the private sector takes on some commercial risk, or

- leases in which the private sector is responsible for some investments

Some governments start with a relatively simple option, such as a management contract, and build up to a more complex one that places more risks and responsibilities on the private sector, such as a concession (Filali Baba, 1998). The important issue is that governments choose the option best tailored to their specific needs, capacities and circumstances.

FIGURE 2.1 : PSP OPTIONS - INVESTMENT / RISK RELATIONSHIP



Source : World Bank (1997b)

The PSP options described thus far predominate PSP in water services world wide. Collignon (1999) introduces the theme of the role of the private sector in service provision to the poor. His focus is on the informal private sector and its role in service delivery in smaller settlements where larger operators rarely break even. He recommends that a careful study be made of the existing service systems offered by the private and informal sector, before new service options are to be considered.

2.4 GLOBAL PERSPECTIVE OF PSP IN WATER SERVICES

Governments in many developing countries have opened their infrastructure sectors to private investors. The stock of private foreign financing for infrastructure projects in developing countries grew from $0.1 billion in 1988 to $20.3 billion in 1996 (Thobani, 1999). The private sector is now involved in areas once considered the preserve of governments, such as power, gas, telecommunications, water, roads, railroads, ports and airports.

Haarmeyer and Mody (1997) point out that, despite the great need for investment in water and sanitation, the competition for private foreign direct investment capital from other infrastructure sectors resulted in the water and sanitation sector attracting less investments than the power or telecommunication sectors, as shown in Table 2.2 overleaf. The authors 'bute this to the sector's characteristics which make investments in this sector re risky than in other infrastructure development projects.

TABLE 2.2 : PRIVATE INFRASTRUCTURE PROJECTS BY SECTOR

Sector	Percentage of global private infrastructure investments
Power	30
Telecommunications	28
Water and Sanitation	18
Road Transport	8
Gas	6
Water Transport	5
Air Transport	3
Rail Transport	2

Source: World Bank (1997b).

The World Bank (1997b) estimates that $600 billion must be invested in the global water industry over the next 10 years. Such resources are not available to traditional government-run utilities. Privatisation is seen by many to be the only feasible way to finance and manage the large-scale water and sanitation projects required to meet growing global needs.

In cities around the world governments face the problem of how to improve citizens' access to good quality, reasonably priced water supply and sanitation services (World Bank, 1997b). Many need to expand services to meet the needs of rapidly growing urban populations and control some of the worst environmental effects of this growth. Often there is a pressing need to improve the efficiency with which the services are delivered, to reduce costs. An increasing number of governments are turning to the private sector to help solve the situation.

Whereas PSP in the provision of water supply and sanitation services in some industrialised countries has been in operation for close on two decades, PSP in these services in developing economies has existed only since the mid 1990s. The economies with PSP in water supply and sanitation services as identified by the World Bank are shown in the Table 2.3.

TABLE 2.3 : FORMS OF PSP IN WATER AND SANITATION AROUND THE WORLD

Option	Water Supply	Sanitation	Water supply and sanitation
Management or service contract	Columbia Gaza Malaysia Turkey	United States	Puerto Rico Trinidad and Tobago
Lease	France Guinea Italy Senegal Spain		Czech Republic France Poland
Concession	Ivory Coast France Macao Malaysia Spain	Malaysia	Argentina France
BOT	Australia China Malaysia Thailand	Chile Mexico New Zealand	
Divestiture	England and Wales		England and Wales

(Source : World Bank, 1997b)

Table 2.3 shows that PSP in the provision of water supply and sanitation services is well established in North and South America, Europe and Australasia. In Asia, Malaysia has implemented PSP in this sector in a number of different contracts, whereas a few other countries have BOT contracts. In Africa PSP in this sector was limited to Senegal, Ivory Coast, and Guinea. More recently Morocco and South Africa have implemented PSP. The rest of Africa has no PSP in the water and sanitation sector. There is therefore great scope for PSP in this continent.

2.4.1 PSP In Water And Sanitation - Case Studies

PSP in the water sector is a fairly recent development in the developing countries. Relevant experience is therefore limited. The literature and case study material on different forms of PSP in the water and sanitation sector, applied in different parts of the world dates back only to 1995.

A global perspective on PSP in water services can serve as a valuable learning experience for PSP in the South African water supply and sanitation sector. The following examples serve to illustrate how the full range of PSP approaches work in practice, indicating both the potential for success and the nature of problems they encounter.

Guinea, a West African nation with a low per capita income, has achieved solid improvements in its water systems under a lease contract with a private operator. A subsidy arrangement was used to ease the transition to high tariffs. Haarmeyer and Mody (1997) and Brook Cowen (1996) point out that co-ordination problems with the government have resulted from lack of clarity in the allocation of commercial risks. The high tariffs have also resulted in serious non-payment problems.

Mexico City provides an example of an incremental approach. The government awarded 10-year management contracts for each quadrant of the city to four separate private companies. Haarmeyer and Mody (1997) report that the contractors are responsible for undertaking a census of the users and installing meters, billing and collecting tariffs, and rehabilitating the system in three phases. They are paid fixed fees by the government. Once the system is financially and operationally in order, the government is expected to award concessions. Haarmeyer and Mody (1997) further report that the devaluation of the peso in December 1994 caused serious financial strain, since operator fees and equipment purchases were denominated in foreign currencies, and set the program back.

A few countries have taken the bigger step of awarding concessions for operating an entire utility system. In ***Argentina***, the city of ***Buenos Aires*** delegated the management and investment responsibility for its water and sanitation systems to a private consortium. Rivera (1996) reports that under the terms of the 30-year concession, the consortium will invest $4 billion in upgrading, rehabilitating, and extending the systems. In three years, the private operator brought dramatic operational and financial improvements through reduced unaccounted for water (UFW) and higher bill-collection rates. Haarmeyer and Mody (1997) suggest that this successful outcome can be traced to the significant steps the Argentine government took to ensure that the concession would be financially viable: raising tariffs prior to privatisation, assuming the state water company's liabilities, financing a voluntary retirement program, providing a guarantee that the concession company could cut off service to consumers for non-payment, and creating an independent regulatory authority to prevent politicisation of the concession. Soon after the award of the concession, however, tariffs had to be raised ahead of schedule because the government agreed with the operator's view that the physical state of the systems was worse than anticipated.

In ***Malaysia,*** the government signed a novel and ambitious 28-year concession with a private consortium to upgrade, rehabilitate, and extend the entire country's sewerage system. Subramaniam (1995) reports that, although the estimated $2.8 billion contract was awarded in 1993, progress was slow, primarily because of significant public and commercial backlash from tariff collection and tariff increases. Haarmeyer and Mody (1997) suggest that Malaysia's experience points to the unique risk allocation issues raised by private provision of retail sanitation services in instances where these services have never been centrally provided before, the legal right to cut off service for non-payment is absent, and sewerage and water services are billed separately.

A step beyond concessions is the full privatisation of utilities' assets, which brings with it both the benefits provided by the assumption of full commercial risk and the discipline exerted by capital markets. According to the World Bank (1997b), the $5 billion public share offering of 10 regional water authorities in ***England and Wales*** in 1989 is the most prominent example of this approach. Haarmeyer and Mody (1997) report that the British government's decision to sell these assets was influenced by a number of factors, including the $40 billion investment program the water authorities needed to undertake to meet the

European Union's environmental standards, the confidence in the new independent regulatory structure, and the existence of highly developed local capital markets. While successful in many respects, the privatisation in England and Wales has been criticised for leading to rapid and substantial increases in tariffs and an absence of metering, and consequent non-accurate measurement of consumption.

2.4.2 Lessons Learned In Global Experience

The above examples indicate that the participation of private enterprises in the provision of water and sanitation services has great potential for improving the efficiency and quality of service delivery in developing countries. However, Rivera (1996) points out that the development of private sector arrangements is not free of risks, and lists the following lessons learned:

- **Quantity and quality of service provision.**

  PSP has led to substantial benefits to consumers in terms of expanded coverage and quality of services as well as significant improvements in productive efficiency. The sustainability of these benefits depends heavily on continuous political commitment and the implementation of complementary reforms.

- **Pricing of water**

  Most privatised utilities inherited or adopted inefficient tariff structures, and set unrealistic goals in the initial stages of PSP. The impact from metering and full cost pricing on consumption is often poorly understood. Tariff setting continues to be influenced by political factors.

- **Financial strategies**

  Given the current balance of risks, incentives and rewards, the private sector is unlikely to invest its own resources in the sector in developing countries. This means that PSP is restricted to management services, or in case of a concession the financing is off-balance sheet with relatively high debt / equity ratios. Innovative financial instruments, more effective incentives, and the design of long-term financial strategies need to be introduced to induce further private interest.

- **Regulation**

  Effective regulation is the cornerstone of sustainable PSP. This requires an efficient institutional and regulatory framework, for which no universally models exist. A major bottleneck to PSP is the high concentration of operators world wide. This limits competition and has contributed to a tendency to concentrate PSP initiatives in large urban centres.

2.5 RISK MANAGEMENT THEORY

There is no universally accepted definition of risk, mainly because the term is used in many different contexts. Valsamakis, Vivian and duToit (1992) present a definition which states that "*...risk implies the presence of uncertainty of the occurrence of an event and the uncertainty of the outcome of the event, if that* *occurs*", and suggest that "... *the degree of uncertainty surrounding the event determines the extent of risk*". In the context of private sector participation in the provision of water services, this generic definition is useful as both the events and their outcomes have different degrees of uncertainty. Risk requires a return, which impacts on the cost of services. To minimise the cost of services requires the management of returns and risks.

Valsamakis *et al* (1992) define risk management as "...*a managerial function aimed at protecting the organisation, its people, assets, and profits, against the adverse consequences of (pure) risk...*". In the context of this research, risk management is taken to be the management of risks experienced by not one organisation, but all the main stakeholders in the water and sanitation service sector.

Risk management comprises a process of risk identification, risk evaluation and assessment, risk allocation, and risk mitigation and control. (Valsamakis *et al*, 1992) The following sections describe these components of the risk management process in more detail.

2.5.1 Risk Identification

According to Valsamakis *et al* (1992) there are two categories of risk: pure risks and speculative risks.

Pure risk concerns the possibility of either a loss or no loss. These risks are normally insurable and a wide range of insurance products have been developed to service this area. Some of the major types of pure risk are listed as follows:

- Natural risks (floods, droughts and famine, earthquake etc)
- Internal business operations risk (assets, people liability, internal control etc)
- Supplier risk (insolvency, delays or non-delivery, etc)
- Business risk (public liability, product defects, performance bond, etc)
- Legislation (professional, indemnity, lawsuits, safety and health)

Natural risks and other uncontrollable and unavoidable risks such as social unrest and war are also referred to as *force majeure* risks.

Speculative risks are those that could result in either a loss or gain. These risks are normally not insurable, except for a range of hedging products developed for particular financial risks. Speculative risks are classified into commercial and non-commercial risks. Commercial risks are the risks of doing business and can be managed by the private sector. Non-commercial risks are beyond the influence and control of the private sector. (Klein,1996b)

***Force majeure* risks** can be considered as non-commercial risks since they are beyond the control of the private sector. However, the inclusion of these risks in a risk management framework ensures an integrated approach to risk management. (Valsamakis *et al*, 1992)

The World Bank (1997b) identifies the following risk categories associated with PSP in the provision of water and sanitation services:

- Design and development risk (design defects)
- Construction risk (cost overrun, delayed completion, failure of plant to meet performance criteria)
- Operating risk (operating cost overrun, bureaucracy, shortfall in water quality or quantity)
- Revenue risk (increase in bulk water supply price, change in tariff rates, water demand)
- Financial risk (exchange rate, foreign exchange, interest rate)
- *Force majeure* risk (political, legal and regulatory, natural disasters, riots and strike)
- Insurance risk (uninsured loss or damage to project facilities)
- Environmental risk (environmental incidents)

Valsamakis *et al* (1992) provide a more theoretical approach to risks, whereas the World Bank classification is a more practical approach, be it from a government perspective. For the purpose of this research the following risk categories are used, combining the two as shown in the following Table 2.4.

TABLE 2.4 : RISK CATEGORIES

Risk Category	**Valsamakis *et al***	**World Bank**
Socio-political / Country	Socio-political / Country	*Force majeure*
Legal / Regulatory	Legal / Regulatory	*Force majeure*
Economic	Economic	Financial
Financial	Financial	Financial
Market	Market	
Environmental		Environmental
Operating	Operating	Operating
Engineering / Technology	Technology	Design & Development Construction
Force majeure	*Force majeure*	*Force majeure*, Insurance

The key risks associated with each of the risk categories related to PSP in the water and sanitation sector are listed in Table 2.5.

TABLE 2.5 : KEY RISKS ASSOCIATED WITH PSP IN THE WATER SERVICES SECTOR

Risk Category	**Key risks related to PSP in the water services sector.**
Commercial Risks	
Economic	Stability of economic policies, inflation, country credit rating, exchange rates.
Financial	Interest rates, currency risk, maturity of financial market.
Market	Tariffs, demand, revenue, competition, ability to pay.
Environmental	Environmental impact of sub-standard water supply quality or waste water treatment.
Operating	Performance risk, cost overruns, level of bureaucracy, water shortage, environmental incidents.
Engineering / Technology	Design defects, construction cost overruns and delays, technology obsolescence.
Non-commercial Risks	
Social Political and Country	Socio-political stability, political climate, willingness to pay for services.
Legal and Regulatory	Consistency of policies and regulations, independence of judiciary, enforceability of contracts.
Force majeure	Natural disasters, riots, unrest, acts of war.

2.5.2 Risk Evaluation And Assessment

Risk evaluation and assessment is the most important component of the risk management process. It represents the foundation for planning, organising and managing the risk to reduce the impact.

The **commercial risks** associated with PSP in water services are evaluated as follows:

- **Economic risk**

  Economic risk constitutes to the variability in key macroeconomic variables of the country i.e. growth rates, balance of payments, budget deficits, and inflation. Economic risk can originate internally and externally. The World Bank (1997b) concludes that uncertainties about the general direction of the economic policies of a country are a major constraint to long-term investment. Dailami and Leipziger (1997) state that stable economic variables will resist economic recession in the event of a speculative attack on local currencies and the impact of global market turmoil, and found that inflation and country credit rating are a good indicators of economic risk.

- **Financial risk**

  Financial risk refers to the risks associated with the financing of the project. Such risks include interest rate risks which affects interest liability on the debt financing, exchange rates risks where the revenue is not in the same currency as the financing, the maturity of the local capital market, and project cash flow risk which will affect project's ability to service its debt.

Haarmeyer and Mody (1997) state that financial risks vary with the stages of the project. In the early stages with large capital outlays and relatively small revenue inflows, the cash flow risk is high.

- **Market risk**

Market risk is that revenues fall short of the forecast and cost of supply are higher than forecast (Arndt and Maguire, 1999a). Revenues are the product of volume and tariff. Volume is affected by demand, demand elasticity and ability to pay. The tariff is affected by the level of service provided, the ability to pay, and government regulations affecting tariffs structures. Revenue is further affected by the proportion of non-payment. Cost of supplies are affected by the bulk water supply prices which are determined by a water board or by intervention of the Minister of Water Affairs and Forestry.

- **Environmental risk**

Environmental risk is associated with the impact of the service provision on the environment. The Department of Water Affairs and Forestry (1994) points at the severe environmental risks and health hazards associated with the supply of sub-standard quality water to consumers or inadequate treatment of waste water and sewage before discharge.

Water supply and waste water treatment standards are strictly legislated. Arndt *et al* (1999a) conclude that potential changes in environmental legislation or administration over the life of the project is a risk to the operator.

- **Operational risk**

  Operational risk refers to those risks directly associated with the day-to-day operation of the service. The World Bank (1997b) indicates that these are affected by the overall efficiency of the operation in relation to the forecast. Cost overruns, water shortages, the effectiveness of the metering and billing, the occurrence of environmental incidents and the degree of bureaucracy of the authorities all contribute to operational risk.

- **Engineering / Technology risk**

  Engineering and technology risk refers to the risk of design defects, technology obsolescence of equipment and processes, the risk associated with the use of new untried technologies and processes, and performance risks with the construction and operation of the infrastructure. The Department of Water Affairs and Forestry (1998b) point out that this risk impacts on the environmental risk and *visa versa.*

The **non-commercial** risk associated with PSP in water services are evaluated as follows:

- **Socio-political / Country risk**

  Socio-political and country risks include those emanating from political uncertainty, social unrest, unionisation, corruption, and the consumer's willingness to pay for services. During the life of the contract the government may change which may lead to policy changes. Serven (1997) argues that income inequality, poverty and poor economic performance could lead to instability, crime and social unrest. The changing constitution and the role of the unions in the labour market are other key factors affecting political risk. In addition to the internal political risks, Serven (1997) points out that the risk of potential regional instability and conflict between South Africa and its neighbours needs to be considered as part of political risk.

- **Legal and Regulatory risks**

  Government makes the laws in the country, and is therefore the primary cause of legal and regulatory risk, and is in the best position to control it. Thobani (1999) states that the key factors affecting these risks are the adequacy, clarity and predictability of the regulatory framework and laws, the independence of the judiciary, the transparency of government, enforceability of contracts and arbitration, level of corruption, and the political commitment to PSP.

- ***Force majeure* risk**

  Force majeure risks are unpredictable and unavoidable and include natural disasters, riot, unrest, and acts of war. (Valsamakis *et al*,1992)

- **The psychology of risk**

  Valsamakis *et al* (1992) suggest that the situations of risk are perceived differently by different individuals, and that this perception is influenced by a multitude of factors such as culture, previous experiences, personal circumstances and prevailing environmental factors. They call it the psychology of risk, which refers to human behaviour under conditions of risk and uncertainty. The type of risk, pure or speculative, also has an influence on the individual perception of risk.

  The personal attitude towards risk, and the fact that risk aversion of individuals is situational, leads to inconsistencies in acceptable levels of risk. The psychology of risk is therefore relevant in the evaluation and assessment of risk.

2.5.3 Risk Allocation

The management of risk in the provision of water services involves the allocation of risks to the various stakeholders involved. Hoffman (1998) suggests that the risk is allocated to those parties best able to minimise or carry the risk at the lowest cost. The main parties involved in PSP in the water services are discussed below.

- **National government**

  Government determines the political willingness, provides the legislation and regulatory framework, and manages the national economy. Government directly influences socio-political / country risk, legal and regulatory risk, and economic risks, as well as bearing some commercial risk in cases where it provides subsidies or financial guarantees.

National government also acts as national regulator for the sector. The World Bank (1997b) confirms the importance of regulation in a natural-monopolistic environment. The regulatory task varies depending on the PSP option chosen, and relates to price, service quality, monitoring and control, protection of the consumer from exploitation and the resources from mismanagement, and to the creation of competition in the market.

- **Provincial government**

  In the present chain of provision of water services the provincial governments play a minor role. The main participants are national and local governments.

- **Local government**

  Local governments are assigned the responsibility of providing services, including water services, to the community. According to the Water Services Act the local government, acting as water services authority, buys bulk water supplies from a water board and provides the distribution of the service to the people (Department of Water Affairs and Forestry, 1997). The local government is also responsible for payment collection from the end consumer as well as the collection and treatment of waste water.

- **Operators**

  The operator is the management company that will manage the water service utility. The extent of responsibility is determined by the type of PSP contract entered into. This can vary from a management contract with limited responsibility, to a concession contract under which the operator takes full responsibility for the provision of the service.

- **Equity investor / sponsor**

  These are investors in the project looking for a certain return on investment, and are therefore willing to take on a certain amount of risk. The sponsor is referred to as the parent company of the local operator. The sponsor often is asked upon to invest in its local operator company and provide, in addition to the technical and commercial expertise, a form of financial backing to the operator. The Development Bank of Southern Africa (1998) proposes that the participation of local equity holders is sought, particularly a black empowerment group, as this will enhance the ability to manage socio-political risk. Equity investors also provide some protection to lenders, as their claims to revenues are subordinate.

- **Lenders**

  Lenders provide debt financing to the project owners, earning an interest in return. This form of project financing is often on a non-recourse or limited recourse basis. This means that the ability of the operator to service the debt as a going operation is the lenders primary concern. The lender is therefore exposed to financial risk but also commercial and operational risks.

- **Underwriters**

Underwriters provide socio-political, credit and currency risk guarantees to operators, particularly in countries with poor credit ratings. (Haarmeyer and Mody, 1997). Underwriters like the International Finance Corporation and MIGA act in close co-operation with the government to secure guarantees for the project. (The World Bank, 1997a).

- **Insurers**

Insurers provide insurance against the pure risks of a project. Valsamakis *et al* (1992) suggest that this would be primarily the *force majeure* risks and some operational risks such as environmental incidents risks.

- **Consumers (the service purchaser)**

Consumers are the organisations or persons receiving the service. The consumers experience the uncertainty of the service being delivered by a different service provider - a private service provider with a profit motive - as opposed to a public provider without a profit motive. The consumer is therefore exposed to the risks related to the quality of service and the cost of service.

- **Advisors**

Advisors play an important role in analysing specialist areas of expertise and ensuring the appropriate incorporation into the service contracts. (Klein, 1996a). Advisors (such as engineers, lawyers, accountants, scientists, economists, political advisors, and others) are not a party in the provision of the services and as such are not risk takers/ bearers. Advisors do play an important role in analysing risks, which improves risk management and mitigation.

Risk allocation is most beneficial when risks are allocated to those that can manage or control the particular risk best.

2.5.4 Risk Control And Mitigation

Arndt and Maguire (1999) point out that risk allocation is not synonymous with mitigation. Allocating the risk to another participant may reduce the risk of that particular participant but increases the risk of another participant. The overall risk to all participants has not been reduced. All that is achieved is that the possibility of risk mitigation is enhanced as the risk has been efficiently allocated to the participant best capable of managing or mitigating the risk.

Risk control and mitigation approaches can be generic or risk specific. The important aspects of each of these are discussed.

Generic Risk Control and Mitigation

A stable macro-economic and political environment and a regulatory framework which minimises ad hoc government intervention provide a predictable environment for investment. Dailami and Klein (1998) suggest first that stability and predictability are more important than the nature of the policy, then Dailami and Leipziger (1997) identify inflation, exchange control, balance of payments and the country credit rating as key factors for foreign investors in considering country risk.

The most common way for an organisation to deal with risk is to pass it on to other parties. Arndt and Maguire (1999) suggest that risk must be shared equitably and risk responsibilities should be clearly spelled out. Organisations involved in projects in the sector implement a range of strategies to control and mitigate risks. Dailami and Klein (1998) identify the following generic risk mitigation techniques:

- **Guarantees for political, legal and regulatory risk**

  Guarantees are important risk control instruments when investors have limited access to risk diversification instruments. Dailami and Leipziger (1997) suggest that guarantees may encourage private investors to take on more risk than without the guarantees. However, guarantees often come at a cost to the project, or if not, the taxpayers carry the cost. Thus, either case is undesirable, and guarantees should therefore be limited to the transitional period only.

- **Insurance of operating and *force majeure* risks**

  Buying insurance is intended to mitigate uncontrollable risks. The insurer, particularly a global insurer, is able to include the local risk in a global portfolio, and thus provide access to global risk control measures.

- **Loan syndication**

  Loan syndication spreads lending risks among lenders and shields participants from country credit risk. (Breytenbach and Manning, 1999). The participation of the Development Bank of Southern Africa in loan syndication achieves these objectives.

- **Equity syndication and inclusion of local equity investor**

  Equity syndication and the participation of local equity holders offers other participants a degree of protection from political risk and commercial risk. The participation of a black economic empowerment equity investor would mitigate the socio-political risks.

- **Derivative instruments for hedging of financial risks**

  The Development Bank of Southern Africa (1999) uses interest and currency hedges as instruments to control financial risks. In less mature capital markets where hedging instruments are not readily available the operator may need to pass some of the commercial risks on to the consumer.

- **Tariff and service quality regulation**

  Tariff and service quality regulation mitigates market risk for the investor, and controls consumer risk. The World Bank (1997b) suggests that price regulation is a substitute for market forces in natural monopolies, and that the need for price regulations declines in cases where competition can be achieved.

- **Contractual ˋˋrangements**

  Contractual arrangements cover a range of potential risk factors such as property rights, arbitration mechanisms, tax breaks and agreed performance levels.

Dailami and Klein (1998) suggest that syndication, performance bonds, guarantees, hedging techniques and insurance are not risk mitigation, but risk control strategies which transfer risk to others. It is assumed that the ultimate risk-bearing party is in the best position to mitigate and or manage the risk at the least cost, and therefore the sum of the transferred risks is smaller.

Specific Risk Control and Mitigation

Specific risk control and mitigation options for commercial and non-commercial risks are described as follows.

- **Commercial risks**

  Currency risks may be mitigated by having the debt financing contracts in local currency (Haarmeyer *et al,* 1997).

  Interest rate risks may be mitigated by using fixed interest rate terms. (Dailami and Leipziger,1997). This reduces the risk for the operator, but exposes the lenders to higher risks, especially in inflationary economies. The lender mitigates risk by using variable interest rates or hedging mechanisms.

Market risks may be mitigated by varying the duration of the contract: shorter contract for high demands, longer contracts for lower demands. (Thobani,1999)

Other specific risk mitigation instruments listed by Dailami and Leipziger (1997) are: hedges, debt guarantees, supplier tariff guarantees, credit and performance guarantees, and insurance.

- **Non-commercial Risks**

Haarmeyer and Mody (1997) note the importance of the institution of specific legal and regulatory frameworks, supported by multilateral agencies that are capable of absorbing non-commercial risk.

Dailami and Leipziger (1997) list the following specific mitigation instruments for non-commercial risks: guarantees of currency convertibility and transferability, legal and regulatory guarantees, political risk guarantees, contractual arrangements and insurance.

- **Price Regulation**

Price regulation is another form of specific risk control. In this case it controls consumer risk. The objective of price regulation is to prevent the earning of monopoly profits by the operator. (Thobani,1999) This is done by price caps, rate-of-return regulation or hybrids of these two.

Price caps link price increases to an independent measure (e.g. Consumer Price Index) with adjustments for expected efficiency gains. The main advantage is that the operator is given an incentive to reduce cost and increase operating efficiency.

Rate-of-return regulation limits the returns earned on invested capital and may include restrictions on dividends payable and capital reserves accumulation. The main advantage is that it keeps prices competitive, while still allowing investors to earn a return on their investments. Consumers bear some of the market risks, as they bear the risk of price or tariff increases.

2.6 SOUTH AFRICAN SITUATION ANALYSIS

The following aspects of the South African situation with regard to PSP in the provision of water services are analysed: water services supply chain, water services backlog, the move towards PSP, current thinking on PSP and current PSP projects in South Africa.

2.6.1 Water Services Supply Chain

The provision of water services in South Africa is largely a public sector monopoly. The supply chain comprises the national government, water boards, and local government / water service authorities. (Department of Water Affairs and Forestry,1997)

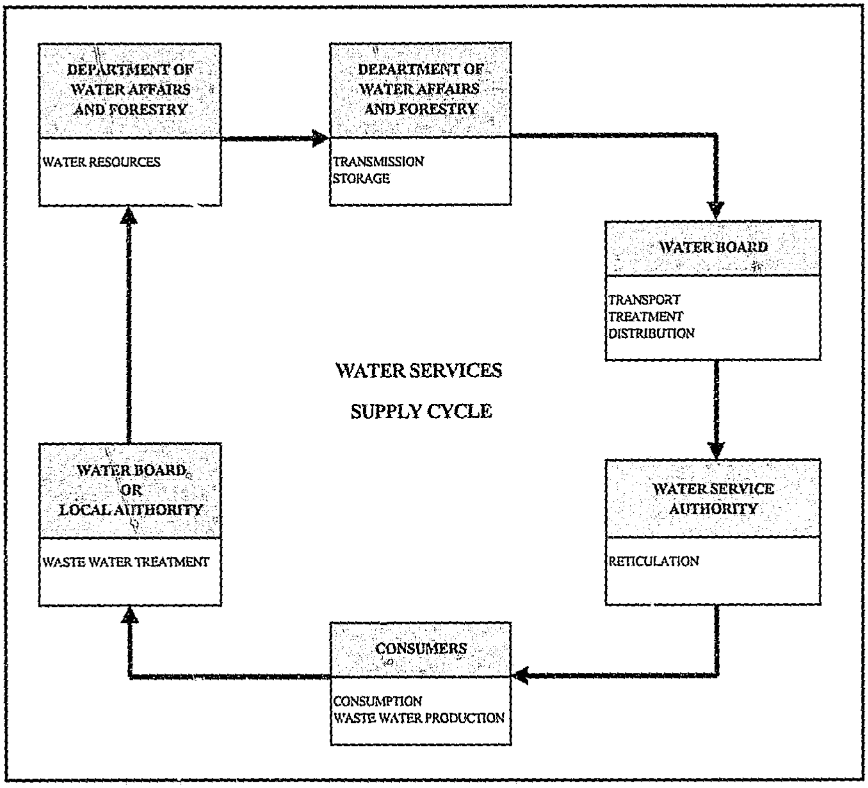
National government manages the water resources of the country through the Department of Water Affairs and Forestry (Department of Water Affairs and Forestry, 1986). This ministry not only manages the resources and regulates the water services sector; it also provides the physical services in areas where the local authorities do not have the capacity to manage such services. The sector is regulated by the Water Services Act of 1997. (Department of Water Affairs and Forestry, 1997)

- Water Boards extract water from the resource, purify it and provide bulk distribution services to water service authorities. Water board activities are highly capital intensive as large infrastructure development is required for the transport, purification and storage of water. Water boards bear the cost of the extracted water and charge water service authorities for water supplied. Water boards also provide waste water treatment services in areas where local authorities do not have the capacity to manage this.

- Water service authorities are usually a local authority or a public utility specially set up to manage water reticulation to the consumers and the collection and treatment of waste water (Department of Water Affairs and Forestry,1997). The authority charges the consumer for both services.

The water services supply chain is shown in Figure 2.2 overleaf.

FIGURE 2.2 : WATER SERVICES SUPPLY CHAIN



2.6.2 Water Services Backlog

The government is committed to redressing the inequities of the past (Department of Water Affairs and Forestry, 1994). Estimates vary, but in 1995, about 52% of the population was urban, and 18% urban dwellers (about 4 million people) had a minimal water supply, or none at all. The equivalent figure for lack of urban sanitation is 22%. In rural areas, it is estimated that 40-60% of the population (8-12 million) does not have an adequate water supply service (in South Africa, this is defined as a reliable 25 litres/capita/day within

200 metres walking distance). These figures indicate the backlog in infrastructure development in this sector.

The areas in which most of the non-served or under-served people live suffer from inadequate investment, or poor operations and maintenance, or both. In the towns, the residents used their non-payment for services as a p[illegible] weapon (Department of Water Affairs and Forestry, 1994). The present government is finding it difficult to reverse this trend, particularly since there are few signs of the services improving. There is a dual economy, with well run "white" towns next door to barely functioning "black townships". This situation has recently changed with the unification of previously separated urban areas, and democratically elected local councils. However, the service backlog is still present, and it will require many resources to bring services to equal levels.

The Development Bank of Southern Africa estimated that R50-80 billion is needed over the next ten years to eliminate the backlogs in services in the urban areas, depending on the level of service provided (Jackson, 1997a). Some of this will come in the form of government grants for a basic level of service, but the bulk will need to be borrowed. To borrow funds on the open market, a service supplier will need to demonstrate its capacity to service the debt, which is not easy with the present culture of non-payment for services. In rural areas, it is estimated that R10-15 billion is needed to bring water supplies up to a basic level of service, and over R2 billion will be required for the provision of sanitation, over the next ten years. Most of this would be in the form of grants.

2.6.3 Moving Towards Private Sector Participation (PSP)

Whereas most South African public authorities employ the private sector to design and construct public infrastructure, such as water supply and sanitation systems. With few exceptions, the private sector have as yet not been employed in the management and operation of service utilities.

The Development Bank of Southern Africa (Jackson, 1997a) concludes that public infrastructure has been funded in a variety of ways. The water boards and the larger municipalities have usually raised funds from the private sector capital market. The smaller, local authorities tended to use operating surpluses to fund capital expenditure, with some access to a government-sponsored loan fund and partial grants. Formerly "black" local authorities were dependent on government grants and concessional finance from the Development Bank of Southern Africa.

Jackson (1997b) points out that the combining of local authorities means that operating surpluses no longer exist and that capital expenditure must be externally financed. This will be through a mix of government grants (sufficient to achieve a basic level of service), concession finance, and loans from the local capital market. Until the private sector capital market is fully able and willing to finance all infrastructure provision there will be much emphasis on co-financing.

The Water Research Commission (Pybus, 1996) released guidelines to assist public sector service suppliers to understand and manage the use of private sector participation in water supply and sanitation services. The guidelines draw from both South African and international experience. They acknowledge that water and sanitation services in South Africa are largely seen as public goods which have been traditionally rendered by the public sector, but this has not in itself produced either a better or worse service.

2.6.4 Current Thinking On PSP

Central government has made clear its commitment to exploring PSP further. The government's Growth, Employment And Redistribution (GEAR) strategy recognises the limited capacity of the fiscus, and states that the government is committed to the application of public-private sector partnerships based on cost recovery pricing where this can practically and fairly be effected.

Mindful of the dangers of municipalities entering into poorly conceived long term arrangements for PSP, the Minister of Water Affairs issued his own interim guidelines (Department of Water Affairs and Forestry, 1996). These lay down some basic principles including the need for transparency, competition, consultation and full coverage, as well as other policy goals of Government such as employment equity, economic empowerment and soil conservation. The Department has given considerable attention to the PSP in the water services. The Water Supply and Sanitation White Paper (Department of Water Affairs and Forestry, 1994), the Water Services Act (Department of Water Affairs and Forestry, 1997) and the Water Act (Department of Water Affairs and Forestry, 1998) all recognise the potential benefits of PSP.

The Department of Constitutional Development has also identified PSP as a way to improve the provision of municipal services. The Municipal Services Act (Department of Constitutional Development, 1998), the Municipal Infrastructure Programme, and the Guidelines for PSP in Municipal Service Delivery (Department of Constitutional Development, 1999) are all indicative of their view of PSP in municipal services.

All the above national departments and the legislative framework they have created indicate the national government's encouragement for PSP in the development and management of infrastructure and provision of municipal services.

However, there are also stakeholders with strong reservations which oppose PSP in water services. Bond (1998) concludes that the South African people most affected by municipal infrastructure and service delivery policies have been relatively excluded from national policy debates, and suggests that much of the policy design work on infrastructure development has been flawed at the cost of local democracy. This has caused discontent amongst civic organisations, and is likely to generate protest, which will effectively stall the process.

The main opposition comes from the unions of municipal workers. They are concerned about the potential loss of jobs that are thought to follow a private sector take-over. They have declared their opposition to privatisation, saying that the private sector only wants to make a profit and will not participate in the upliftment of people. (South African Municipal Workers Union, 1999c).

The South African Municipal Workers Union (1997, 1999a, 1999b, 1999c, 1999d) raises the following objections to PSP in the water sector:

- Privatised water services operate for profit, not to meet the needs of the people;
- Private water services increase the concentration of wealth into a few large multinational companies;
- Private water services are operated by multinational organisations who invest very little of their own money, so that stakeholders carry little risk, and yet expect a rate of return on investment of up to 30%;
- The service authority should not be separated from the service provider. Private sector delivery undermines accountability and turns communities into individual customers, thereby reducing their collective bargaining power;
- Privatisation entails lucrative contracts, and is thus vulnerable to corruption.

Laurence (1999) reports that these objections have been repeated in response to the Igoli 2002 plan of the Greater Johannesburg Metropolitan Council. However, Roberts (1999) detects "*...Murmurs of consent about partnerships*", as the South African Communist party are genuinely thinking of supporting PSP in the delivery of services at local government level. He sums up the South African situation by stating that the need exists for a bigger, faster public-private partnership drive, that government has done the ground work, and business has signalled interest, and that all that is needed now is consensus.

Jackson (1997a), however, concludes more cautiously that PSP is not an end in itself, nor a single solution to all problems. It is one of several items which must be addressed in a developing country environment in order to meet every citizen's needs for improved infrastructure.

2.6.5 Survey Of Key Success Factors

PSP in the infrastructure sector as whole is gaining widespread interest in South Africa. Government has traditionally been responsible for the management of monopolistic infrastructure services such as power, communication, transport and water, but has acknowledged and recognised the potential benefits from PSP in the provision, management and operation of infrastructure. The interest of the private sector in participating in these infrastructure sectors is increasing, now that the government is creating an environment conducive to PSP.

At an a recent (November 1999) international symposium titled "*Public Private Partnerships for 2000 and beyond*" the 117 delegates representing stakeholders from the power, communication, transport and water infrastructure sectors were asked to participate in the identification of key success factors for Public Private Partnerships (PPP) in the provision of infrastructure. (SAAE,CEAC, & ATSE,1999) This resulted in a list of some 35 key success factors.

In a plenary meeting these factors were presented to all delegates, who were asked to rate the importance of these factors by distributing 10 votes among them. The as yet unpublished results of this survey show that the top five success factors for PPPs as identified by the 117 delegates from stakeholders in the sector who participated in the survey are the following:

1 **Business Approach (9% of votes),** meaning a realistic return on investment expectation, negotiated tariffs, market forces to drive the system, price to reflect costs, profitability, economically sustainable and commercially structured.

2 **Financing (8%),** meaning an asset hungry capital market able to provide debt and equity at prices that make a project financially viable.

3 **Risk Management (6.5%),** meaning risk distribution, rigorous assessment and assignment of risk, effective risk allocation and management, equitable balance between responsibility, risk and reward.

4 **Legislation (6%),** including legislative reform to enable PPP and legislative clarity.

5 **Regulatory framework (5.5%),** meaning an investor-friendly environment, and an independent regulator.

The other 30 key success factors identified scored less than 4% each. The results of this survey clearly confirm the that project finance and the management of the risks associated with PSP in the provision of water services are the factors of greatest concern internationally and locally.

2.6.6 Current PSP Projects In South Africa

The three examples of water sector concessions in South Africa are Queenstown, Dolphin Coast and Nelspruit.

- **Queenstown:**

  In 1990, the Queenstown municipality embarked on a process to mobilise private sector participation in municipal service provision (Development Bank of Southern Africa, 1998). A comprehensive consultative process took place with stakeholders, including civic associations and organised labour. A 25-year concession agreement was concluded in June 1992 in terms of which Water and Sanitation Services South Africa (WSSA) took full responsibility for the provision of water and sewerage services in Queenstown.

- **Dolphin Coast:**

  The Dolphin Coast municipality signed a 30-year water and sanitation concession contract with Siza Water Company on 29 January 1999. (Municipal Infrastructure Investment Unit,1999). Siza is a joint venture between a French water services operator (SAUR Services International) and South African empowerment partners, with an employee share participation scheme. Siza took overall responsibility for the operations, maintenance, management and capital investment necessary to expand water and sanitation throughout the jurisdiction. The contract is expected to leverage investments of R434 million (MIIU, 1999).

- **Nelspruit:**

  Nelspruit Town Council is implementing the most comprehensive concession initiative yet for water and sewerage services in South Africa (Leitch, 1997). The council invited tenders for the R330 million contract. The concession scheme entails that the private sector takes over the management of existing, and construction of new, water and sanitation systems on a contract basis. The major hurdles to overcome with concessions in South Africa are the issues of non-payment and potential job loss. The management contract needs to address these issues to the satisfaction of all stakeholders. In April 1999 Nelspruit signed a 30 year concession contract with the greater Nelspruit Utility Company, a private company jointly owned by British water operator, Biwater, and local black empowerment firm, Sivukil Investments. (Municipal Infrastructure Investment Unit, 1999)

In addition to these concessions there are a number of other PSP projects in the water sector :

- Department of Water Affairs BOT projects

  These involve the provision of water supply and sanitation services to the rural and peri-urban areas of the Northern Province, Mapumalanga, KwaZulu-Natal and Eastern Cape.
- Durban wastewater management
- During the course of this research other PSP projects in the water sector have been initiated i.e. Pretoria sludge, Johannesburg water utility management contract, mine water treatment.

2.7 CONCLUSION AND RESEARCH NEED

The literature review indicates that there is a significant body of knowledge in many of the issues associated with PSP in the provision of water and sanitation services. The literature provides adequate information on the industry to understand its characteristics, the conditions in which it operates, and the challenges it is faced with. The literature also provides ample material on the various ways in which the private sector can participate in the provision of water supply and sanitation services.

Essentially most of the pieces of the puzzle are in place for PSP in South Africa. The need for research lies in understanding why PSP has not been adopted on a much larger scale than it has to date, as in various other developing countries. The literature suggests that the reasons are to be found in the management of risks associated with "re-engineering" the sector, and the accessibility of finance to implement development.

The research investigated the constraints on PSP in South Africa, particularly in respect of the management of risk associated with PSP in the water services sector, and the sector's access to finance.

Chapter 3

RESEARCH QUESTIONS

The research questions that emerge from the literature review are:

Primary Question:

What are the main factors constraining private sector participation (PSP) in water supply and sanitation services in South Africa?

Secondary Questions:

1 What are the risks associated with private sector participation in the water supply and sanitation services sector?

2 How are these projects financed, and is the sector able to attract foreign direct investment or is it largely dependent on national investors?

Chapter 4	RESEARCH METHODOLOGY

4.1 THE NATURE OF THE RESEARCH

The objective of this research was to identify and describe the constraints to PSP in the provision of water supply and sanitation services in South Africa. The study attempted to answer the questions of risk management and development finance, which were identified as the key areas of concern.

A largely qualitative approach to the research was thought to be appropriate for the following reasons:

- The literature review indicated that risk arises out of the perception of uncertainty which is often translated into quantitative indicators and measures later in the process. Qualitative research into the management of risk perceptions was therefore thought to be appropriate.

- PSP in the water services sector is a fairly recent development. Consequently the sample population was anticipated to be small, and thus more suited to qualitative research. A small sample size makes quantitative research difficult as it yields results which are statistically insignificant.

More broadly, the aim of this qualitative research was to uncover, organise and interpret knowledge, insights and viewpoints that help to explain key organisational phenomena in the water sector. Zikmund (1997,p102) states that qualitative research provides greater understanding of a concept as opposed to providing measurements or quantification. Evered & Louis (Simon, 1999) describe qualitative research as research from the "inside", and point out that research from the inside is directed towards creating a complete description of the specific case. The objective of the research was to seek a rich appreciation for the context and the conditions operating at this point in time.

4.2 RESEARCH DESIGN AND METHODOLOGY

Schmitt and Klimosky (1991) suggest that qualitative research is more an approach than a particular design or set of techniques. The method used in the research is described as follows.

To counteract the possible biases introduced into research by a single qualitative method, Simon (1999) recommends the use of multiple techniques, and the seeking of evidence of convergence through a technique called triangulation.

Following the multiple technique approach, the methodology for conducting the research comprised a literature review, the formulation of research questions, followed by data collection through questionnaires and structured interviews with the key stakeholders in the water services sector, and a case study analysis of a recent case of PSP in the sector. The triangulation process comprised a comparative analysis of the findings of the two techniques. This process resulted in the research findings and conclusions regarding PSP in the South African water services sector. The findings of both techniques were analysed and compared to provide well founded answers to the research questions.

The research design employed is shown schematically in Figure 4.1 overleaf. Each of the research components in the diagram is explained in more detail below.

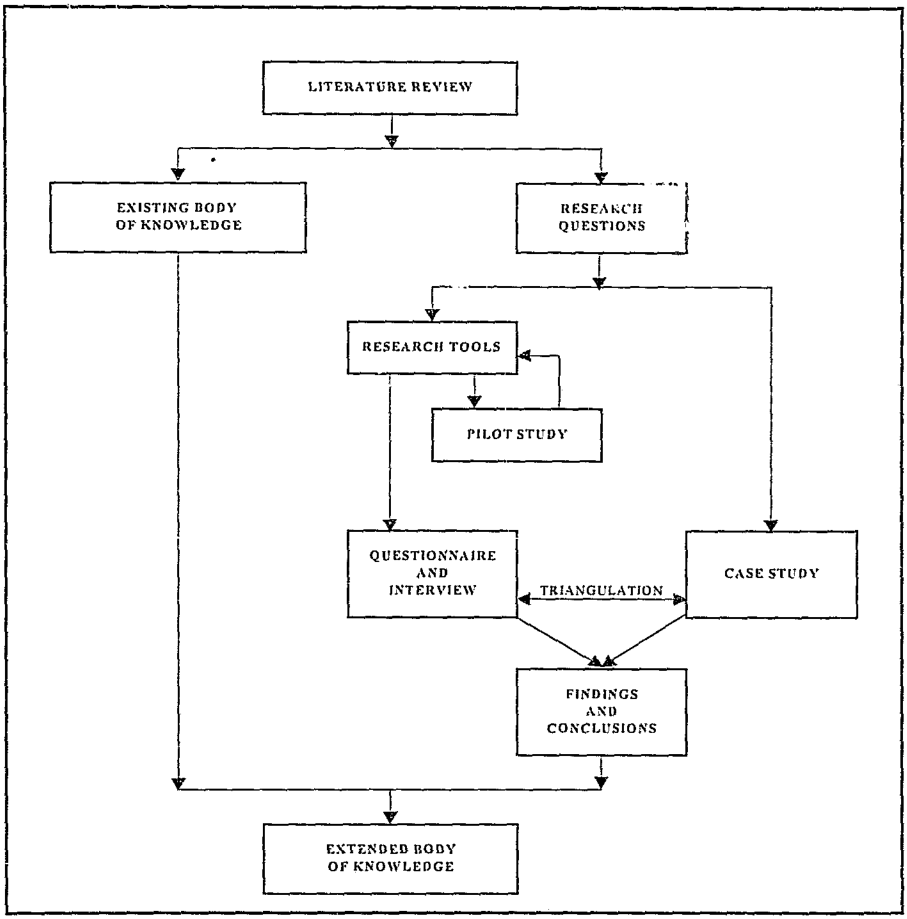
4.2.1 Literature Review

The role of the literature review was to research the key aspects of PSP in the provision of water services, and to identify the underlying theory, issues and experiences concerning the management of risk in this sector. The literature review summarised the existing body of knowledge and provided the baseline information for the rest of the research in this relatively new field of private sector participation in the water sector, and was of key importance in the formulation of the research questions.

4.2.2 Research Tools

Simon (1999) suggests that in qualitative, small sample research the role of the investigator's personal values in the research product needs to be acknowledged. In this method it is more difficult to separate the person from the process. The investigator becomes the research tool.

FIGURE 4.1 : SCHEMATIC REPRESENTATION OF RESEARCH METHODOLOGY



To aid the data collection, the investigator developed an introductory questionnaire and an interview schedule. The purpose and design of these data collection tools are discussed as follows.

Introductory Questionnaire

The introductory questionnaire was administered to the interviewees only, at the start of the interview. The purpose of the questionnaire was two fold. Firstly it served as an efficient method of collecting pre-coded information on the research topic. The primary objective of the questionnaire was to be able to identify the interviewee's perception, rating and ranking of the risks and constraints to PSP. Secondly, it served to get an overview of the key factors identified by the interviewee. This information was then used to streamline the open ended interview that followed, and focus the discussion on the factors identified. A copy of the introductory questionnaire is presented in Appendix A.

Interview Schedule

Schmitt and Klimosky (1991) consider interviews to be the best approach for uncovering and interpreting the perspective of a respondent and for enabling a meaningful and in-depth description of the issues being researched. The purpose of the interview schedule was to provide a fixed format or agenda for the interview and to ensure that the all the interviewees were asked the same questions in the same way. Schmitt and Klimosky (1991) suggest that a key feature of qualitative interviewing is the use of general questions followed up by more specific questions. This reduces the likelihood that the respondent's answer is influenced by the question itself.

A non-standardised scheduled interview schedule was designed to stimulate discussion around the key issues in the management of risk associated with PSP

The key issues discussed were those identified by the introductory questionnaire. A copy of the interview schedule is presented in Appendix B.

4.2.3 Pilot Study

A pilot study was undertaken to test the questionnaires and interview schedule on interviewees. The interviewees were asked to critically comment and make recommendations on the quality of the questionnaire and interview schedule in terms of key issues addressed, clarity of questions and instructions, presentation and duration of the interview, and whether the information collected would provide meaningful answers to the research questions.

The questionnaires and interview schedule were modified, incorporating the comments received. The interview structure was modified to ensure that the duration stayed within the time limits of an hour.

4.2.4 Stakeholder Questionnaire and Interview

A meeting with the interviewee typically started off with a brief introduction by the researcher, followed by the completion of the introductory questionnaire by the interviewee. The interview that followed was aimed to discuss the details of the risks and constraints identified in the questionnaire.

In the interview all interviewees were asked the same open ended questions, with the exception of the questions on the topic of development finance. These questions were omitted as soon as the interviewee indicated that no development finance was provided. The interviewee's answers were noted in the interview schedule, and briefly summarised for conformation with the interviewee.

4.2.5 Case Study

The case study involved the detailed content analysis of the information available on the most recent example of PSP in the water services sector in South Africa, namely the concession in Nelspruit, Mpumalanga. The case study was analysed using the same topics as contained in the interview schedule.

4.2.6 Data Triangulation

To prevent or reduce the possible bias by the use of a single research technique, Simon (1999) suggested the us of multiple techniques. This research used two techniques: stakeholder interviews preceded by an introductory questionnaire, and a case study analysis. The triangulation process comprised a comparative analysis of the findings of both techniques, to yield the main findings and conclusions of the research, which constitute an extension ot the existing body of knowledge.

The validity of the findings is greatly enhanced when the two methods provide similar answers. Contradictions between the findings of the two methods provides valuable insights that would not have been discovered had only one method been used.

4.3 RESEARCH TOOLS DESIGN

The data collection tools developed for this research comprised an introductory questionnaire and an interview schedule. The questionnaire consisted of three parts, each designed to provide a specific type of information. Copies of the introductory questionnaire and the interview schedule are presented in Appendices A and B respectively.

4.3.1 Introductory Questionnaire – Part 1

The first part of the questionnaire was designed to obtain the interviewee's rating of risk and constraints associated with PSP. The interviewee was asked to rate the perception of risk and constraint separately, as the research assumed that the two are related but separate notions. In theory, the perception of risk in a particular category may be fairly high, but if the stakeholder interviewed is in a position to control or mitigate this risk, it may not be perceived a high constraint. Conversely, the same applies. A low or moderate perceived risk which is completely outside the control of the stakeholder may be rated a high constraint.

This part of the questionnaire was used to get the stakeholder to rate the various risk categories individually. It was intended to measure risk and constraint perceptions by individual risk category, without comparing risk categories.

The layout of this part of the questionnaire comprised a brief instruction to the respondent on how to complete the questionnaire, and presented 8 risk categories that required rating in terms of level of risk and constraint. The 8 risk categories were obtained from the list of 9 risk categories identified in the literature review. The *Force Majeure* risk category was omitted from the original list, as the risks in this category are insurable and therefore do not need to be considered in the management of risks of PSP in the provision of water services.

The rating of risk and constraint of the different risk categories was done using a five point scale, ranging from 1 (very low) to 5 (very high). This five point scale was considered suitable for this purpose as the accuracy of the rating, obtained by a scale with more than five points, was not the main concern: the objective of this part of the questionnaire was to get a order of magnitude indication of risk rating. Intervals of 20% were therefore adequate.

4.3.2 Introductory Questionnaire – Part 2

The second part of the questionnaire was designed to obtain the interviewee's ranking of risk and constraints associated with PSP. This part asked the interviewee to rank the same risk categories as used in the first part of the questionnaire, by distributing ten votes in total among the categories. The highest number of votes indicates the highest risk or constraint.

This part of the Introductory Questionnaire comprised a brief instruction to the respondent on how to complete the questionnaire, and presented the same 8 risk categories as in Part 1, that required ranking in terms of level of risk and constraint.

The ranking of risk and constraint of the different risk categories was done by assigning 10 points between the 8 risk categories. The points allocated acted as weighting factors for the composition of the risk portfolio. By giving each stakeholder the same number of points to distribute ensures that their contribution to overall sector risk is equitable.

4.3.3 Introductory Questionnaire – Part 3

The third part of the questionnaire was designed to obtain the interviewee's level of agreement with a list of twenty statements covering a range of important issues related to the management of risk associated with PSP, identified by the literature review. The level of agreement was tested using a five point Likert scale (strongly disagree, disagree, neutral, agree, strongly disagree).

The objective of this part of the questionnaire was to raise a number of key issues in PSP in water services with the interviewee and gauge their level of agreement on the issue. It thus provided a time efficient tool to obtain a range of information and identified the issues the interview needed to focus on. The primary objective was to be an introduction to the interview, not to gather data for quantitative analysis.

This part of the questionnaire comprised a brief instruction to the respondent on how to complete the questionnaire, and presented 20 statements covering a range of issues related to PSP in water services. The questionnaire captures the level of agreement of the interviewee with these statements using a 5 point Likert scale (1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, and 5=strongly agree).

The statements raise various key issues in no particular order. This was done in order not to lead the interviewee into an answer, and to avoid building a particular point of view through the progression of statements.

4.3.4 Interview Schedule

Following the completion of the Introductory Questionnaire the interview proceeded with a set of open-ended questions exploring the main issues identified by the questionnaire. The interview was structured using an interview schedule.

A non-standardised scheduled interview schedule was used to ensure that all the stakeholders interviewed were asked the same set of open-ended questions in the same way. The interview schedule also provided a framework and agenda for the interview to capture the opinions and perceptions of the interviewee.

The schedule contained a brief introduction to a particular aspect of the research and proceeded by asking the interviewee some related open ended questions. The interview schedule covered the following topics: organisation and interviewee identification, opportunities and constraints in the water services sector in South Africa, identification and assessment of risk, risk management, development finance, and other general issues related to PSP. The discussion on the risk management issues was focussed on the risk categories rated highest in terms of risk and or constraint. During the interview the answers to the questions were noted and transcribed into the relevant sections in the interview schedule.

4.4 POPULATION AND SAMPLE

Leedy (1993) states that in qualitative research the results of a survey are no more trustworthy than the quality of the population or the representativeness of the sample. The population parameters and the sampling procedures are of great importance and become critical factors in the success of the research.

Zikmund (1997) identified several stages in the selection of a sample. These are listed below, and the application in this research is described in the sections that follow:

- Definition of the target population,
- Selection of sample frame,
- Determination of sampling method,
- Determination of sample size,
- Selection of actual sampling units.

4.4.1 Definition Of The Target Population

Zikmund (1997) defines the target population as the complete group of specific population elements relevant to the research. This research intc management of risk of PSP in the provision of water services in South Africa has a target population comprising any person or organisation involved in the provision or consumption of water services in South Africa. The former is a relatively small group of elements, whereas the latter is a much bigger group, comprising the entire population of South Africa.

4.4.2 Selection Of Sample Frame

Zikmund (1997) defines the sample frame as the list of elements from which the sample may be drawn. As the target population comprises the entire population of South Africa, the sample frame for this research constitutes the research elements which are in the province of Gauteng and are part of the urban or peri-urban demand elements. The Gauteng province was chosen as representative of the total population in the country, and selected for purpose of research convenience and cost efficiency.

The consumer elements were chosen as all the urban and peri-urban water users, as these are the elements most likely affected, or to be affected, by PSP in water services. The sampling elements are sector stakeholder groups and the sampling units are the individual stakeholders.

4.4.3 Sampling Method

The literature review shows that successful PSP in this sector requires the involvement of all affected parties. To ensure validity, research into the management of risk associated with PSP in the water services sector needed to involve the key stakeholders which were representative of the sector.

The initial sample of interview respondents was obtained using a non-probability sampling technique called judgement or purposive sampling. Zikmund (1997) defines this as a technique in which an experienced researcher selects the sample based upon some appropriate characteristic of the sample members. The researcher has extensive experience in the water sector in South Africa, based on which sector stakeholders were selected as sample members.

As the interviews were taking place, the initial list of stakeholders was modified using a from of the snowball sampling technique. Zikmund (1997) describes this as a sampling procedure which involves asking the initial interviewees to suggest or recommend other interviewees in the same or other stakeholder group.

4.4.4 Sample Size

Since the research was qualitative in nature, a balance had to be found between too few interviews, resulting in missing out on information, and too many interviews, resulting in obtaining little to no new information in the latter interviews. Mintzberg and Simon (1999) both advocate small samples in qualitative research. In qualitative research in-depth data on a small sample is preferred over superficial data on a large sample.

The sample of the interview respondents was compiled to include representatives of each of the stakeholder groups as identified by the literature review, namely:

1 Water users (consumers)
2 National government
3 Provincial and regional government
4 Local government
5 Bulk suppliers
6 Development finance sources (underwriters)
7 Private lenders
8 Unions
9 Service operators
10 PSP consultants / advisors

The literature review indicated that the provincial governments play only a small role as stakeholders in this sector. It was therefore decided to omit this stakeholder group, and concentrate the research efforts on the remaining nine stakeholder groups.

Based on the number of stakeholder groups and the small sampling requirement, it was decided to aim for a sample size of about 20 respondents, approximately two from each stakeholder group. During the interview process, the amount of new information obtained from each interview was monitored to assess the need for more interviews.

4.4.5 Selection of Actual Sampling Units

Water services sector stakeholders were divided into groups of different types of stakeholders. The interviewees were chosen on the basis that they are prominent members of the stakeholder groups, assumed to represent the risk and constraint perceptions of the group. Those stakeholders, who in the opinion of the researcher, were best able to provide insights in to the research questions from their particular perspective were approached to participate. Each of the stakeholders interviewed, in turn, were asked to recommend other stakeholders in the same group or any other group that could provide an interesting perspective on the research questions. The stakeholder groups, the organisations representing each group, and the individuals interviewed for this research are listed in Appendix C.

A total of 19 interviews were conducted, each with a duration of one to one and a half hours. One of the stakeholders on the list was not available for an interview, but did refer the researcher to a number of documents clearly outlining the position of the stakeholder with regard to PSP in the provision of water services. The contents of these documents were analysed and the results presented in the same format as the data from the interviews. The research thus yielded 20 sets of data.

4.5 DATA ANALYSIS

Schmitt and Klimoski (quoted by Simon,1999) point out that methods of analysis of qualitative data are not well formulated. The data obtained from the questionnaires and interviews were analysed using different methods described below.

4.5.1 Questionnaire – Part 1

Part 1 of the questionnaire provides ordinal data on risk and constraints rating for each of the risk categories identified. The results of this part of the questionnaire were analysed using the following sequence of techniques.

Firstly, the interview results were tabulated by risk category. The results for of the risk rating and the constraint rating were analysed separately and later compared for consistency.

Secondly, the results of the stakeholders in the same stakeholder group were summed to obtain stakeholder group results. The results for the entire sector were obtained by the summation of the results of all individual stakeholder results. summarised by risk category for the water services sector as a whole and for the individual stakeholder groups.

Thirdly, the data were subjected to a frequency analysis, with a view to gauge the distribution within the sector of the perception of a particular risk category.

The data for this analysis were obtained by counting the number of times a risk category obtained a certain rating.

Finally, the results of the frequency analysis were subjected to a Chi-squared test of independence. This test was done to establish whether the rating was independent of the risk category.

The results of the analysis of Part 1 were compared to the result of the analysis of Part 2 of the questionnaire to determine consistency of answers.

4.5.2 Questionnaire – Part 2

Part 2 of the questionnaire provides ordinal data ranking risk and constraints for each of the risk categories identified. As before, the results of were tabulated by risk category and summed by group and entire sector for all stakeholders. As for Part 1, the data was subjected to a frequency analysis, and Chi-squared test.

The results of the analysis of Part 2 were compared to the result of the analysis of Part 1 of the questionnaire to determine consistency of answers.

4.5.3 Questionnaire - Part 3

Part 3 of the questionnaire provides ordinal data on the level of agreement of the stakeholders related to the statements contained in the questionnaire. Re-calibration of values of the results using correspondence analysis was not deemed necessary, as the data was only used for graphical presentation of results and not for any quantitative statistics

The results of this part of the questionnaire were summarised as statements for the water services sector as a whole and for the individual stakeholder groups. These were obtained using a frequency analysis to determine the level of agreement among stakeholders on these issues.

4.5.4 Interview Schedule

The data obtained from the interviews were analysed by means of content analysis. Zikmund (1997) explains that content analysis observes and analyses the content of diverse media of communication to identify the specific information content and the characteristics of the message. Krippendorff (1980) describes content analysis as a scientific method that yields inferences from essentially verbal, symbolic, or communicative data and defines content analysis as a research technique for making replicable and valid inferences from data to their context.

A content analysis was performed on each of the schedules separately and the salient issues were captured in interview summaries for each stakeholder. The interview summaries are presented in Appendix H.

Each of these interview summary tables were reviewed to obtain information constructs pertinent to the stakeholder group and the sector as whole. These constructs are discussed in the research result section of this report. The constructs are discussed in order to provide the following:

- An analysis of the results of the interviews focussed on risk management, and the positioning of stakeholders in a PSP option framework according to risk exposure;
- An identification of key constraints to PSP as identified by the stakeholders in the industry in South Africa; and
- A descriptive analysis of development finance option and associated conditions, and analyse the impact on PSP option selection.

4.5.5 Case Study

The case study analysis comprised a content analysis of various references pertaining to the Nelspruit concession. This is the most recent example of PSP in the country, and therefore provided recent information on risk and constraint perceptions. The salient points of the case were captured in a summary table in the same format as the interview summaries.

4.5.6 Triangulation of Results

The triangulation of results was done by means of a content analysis of the findings of each of the research tools. This analysis produced the main findings of this research.

The contribution of each of the research tools to the main findings is shown in Table 4.1.

TABLE 4.1 : RESEARCH TOOL CONTRIBUTION TO MAIN FINDINGS

RESEARCH TOOL	CONTRIBUTION TO MAIN FINDINGS
Introductory Questionnaire Parts 1 and 2	• Identification and assessment of main risks. • Identification and assessment of main constraints. • Perception of risk / constraint relationship.
Introductory Questionnaire Parts 3	• Issues of agreement related to PSP in water services. • Issues of disagreement and uncertainty related to PSP in water services.
Interview Schedule	• Risk management issues. • Constraint assessment. • Development finance options.
Case Study	• Practical example of recent PSP implementation. • Case risk management issues. • Case project finance issues.

4.6 RESEARCH LIMITATIONS

The topic of this research is both wide ranging and current. The scope for research in this area of business in South Africa is great, despite the fact that a substantial body of knowledge does exist. Due to time and funding constraints, the scope of this research is limited to a qualitative analysis focussed on the issue of risk management in this industry.

Schmitt & Klimoski (in Simon, 1999) point out that the relatively small sample size imposes limitations on the research in that it potentially reduces the capacity to detect valid but subtle phenomena, and that it limits generalisation of results and external validity. This is mitigated to some extend by the investigator taking great care to select the sample to be representative of the population of interest.

Schmitt & Klimoski further point out that in qualitative, small sample research the role of the investigator's personal values in the research product needs to be acknowledged. In this method it is more difficult to separate the person from the process. The investigator becomes the research tool. (Simon, 1999). A further consequence of such involvement is that, because methods of objective analysis of qualitative data are not well formulated, the analysis has the potential of being subjective. (Schmitt & Klimoski in Simon,1999).

Chapter 5

ANALYSIS OF RESULTS

5.1 INTRODUCTION

This chapter presents the data obtained during the course of the research and the analysis of the data with regard to the research questions posed in Chapter 3. The analysis of results are contained in separate sections for the introductory questionnaire, the interview schedule, the case study, and the triangulation of results.

The Introductory Questionnaire comprised three parts. Part 1 data were subjected to a statistical analyses with the results pertaining to the risk rating and constraint rating. Part 2 data were subjected to same analyses, with the results pertaining to the risk ranking and constraint ranking. The results of parts 1 and 2 were compared for the purpose of seeking synergies to advance the understanding of the sector. Part 3 data were also subjected to statistical analyses, with the results revealing issues of agreement and disagreement between stakeholders in the sector.

The stakeholder interview data was analysed using contents analysis, providing results pertaining to the management of risk and constraints associated with PSP in the sector, and the financing of such projects.

The case study comprised a contents analysis of the literature pertaining a recent concession contract in the water services sector in South Africa. The analysis focussed on the research questions posed in Chapter 3.

The chapter concludes with the triangulation of the research results by means of a comparative analysis of the interview findings with the case study findings, and summarises the main findings of the research pertaining the management of risk of PSP in the provision of water services.

5.2 INTRODUCTORY QUESTIONNAIRE

The introductory questionnaire constituted three parts. Part 1 pertained to the rating of the individual risk categories in terms of perceived risk and constraint. Part 2 pertained to the ranking of the risk categories in terms of perceived risk and constraint. Part 3 tested the stakeholders agreement with a number of key issues related to PSP in the sector. Each part was analysed separately as described below.

5.2.1 Part 1 : Risk and Constraint Rating

The first part of the Introductory Questionnaire identifies eight risk categories to be rated in terms of perceived level of risk and constraint. The data obtained and the detailed results of the analyses are contained in Appendices D1-3.

The objective of Part 1 of the questionnaire was to obtain an understanding of stakeholder exposure to the given risk categories, and gauge the level of constraint that particular risk category poses for PSP in the sector. An analysis of these two data sets provides insights in terms of the management of risk in the different risk categories.

The assessment of the management of risk was based on the following:

- Risk rating and constraint rating are not necessarily the same. The risk rating of a particular risk category may be high, but because the risk is managed, the constraint rates lower. Conversely, the risk of a certain category may be low, but due to inadequate management of the risk, the constraint rates higher.

- The difference in rating of risk and constraint for the same risk category, is an indicator of the management of risks in that category.

5.2.1.1 Risk rating results

The risk rating results of Part 1 are presented in Appendix D1.

Survey results

Table D1.1 shows the risk rating from the 20 stakeholders for each of the 8 risk categories. It shows the total score for each category across the sector and the percentage contribution of each risk category to the total risk in the sector. These percentages range between 10 – 15% per category.

The average rating shown for each risk category was calculated by dividing the total risk score by the number of stakeholders. This value gives an indication of the rating of the risk category across the sector on a scale 1 to 5 (1 = very low, 2 = low, 3 = moderate, 4 = high, 5 = very high). The results show that the total sector risk was perceived to be 2.55 (less than moderate), that the commercial risks were rated on average 2.45 (less than moderate), and the non-commercial risks rated on average 2.85 (more than moderate). The contribution of non-commercial risks to total sector risk was 28%.

Table D1.1 also shows the total score for each stakeholder. This value in itself is meaningless, but comparison across all stakeholders gave an indication of differing risk perception among stakeholders. The higher the score, the higher the perception of risk of the stakeholder. The scores of the individual stakeholders have been combined into stakeholder groups and shown in Figure D1.11. The stakeholder group scores were fairly evenly distributed, ranging from 9% to 13% of the total perceived risk in the sector. National government perceived the most risk with 13% of the overall sector risk perception. Private service providers perceived the least risk with 9% of the overall sector risk perception.

Table D1.1 further shows the total score for each stakeholder, disaggregated into the commercial and non-commercial risk components. The results show that

72% of the total risk perception in the sector came from commercial risk, with the remaining 28% from non-commercial risks. This result closely resembles the risk category distribution, of which 75% (six out of the eight risk categories) were commercial risks, and 25% (two risk categories) were non-commercial. However, the result does indicate a slightly higher proportional rating of non-commercial risks. This result needs verification and confirmation by the constraint ratings of Part 1, and the results of Part 2 to be considered significant and a finding of the research.

Frequency analysis

Table D1.2 shows the frequency analysis of the risk rating results presented in Table D1.1. This table presents the number of stakeholders that rated a particular risk category 1, 2, 3, 4, or 5, in order to establish the predominant rating for a risk category across the sector. The total represents the risk frequency distribution of the sector, which was calculated as the sum of the frequency distributions for each risk category. The results show a normal distribution around rating 3 (moderate). The risk distribution of commercial risks was slightly skewed towards a rating of 2 (low), and rated low to moderate. The risk distribution of non-commercial risks was slightly skewed towards 4 (high), and rated moderate to high.

Chi-squared test of independence

The chi-squared test of independence is presented in Tables D1.3-5 This test was performed to establish whether in Table D1.2 the row variables (risk categories) were independent of the column variables (risk rating). In other words, whether the risk rating was statistically uniform across the different risk categories, as might be suggested by the small differences in percentage ratings in Table D1.1.

Table D1.3 presents the frequency data of Table D1.2 with the risk categories consolidated from 1-5 to three columns namely low(below moderate), moderate, and high (above moderate). This 'collapsing' of columns was done to ensure that the expected frequencies calculated as part of the chi-squared test exceed the value 5. This 'rule of five' states that the chi-squared test gives reliable results as long as the expected frequency exceeds 5 (Zikmund,1997). The frequencies for the 'low' column were obtained by the sum of the frequencies for 'very low' and 'low' for each of the risk categories. The frequencies for high the 'high' column were obtained by the sum of the frequencies for 'high' and 'very high'.

Table D1.4 contains the expected frequency values for each of the risk categories, and consolidated risk rating categories. These represent the ratio of column total times row total over the grand total.

Table D1.5 shows the chi-squared value for each risk category and risk rating category. The chi-squared statistic is the sum of the row and column totals (42.1). The critical chi-squared value at a 5% significance level with 14 degrees of freedom is 23.685 (see Appendix D1) (Hanke *et al*, 1994). The test shows that the calculated chi-squared statistic is greater than the critical value which indicates that the risk category and the risk rating are dependent.

Risk ratings

The risk rating results shown in Table D1.1 are graphically represented for the whole sector in Figure D1.1, and for each of the stakeholder groups in Figures D1.2-10. These figures show the risk profile of the sector and each stakeholder group, and indicate the percentage contribution of each risk category to the total risk.

Figure D1.1 shows the risk profile of the entire sector, indicated by the percentage contribution of each risk category to the total sector risk. The top three risk categories were socio-political and country risks (15%), market risks (14%), and legal and regulatory risks (13%). The categories with the lowest perceived risk were engineering risks (10%) and environmental risks (10%).

Similarly, Figures D1.2-10 show the risk profiles of the 9 stakeholder groups. As with the risk rating, the results shown were based on only 2-3 stakeholders per stakeholder group, and were therefore not statistically significant, but indicative of the risk profile of the stakeholder group.

The stakeholder risk ratings were used to rate the risk categories across the sector. The results of this analysis are shown in Table 5.1overleaf.

The rating of risk categories across the sector was derived by the summation of the stakeholder group ratings. The category with the highest overall score represents the highest risk in the sector. The risk categories are presented in descending order of overall risk rating. Socio-political risks, market risks, and legal and regulatory risks were rated as highest. Financial risks, operational risks and economic risks were rated moderately. Engineering and technology risks and environmental risks were rated lowest.

TABLE 5.1 : SECTOR RISK RATING

RISK CATEGORY	STAKEHOLDER GROUPS RISK RATING									
	National Govmnt	Local Govmnt	Consumers	Bulk Service	Underwriters	Private Lenders	Unions	Service Providers	PSP Advisors	TOTAL
Socio-political	14	17	13	14	15	15	18	18	15	15.1
Market	11	17	15	10	16	14	14	16	17	14.7
Legal and Regulatory	14	13	15	14	9	15	14	11	17	13.2
Financial	12	11	13	19	12	13	9	13	15	12.7
Operational	13	13	13	14	12	11	13	13	10	12.5
Economic	14	9	9	10	11	11	14	11	14	11.4
Engineering/Technology	12	9	13	10	12	10	7	7	8	10.3
Environmental	10	11	9	9	13	11	11	11	4	10.1
TOTAL	100	100	100	100	100	100	100	100	100	100

Figure D1.11 shows the contribution of each stakeholder group to overall sector risk. The figure ranks stakeholder groups in the sector according to risk perceptions, and identifies the stakeholders that were more risk averse than others. The results show that the national government perceived the most risk and was therefore the largest contributor to the overall perception of risk.

The second highest contribution was from PSP advisors. This stakeholder is an advisor to the sector and not an active participant in the delivery of services. The result for PSP advisors may be seen as an indicator of their perception of total risk in the sector.

The interpretation of the data analyses is presented in Chapter 6.

5.2.1.2 Constraint rating results

The constraint rating results of Part 1 are presented in Appendix D2.

Survey results

Table D2.1 shows the stakeholder constraint rating for each of the 8 risk categories. It shows the total score for each category across the sector and the percentage contribution of each risk category to the total constraint score in the sector. These percentages range between 9 – 15% per category.

The average rating shown for each risk category was calculated by dividing the total constraint score by the number of stakeholders. This value gives an indication of the rating of the risk category across the sector on a scale 1 to 5 (1 = very low, 2 = low, 3 = moderate, 4 = high, 5 = very high). The results show that the total constraint score for the sector was perceived to be 2.38 (less than moderate), that the commercial risks were rated on average 2.21 (just above low), and that the non-commercial risks rated on average 2.88 (just below moderate). The contribution of non-commercial risks to total risk was 30%.

Table D2.1 also shows the total constraint score for each stakeholder. This value in itself is meaningless, but comparison across all stakeholders gave an indication of constraint perception among stakeholders. The higher the total score, the higher the perception of constraint in the sector. The scores of the individual stakeholders have been combined into stakeholder groups and shown in Figure D2.11. The stakeholder group scores were fairly evenly distributed. Unions perceived the most constraint and contributed 13% of overall constraint perception. The private service providers perceived the least constraint, contributing 8% of the overall constraint perception.

Table D2.1 further shows the total score for each stakeholder, broken down in the commercial and non-commercial risk components. The results show that some 70% of the total constraint score in the sector came from commercial risk, with the remaining 30% from non-commercial risks. As before with the risk rating, the result closely resembled the risk category distribution of which 75% were commercial risks, and 25% were non-commercial risks. However, this result did confirm the slightly higher proportion of non-commercial risks found in the previous section on risk rating. This does need verification and conformation by the Part 2 results to be considered significant.

Frequency analysis

Table D2.2 shows the frequency analysis of the risk rating results presented in Table D2.1. This table contains the number of stakeholders that rated a particular risk category 1, 2, 3, 4, or 5, in order to establish the predominant rating for a risk category throughout the sector.

The total represents the frequency distribution of the constraint rating in the sector, which was calculated as the sum of the frequency distributions for each risk category. The results show a skewed distribution around rating 2-3 (low to moderate). The constraint rating distribution of commercial risks shows the same pattern. The constraint distribution of non-commercial risks is a normal distribution around rating 3 (moderate), and rated moderate to low.

Chi-squared test

The chi-squared test of independence was performed to test whether in Table D2.2 the row variables are related or independent to the column variables. Using the same process of combining columns as applied with the risk rating in Appendix D-1, it was found that the expected values for the high constraint rating were less than 5. This would make the chi-squared test unreliable. Further collapsing of the columns to increase the expected value to 5 or above, left a maximum of only two constraint ratings, which rendered this test rather pointless

An alternative test was performed to test the independence of the constraint rating. Table D2.3 shows the chi-squared goodness of fit data, using the risk categories and the total constraint score of Table D2.1. Table D2.4 presents the expected frequency values for each of the risk categories. These were calculated as the uniform distribution of the column total. The hypotheses for this test were:

Ho : Constraint rating is uniformly distributed among the risk categories.

Ha : Constraint rating is not uniformly distributed.

Table D2.5 presents the chi-squared value for each risk category and constraint rating category. The chi-squared statistic is the sum of the row and column totals (17.228). The critical chi-squared value at a 5% significance level with 7 degrees of freedom is 14.067 (see Appendix D2) (Hanke *et al*, 1994). This test shows that the calculated chi-squared statistic is greater than the critical value. This means a rejection of the null hypotheses (Ho). This result indicates that the constraints ratings were not uniformly distributed among the risk categories, and thus that the two were not independent.

Constraint rating

The constraint rating results in Table D2.1 are graphically represented for the whole sector in Figure D2.1, and for each of the stakeholder groups in Figures D2.2-10. These figures show the constraint profile of the sector and each stakeholder group, and indicate the percentage contribution of each risk category to the total constraint perception in the sector.

Figure D2.1 shows the constraint profile of the entire sector, indicated by the percentage contribution of each risk category to the total sector score. The stakeholder constraint ratings were used to rate the risk categories across the sector. The results of this analysis are shown in Table 5.2. The top three categories were market risks (15.9%), legal and regulatory risks (15.1%), and social-political and country risk (15.1%). The risk categories with the lowest risk perception were engineering risk (8.9%) and environmental risks (9.6%).

TABLE 5.2 : SECTOR CONSTRAINT RATING

RISK CATEGORY	STAKEHOLDER GROUPS CONSTRAINT RATINGS									
	National Govmnt	Local Govmnt	Consumers	Bulk Services	Underwriters	Private Lenders	Unions	Service Providers	PSP Advisors	TOTAL
Market	14	17	15	15	17	16	12	17	19	15.9
Legal and Regulatory	14	17	17	10	15	16	16	13	17	15.1
Social Political	12	12	13	20	15	15	20	21	14	15.1
Financial	13	10	13	15	13	11	8	15	16	12.8
Operational	12	12	13	10	11	11	12	10	10	11.4
Economic	12	15	9	10	8	13	16	8	12	11.2
Environmental	12	10	9	10	11	10	8	10	4	9.6
Engineering/Technology	11	7	11	10	10	8	8	6	8	8.9
TOTAL	100	100	100	100	100	100	100	100	100	100

Values shown are percentages of total constraint perception.

Similarly, Figures D2.2-10 show the constraint profiles of each of the 9 stakeholder groups. Also here the results were based on 2-3 stakeholders per stakeholder group, and were therefore not statistically significant, but indicative of the constraint profile of the stakeholder group.

Figure D2.11 shows the contribution of each stakeholder group to the overall sector constraint rating. The figure identifies those stakeholder groups in the sector that indicated a higher constraint perception than others or were more risk averse than others. The results show that the unions and underwriters perceived the highest constraint and were the largest contributors to the overall constraint perception.

Figure D2.11 further indicates that PSP advisors were the second highest in their perception of constraints. As noted earlier, this stakeholder is an advisor to the sector and not an active participant in the delivery of services. The result for PSP advisors may be seen as an indicator of their perception of constraints in the sector.

The interpretation of the data analyses is presented in Chapter 6.

5.2.1.3 Risk / constraint rating comparison

The comparison of the risk ratings and the constraint ratings results of Part 1 are presented in Appendix D3.

Survey results

Table D3.1 shows the survey results obtained form the 20 stakeholders. The values presented in Table D3.1 were calculated by subtracting the constraint rating from the corresponding risk rating.

A negative value indicates that the constraint rating was higher than the risk rating. This may be interpreted as that the present management of the risk in that particular risk category was not effective, and that the stakeholder was averse to the risks in this category. A zero value means that the constraint rating equaled the risk rating. This may be interpreted as that risk management has not affected the risk perception of that particular risk category for the stakeholder concerned. A positive value means that the constraint rating was lower than the risk rating. This may be interpreted as that the present management of the risk in that particular category was effective in reducing the risk perception.

The total score for each risk category indicates the sector's perception of risk and constraint in that category. A negative value means that the overall perception was that the risks in that category were perceived to be a higher constraint than their risk rating indicated. A value of zero indicates that the overall perception was that the risks in that category were as much a constraint as their risk rating indicated. A positive value indicates that the overall perception was that the risks in that category were perceived to be less of a constraint than their risk rating indicated.

Frequency analysis

Table D3.2 shows the frequency analysis of the comparison of results presented in Table D3.1. This table presents the number of stakeholders against the difference in rating for risk and constraint (ranging from –5 to 5) by risk category. This data was interpreted to establish the predominant difference in rating risks and constraints for a risk category throughout the sector.

The summed total of the frequency table shows the distribution of the number of stakeholders and their risk and constraint ratings. The distribution is somewhat skewed towards the positive side. This means that stakeholders in the sector on average rated constraints less than risks. This was primarily caused by the commercial risks. Non-commercial risks were more normally distributed.

Analysis of results

Table D3.3 presents the same frequency analysis, but summarised in only three categories of difference, namely negative (indicating risk management failure), zero (indicating risk management indifference), and positive (indicating risk management success). This table shows that throughout the sector, and indeed in the majority of stakeholder groups, the constraint ratings tended to be lower than the risk ratings.

The results of the comparison of risk and constraint ratings shown in Table D3.1 are shown for the whole sector in Figure D3.1, and for each of the stakeholder groups in Figures D3.2-10. These figures show the impact of risk management on the risk profile of the sector and each stakeholder group.

The highest negative variance was observed for the legal and regulatory risks, meaning that these were perceived to be a higher constraint than their risk rating indicated. The level of risk was thus under estimating the level of constraint. The highest positive variance was observed for engineering risks and operational risk respectively, indicating that these risks were perceived to be lower constraints than their risk rating indicated. Risk management in these categories was perceived to have successfully mitigated the perception of constraint.

Similarly, Figures D3.2-10 show the risk and constraint ranking comparisons for each of the 9 stakeholder groups. Government stakeholders (national and local), underwriters, private lenders and service providers indicated various degrees of difference between their perceptions of risk and constraint. The other stakeholder groups indicated little to no difference between their perception of risk and constraint.

Figure D3.11 shows the overall risk and constraint perception for each of the stakeholder groups. The unions and underwriters were the stakeholders rating their constraints higher than their perception of risk, indicating that they perceived higher constraints than risks, whereas national and local government, private lenders and service providers rated their constraints lower than their risks.

The interpretation of the data analyses is presented in Chapter 6.

5.2.2 Part 2 – Risk and Constraint Ranking

The second part of the Introductory Questionnaire identifies the same eight risk categories as in the first part, to be ranked in terms of risk and constraint perception. The risk and constraint ranking results are presented in Appendices E1-3.

Whereas Part 1 set out to rate the various risk categories independently on a scale of 1 to 5, the aim of Part 2 of the questionnaire was to rank the risk categories against each other and obtain an understanding of stakeholder risk portfolio. The analysis of the management of risk was based on the same method as used in the analysis of Part 1 of the questionnaire.

5.2.2.1 Risk ranking results

The risk ranking results of Part 2 are presented in Appendix E1.

Survey results

Table E1.1 shows the risk ranking from the 20 stakeholders for each of the 8 risk categories. It shows the total score for each category across the sector and the percentage contribution of each risk category to the total constraint perception in the sector. These percentages show a much larger range than the comparable results of Part 1. Here the percentages range between 3 – 26% per category.

Frequency analysis

Table E1.2 shows the frequency analysis of the risk ranking results presented in Table E1.1. This table presents the number of stakeholders that assigned points, ranging from a minimum of zero to a maximum of ten, to a particular risk category. This data shows that none of the stakeholders assigned more than 50% of their total risk perception to one single risk category, which means that risk perception among stakeholders was a combination of risk categories. None of the risk categories monopolised the risk perception of any stakeholder.

Risk ranking

The risk ranking results shown in Table E1.1 are graphically represented for the whole sector in Figure E1.1, and for each of the stakeholder groups in Figures E1.2-10. These figures show the risk profile of the sector and each stakeholder group, and indicate the percentage contribution of each risk category to the total risk.

Figure E1.1 shows the risk profile of the entire sector, indicated by the percentage contribution of each category to the total sector risk. The contributions of commercial and non-commercial risks were much more balanced than in Part 1, with contributions of 55% and 45% respectively. This result, compared to the risk category distribution of 75%/25%, indicates clearly that the non-commercial risks ranked in proportion higher than the commercial risks. This finding confirms and reinforces the earlier findings of Part 1.

Similarly, Figures E1.2-10 show the risk profiles of the 9 stakeholder groups. The results shown were based on only 2-3 stakeholders per stakeholder group, and are therefore not statistically significant, but indicative of the risk profile of the stakeholder group. The risk ranking for the sector is shown in Table 5.3.

The risk categories with the highest ranking were social political risks (25.5%), market risks (22%), and legal and regulatory risks (19.5%). The lowest risk rankings were environmental risk (2.5%) and engineering risk (3.5%)

The interpretation of the data analyses is presented in Chapter 6.

TABLE 5.3 : SECTOR RISK RANKING

RISK CATEGORY	STAKEHOLDER GROUPS RISK RANKINGS									
	National Govmnt	Local Govmnt	Consumers	Bulk Services	Underwriters	Private Lenders	Unions	Service Providers	PSP Advisors	Total Sector
Social Political	30	25	20	10	23	13	40	40	25	**25.5**
Market	4	35	25	20	34	23	20	17	25	**22.0**
Legal and Regulatory	30	20	25	20	7	27	20	7	25	**19.5**
Financial	10	0	15	10	3	17	0	20	15	**11.0**
Economic	17	5	0	10	0	7	20	13	10	**8.5**
Operational	3	0	10	20	10	10	0	3	0	**7.5**
Engineering/Technology	3	0	5	10	13	0	0	0	0	**3.5**
Environmental	3	0	0	0	10	3	0	0	0	**2.5**
TOTAL	100	100	100	100	100	100	100	100	100	**100**

Note: High Moderate Low
Values shown are percentages of the total risk perception of the stakeholder group

5.2.2.2 Constraint ranking results

The constraint rating results of Part 2 are presented in Appendix E2.

Survey results

Table E2.1 shows the survey results obtained from the 20 stakeholders. It shows the total score for each category across the sector and the percentage contribution of each risk category to the total constraint score in the sector. These percentages range between 2 – 27% per category, with commercial and non-commercial risks contributing 50% each.

Frequency analysis

Table E2.2 shows the frequency analysis of the constraint ranking results presented in Table E2.1. This table presents the number of stakeholders that assigned points ranging from a minimum of zero to a maximum of 10 to a particular risk category. This data has been interpreted to establish the constraint portfolio throughout the sector. This data shows that three of the stakeholders assigned more than 50% of their total risk perception to one single risk category; risk perception among the rest of the stakeholders constituted a combination of risk categories.

Constraint ranking

The constraint ranking results shown in Table E2.1 are graphically represented for the whole sector in Figure E2.1, and for each of the stakeholder groups in Figures E2.2-10. These figures show the constraint profile of the sector and each stakeholder group, and indicate the percentage contribution of each risk category to the total risk. The risk categories with the highest constraint ranking were legal and regulatory risks (26%), social political risks (23%), and market risks (19%). The lowest risk rankings were environmental risk (2%) and engineering risk (3%).

The constraints were ranked using the results of this analysis. The sector constraint rankings are shown in Table 5.4 overleaf.

The interpretation of the data analyses is presented in Chapter 6.

TABLE 5.4 : SECTOR CONSTRAINT RANKING

RISK CATEGORY	STAKEHOLDER GROUPS CONSTRAINT RANKINGS									
	National Govmnt	Local Govmnt	Consumers	Bulk Services	Underwriters	Private Lenders	Unions	Service Providers	PSP Advisors	Total Sector
Legal and Regulatory	23	45	25	40	27	37	10	10	25	**26**
Social Political	23	15	20	10	13	17	60	40	25	**23**
Market	10	15	25	0	30	23	20	10	25	**19**
Financial	17	5	15	30	3	13	0	27	15	**14**
Economic	10	15	0	20	4	3	10	3	10	**7**
Operational	7	5	10	0	10	7	0	7	0	**6**
Engineering/Technology	3	0	5	0	10	0	0	0	0	**3**
Environmental	7	0	0	0	3	0	0	3	0	**2**
TOTAL	100	100	100	100	100	100	100	100	100	**100**

Note: High Moderate Low
Values represent the percentage of total perceived constraint.

5.2.2.3 Risk / constraint ranking comparison

The comparison of risk ranking and constraint ranking results of Part 2 are presented in Appendix E3.

Survey results

Table E3.1 shows the survey results obtained from the 20 stakeholders. The values presented in Table E3.1 were calculated by subtracting the constraint rating from the corresponding risk rating.

A negative value indicates that the constraint rating was higher than the risk rating. This implies that the present management of the risk in that particular risk category was not perceived as effective, and that the stakeholders were averse to the risks in this category. A zero value means that the constraint rating equalled the risk rating. This implies that risk management has not affected the risk perception of that particular risk category for the stakeholder concerned. A positive value means that the constraint rating was lower than the risk rating. This implies that the present management of the risk in that particular category was perceived as effective in reducing the risk perception.

The total score for each risk category indicates the sector's perception of risk and constraint in that category. A negative value means that the overall perception was that the risks in that category were perceived to be a bigger constraint than their risk rating indicated. A value of zero indicates that the overall perception was that the risks in that category are as much a constraint as their risk rating indicated. A positive value indicates that the overall perception was that the risks in that category were less of a constraint than their risk rating indicated.

Frequency analysis

Table E3.2 shows the frequency analysis of the comparison results presented in Table E3.1. This table presents the number of stakeholders against the difference in ranking for risk and constraint (ranging form –5 to 5) by risk category. This data has been interpreted to establish the predominant difference in ranking risks and constraints for a risk category throughout the sector.

Table E3.3 presents the same frequency analysis, but summarised in only three categories of difference, namely negative (indicating risk management failure), zero (indicating risk management indifference), and positive (indicating risk management success). This table shows that for certain individual risk categories (such as legal and regulatory, financial and market risks) the constraints and risks were ranked differently, but that in the overall sector the constraints and risks rankings were balanced, with some 64% of the rankings indicating a zero variance between the risk and constraint ranking.

Analysis of results

The results of the comparison of risk and constraint ratings shown in Table E3.1 are graphically represented for the whole sector in Figure E3.1, and for each of the stakeholder groups in Figures E3.2-10. These figures show the impact of risk management on the risk profile of the sector and each stakeholder group.

The highest negative variance was observed for the legal and regulatory risks, indicating that these risk were perceived to be higher constraints than risks. The level of risk was thus under estimating the level of constraint. The other risk category with a negative variance were the financial risks. The highest positive variance was observed for market risk, indicating that these risks were perceived to be lower constraints than their risk rating suggested.

Similarly, Figures E3.2-10 show the risk and constraint comparisons for each of the 9 stakeholder groups. Government stakeholders (national and local), finance underwriters and the unions showed various degrees of difference between their ranking of risks and constraints. The other stakeholder groups ranked risks and constraints fairly even.

The interpretation of the data analyses is presented in Chapter 6.

5.2.3 Comparison Of Results Of Questionnaire – Parts 1 And 2

Parts 1 and 2 of the Introductory questionnaire served two different objectives. Part 1 set out to rate individual risk categories in terms of level of risk and constraint, and focussed on rating risk categories independently. Part 2 aimed to rank the risk categories against each other.

Both parts yielded similar information. A comparative analysis of the results was considered valuable as it may yield information that would complement and extend the understanding of risk and constraints beyond that derived from the individual parts.

The objective of the comparison was to analyse the different sets of results for similarities and variances, to gain confidence in the results, and added understanding of the sector.

The comparison of the results of the two parts is presented in Appendix F.

5.2.3.1 Risk rating results

The comparison of results from the two surveys with regard to risk rating is presented in Appendix F1. Tables F1.1 and F1.2 show the survey results of Parts 1 and 2 respectively, and provide the data for the entire sector and each stakeholder group.

Figure F1.1 shows the risk rating comparison of both surveys, comparing the contribution of each risk category to total risk in the sector. The chart, based on the data from 20 stakeholders, shows that both parts of the questionnaire yield very similar results in terms of identifying the risk categories which contribute more than others to total risk. However, the second part tends to exaggerate the differences between risk categories, whereas the results of first survey were more uniform in nature.

Similarly, Figures F1.2-10 show the risk rating comparison of both surveys, comparing the contribution of each risk category to the total risk for each stakeholder group. Although based on much smaller samples (2 or 3) the comparison yields the same results, in that both sets of ratings were very similar.

Here again, the results of Part 2 tended to indicate higher variances between risk categories, whereas the results of the first survey were more uniform.

5.2.3.2 Constraint rating results

The comparison of results from the two surveys with regard to constraint rating is presented in Appendix F2. Tables F2.1 and F2.2 show the results of the two surveys and provide the data for the entire sector and each stakeholder group.

Figure F2.1 shows the constraint rating comparison of both surveys, comparing the contribution of each risk category to the total score for the sector. The chart, based on the data from 20 stakeholders, shows that both parts of the questionnaire produced very similar results in terms of identifying the risk categories which contributed more than others to the total. However, the results of the second part tended to indicate greater differences between risk categories, whereas the results of the first part were more uniform in nature.

Similarly, Figures F2.2-10 show the constraint rating comparison of both surveys, comparing the contribution of each risk category to the total for each stakeholder group. Although based on much smaller samples (2 or 3) the comparison yields the same results, in that both sets of ratings were very similar. Here again, the results of the second part indicated higher variances between risk categories, whereas the results of the first part were more uniform

5.2.3.3 Risk / constraint rating comparison

The comparison of results from the two surveys with regard to variance in risk and constraints rating is presented in Appendix F3. Tables F3.1 and F3.2 show the survey results of Parts 1 and 2 respectively and provide the data for the entire sector and each stakeholder group.

Figure F3.1 shows the rating comparison of both parts, comparing the variance in rating for each risk category. The chart, based on the data from 20 stakeholders, shows that both parts yielded dissimilar results in terms of identifying the extent of difference in perception between risk and constraint. This difference is also evident in Figures F3.2-10 which show the comparison of the results of both parts for each stakeholder group. As Part 1 was concerned with rating individual risk categories, it thus provided a more reliable comparison.

5.2.4 Part 3 : PSP Issues Survey

The third part of the Introductory Questionnaire presents the interviewee with a number of statements covering a range of aspects of managing risk of PSP in the provision of water services, as identified in by the literature review. This part of the questionnaire tested the interviewee's level of agreement with these statements. The data obtained and the results of the analysis are presented in Appendix G.

Survey results

Table G.1 shows the survey results as obtained from the 20 stakeholders. The level of agreement as indicated by 1(strongly disagree) to 5 (strongly agree) were summed for each statement. The total and average scores for each of the statements indicate the level of agreement with the statement across the water services sector. An average score greater than say 3.5 would indicate the sector's tendency to agree with the statement, whereas an average score less than say 2.5 would indicate the sector's tendency to disagree with the statement. Average scores between 2.5 and 3.5 could indicate the sector's neutral position or the issue, but could also be the result of an equal number of stakeholder agreeing and disagreeing with the statement.

Overall sector agreement or disagreement with a particular statement was of interest to characterise the sector and the stakeholders. The analysis of disagreement within the sector on certain issues was of greater interest. Disagreement among stakeholders results in uncertainty, which causes risk in the sector to increase. The analysis of agreement across the sector was done using a frequency analysis.

Frequency analysis

Table G2 shows the results of the frequency analysis of the data presented in Table G1. This table gives the number of stakeholders per level of agreement for each of the 20 statements. This analysis gives an indication of the level of agreement among stakeholders. The management of risks in the sector benefits from an understanding of the level of agreement among the stakeholder on a particular issue.

Table G3 shows the results of the agreement analysis, expressed as a percentage of stakeholders disagreeing, neutral or agreeing with the statements on the questionnaire. This table indicates that for 8 of the 20 statements the sector stakeholders are in disagreement.

Analysis of results

Figures G1-20 show the frequency distribution of stakeholder agreement for each of the 20 statements made. The figures show the number of stakeholders for each level of agreement. The figures indicate that for 12 of the 20 statements the stakeholders across the sector were in agreement, and for the remaining 8 statements the sector was divided

The management of risk is concerned with the identification and management of uncertainty. The attention of this research was therefore focussed on those statements for which the results showed a considerable disagreement among the sector stakeholders. Disagreement is a sign of uncertainty in the sector.

Issues of disagreement were identified using the results of Tables G1 and G2 and the frequency distribution graphs. The statements identified have an average level of agreement of between 2.5 and 3.5 and show a uniform or somewhat bi-modal frequency distribution. The statements over which the sector was in disagreement are the following:

- Statement 5: concerning the regulation of PSP in the sector.
- Statement 6: concerning the issue of risk transfer to the private sector.
- Statement 7: concerning the issue of separating the responsibility and actual service delivery.
- Statement 11: concerning the lack of private equity investment as a constraint to PSP.
- Statement 13: concerning the issue of the financial risk / return ration in the sector.
- Statement 16: concerning the issue of PSP to be more suitable for urban areas than for rural areas.
- Statement 19: concerning the issue of gradual transition of services to the private sector.

The stakeholders concurred on their agreement with the following statement:

- Statement 1 : concerning the reduction of risk to local governments as a result of PSP.
- Statement 2: concerning the improvement of level of services as a result of PSP.
- Statement 4: concerning the necessity of PSP to keep up with service demands.
- Statement 8: concerning the achievement of competitive returns on investments by the private sector.

- Statement 9: concerning that there should be a balance between operational efficiency and job-loss minimisation.
- Statement 12: concerning the issue of political unwillingness as a major constraint to PSP.
- Statement 15: concerning the issue of situation dependent PSP.
- Statement 17: concerning the ability of South Africa to attract foreign direct investment into the water sector.
- Statement 18: concerning the important role of PSP in solving the backlog in services.
- Statement 20: concerning the issue that the water sector should be made more attractive to investors.

The stakeholders concurred on their disagreement with statement 10, concerning the importance of asset ownership to private investment in the sector.

The results of this part of the questionnaire have been used in the interpretation of the research results in Chapter 6 of this report.

5.2.5 Summary

The Introductory Questionnaire constituted three parts. Part 1 provided some quantification of the rating of perceived levels of risks and constraints, whereas Part 2 quantified the ranking of risks and constraints.

The results of Parts 1 and 2 were compared to assess the link between risk and constraint. The results of Part3 were used to identify issues of disagreement among sector stakeholders which cause uncertainty and thus risk in the sector.

The results of the analysis of the introductory questionnaire are complemented with the results of the stakeholder interviews, and together form the first leg of the triangulation of results.

5.3 STAKEHOLDER INTERVIEWS

The objective of the stakeholder interviews was to collect more detailed information to complement - and provide a deeper understanding of - the data obtained through the questionnaire. The interview summaries are contained in Appendix H, which formed the basis for the findings presented here.

Risk perception is specific to each stakeholder group. The aim of the interviews was to discuss, and obtain a deeper understanding of, the risk management perception of each stakeholder group. The content analysis of the interview schedules and summaries revealed the following:

5.3.1 National Government

The national government stakeholder group rated socio-political risk, legal and regulatory, and economic and financial risks. The following points capture the perception of risk management by this stakeholder group:

Socio-political risk:

- National government has an overall commitment to provide service for social good.
- It is faced with a large backlog of services to the poor who cannot afford to pay for services.

Legal and regulatory risk:

- National government recognises the benefits of PSP, provided there is transfer of risk and within a regulated framework.
- National government is the regulator. The need to regulate arises from the need to protect society from the ills of creating a private monopoly.
- Regulators have policy and legislative power to set the playing field. The present regulatory framework was judged to be inconsistent, which indicates the ad hoc and uncoordinated process of establishing this framework.
- Government stakeholders have a high perception of risk associated with PSP. This perception of risk has been instrumental in the development of a legislative and regulatory framework, which gives preference to public provision of services, and in case of PSP transfers a considerable portion of risk to the private sector.

Economic / financial risk:

- National government has limited financial resources, in the environment of a vulnerable emerging economy.

5.3.2 Local Government

Local government stakeholders rated legal and regulatory risks, market risks, and operational risks as the most important risks. The following points capture the perception of risk management by this stakeholder group:

Socio-political risks:

- As an elected body it has the advantage of being representative, and is therefore in a position to manage socio-political risks.
- It is responsible for managing social and political risk by educating the community, and involving the community in the decision making process.
- The lack of local success stories is a constraint to gaining public acceptance of PSP.
- It is responsible for efficient, affordable service delivery, and the extension of service delivery.
- The socio-political pressure to extend services to the unserved areas creates deadline pressure for finding a solution.

Legal / regulatory risk:

- Government's responsibility for service delivery is decentralised and delegated to local government.
- It perceives the regulatory framework to present a first step in improving the present situation, but does not go far enough to stimulate PSP.
- It recognises the benefit of PSP, provided there is transfer of risk and create incentives to the private sector to participate.

Market risk:

- Local government is the stakeholder responsible for service delivery, and experiences the practical implications of market risk.
- As a public service provider, it is exposed to market risk.
- A willingness to outsource the provision of water services is constrained by general culture of non-payment for services, creating revenue risk, opposition of unions, and consumers.

Operational risk:

- It is responsible for efficient, affordable service delivery, and the extension of service delivery.
- The lack of local success stories is a constraint to PSP.
- Generally present operations are inefficient, and revenue does not cover costs.

5.3.3 Consumers

Consumer stakeholders have rated legal and regulatory risks, market risks, operational and engineering risks as the most important risks. The following points capture the perception of risk management by this stakeholder group:

Legal and regulatory risk:

- Tariff controls are needed, as tariffs are a source of risk for both consumers and service providers.

Market risk:

- The willingness to pay depends on quality of service.
- The ability to pay determines appropriate level of service.
- Expectations of service delivery are often not in line with the ability to pay.
- Consumers recognise the benefits of PSP in terms of service delivery, but perceive this to be accompanied by tariff increases, with the danger of making the services unaffordable.
- Business risk can be mitigated by a collective effort of consumers to pay for services.

Operational risk:

- The ability to pay determines appropriate level of service.
- The willingness to pay depends on the quality of service.
- Consumers recognise the benefits of PSP in terms of service delivery, but perceive this to be accompanied by tariff increases, with the danger of making the services unaffordable.

Engineering / technology risk:

- The ability to pay determines appropriate level of service and technology.
- As purchaser of waste water treatment services, consumers (especially industries) perceive engineering and technology risk and operational risk as important. Inadequate technology by the service provider results in a sub-standard service, which increases business risk.

5.3.4 Bulk Service Providers

Bulk service providers have rated socio-political risks, legal and regulatory risks, market risks, and economic and financial risks as the most important risks. The following points capture the perception of risk management by this stakeholder group:

Socio-political risk:

- In communities where PSP is not feasible, a public-public partnership is likely to offer a suitable alternative.
- Stakeholder participation in the formulation of national policies and local service levels is seen as necessary to manage and mitigate risk.

Economic / financial risk:

- PSP relies on sustained revenue stream. A sustained financial viability is needed to service debt.

Market risk:

- There is a perceived high exposure to market risk, including revenue and demand risk. Efficiently managed water service authorities will reduce this risk.
- The ability to pay is the main factor. This is managed by the provision of affordable level of service.
- PSP relies on sustained revenue stream. A sustained financial viability is needed to service debt.

- Introduction of competition increases efficiency in the sector.
- See opportunities in providing reticulation services in addition to distribution services.

Legal and regulatory risk:

- Regulatory uncertainty and risk are due to the framework being relatively new and untested.
- Introduction of competition increases efficiency in the sector.

5.3.5 Development Financiers (Underwriters)

Development financiers have rated legal and regulatory risks, market risks, socio-political risks and financial risks as the most important risks. The following points capture the perception of risk management by this stakeholder group:

Legal and regulatory risk:

- A regulatory framework allows government intervention in or regulation of profits, rates of return and surplus application. These place significant uncertainty on the operator's ability to service debt.
- Regulations by various regulating organisations are inconsistent. The Water Services Act clearly favours public sector provision of services and views PSP a secondary option. The Local Government Transformation Act forbids the outsourcing of payment collection and tariff setting.

Market risk:

- The culture of non-payment among consumers increases revenue risk and associated financial risk.
- International underwriters source their financing from abroad. These funds require higher return for investment in Africa, which makes finance relatively expensive and not competitive with the local financial institutions.

Socio-political risk:

- Closer links to government enables underwriters to better manage and control socio-political risks, and thus provide finance carrying a higher risk as private financial institutions would for the same return.
- National underwriters are in a position to provide project financing when private lenders find it to risky.

Financial risk:

- The culture of non-payment among consumers increases revenue risk and associated financial risk.
- National underwriters are in a position to provide project financing when private lenders find it to risky.
- The present drive for commercialisation leads to the phasing-out of 'soft' loans, and a move to 'more risk' loans. Underwriters also provide credit enhancement facilities and guarantees.

5.3.6 Private Lenders

Private lenders have rated legal and regulatory risks, economic and financial risks, market risks, and socio-political risks as the most important risks. The following points capture the perception of risk management by this stakeholder group:

Legal and regulatory risk:

- The regulatory framework is inconsistent, causing uncertainty for lenders. The Water Services Act gives power to government to regulate operating company profits, returns on investment an application of surplus. This directly affects the operator's ability to service debt.
- New environmental legislation exposes investors to operational and environmental risk, by holding investors partly responsible for the environmental performance of the projects they invest in.

Economic / financial risk:

- The main concern of lenders is the ability of the borrower (operator) to service the debt.
- The cost of finance is a reflection of the risk perception.
- Lenders' risk can be mitigated through loan syndication, with each lender carrying a portion of the risk in the sector. The inclusion of the Development Bank of Southern Africa is important for mitigating risk at this stage of PSP in the sector.
- Project financing usually occurs on the basis of a debt / equity ratio of

around 80 / 20. This high gearing means that financial institutions bear most of the commercial risks.

- Financial risk mitigation is the core competence of financial institutions. Exposure to other risks is their main concern.
- Foreign investors face the added risk of exchange rates and control. This risk can be controlled by various financial hedging instruments, but they add to the cost of finance.

Market risk:

- The main concern of lenders is the ability of the borrower (operator) to service the debt.
- The cost of finance is a reflection of the risk perception
- Project financing usually occurs on the basis of a debt / equity ratio of around 80 / 20. This high gearing means that financial institutions bear most of the commercial risks.
- Foreign investors look for opportunities to invest world wide. The South African water services sector competes for funds against other global investment opportunities. If the sector shows favourable risk / returns ratios, project finance will not be a problem.

Socio-political risk:

- Political non-commitment and strong opposition from the unions increase perceived risk in the sector.

5.3.7 Unions

Unions rated socio-political risks, market risks, and operational risks as the most important risks. The following points capture the perception of risk management by this stakeholder group:

Socio-political risk:

- Unions are politically opposed to privatisation in general, and in principle are opposed to private control over public goods.
- Unions are concerned that efficiency gains lead to job loss.
- Unions are also concerned that PSP will reduce the opportunity for community participation in decision making, turning communities into individual consumers.
- Public sector or public-private partnerships are preferred service providers. This places public goods under public control.

Market risk:

- Unions perceive the risk of less accountability and transparency, less opportunity for cross subsidisation, and the excessive profit taking in a private monopoly.
- Unions are concerned that increases in tariffs will result in reduced service quality to low income groups.

Operational risk:

- Unions are concerned that PSP will reduce the opportunity for community participation in decision making, turning communities into individual consumers.

- Unions are concerned that increases in tariffs will result in reduced service quality to low income groups.
- Unions are opposed to PSP as they are of the opinion that the benefits of PSP are outweighed by the negative operational effects.

5.3.8 Service Providers

Service providers have rated legal and regulatory risks, socio-political risks, and market risks as the most important risks. The following points capture the perception of risk management by this stakeholder group:

Legal and regulatory risk:

- The Water Services Act provides for the regulation of profit, rate of return, and the application of surplus. This in itself would be acceptable if clearly spelled out. Present intentions are ambiguous and therefore perceived risky.
- The legislative framework is not providing a stimulating environment for PSP. Water Boards are the preferred service providers.
- Risk mitigation can occur through public-private partnerships, where public sector bears regulatory risk and manages the opposition of the unions.
- Private syndication of risk can be achieved by selecting competent joint venture partners, prepared to take risk, and by undertaking a thorough due diligence study to assess risks.

Socio-political risk:

- The slow pace of change, due to a not fully committed government and strong opposition of the unions, causes increased project development cost, causing market attractiveness and confidence to decrease.
- Risk mitigation can occur through public-private partnerships, where public sector bears regulatory risk and manages the opposition of the unions.
- Private syndication of risk can be achieved by selecting competent joint venture partners, prepared to take risk, and by undertaking a thorough due diligence study to assess risks.

Market risk:

- The private service operator typically provides 20-30% of project finance through equity. Country risk and project risk are the main determinants for establishing required returns.
- Despite the slow process of change, the South African water services market is considered attractive from an opportunity point of view.
- Most service providers are large global organisations who set global criteria for required return on investments. The South Africa water services sector competes with other investment opportunities in the world. In-depth project research is done to determine risk and required return.

Financial risk:

- Private sector syndication of risk can be achieved by selecting competent joint venture partners, prepared to take risk, and by undertaking a thorough due diligence study to assess risks.

- The private service operator typically provides 20-30% of project finance through equity. Country risk and project risk are main determinants for establishing required returns.
- Most service providers are large global organisations who set global criteria for required return on investments. The South Africa water services sector competes with other investment opportunities in the world. In depth project research is done to determine risk and required return.

5.3.9 PSP Advisors

PSP advisor rated legal and regulatory risks, socio-political risks, and market risks as the most important risks. The following points capture the perception of risk management by this stakeholder group:

Legal and regulatory risk:

- Legal and regulatory risk need to be born by national government. The inclusion of an empowerment organisation is crucial for the success of the project, and the control of socio-political risk and market risk.

Socio-political risk:

- Government has a political commitment to provide services, and are under pressure from the communities without water services to deliver. Government recognises the benefits of PSP, but it is not considered to be the only or best option.

- Customer (community) participation in the decision making process is vital to the success of PSP.

Market risk:

- Stakeholders are not an active participant in the provision of water services, and thus do not take bear risk other than for services rendered.

5.3.10 Summary

The stakeholder interviews constituted a discussion on the risks and constraints in the water services sector, guided by a set of open-ended questions. The results are part of the qualitative research aimed at seeking a richer appreciation of the context and conditions surrounding risk perception in the sector. These qualitative results complement the measurements of risk and constraint perceptions in the questionnaire.

The combined findings of the questionnaire and the interviews constituted the first leg of the triangulation of results. These findings are compared to the findings of the case study to yield the main findings for this research.

5.4 PSP CASE STUDY

The results of the case study analysis are tabulated and summarised in the same manner as the interview schedules. The case study summary table is given in Appendix H following the interview summary tables. The case study of the

Nelspruit concession rated legal and regulatory risks, socio-political risks, market risks, and financial risk as the most important risks. The following points capture the perceptions and management of risk in this case of PSP in the water services sector:

Socio-political risk:

- The area is characterised by service backlogs, requiring large capital investment. The supply area of the concession has expanded from the original 24 000 households to 230 000 households.
- Strong union opposition caused extensive delays in implementation. Labour opposition was addressed at national level.

Market risk:

- Inadequate service provision and levels of services resulted in a low willingness to pay, and consequent poor revenue performance.
- The concession owner is a joint venture between an international service provider and a black empowerment organisation, combining international expertise with local knowledge, which enables risk sharing and control.

Financial risk:

- The municipality had largely exhausted its capacity to borrow.
- Based on the experience with this project, model contracts are being developed to assist with PSP project in the future.
- Lenders played a key role, providing about 80 % of the project company's financing. Lenders' rights and obligations feature in the contract

documentation, and finance is a 'suspensive condition' to the contract.

- Project finance is provided by the Development Bank of Southern Africa which is providing bridging finance to get the project started. The aim is to sell off the majority of the debt to private financial institutions, while maintaining the socio-political and regulatory risk.

Legal and regulatory risk:

- A lack of previous cases means that the implementation of this concession is a test case for concessions in South Africa. Success of this pilot project will enhance the opportunities for PSP in the sector. Failure to deliver on its promises will seriously limit further opportunities.
- Based on the experience with this project, model contracts are being developed to assist with PSP project in the future.
- The legal and regulatory framework caused amendments to the concession contract. The framework does not allow the municipality to outsource revenue collection, or relinquish the right to determine tariffs. An interim arrangement was instituted, in which the municipality continues to be responsible for revenue collection and tariff setting, until such time that changes to the regulatory framework have been made.

Summary

The case study constituted a content analysis of the available literature pertaining the case and the opinions of the stakeholders expressed during the interviews which were directly pertinent to the case. The results are part of the qualitative research aimed to provide a practical perspective on the management of risk of PSP in the sector, and constitute the second leg of the triangulation process of this research.

5.5 TRIANGULATION OF RESULTS

The combined results of the introductory questionnaire and the stakeholder interviews were compared to the findings of the case study. The results of this comparative analysis are summarised to form the following set of main research findings.

5.5.1 Constraints to PSP in Water Services

Overall sector constraints were established by combining the results of all stakeholders. This research identified the following constraints to PSP in the water services sector:

- Management of risks associated with PSP, and
- Project finance.

5.5.2 Risk Management in the Water Services Sector

As risk management is a process comprising four components, the key findings with regard to risk management as a constraint to PSP in the provision of water services relate to those components: identification, evaluation and assessment, allocation, control and mitigation.

Risk identification

The stakeholder survey data indicated that the management of risks is a major constraint to PSP. An analysis of the data collected resulted in the rating of the level of constraint perceived from each of the risk categories. The results of this analysis are summarised in Table 5.5.

TABLE 5.5 : SECTOR CONSTRAINT RATING CATEGORIES

RISK CATEGORY	STAKEHOLDER GROUPS CONSTRAINT RATINGS									SECTOR
	National Govmnt	Local Govmnt	Consumers	Bulk Services	Underwriters	Private Lenders	Unions	Service Providers	PSP Advisors	TOTAL
Legal and Regulatory risk	H	H	H	H	H	H	M	M	H	**H**
Social Political risk	H	M	H	M	M	M	H	H	H	**H**
Market risk	M	M	H	L	H	H	H	M	H	**H**
Financial risk	H	L	M	H	L	M	L	H	M	**M**
Economic risk	M	M	L	M	L	L	M	L	M	**M**
Operational risk	M	L	M	L	M	M	L	M	L	**M**
Engineering/Technology risk	M	L	L	L	M	L	L	L	L	**L**
Environmental risk	L	L	L	L	L	L	L	L	L	**L**

Note: H High M Moderate L Low

Table 5.5 shows that the top three risk categories in terms of being a constraint to PSP in the water services sector are legal and regulatory risks, social and political risks, and market risks. The next level of constraints, perceived as moderate, comprises financial risks, economic risks, and operational risks. The two remaining risk categories, engineering / technology risks and environmental risks, were rated as low constraints to PSP in the sector.

The constraint ratings of the risk categories were found to show a degree of consistency among the stakeholders. The most notable exception was the financial risk category, in which there was the greatest variation among stakeholder constraint perceptions. National government, bulk service suppliers, and water service providers rated these risks as a high constraint, primarily attributable to the fact that these are the stakeholders which held the biggest financial commitment in the sector. The rest of the stakeholders rated financial risks only as moderate or low constraint to PSP.

Risk assessment

The research found a statistically significant difference among the constraint ratings of the different risk categories, meaning that the risk and constraint perception of stakeholders is not uniformly distributed over all risk categories. The various stakeholder groups rated the risk categories with a fair degree of variance, but also showed a fair degree of consistency among the ratings. It is this degree of consistency among stakeholder groups that lead to the identification of three level of constraint. Without a degree of consistency, the variance in the ratings of the various stakeholders would have aggregated into a fairly uniform distribution of risk rating among the risk categories. Within stakeholder groups the research found there was broad consensus about risk and constraint perception among stakeholders. The risks and constraints perceived in each of the risk categories were assessed as follows:

- **Legal and regulatory risks** were identified as the biggest constraint and greatest contributor to overall sector risk. These risks were caused primarily by the inconsistencies in the framework established by the various regulators involved in the sector. The Water Services Act (1997) empowers the government to set technical standards and tariffs, intervene in contracts, regulate profits, rates of return and the application of surplus funds, seize assets without compensation, and gives preference to public sector operators. The Local Government Transition Act (1993) allows the local governments to enter into agreements with the private sector, but prohibits local governments to contract out its power to set or collect tariff revenues. This means a contract would be unenforceable if the contract disempowers a local government from exercising its public duties. This regulatory framework constituted a risk and high constraint for all stakeholders in the sector.

- **Socio-political risks** were caused primarily by a perceived lack of political willingness to make the sector attractive to PSP: the strong opposition of the unions to privatisation in general and particularly of the water services sector; the persisting culture of non-payment, coupled with the political reluctance to strongly support discontinuation of services to payment defaulters; and the overall negative perception of the private sector wanting to make a profit from basic human needs. Water is seen as a public good, to be controlled by the public sector.

- **Market risks** were caused primarily by the general uncertainty regarding the long term sustainability of the ability of the consumer to pay for the level of service, related to the long term economic situation of the area served, the uncertainty regarding the impact of tariff increases on water demand, the ability of the operator to pass on tariff increases from bulk suppliers, and the general culture of non-payment for services which creates revenue risk.

Risk allocation

The aim of risk allocation is to transfer the risk to the party best able to control and or mitigate it. Depending on the PSP option, the risk sharing arrangement was found to differ. This research found that many of the stakeholders are of the opinion that PSP can only have the desired results if there is a transfer (allocation) of risk to the private sector. The transfer of risk ensures the required efficiency gains.

The allocation of risks was found to give rise to major constraints in the sector. The high constraint risk categories identified by this research were rated high because stakeholders carried risk which they are not able to control. Two of the risk categories identified as being the biggest constraint to PSP are non-commercial risks which should be allocated as much as possible to the government stakeholders, as these organisations are best able to manage them. In fact presently the national government, as regulator of the sector, has put a framework together that adds to the risk perception of the private sector.

Risk control and mitigation

This research found that risk allocation was not the same as risk mitigation. Transferring risk from one stakeholder to another, may reduce the risk of the former stakeholder, but exposes the latter stakeholder to more risk. For example, to control and mitigate some of the risks of the national government, the regulators have established a regulatory framework to control and mitigate the public sector risk. However, having done so, they have transferred risk to the private sector and other stakeholders who are not able, or are certainly not in the best position to control or mitigate the risk.

The literature identified several risk control and mitigation methods. These are categorised in generic mitigation and specific mitigation options. During the interviews conducted as part of this research, the application of a variety of risk mitigation methods were discussed in relation to the risk categories identified. The findings of this analysis are summarised in Table 5.6 overleaf.

This research has shown that the high rated risk categories are legal and regulatory, social-political and market risks. To mitigate the risk in the sector and reduce the constraints on PSP in the provision of water services, these high risk categories are an obvious target for improvements.

TABLE 5.6 : RISK CONTROL & MITIGATION FRAMEWORK

The suitability of the method is indicated by :+ (low); ++ (moderate); +++ (high)

Risk Category	Generic Risk Control and Mitigation Options								
	Insurance	Guarantees	Syndication	Performance Bonds	Hedging	Political stability	Macroeconomic Stability	Tariff regulation	Contractual arrangements
Legal and Regulatory				+++			+	++	+++
Socio-political	+	++	+++	++		+++	++		+
Market		++		++	+	++		+++	+
Financial		++	++		+++		++		
Economic		++	+			++	+++		
Operating	+++								+
Engineering/ Technology	+			+					+++
Environmental	++								+

Another key finding of this research with considerable implications for the management of risks in this sector was the interrelationship of risks. The interviews with the stakeholders brought out that control or mitigation, or the lack thereof, of risks in a certain risk category, affects the risk perception in another risk category. For example, the culture of non-payment for services was found to be a socio-political risk, but also affected market risks, and indirectly affected financial risks.

5.5.3 Development Finance

Besides the management of risks, development or project finance was found to be the next main constraint to PSP in the sector. The main causes for rating this a high risk is the level of financial risk perceived in the sector and related to that the financing structure of PSP projects.

The typical financing structure of water services projects was found to be a with a debt / equity ratio of around 80/20. This means that debt is provided on a non-recourse basis. Lenders directly or indirectly carry the bulk of the commercial risk. Lenders are therefore justifiably concerned with the management of risk in this sector.

Other stakeholders in the market commented on their perception that lenders were risk averse. However, lenders provide 70-80% of the project finance and thereby not only exposed to financial risk, which they are able to manage, but also to an array of other risks over which they have little control. The research found that the latter risks increase the risk perception of the lenders.

Sources of debt finance were found to be mainly local financial institutions. In respect of international investments, the water sector was found to be in competition with other infrastructure sectors. The water services sector was rated a lower investment grade than other local infrastructure sectors, such as power, telecommunications and roads. With regard to the international funding of projects, the water sector competes with any other investment opportunity world wide.

The type of debt finance mostly used for projects like this was found to be non-recourse finance. This type of finance relies on the cash generation of the project to service the project debt. This means that the lenders are exposed to financial risks and indirectly any other risk that affects the revenue and cash generation of the project. The culture of non-payment and the ability to pay for service in low income areas add to the risk perception.

Through the interviews it was found that enhancing or securing the project cash flow was an efficient method of mitigating financial risk. Methods to enhance cash flow and thus reduce financial risk of operator were identified as follows:

- Affordable levels of service,
- Good quality of service (reliable, quality of water),
- Accurate metering and billing,
- Pre-pay systems where appropriate,
- Government support for the enforcement of disconnection,
- Government support for education of consumers, and a commitment to payment for services,
- Stakeholder involvement in tariff setting,
- Transparency and accountability,
- Efficient management of operations,
- Government subsidies / guarantees.

Loan syndication was found to be another way to control financial risks. Here various financial institutions each provide a portion of the debt, and thus share in the financial risk associated with it. The inclusion of finance underwriters was found to be an important factor in the control and mitigation of financial risks. International underwriters however, source their funds internationally in hard currency. The added financial risks of interest rates and exchange rates and control, increased the required rate of return well beyond that of the local capital market.

Finally, equity finance was provided by the project company and its sponsors. Project companies were found to be joint ventures between a large international water services provider and local investors including black empowerment organisations. The majority of the equity provided by the project company was found to be provided by the international operator company. A large portion of the equity funding were international funds. The international operators search for opportunities around the world. Local water services projects therefore compete for these resources with the rest of the world.

Chapter 6	INTERPRETATION OF RESULTS

6.1 INTRODUCTION

This chapter integrates the results of the research (Chapter 5) with the concepts and insights from the literature review (Chapter 2), into a discussion around the research questions. The interpretation of the results is divided into 3 parts, corresponding to the research questions posed in Chapter 3 of this report.

The first part is an interpretation of the research results in terms of the first secondary research question concerning the issue of managing risk associated with PSP in the water services sector. The second part is an interpretation of the research results in terms of the second secondary question concerning the issue of financing water services projects. The third part integrates all aspects of this research to address the primary research question concerning the constraints to PSP in the water services sector.

The chapter concludes with a risk management framework for the present situation in the water services sector in South Africa. The framework shows the risk categories perceived to be the highest risks, which were consequently identified as the biggest constraints to PSP in the provision of services.

6.2 RISK MANAGEMENT

The first of the secondary research questions posed in Chapter 3 concerns the management of risk associated with PSP in the water services sector. The literature describes risk management as a process, comprising 4 components: risk identification, risk evaluation and assessment, risk allocation, and risk control and mitigation. The interpretation of the results and key findings of this research is presented using the components of the risk management process as a structure.

6.2.1 Risk Identification

In the literature review, Valsamakis *et al* suggest that the identification of risks is an important starting point to risk management and requires an in-depth understanding of the sector. The identification of risks therefore requires knowledge of the stakeholders and the institutional framework in which they operate, and a clear understanding of the impact of PSP on the sector.

The research identified nine key stakeholder groups who make up the bulk of the sector. Eight of these stakeholders were actively participating in the sector, and one advises the sector on PSP.

The identification of the different risks perceived in the sector used the water services supply chain shown in Figure 2.3. as a first step. However, considering only the service supply side would result in an incomplete answer. To identify all the risks in the sector the following three components of the sector were considered:

- Risk associated with the service delivery of supply chain,
- Risks associated with the return flows of services in the form of financial compensation,
- Risks associated with the institutional restructuring.

The commercial risks (economic, financial, market, operational and engineering and technology risks) were identified as associated with the service delivery and financial return flows. The non-commercial risks (socio-political and legal and regulatory risks) were identified to cover the perception of risk associated with overall environment of the sector in which private sector participation is considered.

An evaluation and assessment of the risk categories for individual stakeholders, stakeholder groups and the entire sector follows.

6.2.2 Risk Evaluation and Assessment

Stakeholder risk perception

In the literature Valsamakis *et al* suggest that risk perception is different for different persons and organisations in similar environments, which suggests that different stakeholders in the same sector perceive risk differently. This research, by means of a questionnaire, set out to establish the perception of risk among stakeholders in the sector. The analysis of the results confirmed in part the findings of Valsamakis *et al*, but also suggested that certain risks in this sector were perceived largely uniformly throughout the sector.

The results of the questionnaire confirmed the existence of the psychology of risk in the sector, particularly among stakeholder groups. Risk perception among stakeholder groups showed considerable differences, resulting in different risk profiles for different stakeholder groups. Risk perception among individual stakeholders within the same group, however, showed marginal differences, indicating a degree of homogeneity in risk perception among stakeholders in the same group.

Further interpretation of the same research results yielded a conclusion not encountered in the literature review, that certain risk categories were evaluated with a significant degree of similarity among all stakeholders across the sector. Table 5.5, where risk were assessed and evaluated as to the degree of constraint to PSP, shows that the legal and regulatory risks and the socio-political risks were rated the same by almost all stakeholders.

The risk categories concerned are the non-commercial ones which establish the framework for the sector and its stakeholders. There was consensus among stakeholders that the regulatory framework is a source of high risk for most stakeholders in the sector.

Similarly, the bottom of Table 5.5 shows that engineering / technology risks and environmental risks were consistently evaluated low on the scale of constraints by the large majority of the stakeholders, indicating that the majority of stakeholders perceive these risks to be well managed under PSP.

Based on the above discussion, it is suggested that the variation in stakeholder perception of risk occurs only in four of the eight risk categories, namely: market risks, financial risks, economic risks, and operational risks. These risk categories represent the risk associated with the practical management and operation of water services. The differential perception of the risks depends on the role of the stakeholder in the supply chain.

Sector risk assessment

The questionnaire assessed the risks which affect the sector. The top three risk categories in the sector were perceived to be legal and regulatory risks, social-political risks, and market risk. Two of the three are non-commercial risks and have little to do with the physical delivery of services, but represent the environment in which the sector operates. The environment is determined by the government policies, the social structure of the community and the national legal and regulatory framework. The case study confirmed that the present legal and regulatory environment in which the sector operates was perceived as the largest contributor to overall sector risk.

The interviews with the stakeholders in the sector confirmed this result, and provided the following reasons for this situation:

- The socio-political environment is characterised by the government policies supposedly committed to delivery of appropriate levels of services to all. Some stakeholders expressed their disappointment with this commitment, stating that progress had been slow.

- The other aspect of the socio-political environment concerns the strong opposition of the unions to privatisation. This has caused major delays in project implementation, reduced overall business confidence in the sector and contributed greatly to the overall perception of risk..

- The legal and regulatory framework in which the sector operates was considered risky by private sector operators and investors. The main reasons are that certain sections of the Water Services Act empower the minister to intervene in the commercial side of the service, by regulating profits, return on investments, and the application of surplus.

Thus the biggest problem for the sector is not the lack of potential for commercialisation but the non-commercial aspects. This suggests that the private sector is ready for PSP, but is deterred by the risks arising out of the socio-political environment and regulatory framework.

Risk and constraint rating

The literature review makes a distinction between risks and constraints. It was suggested that a risk may be perceived and rated as high, but because the stakeholder is able to manage the risk effectively, or is not averse to the risk, may rate that risk as a low constraint. Conversely, certain risks may be perceived and rated as low, but because the potential impact of bearing this risk on a particular stakeholder is high and cannot be controlled, the stakeholder may rate it as a high constraint.

In the questionnaires the stakeholders were asked to rate risk categories in terms of risk and constraint separately. The majority of the stakeholders rated the risk and constraint the same or marginally different, suggesting that risk perception is a reliable predictor of constraint perception.

6.2.3 Risk Allocation

In the literature, Valsamakis *et al* suggests that risk allocation is based on the principle that risk is transferred to the parties best able to control and mitigate it, and that, depending on the PSP option chosen, the risk sharing arrangement will differ.

This research set out to establish whether high constraint ratings were attributable to the allocation of risk in the sector. The stakeholder interviews confirmed that a significant portion of the perceived risk and constraint rating was a direct consequence of inadequate risk allocation. Various stakeholders were found to be bearing risk they had no control over or were not in a position to mitigate.

The literature identified a number of different methods for allocation of risk among stakeholders in the water sector. The results of the stakeholder interviews confirmed the use of different methods of risk allocation and transfer. The stakeholder interviews also provided opinions on risk allocation and sharing in the sector. Interpretation of theses opinions resulted in a risk allocation matrix shown in Table 6.1 overleaf, which indicates the proportion of risk to be born by the various stakeholders in the sector.

National government is the stakeholder best able to manage the non-commercial risks at national level. In the present situation of public provision of services, the national government is bearing a large portion of the commercial risks. PSP in the sector enables the government to transfer the bulk of the commercial risk to the private sector.

Local government is the stakeholder best able to manage the non-commercial risk at local level. Presently most local governments are water service authorities and are the water services utility. Fulfilling this role local government bear the commercial risk of service delivery. PSP in the sector enables local government to transfer the bulk of the commercial risk to the private sector, and retain the non-commercial risks at local level.

TABLE 6.1 : RISK ALLOCATION MATRIX FOR WATER SERVICES

Risk Category	RISK ALLOCATION AND SHARING								
	National Government	Local Government	Operators	Equity Investor / Sponsor	Lender	Underwriters	Insurers	Consumers	PSP Advisors
Legal Regulatory	+++	++		++					
Socio-political	+++	+				++	+	+	
Market		+	++	+++	+			++	
Financial	+		+	++	+++	++		+	
Economic	+++			+++	++				
Operating		+	+++	+	+		+++		
Engineering/ Technology		+++	++					+	
Environmental	++	++	++	+	+		+++	+	

Proportion of risk to be born by stakeholder: +++(high), ++ (medium), +(low).

Private operators are the stakeholders best able to manage the commercial risks. They have the technical and management expertise to sustain a quality service. However, operators are not in a position to manage non-commercial risk effectively. The effects of the social structures, policies and the legal and regulatory framework on commercial risk are those to be shared with the public sector.

Equity investors or sponsors are the stakeholders who bear the major part of the financial, economic and market risks. These stakeholders are in a position to manage the risks, provided they are given the room to act. The legal and regulatory framework defining the environment in which to operate may place further constraints on their actions, and thereby limiting the ability to manage ᴗne risks. For example, the tariff regulations referred to in the Water Services Act protect the consumer from monopolistic price increases, but put limitations on the management of the service.

Lenders are the stakeholders who provide debt finance for projects. These stakeholders are in the best position to assume financial risk. Lenders are also exposed to market risk as the typical method of project finance is non-recourse finance based on project cash flow. Lenders seek to transfer this risk onto the operators, equity investors, and the local government, or share it among other lenders through loan syndication.

Underwriters are the stakeholders who underwrite the financing of projects, and carry financial and non-commercial risk. They are in a better position to bear and control non-commercial risk as they are internationally based organisations with the ability to spread their risk in a world wide portfolio, and by supporting a project can impose certain conditions at national level to mitigate risk.

Insurers are the stakeholders who underwrite insurable risks, such as some operational and environmental risks, and *force majeure* risk. Insurers are bes able to mitigate risk, be it at a cost.

Consumers are the stakeholders who are at the receiving end of the service prc''ided, and can thus only bear little risk. By being the stakeholder that pays for the entire service delivery chain, they have allocated risk to the other stakeholders in the sector.

PSP advisors are the stakeholders who are not active participants in the sector and thus do not carry any risk other than that for the advice they give to the other stakeholders in the sector.

PSP and the allocation of risks

The World Bank (1997b) suggested that PSP in the provision of water services has an impact on the allocation of risk in the sector. The impact depends on the form of PSP chosen for a particular project. As outlined above, the private sector is able to bear the commercial risks associated with the provision of water services, provided it receives the right incentives and is not limited by means of regulations on managing risks.

The interviews confirmed that allocation was an important factor in the rating of risks by the various stakeholders. The perceived misallocation of risk has contributed to the high risk and constraint perception in the sector. The interviews and case study pointed out the following:

Legal and regulatory risk : The regulator (national government) has developed a regulatory framework which provides for the Minister to intervene in the commercial part of service delivery. This gave the private sector service operators the perception that risks are being transferred without incentives being provided. The prohibition of local governments to outsource tariff setting and revenue collection limits the private sector operator to manage revenues, and the regulation of profits and rates of return was found to limit the operator's access to private sector loan funding, and acted as disincentives for efficiency gains. While each of these individual regulations are effective risk control and mitigation instruments from a government view point, the present combination of regulations pertaining water services was found to be the cause of considerable uncertainty among sector stakeholders, and therefore, creating an environment perceived to be the biggest constraint to PSP in the sector.

The government is the main bearer of the these risks as it is in the best position to manage, control and mitigate non-commercial risks. The results of this research showed that these risk categories are considered to contribute the most to overall sector risk, which clearly places the responsibility on the government to undertake steps to control and mitigate those risks.

Social and political risk : Across the sector the stakeholders expressed the view that these risks should be allocated to the national government (at national level), local government (at local level), and the unions. These three stakeholders, together with the consumers and communities, are best able to control and manage such risks.

Market risk : These risks, other than indirect risk imposed by the regulatory environment, are born by the provider of services. At present, the public sector is the main provider of services and thus bears full market risks, related to service delivery, payment collection and revenue risk. With PSP, varying degrees of market risk may be transferred to the private sector. The private sector is in the best position to control market risk, provided the legislation and regulatory framework provide an environment which supports private service provision.

6.2.4 Risk Control and Mitigation

Risk control is concerned with the control of the potential impact of risk. Risk mitigation concerns with the actual reduction (lowering) of risk and its potential impact. From this research the control and mitigation strategies most appropriate for these categories were identified as follows.

Legal and regulatory risks

Legal and regulatory risks were rated high as there is general consensus among stakeholders that the present regulatory framework suffers from inconsistencies and clauses which create considerable uncertainty in the sector, particularly among those private sector stakeholders that provide the finance for water services projects. The findings indicate a somewhat ad hoc approach to sector regulation in the recent past. The various national government stakeholders responsible for regulating this sector have made great progress in drafting the present framework, but are perceived to have done so largely from their own perspective, without a great deal of co-ordination of policy in the sector. This has resulted in unwanted uncertainty.

These risks are controlled by performance bonds to mitigate compliance risk, contractual arrangements to control and mitigate political and social interventions in the commercial aspects of the projects. However, the most effective and sustainable way to control and mitigate these risks is for authorities to provide a more harmonised framework of regulations, as a consequence of a more co-ordinated and integrated approach to regulatory reform and risk management in the sector.

Socio-political risks

Socio-political risks are controlled and mitigated by a combination of techniques. Guarantees control political risk, but only for a limited time. Syndication and the involvement of all stakeholders – notably consumers, unions, communities and black empowerment organisations - in the entire process of a project is regarded as effective in mitigating social and political risk.

Market risks

Market risks are controlled and mitigated by a variety of techniques. Government guarantees mitigate market risks for the operating company, but are an interference in the market. Guarantees also expose the government stakeholders who provide the guarantee to market risk. Depending on the PSP option chosen, this may be suitable or not. Performance bonds control market risk for local governments, but only for a limited time.

The most effective method of mitigating market risk is by means of tariffs, which control uncertainty about charges throughout the sector, and mitigate risks for both government stakeholders and private sector stakeholders

In the market risk category, risk control is considered more important than risk mitigation. In the event of PSP in the sector, the private sector is the main bearer of market risk. Risk control reduces some of the uncertainties and thus risk in the market, but the private sector is not interested in a risk free market, as a risk free market tends to be a return free market.

The South African water services sector has few practical examples of risk mitigation, as there are only a few very recent examples of PSP in the sector, which are too recent to judge the effectiveness of the risk control and mitigation methods used.

6.3 DEVELOPMENT FINANCE

The second secondary research question concerns the issue of development and project finance, and involves the identification of different methods of financing, and the ability of the sector to attract local and foreign capital. Finance was identified by a survey of private infrastructure stakeholders (including water services) as being in the top three key success factors for PSP in the infrastructure development in general. The results of this research confirmed this, as financial risk were rated fourth highest contributor to overall sector risk.

Finance methods

The World Bank (1996b) suggested that the method of financing depends on the level of PSP in the project, and identified a combination of the following methods as most appropriate.

- Equity finance by investors.
- Debt finance by local and foreign debt financiers.
- Bilateral or multilateral funding agencies.
- Infrastructure funds.
- Government grants.
- Municipal or water board bonds.

The interviews with the stakeholders of the sector confirmed the use of these techniques in South Africa, but also identified that under the present system of incentives, risks, and rewards facing the private sector, the bulk of the financial resources for the sector will come from non-recourse or limited recourse debt financing. This method relies on the cash generated by the operation of the service to service the debt. Cash is paid by consumers through tariffs, and in some cases is supplemented by government subsidies. The ultimate guarantee to investors and lenders was found to depend on the extent to which tariffs are politically and socio-economically acceptable and sustainable.

A secure project cash flow was identified in both the interviews and the case study as the most important factor in managing financial and market risks. The ability to service debt is directly affected by project cash flow.

Financial risk management

Debt financiers use a variety of financial hedging instruments to control and mitigate financial risk, such as interest rates, and exchange rates. The cash flow, and thus the ability to service the debt were identified as key considerations of financial risk.

The stakeholder interviews revealed that the typical finance structure is a debt/equity ratio of 80/20 to 70/30. This implies high gearing with the debt financiers bearing the bulk of the financial and market risk. Financial risk was indicated to be at its highest at the start of the a project, when relatively high capital expenditure takes place, and the cost recovery is lagging behind with the service delivery.

Interpretation of the stakeholders' responses revealed that financial risks are affected by the following:

- Non recourse debt financing which is cash flow driven,
- The national government policy not to issue guarantees,
- The resent legislation and regulatory framework which empowers ministerial intervention and regulation of the commercial part of service delivery,
- Government commitment to disconnect defaulting consumers,
- The state of the local and national economy,
- Social political stability in the service area and the country as a whole,
- The long term commercial viability of project.

The interviews confirmed that risk allocation and mitigation plays an important role in project financing. However, the case study pointed out that the risks perceived by the private financial institutions were such that syndication with other private lenders did not dilute the risk enough to be viable: at this stage of development, loan syndication needs to involve underwriters who are able to bear the legal and regulatory and socio-political risks. In the case of Nelspruit, the involvement of the Development Bank of Southern Africa was crucial to the successful completion of the project finance.

Ability to attract finance

The World Bank (1997b) stated that investment in the water sector competes with investment in other infrastructure sectors. The stakeholder interviews confirmed this but also uncovered that, in terms of investment rating, the water sector has a lower rating that any other infrastructure development sector. This makes it more difficult to attract finance (local or foreign)

However, the stakeholder interviews also revealed that the local capital market is well developed and mature, and that local financial institutions have expressed considerable interest in financing water services projects. This means there is enough capital in the market to finance projects, but the perceived risk in the sector is fairly high, resulting in limited use of private financing. One of the important benefits of PSP, being the ability to access additional financial resources, is hereby constrained.

The literature suggested that the ability of a project to attract finance depends on the risk / return ratio as noted above, and the ability of the project to generate enough cash flow to service the debt. The stakeholder interviews confirmed this, but suggested that the perceived risks other than the financial risks raise the required return, which makes the finance more expensive and less available for projects serving low income consumers.

Ability to attract foreign investment

The literature suggested that foreign investment in this sector may take the form of equity investment from foreign operators and sponsors, foreign loan finance, and finance from international specialised funds, and bilateral and multilateral funding agencies. The stakeholder interviews and case study confirmed that foreign equity funding did occur, but that the benefit of such investment to the host nation is limited as it only amounts to 20-30% of the capital required.

The literature review also suggested that the foreign providers of loan finance perceive more risk in the sector than the local lenders. The stakeholder interviews confirmed this, and suggested further that foreign debt, raised in foreign currency, exposes the operator, sponsor and foreign lender to exchange rate risks.

The interviews with the international financial institutions revealed that interest rates are fairly similar than those in the domestic private sector, but that these institutions are prepared to carry more risk. However, because of the exchange rate changes, international financial institutions have not been able to compete in this market. The participation of these or similar institutions in loan syndication does have a risk mitigating effect.

In Concusion

The method of project financing most appropriate for PSP in water services, depends largely on the PSP option for the project. In other words, the structure of the financing was found to be project specific.

The financial risk associated with PSP in water services was found to be dependent on the type of project and the financing structure. The overall financial risk was rated moderately high by the sector, as well as by the private lenders and the development finance underwriters.

Typically, project finance is about 70-80% debt and 20-30% equity. The debt finance is non-recourse finance. In such a financing structure the loan financiers are bearing a large portion of the financial risk, and indirectly the market risk. Financial institutions reflect this risk in the interest rates charged. The other stakeholders in the sector were found to perceive the level of interest rates as an indication of risk aversion among the financial institutions.

Local financial institutions were found to have expressed considerable interest in the water sector. However, the perception of risk was found to be a constraint to extensive participation to project financing at this stage.

6.4 CONSTRAINTS TO PRIVATE SECTOR PARTICIPATION

For the purpose of this research and in the context of managing risk, a constraint occurs when the risk remaining after allocation, transfer and mitigation (i.e. residual risk) is not sufficiently compensated by rewards.

To identify the main constraints to PSP in the water services sector, the stakeholders were questioned about their perception of constraint separate from the perception of risk. This was based on the theoretical assumption noted earlier, that a risk category could rate high in terms of risk rating, but if the risk was managed well, it would not be rated as a high constraint. Conversely, a relatively low risk, to a risk averse stakeholder, may yield a high constraint rating.

The results of the research showed that the risk categories identified as being high constraints to PSP were the same risk categories with the highest risk rating in the sector. This was not universally true for all stakeholders, but for the sector as a whole. Such a finding indicates that in completing the questionnaires most of the stakeholders did not differentiate between risk rating and constraint rating.

In answering the Primary research question, this research found, and rated the main constraints to PSP in the water services. The questionnaires showed that the main constraints to PSP in the provision of water services are the management of risks, particularly in the legal and regulatory risks, socio-political risks and market risks, and project finance.

Interpretation of the findings of the interviews and case study provided the following observations concerning the management of risks of PSP in the sector.

The **legal and regulatory** framework as it stood at the time this research was such that six out of the nine stakeholders ranked this risk category as the highest constraint to PSP in the provision of water services. Inconsistency in the legislative and regulatory frameworks were given as the main reasons. The regulatory framework did not protect the private sector from political interference in the commercial aspects of service delivery. It was expressed by most stakeholders that reform of the regulatory framework was needed.

The **socio-political** situation was, at the time of this research, rated second highest constraint to PSP in the water services sector. The strong opposition of the unions and of certain civic organisations against PSP contributed to this rating, as did the political commitment and support for the discontinuation of services to consumers in payment default.

The **market risks** were the third highest constraint to PSP in the water services. Market risk was rated high due to the general culture of non-payment for services, and the generally unfavourable perception of the private sector as water service providers.

These constraints need to be removed to create an environment in which the private sector is able to provide the benefits of efficiency, service quality and access to additional finance. The research indicates that the most appropriate method of addressing these constraints is through a process of integrated risk management in the sector. A framework for integrated risk management in the water services sector is described in the next section.

6.5 INTEGRATED RISK MANAGEMENT FRAMEWORK

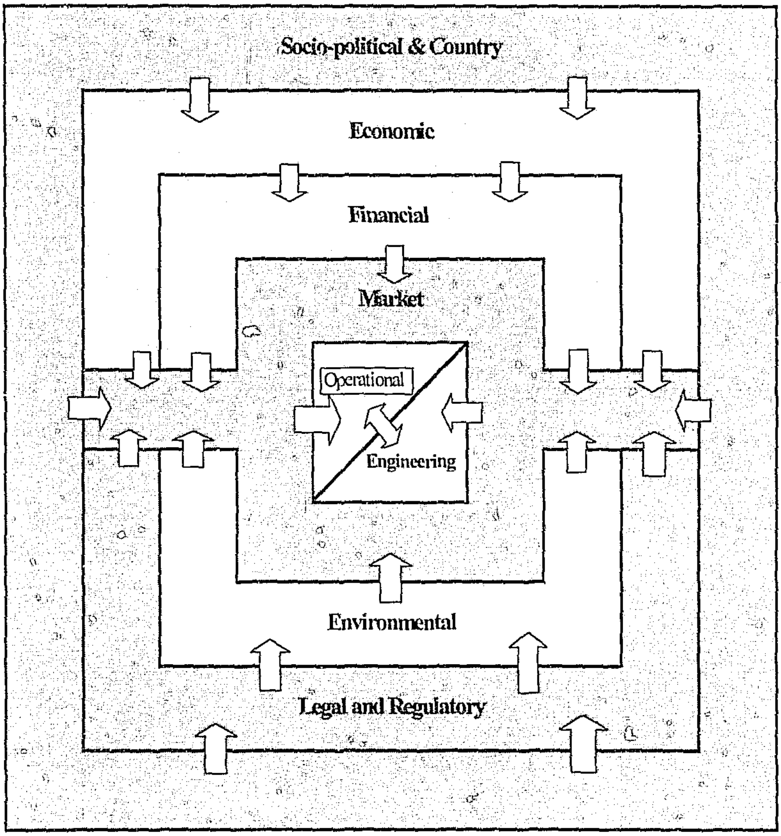
In the literature review, Valsamakis et al (1992) suggest an integrated approach to risk management as the only way to sustainable, sector wide risk mitigation, and thus removing constraints to PSP in the sector.

The literature review suggests, and some of the stakeholder interviews confirmed, that ad hoc risk management may reduce the risk of some stakeholders. However, by transferring the risk from one stakeholder to another, and thereby increasing the risk of the other stakeholders, may result in the overall sector risk remaining the same.

Based on this research, a simple framework for integrated risk management in the water services sector was conceived. The framework contained in Figure 6.1 overleaf, shows the risk categories for the sector and indicates by means of different shadings the level of constraint the risk category is to PSP in this sector as determined by this research. The shadings indicate the following:

- Dark shading indicates high constraint (1st tier)
- Light shading indicates moderate constraint (2nd tier)
- No shading indicates low constraint (3rd tier)

FIGURE 6.1 : INTEGRATED RISK AND CONSTRAINT MANAGEMENT FRAMEWORK FOR THE WATER SERVICES SECTOR.



The framework was conceived from the interpretation of both the literature review data and the interviews and case study data, and shows the close interrelationship between the different risk categories, and their constraints rating.

Socio-political and Country Risk

The socio-political state of the country is the all encompassing environment for the sector, affecting all other risk categories either directly or indirectly. Issues like political stability, social structure, and government policy are all part of this category which impacts on the other risk categories.

In the water services sector the social-political and country risk have a direct effect on the water services market. The government policies of services delivery to all and the establishment of the equitable share of water, all have a direct impact on the risk in the water services market.

Legal and Regulatory Risk

This category is in the second layer, as it is affected by social-political and country risk. In turn, legal and regulatory risk affects environmental and market risks.

The legal and regulatory framework is a direct result of the government policies. As this research has pointed out, the inconsistencies in the legal and regulatory framework, affect the perception of the risk categories in the sector. Examples are the much debated Water Services Act which permits ministerial intervention in the water services market, affecting the risk perception in that category. Also stricter environmental legislation increased the environmental risk.

Economic Risk

This category is also in the second layer, as it is impacted on by social-political and country risk, and in turn, impacts on financial and market risk. The economic state of a country is affected by the internal economic policies, which are direct results of government policies and the social structure of the country.

The interviews with the various national and international stakeholders showed that stable economic policies affect economic risk but also affect financial risk through inflation, exchange controls, exchange rates, and balance of payments. Economic policies also affect market risk in that the local markets are indirectly affected by the national economy.

Financial Risk

This category is in the third layer, as financial risks are impacted on by the economic policies of the country. The financial risk is determined by fiscal policies, maturity of the capital market, exchange rates and interest rates. These same factors also affect market risk, in that they affect the ability of the service provider to service debt. The lenders clearly indicated that the ability to service debt is one of the key determinants of market risk.

Market Risk

Market risk is in the fourth layer, with direct links to the first, second and third layers, as market risk is affected by all the risk categories in the outer layers. The social and political situation in the country, the economic characteristics of a country, the legal and regulatory framework and environmental legislation, regulation and standards all affect the market in which water services are provided.

Market risk is determined by the perceived quality of water services and the related willingness to pay, the ability to pay for services, the strength of the local economy, and demand elasticity. The characteristics of the market form the environment in which the service is operated and engineered. Operational risk and engineering risk are thus directly affected by the market. Any changes and uncertainties in the market will affect the perception of operational and engineering risk.

Operational and Engineering / Technology Risk

The operational and engineering and technology risk are at the physical core of service delivery. The risk experienced at this level is caused by activities within the category and is directly affected by the market.

Operational risk is affected by the market in which the operation takes place. The economic characteristics of consumers, their ability and willingness to pay have a direct affect on the operation of the service. Engineering and technology risk is also affected by the market in which the project takes place, as service levels affect the engineering and technology applied in the provision of the services.

Within the core of service delivery, operational and engineering / technolo risk interact and mutually affect each other. The ability to operate and deliver a quality service is determined by the appropriateness and quality of the engineering infrastructure and technologies applied. Conversely. the engineering risk is dependent on the quality of operational management of the service delivery infrastructure.

A framework for integrated risk management

The framework shows not only the close interrelationship between the different risk categories, but also indicates how this relationship affects risk perception moving from the outside to the core, and also affects the risks moving from the core outwards.

For example, the non-delivery of services, or the delivery of inappropriate or inadequate levels of service affects the market as either the willingness to pay of consumers declines resulting in non-payment, or the ability to pay does not sustain the level of services provided. This situation not only increases market risk, but will affect risk perceptions further outwards. Financial risk will increase as operator's ability to service debt will be affected. Unsustainable delivery of services, or discontinuation of services due to non-payment have serious environmental impacts and increase the risk in this category. Legal and regulatory risk will also be affected as bad examples like the situation described are likely to bring about changes and thus increased uncertainty to the legal and regulatory framework. Finally, the social and political risk will increase as a situation like this will have a negative affect on the perception of PSP in the sector and generate social and political unwillingness for PSP in the provision of water services.

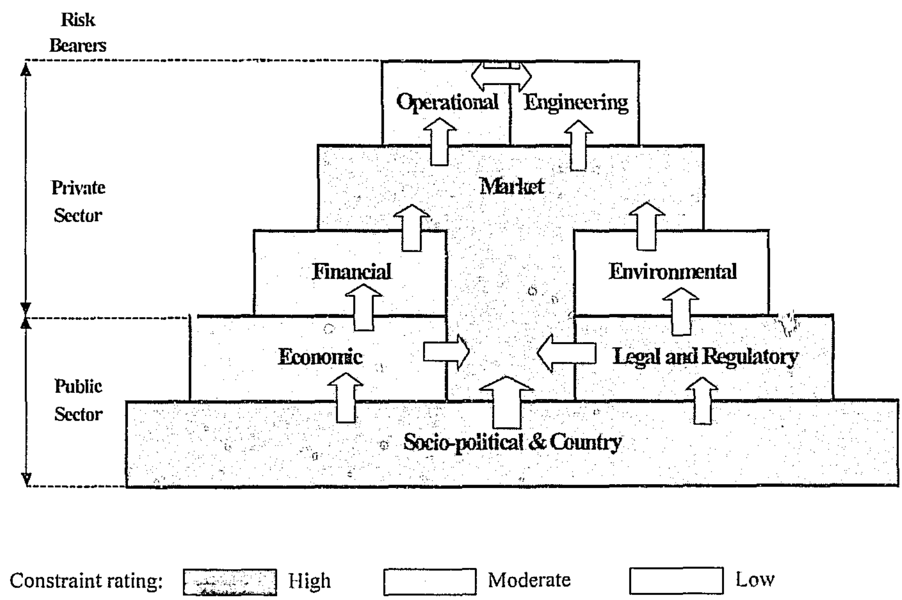
Integrated management of the risk of PSP in the provision of water services needs to take into account the existence of interrelated risks. The interpretation of the research results clearly showed that the application of both generic and specific risk control and mitigation measures provides a sound strategy for integrated risk management. The control and mitigation of risk in the outer layers of the framework will have a positive and risk mitigating effect on the risks in the inner layers and core.

The different levels of shading in the model indicate the level of constraint of the risk categories, as identified by this research. These risk categories represent the weak areas of the management of risk of PSP in the provision of water services. Any attempt at reducing the risks and constraints in the sector would have to consider these categories as first priority targets for improvement. The outer layer representing social and political risk was identified by this research as being rated a high level of constraint for PSP. As the management of risks in this category has an impact on the perception of risk in all other risk categories, it should receive top priority.

Constraint management

An alternative representation of the integrated risk / constraint management framework (Figure 6.1) is shown in Figure 6.2, indicating the same interrelationship between risk categories and risk category constraints ratings, but including an indication of the allocation of risk between public and private sectors according to ability to control and mitigate risk in the categories.

FIGURE 6.2 : INTERGRATED RISK ALLOCATION AND CONSTRAINT MANAGEMENT FRAMEWORK FOR THE WATER SERVICES SECTOR



A logical conclusion of the process of defining integrated risk management is a consideration of methods of constraint minimisation. The literature identified a number of strategic options available to control and mitigate risk. The findings of the interviews were integrated to yield a constraint management matrix for the high constraint risk categories shown in Table 6.2.overleaf. This table contains specific risk control and mitigation actions that various stakeholders could take to achieve a more enabling environment for PSP in the provision of water services.

TABLE 6.2 : CONSTRAINT MANAGEMENT MATRIX

Stakeholder	Socio-political Constraint	Legal / Regulatory Constraint	Market Constraint
National Government	• Educate sector stakeholders. • Policy formulation. • Instil culture of payment for services. • Participative process of services. • Political risk guarantees.	• Regulate sector to minimise risk. • Provide consistent frame works. • Provide an enabling environment. • Ensure independence of regulator.	• Commit to payment for services. • Reduce culture of non payment. • Facilitate commercial pricing.
Local Government	• Educate the stakeholders. • Define service levels in contract payment for services. • Boost local economy. • Involve community.	• By laws providing for service levels and water quality standards.	• Campaign for payment of services. • Disconnecting payment defaulters.
Operators	• Communicate with communities and local government.	• Lobby to regulator. • Proactive participation in regulation formulation.	• Provide quality service at appropriate level. • Open relationship / communications with communities.
Consumers	• Participate in the decision making process. • Form associations to act as representative forum.	• Consumer involvement in defining regulatory framework.	• Pay for services. • Demand quality service.
Underwriters	• Liase with national government on sector risk management. • Bear risk in syndication with private lenders.	• Advise regulator on the provision of consistent regulatory framework.	• Undertake market credit ratings.
Unions	• Are politically opposed to PSP.	• Prefer public sector service delivery.	• Unlikely participants in constraint mitigation.
Equity Investors / Sponsor	• Educate the community. • Practice transparancy. • Involve community. • Seek local empowerment partner.	• Liase with the regulator on issues of concern. • Provide information on regulatory frameworks in developing countries.	• Institute community development funds from revenue.
Lenders	• Manage perception of being risk avers an profit hungry by information disclosure.	• Lobby to regulator.	• Ensure appropriate service levels. • Community participation in defining service levels.

Chapter 7	CONCLUSIONS

7.1 WATER SERVICES SECTOR OVERVIEW

Water services are provided by a chain of public institutions comprising national government, water boards and water service authorities (local government). The present situation in the sector is characterised by the following:

- There is a considerable backlog in the provision of water services both in urban and rural areas. An estimated 11 million people are lacking adequate water services;
- The existing water services operate inefficiently, resulting in water and revenue losses;
- There is increasing social pressure on the responsible authorities to deliver quality service; and
- There are limited public funds available for service infrastructure development in a capital intensive sector.

Private sector participation (PSP) in the provision of public services aims to harness the advantages of access to additional investment capital and management skills, while minimising the disadvantages of higher prices. This is achieved through different forms of PSP, ranging from the minimum participation of a management contract to full privatisation. The options are tailored to suit the project.

Despite the recognised advantages of PSP, to date there are few such projects in the water services sector. Those projects that do exist have only recently started and provide little information on the achievement of planned benefits at this stage.

The limited progress to date indicates that the sector experiences constraints to PSP. The literature suggests that the constraints are the management of risks associated with PSP and the access to project finance. This research set out to verify the presence of these constraints in the South African situation, provide an insight into the management of risk of PSP in the sector, and assess the sector's access to finance.

PSP in infrastructure development is gaining widespread interest in South Africa. Government, traditionally responsible for the management of monopolistic infrastructure services such as power, communication, transport and water, has acknowledged and recognises the potential benefits from PSP in the provision, management and operation of infrastructure. The private sector's interest in participating in these infrastructure sectors is increasing, now that the environment is more conducive to PSP.

Public and private stakeholders from these four infrastructure sectors recognise that public-private partnerships (PPP) are the way ahead in the provision of infrastructure, and identified as the key success factors: the adoption of a business approach to service delivery, the access to project financing, the management of the risk of private sector participation, and the establishment of a legal and regulatory framework conducive for private sector participation.

7.2 CONSTRAINTS TO PSP IN THE PROVISION OF WATER SERVICES

The research set out to identify the constraints to PSP in the water services sector. Guided by the key success factors noted earlier, the research focussed on the identification and management of risks and the finance of water services projects

7.2.1 Risks Associated with PSP

Consolidating the individual stakeholder ratings in to the sector ratings resulted in the following three risk categories being the main contributors to overall sector risk and thus the main constraining risk categories in the sector.

- **Legal and regulatory risks**

  The regulatory framework as it stood at the time of this research was identified by the stakeholders as the largest constraint and greatest contributor to overall sector risk. This was attributed to two major aspects.

  The first is the Water Services Act (DWAF, 1998). This Act provides for the minister to regulate (limit) the operators' profits, rates of return or the application of surplus. These provisions generate uncertainty and consequent risk among the private sector participants in the sector such as operators, sponsors, and financial institutions providing debt finance. In an attempt to regulate the market, the regulatory framework has increased the market risk. In other words, the market risks are as a result of regulation and therefore classified as regulatory risk.

The second attribute contributing to the fact that legal and regulatory risk were rated the highest constraint to PSP in the sector, was the overall perception of the private sector that the government policy statements are somewhat inconsistent with the regulatory framework. This has contributed to overall sector uncertainty among private sector participants. At the time of this research the private financial institutions providing loan financing perceived this aspect of risk to be a significant obstacle to financing agreements.

- **Socio-political risks**

The socio-political risks were rated the second largest constraint to PSP in the water services sector. This was attributed to the following:

Firstly, the negative perception of the private sector among communities. PSP in water services is perceived to allow the private sector to make a profit by exploiting a basic human need. This negative perception results in the reluctance from communities to engage the private sector in the delivery of such services.

Secondly, the culture of non-payment is a major contributor to socio-political risk and market risk in the sector. Non-payment for services was used as a political protest against the governments of the past, and against the poor level of services. In the new political environment the culture of non-payment persisted as service levels did not improve as rapidly as political changes took place. Non-payment for services is a major constraint to PSP in the sector.

Thirdly, the political reluctance thus far to strongly support discontinuation of services to payment defaulters is causing uncertainty and risk to the operation and creates revenue risk. Discontinuation of services may be part of the contractual arrangements, but if it is not strongly supported by the social and political leadership then it becomes a risk to the operator.

Lastly, the unions have expressed their opposition to privatisation in general, and are therefore opposed to PSP in any sector. The socially and politically strong position of the unions creates an element of uncertainty. The resulting risk is not as much of a constraint for the private sector which expressed the ability to manage and accommodate the effects of unions on the operations. The unions constitute a constraint more by causing the national government and local government to act cautiously in implementing projects.

- **Market risks**

Market risks, those that affect the commercial aspects of the service delivery, mainly revenue and cost, were rated the third highest constraint to PSP in the water services sector. The rating was attributed to the following.

Firstly, there is uncertainty that the long term sustainability of the ability of the consumers to pay for the level of service will be sustained in the long term. Projections of the long-term economic situation of the service area, the demography of the service area, and the sustained water demand after PSP are not unreservedly positive. Present public service delivery uses cross subsidisation of services to recover the cost of providing services to the low income groups. The private sector may be less inclined to cross subsidise service delivery, thus placing cost pressures on individual users.

Secondly, as noted previously, market risks are enhanced indirectly by the social political environment and the regulatory framework in which the services are provided.

These risk categories not only received the highest risk rating, but were also identified as the largest constraints to PSP in the sector, and have been the main reasons for the slow progress. To harness the advantages and balance the disadvantages of PSP, this research concludes that these risk categories are to be the focus of attention of the stakeholders in the sector.

This research identified a number of strategy options available to the various stakeholders to control and mitigate risk. A constraint management matrix identifies options each stakeholder could undertake.

7.3.2 Project Finance

Project finance was identified as the second most important success factor for PPPs. The second of the secondary research question addressed the issue of finance in PSP in the sector, and the ability of the sector to attract local and foreign capital.

Finance methods

The research found that the method of financing depends on the level of PSP in the project: different PSP options have different financing requirements. Each project is unique and has its own risk environment. The methods of financing projects in the sector found to be most appropriate were a combination of: equity finance by investors; debt finance by local and or foreign debt financiers; bilateral or multilateral funding agencies; infrastructure funds providing both equity and debt finance; government grants; and municipal or water board bonds.

Under the present system of incentives, risks, and rewards facing the private sector, the research found that the bulk of the financial resources for the sector will come from non-recourse or limited recourse debt financing. This method relies on the revenue generated by the project to service the debt. Cash flow is generated by consumers paying tariffs, and in some cases supplemented by government subsidies. The ultimate guarantee to investors and lenders was found to depend on the effectiveness of politically and socio-economically sustainable tariffs.

The ownership of the service infrastructure assets was found to be a minor factor in managing financial risk. Water services infrastructure is usually buried in the ground. Once constructed and installed there is little else that can be done with the assets, and there is no resale market for them. Water service infrastructure was found to be unsuitable to act as debt security, hence such projects are financed with non-recourse or limited recourse loan finance.

Financial risk management

Project cash flow was found to be the most important factor in managing financial risk, associated with non-recourse project finance. Other components of financial risk and foreign exchange risk are manageable by the financial institutions, through a variety of financial hedging instruments. Project cash flow was found to be the main risk component for financial institutions as it is determined by the management and operation of the service, not by the financial institution itself. A secure project cash flow enhances the ability of the project to service debt and reduces financial risk.

Debt financiers use a variety of financial hedging instruments to control and mitigate financial risk emanating from interest rates, and exchange rates. The cash flow, and thus the ability to service the debt, was identified as key considerations of financial risk.

The typical finance structure is a debt/equity ratio ranging between 80/20 to 70/30. This implies high gearing with the debt financiers bearing the bulk of the financial and market risk, and this is reflected in their required returns. Other stakeholders in the sector see this as indicating the risk aversion among financial institutions.

Risk allocation and mitigation were found to play an important role in project financing, with loan syndication the most common used technique. The reduction of the loan term and the inclusion of regular loan revisions were other methods found in use.

Ability to attract finance

The water sector competes with other infrastructure sectors for the limited investment resources of the public sector. This research found that in terms of investment rating, the water sector has a lower rating that any other infrastructure development sector. Factors contributing to the perceived risk, and thus lower rating, are the fact that water services are more difficult to provide effectively than say power or communication. Water as a social good provides less opportunity for profit making and is generally provided at lower rates of return, particularly in the early stages of the private sector provision of the services. This makes it more difficult to attract finance (local or foreign)

The stakeholders interviewed generally were of the opinion that the local capital market was well developed and mature. Local financial institutions have expressed interest in financing water services projects, with considerable quantities of private capital available to the market to finance projects. However, the perceived risk in the sector was high, which makes private finance costly, and thereby inaccessible to projects serving low-income communities.

For such projects, the Development Bank of Southern Africa (DBSA) may be able to provide funding for water services projects in the present market. The DBSA can provide bridging finance for a project in its initial stages, and sell off the finance to private institutions, while keeping the non-commercial risks.

Ability to attract foreign investment

The research identified the following sources of foreign investment.

- Foreign equity investment through foreign operator companies.
- Foreign loan finance: foreign investment financiers raise money in foreign currency for investment in South Africa. This results in added foreign exchange risk for which they seek additional returns. Local finance is therefore generally cheaper than foreign.

7.3 MANAGING THE RISKS OF PSP

The title of this research *"Managing the risk of PSP in the provision of water services"* may be interpreted to suggest that PSP in water services is more risky than the public sector provision of these same services. The research was focussed on the management of risks associated with PSP in the sector, and did not aim to draw a comparison between the public and private sector management of water services.

The first main characteristic of managing risks is that it is a process, comprising risk identification, assessment, allocation, and control and mitigation. Each of these components of risk management was analysed in some detail.

This research investigated two forms of PSP in the provision of water services. The first is the private sector participating in the provision of the actual service. The second is the private sector participating only in the financing of water services projects.

7.3.1 Risk Identification

The risks associated with the provision of water services in developing countries were grouped into risk categories to prevent having to deal with a large number of more specific risk categories. These generic risk categories were found to apply to the sector irrespective of whether the services were provided by the public sector or with PSP in the sector.

The private sector provision of services is associated with efficiency, profit motive, creating a private sector monopoly and price increases for services. Efficiency in service delivery is welcomed by all stakeholders. However, the possibility of job loss among the employees of the public sector increases the risk in the sector. The profit motive of the private sector is widely considered as inherent to its participation. However, profits on providing a basic human need is not without strong opposition. These financial and market risks are introduced to the sector as a result of PSP.

PSP is perceived to lead to increases in the price of water services. This occurs mainly because the private operator needs to recover the full cost of services, whereas with public provision some of the these costs are less well attributed or born by an other public organisation.

PSP in the sector also introduces the concern of stakeholders of turning a public monopoly into a private monopoly. Public monopolies are more acceptable than private monopolies, hence the need for increased regulation of the sector. Again, this is a direct consequence of PSP in the sector.

7.3.2 Risk Evaluation And Assessment

The research found that the stakeholders' perceptions of risk varied for some risk categories (financial risks, economic risks, operational risks and market risks), but were unexpectedly similar for some other categories (legal and regulatory risks, socio-political risks, engineering and technology risks, and environmental risks). The variance in risk perception depended much on the position in the sector. The similarity in risk perception confirmed that the rating of high risk categories was independent of the position in the sector.

The social political, legal and regulatory and market risks were rated the highest. By evaluating risk and constraint ratings the largest common risks among stakeholders were identified. Management of these risks is set to benefit all stakeholders in the sector, and are thus the key risk categories to reduce overall sector risk.

The reduction of overall sector risk was found to be important for managing the overall cost of the services. The risk in the sector will cause the stakeholders to seek compensation for bearing the risk. Risk in the sector is ultimately reflected in the cost of the services provided. Mitigation of overall sector risk will thus indirectly affect and reduce the cost of services.

7.3.3 Risk Allocation and Sharing

A critical component of risk management process concerns the allocation and transfer of risk to those rties best able to manage and control the risk at the lowest cost.

Syndication was found to be a commonly used method of risk allocation/sharing. The service operator, the project sponsors, and financial institutions all use a form of syndication to be able to bear the risk, and transferring it amongst other stakeholders.

PSP introduces the private sector into a public sector dominated service sector. The private sector is capable of bearing an array of commercial risks, presently born by the public sector. The private sector was found to be willing to bear the risks, provided there are sufficient incentives to do so.

This research found that social and political risk should be allocated to the national and local government organisations, as these are best able to manage or control these, be it at different levels of society. The legal and regulatory risk also belongs with the national government and local regulators, as these institutions develop the framework within which the sector operates.

With PSP, the market risks may be transferred and allocated to the private sector as such organisations are in the best position to manage market factors. However, the national government needs to be aware of the impact of the socio–political, legal and regulatory environment on the perception of market risk, and indirectly, the perception of risks throughout the sector.

Risk allocation and sharing were found to transfer risk rather than mitigate risk. Allocation of risk reduces the risk of the one stakeholder by transferring it to another stakeholder. However, the overall sector risk has not been reduced. Risk allocation was found to have an enabling affect on risk mitigation by transferring risk to stakeholders in a better position to control it.

7.3.4 Risk Control And Mitigation

A number of risk control and mitigation techniques were identified. Specific techniques, such as joint venture companies, interest rate hedges, and price regulation, are used by a particular stakeholder to control and mitigate a specific risk. By mitigating a particular stakeholder's risk, the overall sector risk is reduced.

Generic techniques, such as regulatory framework, insurance, guarantees, political stability and macro economic stability are used to control and mitigate sector risk perceptions. Here the national government and regulators play an important role in reducing sector risk by establishing a socio-political environment and regulatory framework conducive tot PSP in the sector.

Stakeholders in the sector need to be aware of the fact that risk control and mitigation of one specific risk may increase other risks. For example, government interventions in regulating tariffs and private sector profits mitigate national government and consumer risks, but increase the market risk born by the private sector participants.

This research identified the constraints, in the form of risk categories, to PSP in the sector. These risk categories spill over into perceptions of other risk categories and were therefore identified as first priority for risk mitigation. The national government plays an important role in the mitigating the risks and constraints in this sector.

Finally, in the mitigating risks the stakeholders need to take cognisance of the interrelationship of risks. Successful control and mitigation of risk in the sector would need an integrated approach, involving a combination of generic and specific techniques. This requires the involvement of all stakeholders in the sector to participate in defining the aims and objectives of risk management in the sector.

7.3.5 Integrated Risk Management

The literature suggested that an integrated approach to risk management is the most effective strategy to control and mitigate risk. Based on the findings of this research, a integrated risk management framework was developed for the water services sector. The framework takes account of the interrelationship of the various risk categories and their constraint rating in the sector.

Integrated management of the risk of PSP in the provision of water services needs to be aware of the phenomena of interrelated risks. The interpretation of the research results clearly shows that the application of both generic and specific risk control and mitigation measures is a sound strategy for integrated risk management.

These risk categories represent the weak area of the management of risk of PSP in the provision of water services, and should be first priority targets for improvement. This is particularly true of the social and political environment, as noted earlier.

- **Market risk** will increase when non-delivery of services, or the delivery of inappropriate or inadequate levels of service affects the willingness to pay of consumers, possibly resulting in non-payment, or the ability to pay does not sustain the level of services provided. This situation does not only increase market risk, but will affect risk perceptions further outwards.

- **Financial risk** will increase as a situation like this will affect the operator's ability to service debt. Unsustainable delivery of services, or discontinuation of services due to non-payment will have serious environmental impacts and increase the risk in this category.

- **Legal and regulatory risk** will also be affected as bad examples like the situation described above are likely to trigger changes and thus uncertainty to the legal and regulatory framework.

- **Socio-political risk** will increase as a situation like this will have a negative affect on the perception of PSP in the sector and generate social and political unwillingness for PSP in the provision of water services.

PSP in the provision of water services is a recent development in the sector. The stakeholders of the sector are getting exposed to new uncertainties and risks. In trying to manage the risk of PSP the stakeholders are going through an evolutionary process of learning. It is hoped that this research and the use of the Queenstown, Nelspruit and Dolphin Coast concessions as pilot projects, will add to the sector's learning, and extend the body of knowledge with regard to managing the risks of PSP in the provision of water services.

7.4 RESEARCH ACHIEVEMENTS AND LIMITATIONS

On completion of the research, this section contains a brief reflection on the achievements and limitations of this work.

7.4.1 Research Achievements

This research set out to identify the constraints to PSP in the water services sector, analyse the management of risks in the sector, and assess the sector's ability to access project finance. The outcome of the research provided the following contributions to a deeper understanding of the management of risk of PSP in the provision of water services:

- A fairly extensive literature review summarising of the current issues related to PSP in water services nationally and internationally, based on the most recent literature.
- An analysis of the issues related to the PSP success factors identified in a recent survey among stakeholders in the sector.
- An identification and analysis of the main constraints to PSP in the sector, based on interviews with stakeholders in the sector.
- An analysis of the private sector's ability to provide access to additional financial resources, which found that despite considerable interest from the

private financial institutions, the perceived risks are high, which means required returns are high, which makes finance expensive and largely inaccessible to projects serving low-income communities.

- An analysis of the risk management process in the sector.
- An integrated risk management framework, indicating the interrelationship of risk categories and identifying the constraints to PSP in the sector.
- An extended list of references and bibliography, including some of the most recent literature available on the topic, which covers a broad range of issues related to PSP in the water services sector.

7.4.2 Research Limitations

As stated previously, PSP in the provision of water services is a fairly recent development in the South African water sector. Consequently, there are not that many players in the sector. The limited scope and rapid developments in the sector make this research very topical at present, but puts limits on its relevance in the medium to long term.

Although the participants in the research were generous with their time and the information provided during the interviews, the researcher was not allowed access to any documentation concerning risk management or funding strategy or structure. Respectful of the concerns of the participants of losing competitive advantage by revealing this information, the researcher only utilised published information.

Due to the limitations of time, this research used the information from a limited number of stakeholders in the sector. Although it was found that as the interviews progressed, the amount of new information and insights regarding the overall sector diminished, the identification of risk within the different stakeholder groups could be improved by interviewing more stakeholders in each group. The assessment of overall sector risk is a synthesis of all stakeholder information, and thus is not expected to change much by interviewing more stakeholders, but the risk profile of the stakeholder groups will improve in accuracy by interviewing more stakeholders.

7.5 SUGGESTIONS FOR FURTHER RESEARCH

Based on the findings and experience of this research, and bearing in mind the limitations of this research, there are various aspects related to PSP in the public service delivery that warrant further research. Suggestions for further research are as follows:

1. Comparison of risk management of PSP in other public services, such as solid waste management, power and telecommunications.
2. Extending this research by interviewing more stakeholders, to obtain a more accurate risk profile of the various stakeholder groups.
3. Conduct a more quantitative research on the factors affecting market risk
4. This research found that the culture of non-payment is the largest contributing factor to market risk. This research also found that the consumer's willingness to pay is strongly dependent on the quality of the

service provided. Further research into the factors affecting service quality among consumers and thus willingness to pay may reveal solutions that will reduce future risk.

As time passes, and the sector progresses and more information on the three present concession contracts becomes available, the following aspects of PSP in the water services sector will constitute useful research:

5. A quantitative analysis of the effect of PSP on water tariffs
6. Benchmarking the private sector operators against each other in the sector nationally and internationally.

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APPENDICES

APPENDIX A

Introductory Questionnaire

Organisation: ______________________ Interviewee: ______________________

INTRODUCTORY QUESTIONNAIRE – PART 1

Please indicate with a ✓ how you rate the following Risk categories in terms of :
1. level of risk experienced or perceived
2. level of constraint to PSP in the water sector in South Africa

Legend: **1** = Very Low; **2** = Low; **3** = Moderate; **4** = High; **5** = Very High.

#	Risk Category	Risk Rating					Constraint Rating				
1	**Legal, Regulatory Risk** Legislation and regulatory framework Independent judiciary, contracts and arbitration	1	2	3	4	5	1	2	3	4	5
2	**Economic Risk** Stability of economic policies, growth, Budget deficit, balance of payments, unemployment, inflation	1	2	3	4	5	1	2	3	4	5
3	**Financial Risk** Interest rates, exchange rates, foreign exchange, maturity of capital market, project cash flow	1	2	3	4	5	1	2	3	4	5
4	**Market Risk** Bulk water supply prices, tariffs, demand elasticity, non-payment, demographics, competition, ability to pay	1	2	3	4	5	1	2	3	4	5
5	**Operational Risk** Cost overrun, bureaucracy, water shortage, environmental incidents, billing, metering	1	2	3	4	5	1	2	3	4	5
6	**Engineering / Technology Risk** Design defects, construction cost overruns and delays, obsolescence, new technology	1	2	3	4	5	1	2	3	4	5
7	**Socio-political / Country Risk** Political, willingness to pay, social unrest, strikes, corruption	1	2	3	4	5	1	2	3	4	5
8	**Environmental Risk** Environmental impact and sustainability	1	2	3	4	5	1	2	3	4	5

Organisation: ____________________________ Interviewee: ________________________

INTRODUCTORY QUESTIONNAIRE – PART 2

Please indicate how you rank the following Risk categories in terms of :
3. level of risk experienced or perceived
4. level of constraint to PSP in the water sector in South Africa

Please rank the assign 10 points in total in each column, among the risk categories which in your opinion rank highest. (E.g. one risk category = 10, 4 risk categories = 5,3,1,1). The more points you assign to a risk category, the higher the ranking.

#	Risk Category	Risk Ranking	Constraint Ranking
1	**Legal, Regulatory Risk** Legislation and regulatory framework Independent judiciary, contracts and arbitration		
2	**Economic Risk** Stability of economic policies, growth, Budget deficit, balance of payments, unemployment, inflation		
3	**Financial Risk** Interest rates, exchange rates, foreign exchange, maturity of capital market, project cash flow		
4	**Market Risk** Bulk water supply prices, tariffs, demand elasticity, non-payment, demographics, competition, ability to pay		
5	**Operational Risk** Cost overrun, bureaucracy, water shortage, environmental incidents, billing, metering		
6	**Engineering / Technology Risk** Design defects, construction cost overruns and delays, obsolescence, new technology		
7	**Socio-political / Country Risk** Political, willingness to pay, social unrest, strikes, corruption		
8	**Environmental Risk** Environmental impact and sustainability		

Organisation: ______________________ Interviewee: ______________________

INTRODUCTORY QUESTIONNAIRE – PART 3

Please indicate with a ✓ your agreement with the following statements:

#	Statement	Strongly Disagree (1)	Disagree (2)	Uncertain (3)	Agree (4)	Strongly Agree (5)
1	PSP in water services reduces the risk to local governments	1	2	3	4	5
2	PSP will improve the level of service	1	2	3	4	5
3	PSP will increase the cost of service	1	2	3	4	5
4	PSP is necessary to keep up with service demands	1	2	3	4	5
5	PSP in the water sector needs to be regulated at central government level, not at local level	1	2	3	4	5
6	The risks to be managed by the private sector are a constraint to PSP in SA	1	2	3	4	5
7	Water and sanitation service delivery should be a government responsibility and a private sector function	1	2	3	4	5
8	The private sector should be allowed to achieve a competitive return on investments	1	2	3	4	5
9	Operation efficiency should be balanced by job loss minimisation	1	2	3	4	5
10	Asset ownership is the key to private investment in the sector	1	2	3	4	5
11	The lack of private equity investment is a major constraint to PSP in SA	1	2	3	4	5
12	Political unwillingness is major constraint to PSP in the SA water sector	1	2	3	4	5
13	Financial risks and required returns are the major constraints for PSP in SA	1	2	3	4	5
14	The present regulatory and legal framework is a major constraint for PSP in SA	1	2	3	4	5
15	PSP in the provision of water services should differ depending on the local situation and need	1	2	3	4	5
16	PSP in the provision of water supply and sanitation services in the rural areas is less appropriate as in urban areas	1	2	3	4	5
17	After a period of transition and consequently high risk, SA is now in a good position to attract FDI in to the water sector	1	2	3	4	5
18	PSP is the key to solve the backlog in water and sanitation services in SA	1	2	3	4	5
19	The transition from public to private sector provision of services should be a gradual one	1	2	3	4	5
20	Local and foreign private sector investment in the water sector in SA needs to be made more attractive.	1	2	3	4	5

APPENDIX B

Interview Schedule

MANAGING THE RISKS OF PRIVATE SECTOR PARTICIPATION IN THE PROVISION OF WATER SERVICES

INTERVIEW SCHEDULE

1 INTRODUCTION

Interviewer introduction:

- Civil Engineer
- Consulting in the Water Sector for last 15 years
- Operates Nationally and Internationally

In South Africa, Africa and throughout the developing world there is an increasing demand for water supply and sanitation services, with significant sectors of the people in developing countries without access to these services. The provision of these services, particularly in the urban areas, requires large capital investments in water supply and sanitation infrastructure. Governments, be it central , provincial or local, are responsible for the provision of these essential social services, and have up to recently, particularly in the developing countries, provided these services.

The limited resources available to the authorities often result in a backlog in infrastructure development and maintenance, and causes inefficient operation. The participation of the private sector in the provision of these services is seen as a source of management skills to improve the operation service delivery and cost recovery.

The introduction of PSP involves a major change in the industry, which traditionally is dominated by the public sector. Successful introduction of PSP requires the understanding of all the stakeholders involved in the provision of these services, the risks they are taking or perceiving, and the appropriate management of these risks.

In other parts of the developing world, in Latin America and Asia, PSP in this industry has been implemented to enhance the delivery of these services. Compared to these continents /countries, the introduction of PSP in this industry in Africa lags behind. Even in South Africa, PSP in this sector has not been adopted on a large scale.

This research aims to identify the main constraints / obstacles to PSP in Africa and South Africa in particular, by identifying the stakeholders in this industry, and interviewing them to obtain a clear and complete picture / overview of the issues and risks they face, and how best to manage these. The aim is to identify the most important constraints / obstacles to PSP in the sector, and make recommendations to improve the management of these risks, and thereby facilitating an increase in PSP and investment in the provision of these services, essential to South Africa's economic and human development.

Through this interview I hope to uncover your organization's perspective of the situation in South Africa, and use this to compile an aggregate perspective for the stakeholder group. This interview will cover the following topics:

1 Organization Identification
2 Water and sanitation services in South Africa
3 Organizational Risk Assessment
4 Risk Management
5 Development Finance
6 General Issues
7 Conclusions and Recommendations

2 IDENTIFICATION

2.1 Organization

Stakcholder Group : ______________________

Name : ______________________

Type of Organization : ______________________

Size of Organization :

- No. Of People : ______________________
- Capital / Turnover : ______________________

Mission / Service : ______________________

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2.2 Interviewee

Initials & Surname : ______________________

Position in Firm : ______________________

Function Description : ______________________

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3 PSP IN THE SOUTH AFRICAN ENVIRONMENT

PSP in the provision of water supply and sanitation services in South Africa is a much debated topic. The delivery of these services is the responsibility of the local authorities in the urban areas, and of the central / provincial authorities in the rural areas. The situation in South Africa is such that these authorities are experiencing increasing difficulty in providing the continuous increase in demand for these services caused by population growth and urbanization.

The White Paper on Water Supply and Sanitation identifies the private sector as a useful source of capital and expertise to fund and operate water supply and sanitation services. In the years just after the first democratic elections in 1994, the ground work was done to address PSP in this sector. PSP is considered to be desirable and seen as beneficial to the country's population and economy. Policy frameworks and regulations were put in place to facilitate the introduction of PSP.

Yet 5 years have past and PSP has not taken place at a significant scale. Only a few relatively small local authorities have implemented some form of PSP in this sector. (Queenstown, Dolphin Coast, Nelspruit). None of the large cities have implemented it.

3.1 **How would you describe the present situation in the water and sanitation services in South Africa? (Backlog, progress, problems, quality, access)**

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3.2 What are the key areas of <u>OPPORTUNITY</u> for PSP in this sector in South Africa?

3.3 What in your opinion are the main <u>CONSTRAINTS</u> for PSP in the provision of water services in South Africa?

3.4 How do you see <u>FUTURE DEVELOPMENTS</u> in this sector, and what role is your organization likely to play in this?

4 RISK ASSESSMENT

A review of the literature - The World Bank (1997), Haarmeyer (1996), WASH (1993) and others in this field - identified the following risk categories to be considered:

1. **Legal and Regulatory risk**, involving political risk, legal and regulatory risk.
2. **Economic risk**, involving budget deficit, balance of payments, infrastructure investment deficit.
3. **Financial risk**, involving interest rates, exchange rates, foreign exchange and the maturity of the capital market.
4. **Market risk**, involving bulk water supply price increases, changes in tariff rates, water demand elasticity, billing and metering, ability to pay and non-payment.
5. **Operational risk**, involving operating cost overrun, bureaucracy, water shortage (quality and or quantity), environmental incidents and risk.
6. **Engineering / Technology risk**, involving design defects, construction cost overruns and delays, technology obsolescence and under performance.
7. **Socio-political risk**, involving political risk, willingness to pay, potential for job loss, employment changes, demographics.
8. **Environmental risk**, involving environmental impact and sustainability.

4.1 What are the <u>RISKS</u> involved for your stakeholder group associated with PSP in the provision of water services?

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4.2 **How do these risks IMPACT on your organization?**

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5 RISK MANAGEMENT

The risks associated with the introduction of PSP in the provision of water services differ for each of the stakeholders involved. The attractiveness of PSP, and its sustainable success largely depend on the extent and the way in which these risks are managed.

An important part of the research into the feasibility of PSP in this sector in South Africa is therefore to understand how to manage the risks of the stakeholders in a mutually satisfactory and sustainable way.

Risk management involves risk identification, evaluation, allocation, control and mitigation or insurance. Risk allocation and control may also involve the provision of potential rewards as an incentive to take on the risk. This part of the research is aimed at understanding the risk profile of the stakeholder group and the options available to manage their risk / reward balance.

5.1 **How do you see your organization's risks, and thus those of your stakeholder group, best managed in this sector?** (Allocation, Control and Mitigation)

5.2 **What is the role of your organization / stakeholder group in managing these risks in South Africa?**

5.3 **How does your organization manage its risks?** (Mitigation / allocation)

5.4 **What, in your opinion, should be the <u>ROLE OF THE PUBLIC SECTOR</u>?**

6 DEVELOPMENT FINANCE

PSP in the provision of water supply and sanitation services in the industrial world started some 20 years ago. In the developing world its is relatively new. Only in the last 3-5 years countries in Latin America and Asia have adopted PSP as a strategy for development in the water sector. As a result these countries have attracted large investments in this sector, both nationally and internationally.

Access to finance is often a major constraint to development in the water and sanitation services sector in South Africa. This research aims to establish the global competitiveness of the South African water sector in attracting foreign direct investment, establish the types of development finance available to South Africa, and the conditions associated with them.

6.1 **What SCURCES OF FINANCE are most suitable for development in the water sector?**

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6.2 **What TYPE OF DEVELOPMENT FINANCE does your organization provide?**

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6.3 **What <u>INVESTMENT CRITERIA</u> does your organization use to determine where to invest and how much?**

6.4 **What are the <u>CONDITIONS OF FINANCE</u> associated with the different types of finance?**

6.5 **How do you see South Africa's position in the global competitive environment for attracting foreign investment into the water sector? How does the water sector rate against other infrastructure development sectors such as power, transport, and telecommunications?**

6.6 **As a stakeholder in this sector, how is your organization contributing to the enhancement of South Africa's global competitiveness to attract investments in this sector?**

6.7 **What would you consider a suitable finance package for water and sanitation services development? (Debt / Equity, Local / Foreign)**

7 CONCLUSION AND RECOMMENDATIONS

Finally, in conclusion of this interview, I would like to elicit your conclusions and recommendations as far as your organization / stakeholder group is concerned with regard to PSP and risk management in the water sector of South Africa.

7.1 How does your organization see the future of PSP in the provision of WS&S services in South Africa?

7.2 What are your recommendations with regard PSP in the water sector in South Africa?

7.3 **Any other comments you would like to make in this regard?**

8 CLOSURE

This concludes this interview.

I thank you for your time, and for sharing your thoughts, insights and information and appreciate your participation in this research.

I re-emphasize, that the content of this discussion remains strictly confidential. My notes on this discussion will be destroyed as soon as this research has been completed. No reference or information from this interview, or the organization's name or representatives will be quoted in the research report or any other written or verbal report in this regard, without prior permission from you and the organization you represent.

THANK YOU FOR YOUR TIME AND PARTICIPATION

APPENDIX C

Stakeholder Interview Sample List

APPENDIX C

STAKEHOLDER INTERVIEW SAMPLE – CONTACT LIST

#	Description	Contact Person	Telephone Cell Fax E-mail	Physical Address
1	**NATIONAL GOVERNMENT**			
1.1	Department of Water Affairs and Forestry	**Ms Thuli Khambule** Senior Development Expert	012-336 6502 082-804 9976 012-323 3877 vcb@dwaf.pwv.gov.za	105 Schoeman Street Pretoria
1.2	Department of Constitutional Development	**Ms Gugu Maloi** Chief Director: Local Govmt Infrastructure and Planning	012-334 0741 082 465 6165 012-334 0610 gugu@dso.pwv.gov.za	87 Hamilton Street cnr Hamilton/Proes Arcadia Pretoria
1.3	Department of Finance	**Mr Michael Schur**	(012) 315 5863 083 680 9292 (012) 325 1620 schurmic@finance.pwv.gov.za	240 Vermeulen Str Pretoria
2	**LOCAL GOVERNMENT**			
2.1	Johannesburg	**Mr Antony Still** Transition Manager	(011) 407 6614 082 820 8342 (011) 403 4400 astill@mj.org.za	Metro Centre A Block 4th floor, room 451 Johannesburg
2.2	Nelspruit	**Mr Rolf Kotze** Town Clerk	(013) 759 2000 (013)744 9819 (home)	
3	**CONSUMERS**			
4.1	Chemical and Allied Industries Association	**Dr Laurraine Lotter** Executive Director	(011) 482 1671/4 08 (011) 726 8310 caia@africa.com	15th floor Metal Box Centre 25 Owl Street Auckland Park, 2092
4.2	Eldorado Park	Annoymous SANCO		

4	**BULK SERVICE PROVIDERS**			
4.1	Rand Water	**Mr Rowan Düvel** Manager Retail Water Operations Department	(011) 682 0911 082 886 7012 (011) 496 1096 row[illegible]n@randwater.com	522 Impala Road Glenvista
5	**DEVELOPMENT FINANCE (UNDERWRITERS)**			
5.1	Development Bank of Southern Africa	**Mr B Jackson** Policy Analyst	(011) 313 3686 082 788 1853 (011) 313 3086 barry@dbsa.org.za	Lever Road Midrand
5.2	Municipal Infrastructure Investment Unit	**Ms Karén Breytenbach** Private Sector Investments	(011)313 3522 082 579 0809 (011) 313 3629	Lever Road Midrand
5.3	International Finance Corporation	**Mr Philip Condon** Senior Investment Officer	(011) 341 9038 08 (011) 325 0582 pcondon@ifc.org	Victoria Gate way Hydepark Sandton
6	**PRIVATE LENDERS**			
6.1	Investec	**Mr Jose de Nobrega,** **Ms Della Levinsohn** Project & Infrastructure Finance	(011) 286 7000 08 (011) 286 7200 jdenobrega@investec.co.za (011) 286 7229 08 (011) 28[illegible] 7200 dlevinsohn@investec.co.za	100 Grayston Drive Sandton 2196
6.2	New Africa Finance Corporation	**Mr Charles Krakoff** Senior Consultant	(011) 836 2027 083 307 6990 (011) 836 0029	9^{th} Floor 1066 Building 35 Pritchard Street Johannesburg, 2001
6.3	Standard Corporate and Merchant Bank	**Mr Colin King** Manager Project Finance Division	(011) 636 4255 083 307 6563 (011) 636 6481 kingc@scmb.co.za	6^{th} Floor 3 Simmonds Street Johannesburg 2001

7	**UNIONS**			
7.1	South African Municipal Workers Union	**Lance Veotte** Anna Weeks	(021) 697 1151 (011) 836 8835 (011) 333 1630 infotech@samwu.org.za	8 New South Street
7.2				
8	**SERVICE PROVIDERS**			
8.1	Lyonnaise Water Southern Africa 50%Group5 50%Lyonaisse	**Mr Tony Sanders** Director: New Projects	(011) 804 5140 / 5601 082 460 3672 (011)804 5844 / 5847 asanders@g5.co.za	Block E Lincolnwood Office Park Woodlands Drive Woodmead
8.2	Biwater	**Mr Tony Wright** Manager : Special Projects	(011) 462 4220 082 458 4886 (011) 462 2674 100673,2016@compuserve.com	10 Vervoer Street Kya Sand Randburg
8.3	Concor / Thames Water	**Mr Ian Symon** General Manager	(011) 807 8677 082 – 787 7219 (011) 837 8703 thamesco@iafrica.com	North East Bldg 5 Wessels Road Rivonia
9	**PSP ADVISORS**			
9.1	Water Policy Africa	**Mr Len Abrams** Director	(011) 441 1111 08 (011) 441 labrams@iafrica.com	SRK House 265 Oxford Road Illovo
9.2	CSIR – Building and Construction Technology	**Dr Kevin Wall** Manager: Urban Infrastructure and City Management	(012) 841 2040 082 459 3618 (012) 841 2319 kwall@csir.co.za	CSIR Pretoria

APPENDIX D

Analysis of Results : Questionnaire - Part 1

APPENDIX D

CONTENTS

APPENDIX D-1

RISK MANAGEMENT IN PSP IN WATER SERVICES

RISK RATING

RESULTS FROM QUESTIONNAIRE - Part 1

TABLE D1.1 SURVEY RESULTS

STAKEHOLDERS Group Interviewee	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	Pcntg	Avg
Legal	3	4	4	3	3	3	4	3	2	1	3	4	2	4	3	2	2	2	4	4	60	13%	3.00
Economic	4	4	3	2	2	2	2	2	1	3	3	3	2	3	3	2	2	2	3	4	52	11%	2.60
Financial	4	3	3	2	3	3	3	4	1	4	3	3	3	3	2	2	3	2	3	4	58	13%	2.90
Market	4	3	2	4	4	3	4	2	3	5	3	4	2	4	3	2	4	3	3	5	67	15%	3.35
Operational	4	4	3	3	3	2	4	3	2	3	3	3	2	3	3	2	2	3	3	2	57	13%	2.85
Engineering	5	3	2	2	2	4	2	2	3	2	3	2	2	3	2	1	2	1	2	2	47	10%	2.35
Socio-political	3	4	4	4	4	2	4	3	4	2	4	2	3	5	4	2	4	4	4	3	69	15%	3.45
Environmental	3	3	2	3	2	2	2	2	3	3	3	3	2	3	2	2	3	1	1	1	46	10%	2.30
Total	30	28	23	23	23	21	25	21	19	23	25	24	18	28	22	15	22	18	23	25	456		2.85
Commercial	24	20	15	16	16	16	17	15	13	20	18	18	13	19	15	11	16	12	15	18	327	72%	2.73
Non-commercial	6	8	8	7	7	5	8	6	6	3	7	6	5	9	7	4	6	6	8	7	129	28%	3.23

TABLE D1.2 FREQUENCY ANALYSIS

	1	2	3	4	5	Sum
Legal	1	5	7	7	0	20
Economic	1	9	7	3	0	20
Financial	1	4	11	4	0	20
Market	0	4	7	7	2	20
Operational	0	6	11	3	0	20
Engineering	2	12	4	1	1	20
Socio-political	0	4	4	11	1	20
Environmental	3	8	9	0	0	20
Total	8	52	60	36	4	160
Commercial	7	43	49	18	3	120
Non-commercial	1	9	11	18	1	40
Cumulative	8	60	120	156	160	
Cumulative %	5%	38%	75%	98%	100%	

NOTES:

1 To ensure the confidentiality of the interviewees, the interview numbers shown in Table 1 are assigned arbitrarily, and do not correspond with the numbers given in the stakeholder list in Appendix C.

2 The association between the interview number, the interviewee and the stakeholder group is not shown for reason of confidentiality.

CHI-SQUARED TEST OF INDEPENDENCE

TABLE D1.3 Rule of Five

	Low	Med	High	Sum
Legal	6	7	7	20
Economic	10	7	3	20
Financial	5	11	4	20
Market	4	7	9	20
Operational	6	11	3	20
Engineering	14	4	2	20
Socio-political	4	4	12	20
Environmental	11	9	0	20
Total	60	60	40	160
Commercial	50	49	21	120
Non-commercial	10	11	19	40

TABLE D1.4 Expected Values

	Low	Med	High	Sum
Legal	7.5	7.5	5.0	20
Economic	7.5	7.5	5.0	20
Financial	7.5	7.5	5.0	20
Market	7.5	7.5	5.0	20
Operational	7.5	7.5	5.0	20
Engineering	7.5	7.5	5.0	20
Socio-political	7.5	7.5	5.0	20
Environmental	7.5	7.5	5.0	20
Total	60	60	40	160
Commercial	45	45	30	120
Non-commercial	15	15	10	40

TABLE D1.5 Chi-squared Values

	Low	Med	High	Sum
Legal	0.30	0.03	0.80	1.133
Economic	0.83	0.03	0.80	1.667
Financial	0.83	1.63	0.20	2.667
Market	1.63	0.03	3.20	4.867
Operational	0.30	1.63	0.80	2.733
Engineering	5.63	1.63	1.80	9.067
Socio-political	1.63	1.63	9.80	13.07
Environmental	1.63	0.30	5.00	6.933
Total	12.8	6.933	22.4	42.1
Commercial	11	5	12	28
Non-commercial	2	2	11	14

CHI-SQUARE TEST OF INDEPENDENCE:

CHI -TEST = 0.000
Degrees of Freedom 14
CHI CRITICAL = 23.685
CHI CALC= 42.133

FIGURE D1.1: TOTAL SECTOR RISK

#	Risk	Score	Total
7	Socio-political	15.1%	69
4	Market	14.7%	67
1	Legal	13.2%	60
3	Financial	12.7%	58
5	Operational	12.5%	57
2	Economic	11.4%	52
6	Engineering	10.3%	47
8	Environmental	10.1%	46
	Total	100%	456

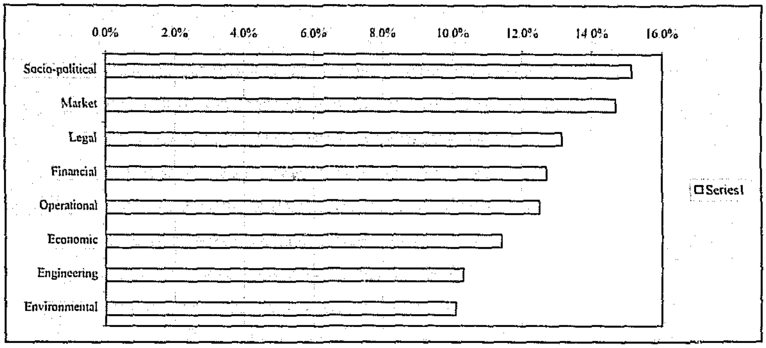


FIGURE D1.2: STAKEHOLDER GROUP 1 - NATIONAL GOVERNMENT

#	Risk	Score	Total
1	Legal	13.6%	11
2	Economic	13.6%	11
5	Operational	13.6%	11
7	Socio-political	13.6%	11
3	Financial	12.3%	10
6	Engineering	12.3%	10
4	Market	11.1%	9
8	Environmental	9.9%	8
	Total	100%	81

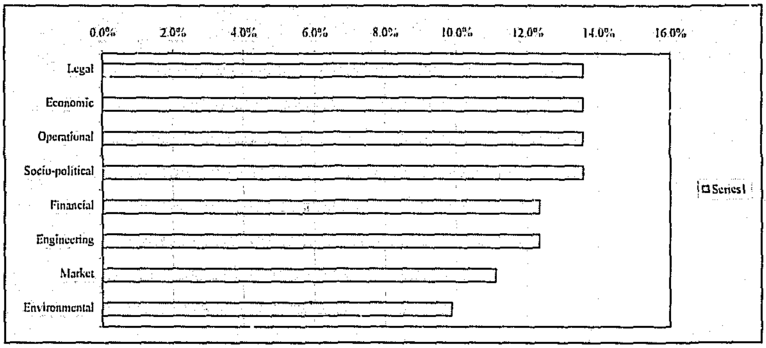


FIGURE D1.3: STAKEHOLDER GROUP 2 - LOCAL GOVERNMENT

#	Risk	Score	Total
4	Market	17.4%	8
7	Socio-political	17.4%	8
1	Legal	13.0%	6
5	Operational	13.0%	6
8	Environmental	10.9%	5
3	Financial	10.9%	5
2	Economic	8.7%	4
6	Engineering	8.7%	4
	Total	100%	46

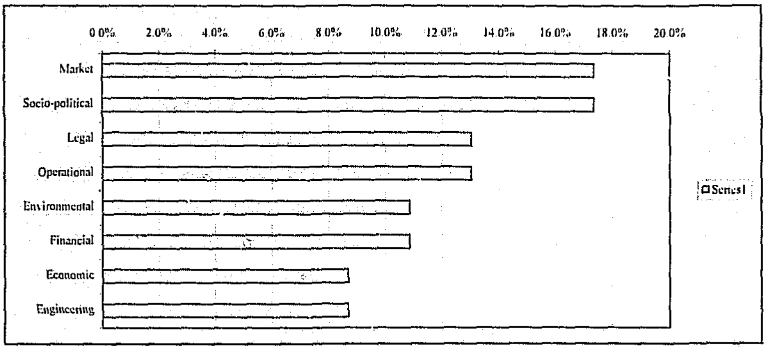


FIGURE D1.4: STAKEHOLDER GROUP 3 - CONSUMERS

#	Risk	Score	Total
1	Legal	15.2%	7
4	Market	15.2%	7
6	Engineering	13.0%	6
3	Financial	13.0%	6
5	Operational	13.0%	6
7	Socio-political	13.0%	6
2	Economic	8.7%	4
8	Environmental	8.7%	4
	Total	100%	46

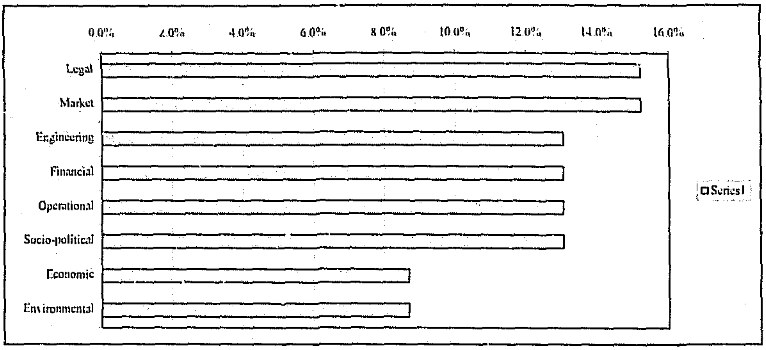


FIGURE D1.5: STAKEHOLDER GROUP 4 - BULK SERVICE PROVIDERS

#	Risk	Score	Total
3	Financial	19.0%	4
1	Legal	14.3%	3
5	Operational	14.3%	3
7	Socio-political	14.3%	3
2	Economic	9.5%	2
4	Market	9.5%	2
6	Engineering	9.5%	2
8	Environmental	9.5%	2
	Total	100%	21

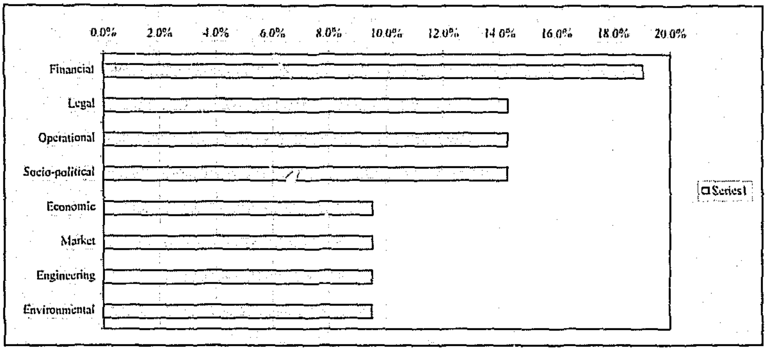


FIGURE D1.6: STAKEHOLDER GROUP 5 - DEVELOPMENT FINANCE (UNDERWRITERS)

#	Risk	Score	Total
4	Market	16.4%	11
7	Socio-political	14.9%	10
8	Environmental	13.4%	9
3	Financial	11.9%	8
5	Operational	11.9%	8
6	Engineering	11.9%	8
2	Economic	10.4%	7
1	Legal	9.0%	6
	Total	100%	67

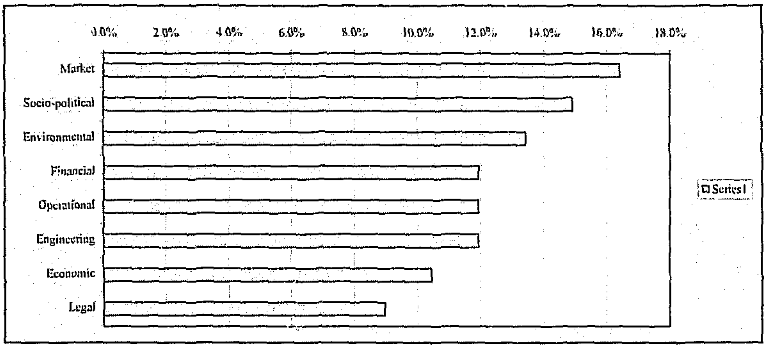


FIGURE D1.7: STAKEHOLDER GROUP 6 - PRIVATE LENDERS

#	Risk	Score	Total
1	Legal	14.3%	10
4	Market	14.3%	10
7	Socio-political	14.3%	10
3	Financial	12.9%	9
2	Economic	11.4%	8
5	Operational	11.4%	8
8	Environmental	11.4%	8
6	Engineering	10.0%	7
	Total	100%	70

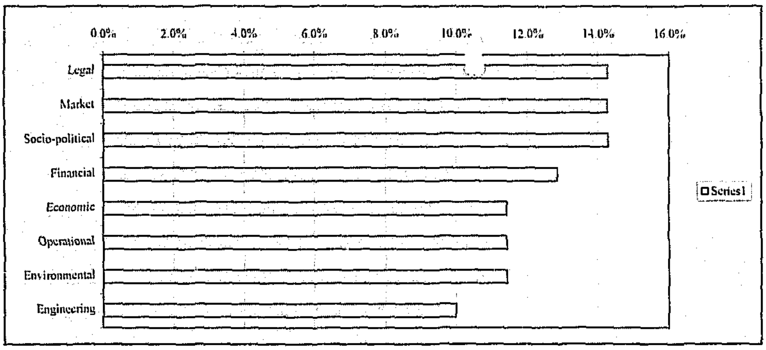


FIGURE D1.8: STAKEHOLDER GROUP 7 - UNIONS

#	Risk	Score	Total
7	Socio-political	18.2%	4
1	Legal	13.6%	3
2	Economic	13.6%	3
4	Market	13.6%	3
5	Operational	13.6%	3
3	Financial	9.1%	2
6	Engineering	9.1%	2
8	Environmental	9.1%	2
	Total	100%	22

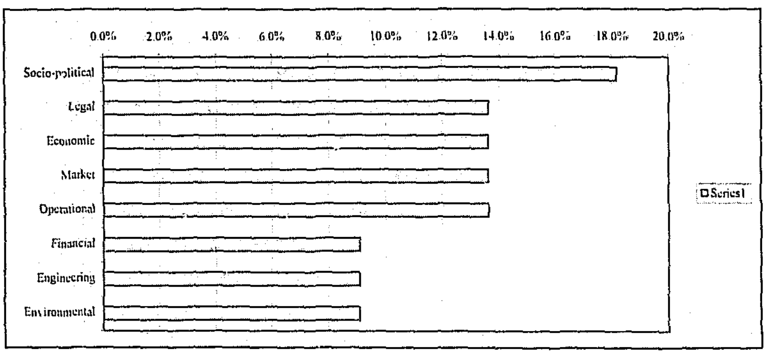


FIGURE D1.9: STAKEHOLDER GROUP 8 - SERVICE PROVIDERS

#	Risk	Score	Total
7	Socio-political	18.2%	10
4	Market	16.4%	9
3	Financial	12.7%	7
5	Operational	12.7%	7
1	Legal	10.9%	6
2	Economic	10.9%	6
8	Environmental	10.9%	6
6	Engineering	7.3%	4
	Total	100%	55

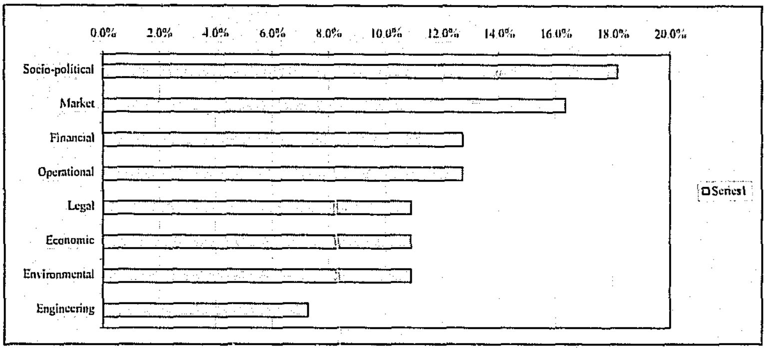


FIGURE D1.10 STAKEHOLDER GROUP 9 - PSP ADVISORS

#	Risk	Score	Total
1	Legal	16.7%	8
4	Market	16.7%	8
2	Economic	14.6%	7
3	Financial	14.6%	7
7	Socio-political	14.6%	7
5	Operational	10.4%	5
6	Engineering	8.3%	4
8	Environmental	4.2%	2
	Total	100%	48

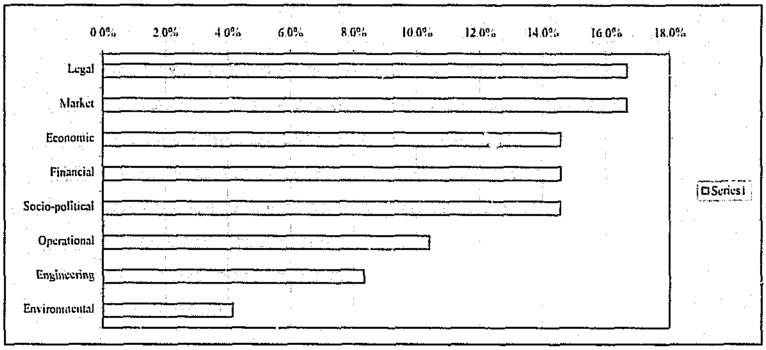
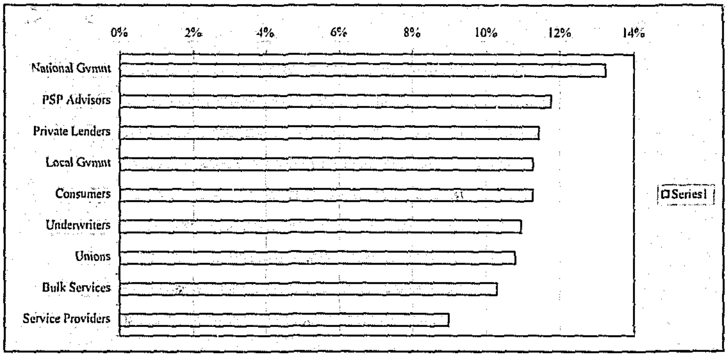


FIGURE D1.11: STAKEHOLDER GROUPS - SECTOR RISK CONTRIBUTION

#	Risk	Percentage	Score
1	National Gvmnt	13%	27
9	PSP Advisors	12%	24
6	Private Lenders	11%	23
2	Local Gvmnt	11%	23
3	Consumers	11%	23
5	Underwriters	11%	22
7	Unions	11%	22
4	Bulk Services	10%	21
8	Service Providers	9%	18
	Total	100%	204



NOTES:

1 The stake holder score represents the total (ie summed) score of all the stakeholders representing the stakeholder group. These scores have been normalised for (ie divided by) the number of stakeholders in the group for this research.

2 The percentage represents the contribution of each stakeholder to total sector risk. The higher the contribution the more risk averse the stakeholder is in this sector.

APPENDIX D-2

RISK MANAGEMENT IN PSP IN WATER SERVICES

CONSTRAINT RATING

RESULTS FROM QUESTIONNAIRE - Part 1

TABLE D2.1 SURVEY RESULTS

STAKEHOLDERS Group Interviewee	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	Pcntg	Avg
Legal	3	3	3	3	4	4	4	2	3	5	3	4	2	4	4	2	2	2	4	4	65	15%	3.25
Economic	3	3	2	2	4	2	2	2	1	2	3	3	2	3	4	1	1	2	2	4	48	11%	2.40
Financial	4	3	2	2	2	3	3	3	2	4	3	2	3	2	2	2	3	2	3	5	55	13%	2.75
Market	4	3	2	3	4	3	4	3	4	5	3	3	3	4	3	1	3	4	4	5	68	16%	3.40
Operational	2	3	3	2	3	2	4	2	2	3	3	2	2	3	3	2	1	2	3	2	49	11%	2.45
Engineering	2	3	2	1	2	3	2	2	2	2	3	2	1	2	2	1	1	1	2	2	38	9%	1.90
Socio-political	2	3	3	2	3	2	4	4	3	4	4	2	3	4	5	2	3	5	4	3	65	15%	3.25
Environmental	3	3	2	2	2	2	2	2	2	3	3	2	2	2	2	2	1	2	1	1	41	10%	2.05
Total	23	24	19	17	24	21	25	20	19	28	25	20	18	24	25	13	15	20	23	26	429		
Commercial	18	18	13	12	17	15	17	14	13	19	18	14	13	16	16	9	10	13	15	19	299	70%	2.49
Non-commercial	5	6	6	5	7	6	8	6	6	9	7	6	5	8	9	4	5	7	8	7	130	30%	3.25

TABLE D2.2 FREQUENCY ANALYSIS

	1	2	3	4	5	Sum
Legal	0	5	6	8	1	20
Economic	3	9	5	3	0	20
Financial	0	9	8	2	1	20
Market	1	1	9	7	2	20
Operational	1	10	8	1	0	20
Engineering	5	12	3	0	0	20
Socio-political	0	5	7	6	2	20
Environmental	3	13	4	0	0	20
Total	13	64	50	27	6	160
Commercial	13	54	37	13	3	120
Non-commercial	0	10	13	14	3	40
Cumulative	13	77	127	154	160	
Cumulative %	8%	48%	79%	96%	100%	

NOTES:

1 To ensure the confidentiality of the interviewees, the interview numbers shown in Table 1 are assigned arbitrarily, and do not correspond with the numbers given in the stakeholder list in Appendix C.

2 The association between the interview number, the interviewee and the stakeholder group is not shown for reason of confidentiality.

CHI-SQUARED TEST OF GOODNESS OF FIT

TABLE D2.3 Total Scores

				Sum
Legal	65			65
Economic	48			48
Financial	55			55
Market	68			68
Operational	49			49
Engineering	38			38
Socio-political	65			65
Environmental	41			41
Total	429			429
Commercial	299			299
Non-commercial	130			130

TABLE D2.4 Expected Values

				Sum
Legal	53.6			53.63
Economic	53.6			53.63
Financial	53.6			53.63
Market	53.6			53.63
Operational	53.6			53.63
Engineering	53.6			53.63
Socio-political	53.6			53.63
Environmental	53.6			53.63
Total	429			429
Commercial	322			322
Non-commercial	107			107

TABLE D2.5 Chi-squared Values

				Sum
Legal	2.413			2.413
Economic	0.590			0.59
Financial	0.035			0.035
Market	3.853			3.853
Operational	0.399			0.399
Engineering	4.553			4.553
Socio-political	2.413			2.413
Environmental	2.972			2.972
Total	17.228			17.2[illegible]
Commercial	12			12
Non-commercial	5			5

CHI-SQUARE TEST OF GOONESS OF FIT:

CHI -TEST = 0.016
Degrees of Freedom 7
CHI CRITICAL = 14.067
CHI-CALC+ 17.228

FIGURE D2.1: TOTAL SECTOR CONSTRAINT RATING

#	Risk	Score	Total
4	Market	16%	68
1	Legal	15%	65
7	Socio-political	15%	65
3	Financial	13%	55
5	Operational	11%	49
2	Economic	11%	48
8	Environmental	10%	41
6	Engineering	9%	38
	Total	100%	429

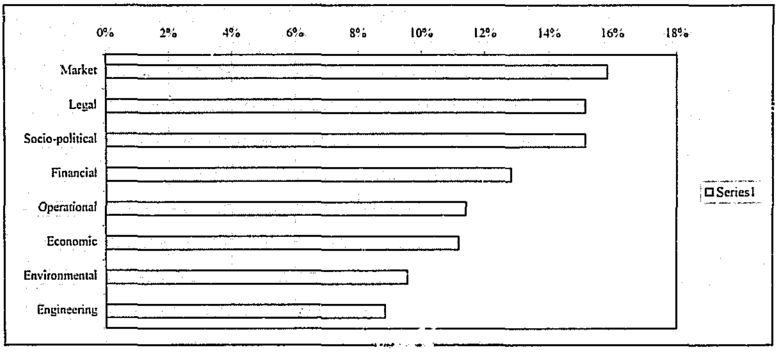


FIGURE D2.2: STAKEHOLDER GROUP 1 - NATIONAL GOVERNMENT

#	Risk	Score	Total
1	Legal	14%	9
3	Financial	14%	9
4	Market	14%	9
2	Economic	12%	8
5	Operational	12%	8
7	Socio-political	12%	8
8	Environmental	12%	8
6	Engineering	11%	7
	Total	100%	66

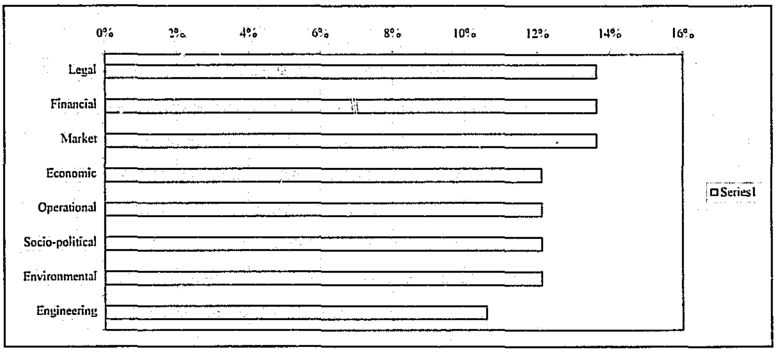


FIGURE D2.3: STAKEHOLDER GROUP 2 - LOCAL GOVERNMENT

#	Risk	Score	Total
1	Legal	17%	7
4	Market	17%	7
2	Economic	15%	6
5	Operational	12%	5
7	Socio-political	12%	5
3	Financial	10%	4
8	Environmental	10%	4
6	Engineering	7%	3
	Total	100%	41

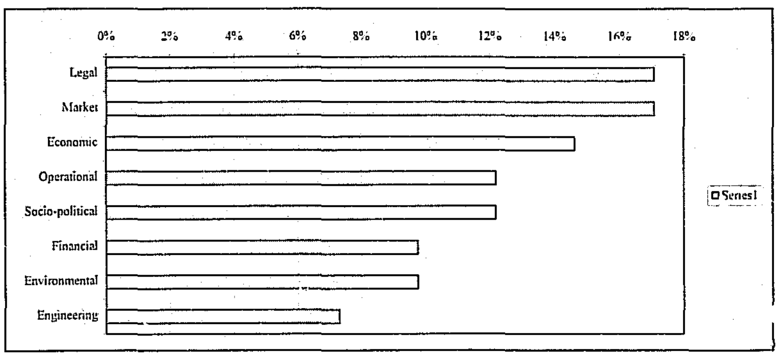


FIGURE D2.4: STAKEHOLDER GROUP 3 - CONSUMERS

#	Risk	Score	Total
1	Legal	17%	8
4	Market	15%	7
3	Financial	13%	6
5	Operational	13%	6
7	Socio-political	13%	6
6	Engineering	11%	5
2	Economic	9%	4
8	Environmental	9%	4
	Total	100%	46

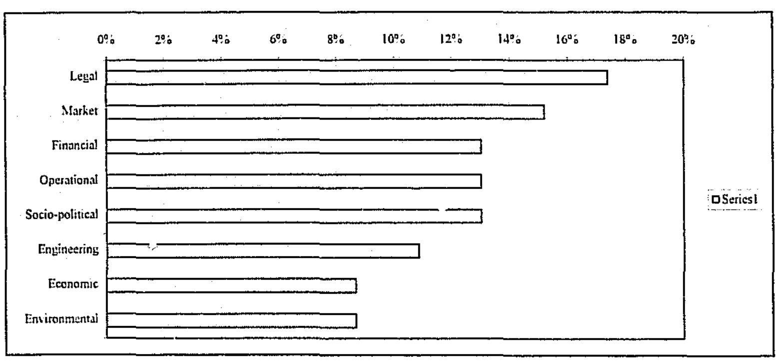


FIGURE D2.5: STAKEHOLDER GROUP 4 - BULK SERVICE PROVIDERS

#	Risk	Score	Total
7	Socio-political	20%	4
3	Financial	15%	3
4	Market	15%	3
1	Legal	10%	2
2	Economic	10%	2
5	Operational	10%	2
6	Engineering	10%	2
8	Environmental	10%	2
	Total	**100%**	**20**

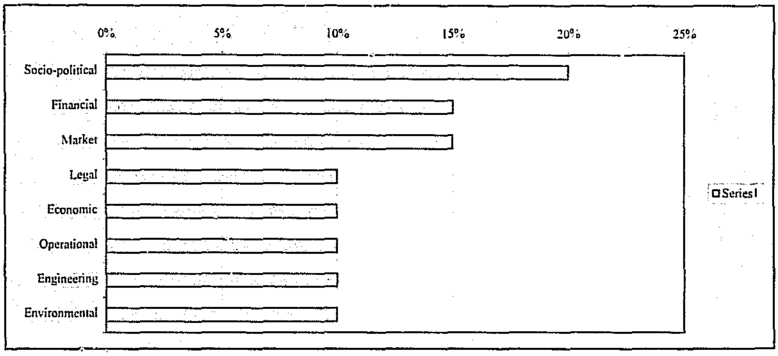


FIGURE D2.6: STAKEHOLDER GROUP 5 - DEVELOPMENT FINANCE (UNDERWRITERS)

#	Risk	Score	Total
4	Market	17%	12
1	Legal	15%	11
7	Socio-political	15%	11
3	Financial	13%	9
5	Operational	11%	8
8	Environmental	11%	8
6	Engineering	10%	7
2	Economic	8%	6
	Total	**100%**	**72**

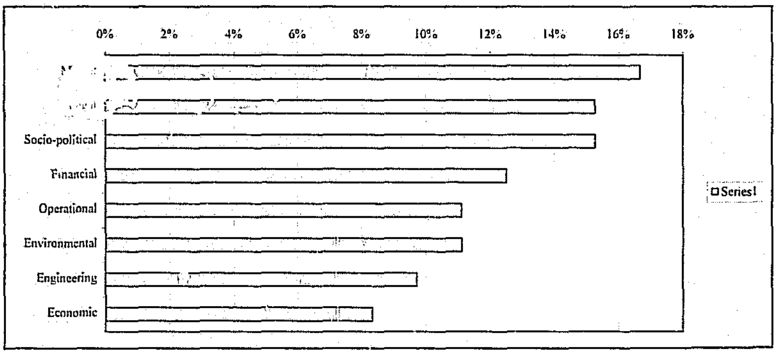


FIGURE D2.7: STAKEHOLDER GROUP 6 - PRIVATE LENDERS

#	Risk	Score	Total
1	Legal	16%	10
4	Market	16%	10
7	Socio-political	15%	9
2	Economic	13%	8
3	Financial	11%	7
5	Operational	11%	7
8	Environmental	10%	6
6	Engineering	8%	5
	Total	**100%**	**62**

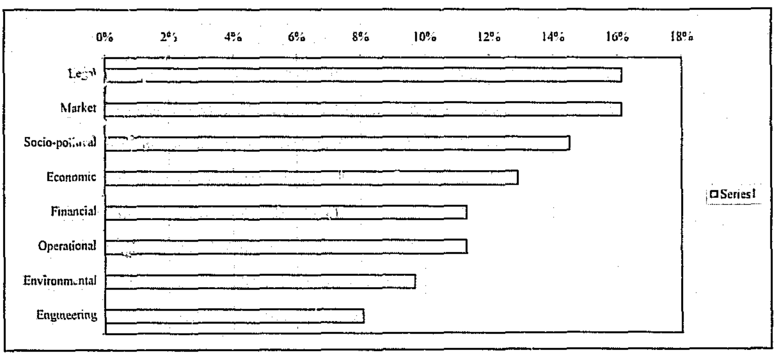


FIGURE D2.8: STAKEHOLDER GROUP 7 - UNIONS

#	Risk	Score	Total
7	Socio-political	20%	5
1	Legal	16%	4
2	Economic	16%	4
4	Market	12%	3
5	Operational	12%	3
3	Financial	8%	2
6	Engineering	8%	2
8	Environmental	8%	2
	Total	**100%**	**25**

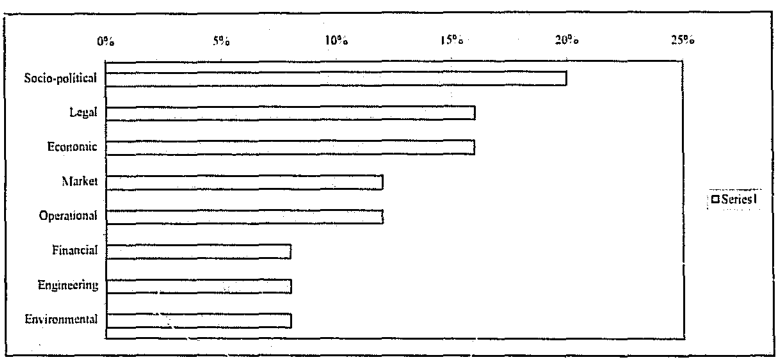


FIGURE D2.9: STAKEHOLDER GROUP 8 - SERVICE PROVIDERS

#	Risk	Score	Total
7	Socio-political	21%	10
4	Market	17%	8
3	Financial	15%	7
1	Legal	13%	6
5	Operational	10%	5
8	Environmental	10%	5
2	Economic	8%	4
6	Engineering	6%	3
	Total	100%	48

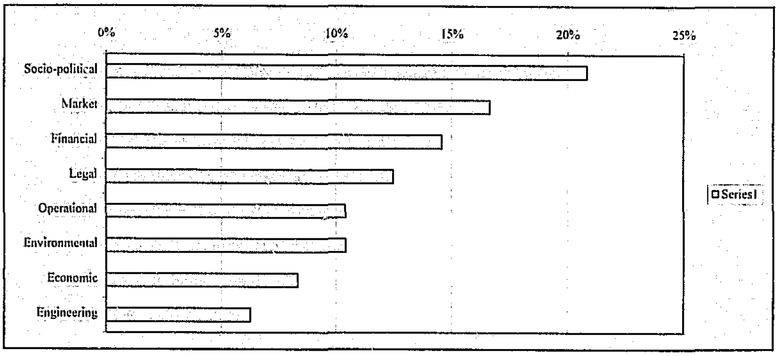


FIGURE D2.10 STAKEHOLDER GROUP 9 - PSP ADVISORS

#	Risk	Score	Total
4	Market	18%	9
1	Legal	16%	8
3	Financial	16%	8
7	Socio-political	14%	7
2	Economic	12%	6
5	Operational	10%	5
6	Engineering	8%	4
8	Environmental	4%	2
	Total	100%	49

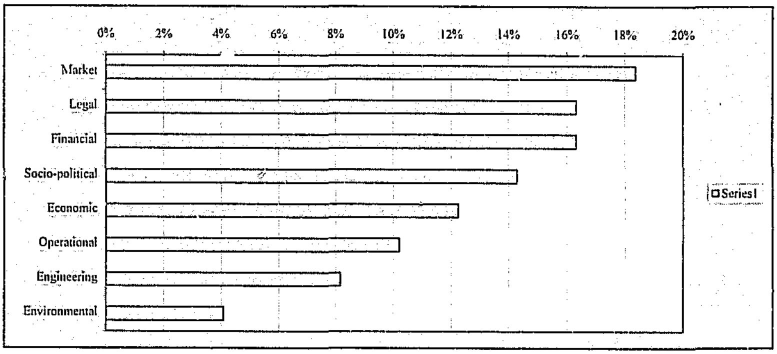
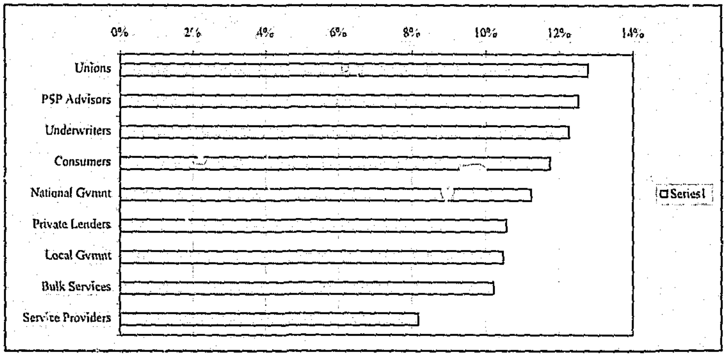


FIGURE D2.11: STAKEHOLDER GROUPS - SECTOR CONSTRAINT CONTRIBUTION

#	Risk	Percentage	Score
7	Unions	13%	25
9	PSP Advisors	13%	25
5	Underwriters	12%	24
3	Consumers	12%	23
1	National Gvmnt	11%	22
6	Private Lenders	11%	21
2	Local Gvmnt	10%	21
4	Bulk Services	10%	20
8	Service Providers	8%	16
	Total	100%	196



NOTES:

1 The stake holder score represents the total (ie summed) score of all the stakeholders representing the stakeholder group. These scores have been normalised for (ie divided by) the number of stakeholders in the group for this research.

2 The percentage represents the contribution of each stakeholder to total sector risk. The higher the contribution the more risk averse the stakeholder is in this sector.

APPENDIX D-3

RISK MANAGEMENT IN PSP IN WATER SERVICES

RISK / CONSTRAINT COMPARISON

RESULTS FROM QUESTIONNAIRE - Part 1

TABLE D3.1 SURVEY RESULTS

STAKEHOLDERS Group Interviewee	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Legal	0	1	1	0	-1	-1	0	1	-1	-4	0	0	0	0	-1	0	0	0	0	0	-5
Economic	1	1	1	0	-2	0	0	0	0	1	0	0	0	0	-1	1	1	0	1	0	4
Financial	0	0	1	0	1	0	0	1	-1	0	0	1	0	1	0	0	0	0	0	-1	3
Market	0	0	0	1	0	0	0	-1	-1	0	0	1	-1	0	0	1	1	-1	-1	0	-1
Operational	2	1	0	1	0	0	0	1	0	0	0	1	0	0	0	0	1	1	0	0	8
Engineering	3	0	0	1	0	1	0	0	1	0	0	0	1	1	0	0	1	0	0	0	9
Socio-political	1	1	1	2	1	0	0	-1	1	-2	0	0	0	1	-1	0	1	-1	0	0	4
Environmental	0	0	0	1	0	0	0	0	1	0	0	1	0	1	0	0	2	-1	0	0	5
Total	7	4	4	6	-1	0	0	1	0	-5	0	4	0	4	-3	2	7	-2	0	-1	27
Commercial	6	2	2	4	-1	1	0	1	0	1	0	4	0	3	-1	2	6	-1	0	-1	28
Non-commercial	1	2	2	2	0	-1	0	0	0	-6	0	0	0	1	-2	0	1	-1	0	0	-1

TABLE D3.2 FREQUENCY ANALYSIS

	-5	-4	-3	-2	-1	0	1	2	3		5	Sum
Legal	0	1	0	0	4	12	3	0	0	0	0	20
Economic	0	0	0	1	1	11	7	0	0	0	0	20
Financial	0	0	0	0	2	13	5	0	0	0	0	20
Market	0	0	0	0	5	11	4	0	0	0	0	20
Operational	0	0	0	0	0	13	6	1	0	0	0	20
Engineering	0	0	0	0	0	13	6	0	1	0	0	20
Socio-political	0	0	0	1	3	8	7	1	0	0	0	20
Environmental	0	0	0	0	1	14	4	1	0	0	0	20
Total	0	1	0	2	16	95	42	3	1	0	0	160
Commercial	0	0	0	1	9	75	32	2	1	0	0	120
Non-commercial	0	1	0	1	7	20	10	1	0	0	0	40
Cumulative	0	1	1	3	19	114	156	159	160	160	160	
Cumulative %	0%	1%	1%	2%	12%	71%	98%	99%	100%	100%	100%	

TABLE D3.3 FREQUENCY ANALYSIS

	<0	0	>0	Sum
Legal	5	12	3	20
Economic	2	11	7	20
Financial	2	13	5	20
Market	5	11	4	20
Operational	0	13	7	20
Engineering	0	13	7	20
Socio-political	4	8	8	20
Environmental	1	14	5	20
Total	19	95	46	160
Commercial	10	75	35	120
Non-commercial	9	20	11	40

FIGURE D3.1: TOTAL SECTOR RISK

#	Risk	Score	Total
1	Legal	-5	-5
4	Market	-1	-1
3	Financial	3	3
2	Economic	4	4
7	Socio-political	4	4
8	Environmental	5	5
5	Operational	8	8
6	Engineering	9	9
	Total	27	27

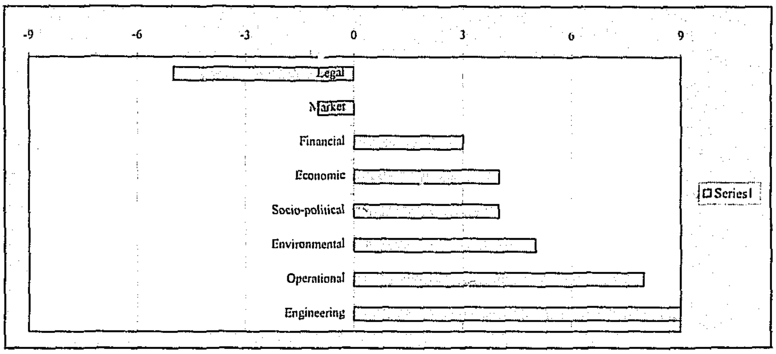


FIGURE D3.2: STAKEHOLDER GROUP 1 - NATIONAL GOVERNMENT

#	Risk	Score	Total
4	Market	0	0
8	Environmental	0	0
3	Financial	1	1
1	Legal	2	2
2	Economic	3	3
5	Operational	3	3
6	Engineering	3	3
7	Socio-political	3	3
	Total	15	15

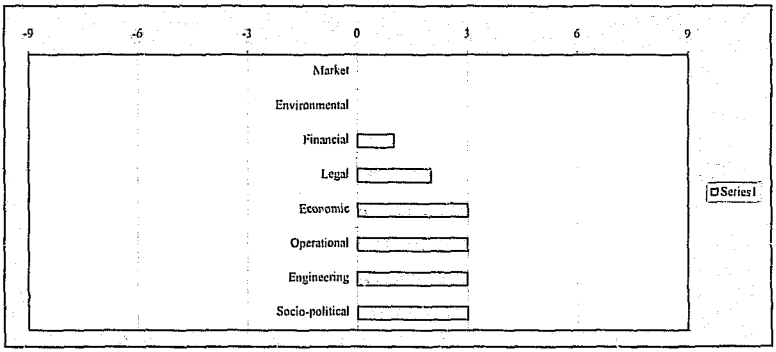


FIGURE D3.3: STAKEHOLDER GROUP 2 - LOCAL GOVERNMENT

#	Risk	Score	Total
2	Economic	-2	-2
1	Legal	-1	-1
3	Financial	1	1
4	Market	1	1
5	Operational	1	1
6	Engineering	1	1
8	Environmental	1	1
7	Socio-political	3	3
	Total	5	5

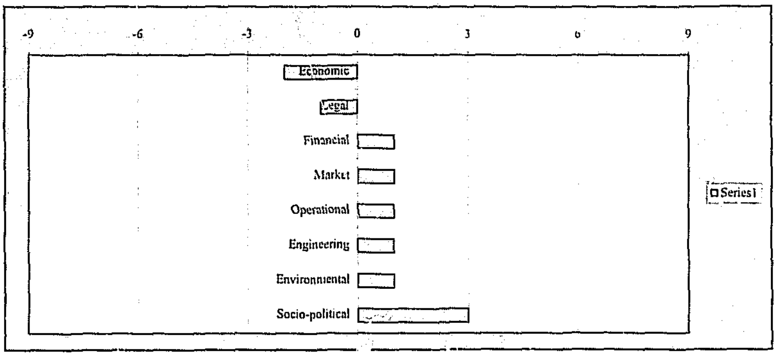


FIGURE D3.4: STAKEHOLDER GROUP 3 - CONSUMERS

#	Risk	Score	Total
1	Legal	-1	-1
2	Economic	0	0
3	Financial	0	0
4	Market	0	0
5	Operational	0	0
6	Engineering	1	1
7	Socio-political	0	0
8	Environmental	0	0
	Total	0	0

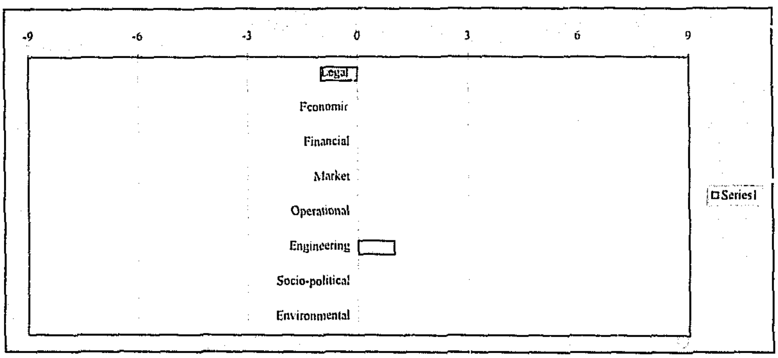


FIGURE D3.5: STAKEHOLDER GROUP 4 - BULK SERVICE PROVIDERS

#	Risk	Score	Total
4	Market	-1	-1
7	Socio-political	-1	-1
2	Economic	0	0
6	Engineering	0	0
8	Environmental	0	0
1	Legal	1	1
3	Financial	1	1
5	Operational	1	1
	Total	1	1

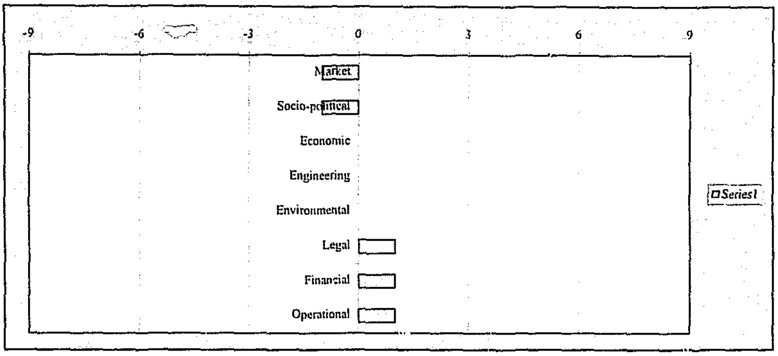


FIGURE D3.6: STAKEHOLDER GROUP 5 - DEVELOPMENT FINANCE (UNDERWRITERS)

#	Risk	Score	Total
1	Legal	-5	-5
3	Financial	-1	-1
4	Market	-1	-1
7	Socio-political	-1	-1
5	Operational	0	0
2	Economic	1	1
6	Engineering	1	1
8	Environmental	1	1
	Total	-5	-5

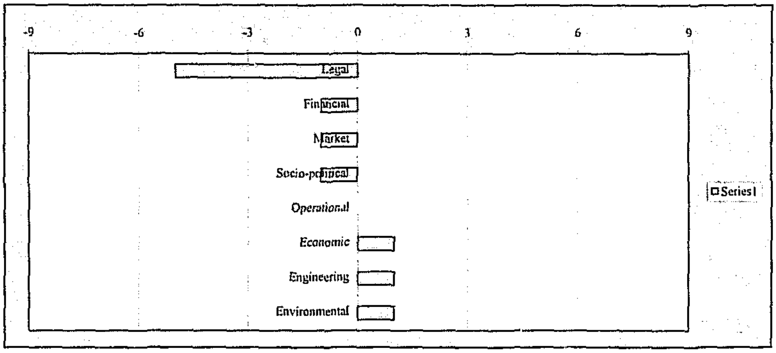


FIGURE D3.7: STAKEHOLDER GROUP 6 - PRIVATE LENDERS

#	Risk	Score	Total
1	Legal	0	0
2	Economic	0	0
4	Market	0	0
5	Operational	1	1
7	Socio-political	1	1
3	Financial	2	2
6	Engineering	2	2
8	Environmental	2	2
	Total	8	8

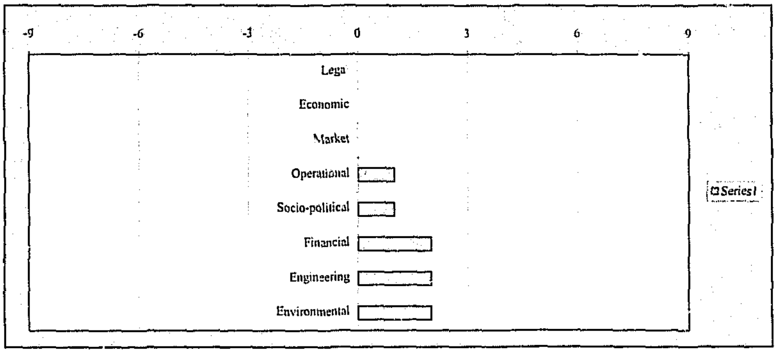


FIGURE D3.8: STAKEHOLDER GROUP 7 - UNIONS

#	Risk	Score	Total
1	Legal	-1	-1
2	Economic	-1	-1
7	Socio-political	-1	-1
3	Financial	0	0
4	Market	0	0
5	Operational	0	0
6	Engineering	0	0
8	Environmental	0	0
	Total	-3	-3

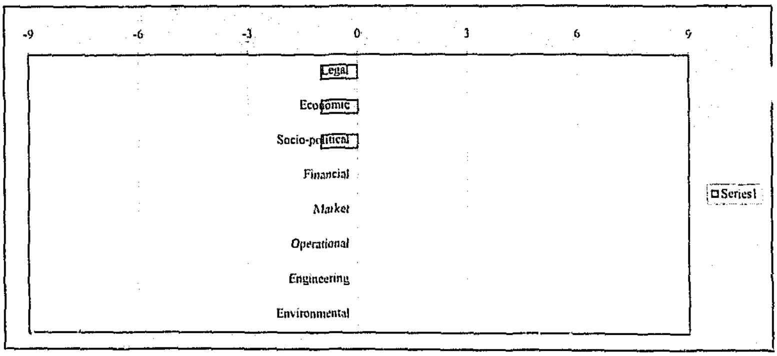


FIGURE D3.9: STAKEHOLDER GROUP 8 - SERVICE PROVIDERS

#	Risk	Score	Total
1	Legal	0	0
3	Financial	0	0
7	Socio-political	0	0
4	Market	1	1
6	Engineering	1	1
8	Environmental	1	1
2	Economic	2	2
5	Operational	2	2
	Total	7	7

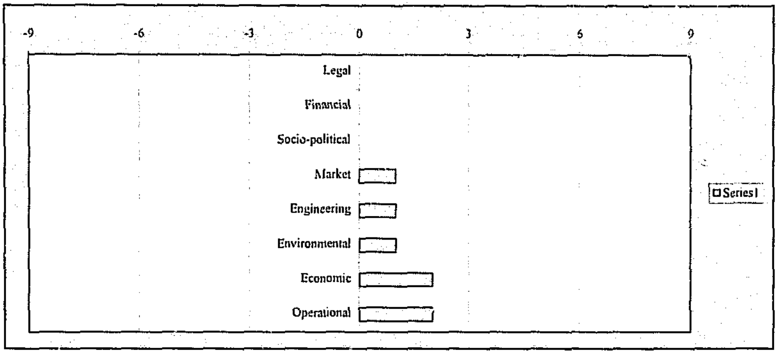


FIGURE D3.10 STAKEHOLDER GROUP 9 - PSP ADVISORS

#	Risk	Score	Total
3	Financial	-1	-1
4	Market	-1	-1
1	Legal	0	0
5	Operational	0	0
6	Engineering	0	0
7	Socio-political	0	0
8	Environmental	0	0
2	Economic	1	1
	Total	-1	-1

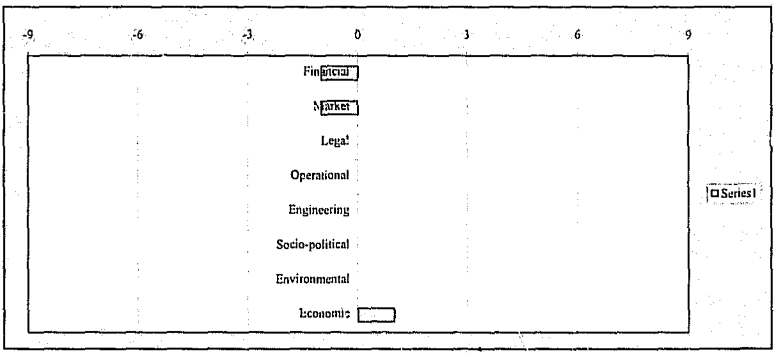
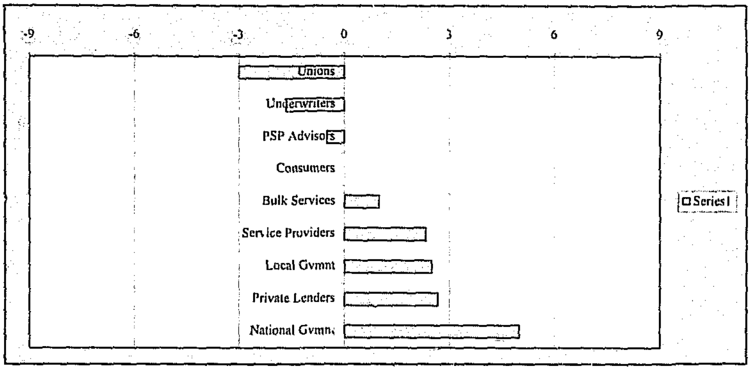


FIGURE D3.11: STAKEHOLDER GROUPS - SECTOR RISK CONTRIBUTION

#	Risk	Score	
7	Unions	-3	-3
5	Underwriters	-2	-2
9	PSP Advisors	-1	-1
3	Consumers	0	0
4	Bulk Services	1	1
8	Service Providers	2	2
2	Local Gvmnt	3	3
6	Private Lenders	3	3
1	National Gvmnt	5	5
	Total	8	8



NOTES:

1 The stake holder score represents the total (ie summed) score of all the stakeholders representing the stakeholder group. These scores have been normalised for (ie divided by) the number of stakeholders in the group for this research.

2 The percentage represents the contribution of each stakeholder to total sector risk The higher the contribution the more risk averse the stakeholder is in this sector

APPENDIX E

Analysis of Results : Questionnaire – Part 2

APPENDIX E

CONTENTS

APPENDIX E-1

RISK MANAGEMENT IN PSP IN WATER SERVICES

RISK RANKING

RESULTS FROM QUESTIONNAIRE - Part 2

TABLE E1.1 SURVEY RESULTS

STAKEHOLDERS Group Interviewee	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	Pcntg
Legal	3	2	4	1	3	4	1	2	0	2	0	4	1	3	2	1	1	0	3	2	39	20%
Economic	2	2	1	0	1	0	0	1	0	0	0	1	1	0	2	2	1	1	0	2	17	9%
Financial	2	0	1	0	0	2	1	1	0	0	1	1	3	1	0	0	4	2	1	2	22	11%
Market	1	0	0	4	3	2	3	2	2	5	3	3	1	3	2	2	1	2	2	3	44	22%
Operational	0	1	0	2	1	0	2	2	0	0	3	1	1	1	0	0	0	1	0	0	15	8%
Engineering	0	1	0	0	0	1	0	1	2	0	2	0	0	0	0	0	0	0	0	0	7	4%
Socio-political	1	4	4	3	2	1	3	1	4	2	1	0	3	1	4	5	3	4	4	1	51	26%
Environmental	1	0	0	0	0	0	0	0	2	1	0	0	0	1	0	0	0	0	0	0	5	3%
Total	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	200	
Commercial	6	4	2	6	5	5	6	7	6	6	9	6	6	6	4	4	6	6	3	7	110	55%
Non-commercial	4	6	8	4	5	5	4	3	4	4	1	4	4	4	6	6	4	4	7	3	90	45%

TABLE E1.2 FREQUENCY ANALYSIS

Frequency	0	1	2	3	4	5	6	7	8	9	10	Sum
Legal	3	5	5	4	3	0	0	0	0	0	0	20
Economic	8	7	5	0	0	0	0	0	0	0	0	20
Financial	7	7	4	1	1	0	0	0	0	0	0	20
Market	2	3	7	6	1	1	0	0	0	0	0	20
Operational	10	6	3	1	0	0	0	0	0	0	0	20
Engineering	15	3	2	0	0	0	0	0	0	0	0	20
Socio-political	1	6	2	4	6	1	0	0	0	0	0	20
Environmental	16	3	1	0	0	0	0	0	0	0	0	20
Total	62	40	29	16	11	2	0	0	0	0	0	160
Commercial	58	29	22	8	2	1	0	0	0	0	0	120
Non-commercial	4	11	7	8	9	1	0	0	0	0	0	40
Cumulative	62	102	131	147	158	160	160	160	160	160	160	
Cumulative %	39%	64%	82%	92%	99%	100%	100%	100%	100%	100%	100%	

NOTES:

1 To ensure the confidentiality of the interviewees, the interview numbers shown in Table 1 are assigned arbitrarily, and do not correspond with the numbers given in the stakeholder list in Appendix C.
The association between the interviewee and the stakeholder group is not shown for the same reason.

FIGURE E1.1 TOTAL SECTOR RISK

#	Risk	Score	Total
7	Socio-political	26%	51
4	Market	22%	44
1	Legal	20%	39
3	Financial	11%	22
2	Economic	9%	17
5	Operational	8%	15
6	Engineering	4%	7
8	Environmental	3%	5
	Total	100%	200

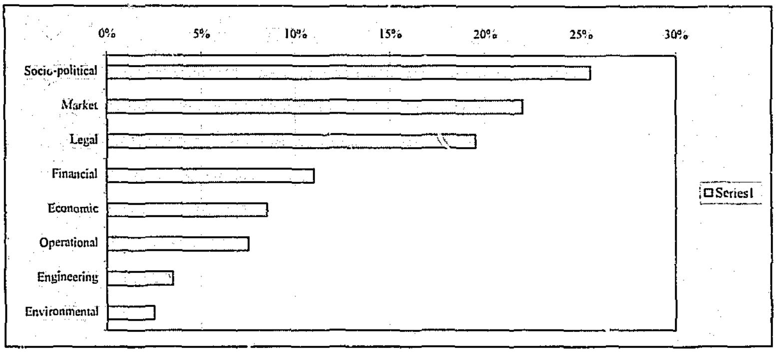


FIGURE E1.2 STAKEHOLDER GROUP 1 - NATIONAL GOVERNMENT

#	Risk	Score	Total
1	Legal	30%	9
7	Socio-political	30%	9
2	Economic	17%	5
3	Financial	10%	3
4	Market	3%	1
5	Operational	3%	1
6	Engineering	3%	1
8	Environmental	3%	1
	Total	100%	30

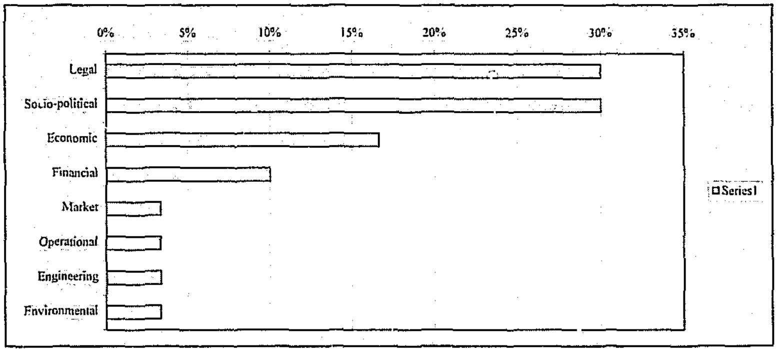


FIGURE E1.3 STAKEHOLDER GROUP 2 - LOCAL GOVERNMENT

#	Risk	Score	Total
4	Market	35%	7
7	Socio-political	25%	5
1	Legal	20%	4
5	Operational	15%	3
2	Economic	5%	1
3	Financial	0%	0
6	Engineering	0%	0
8	Environmental	0%	0
	Total	100%	20

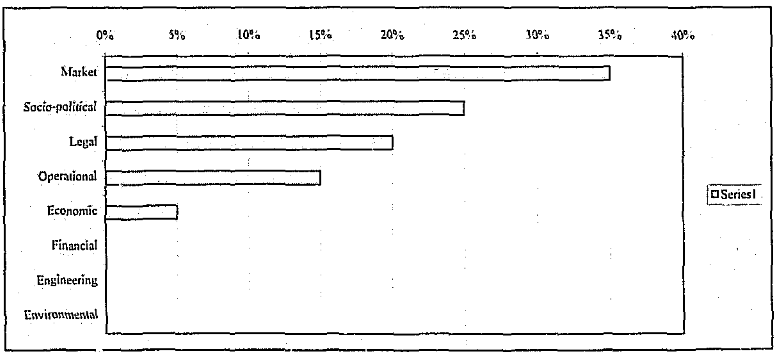


FIGURE E1.4 STAKEHOLDER GROUP 3 - CONSUMERS

#	Risk	Score	Total
1	Legal	25%	5
4	Market	25%	5
7	Socio-political	20%	4
3	Financial	15%	3
5	Operational	10%	2
6	Engineering	5%	1
2	Economic	0%	0
8	Environmental	0%	0
	Total	100%	20

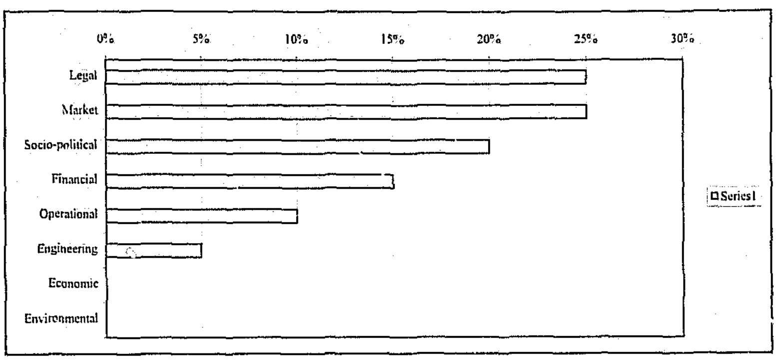


FIGURE E1.5 STAKEHOLDER GROUP 4 - BULK SERVICE PROVIDERS

#	Risk	Score	Total
1	Legal	20%	2
4	Market	20%	2
5	Operational	20%	2
2	Economic	10%	1
3	Financial	10%	1
6	Engineering	10%	1
7	Socio-political	10%	1
8	Environmental	0%	0
	Total	**100%**	**10**

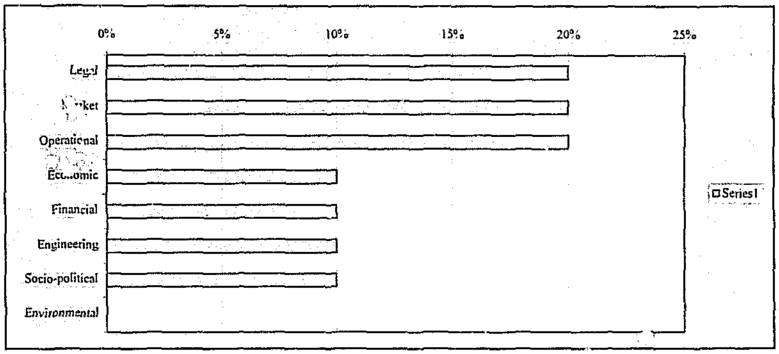


FIGURE E1.6 STAKEHOLDER GROUP 5 - DEVELOPMENT FINANCE (UNDERWRITERS)

#	Risk	Score	Total
4	Market	33%	10
7	Socio-political	23%	7
6	Engineering	13%	4
5	Operational	10%	3
8	Environmental	10%	3
1	Legal	7%	2
3	Financial	3%	1
2	Economic	0%	0
	Total	**100%**	**30**

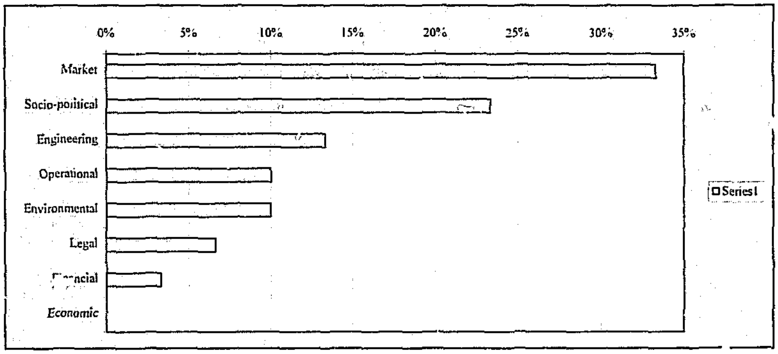


FIGURE E1.7 STAKEHOLDER GROUP 6 - PRIVATE LENDERS

#	Risk	Score	Total
1	Legal	27%	8
4	Market	23%	7
3	Financial	17%	5
7	Socio-political	13%	4
5	Operational	10%	3
2	Economic	7%	2
8	Environmental	3%	1
6	Engineering	0%	0
	Total	**100%**	**30**

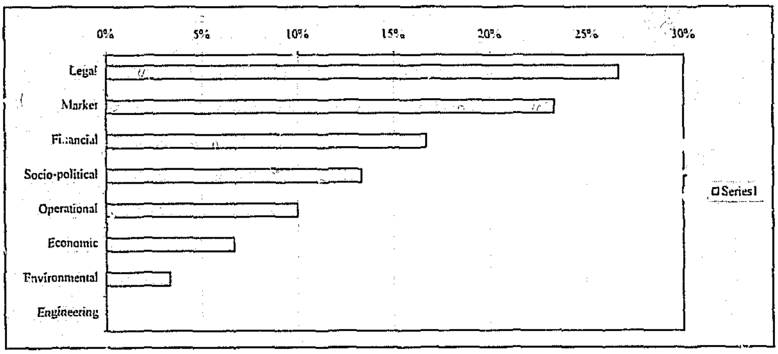


FIGURE E1.8 STAKEHOLDER GROUP 7 - UNIONS

#	Risk	Score	Total
7	Socio-political	40%	4
1	Legal	20%	2
2	Economic	20%	2
4	Market	20%	2
3	Financial	0%	0
5	Operational	0%	0
6	Engineering	0%	0
8	Environmental	0%	0
	Total	**100%**	**10**

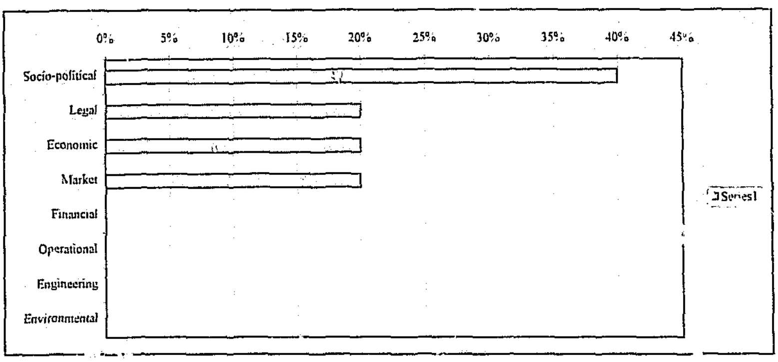


FIGURE E1.9	STAKEHOLDER GROUP 8 - SERVICE PROVIDERS		
#	Risk	Score	Total
7	Socio-political	40%	12
3	Financial	20%	6
4	Market	17%	5
2	Economic	13%	4
1	Legal	7%	2
5	Operational	3%	1
6	Engineering	0%	0
8	Environmental	0%	0
	Total	100%	30

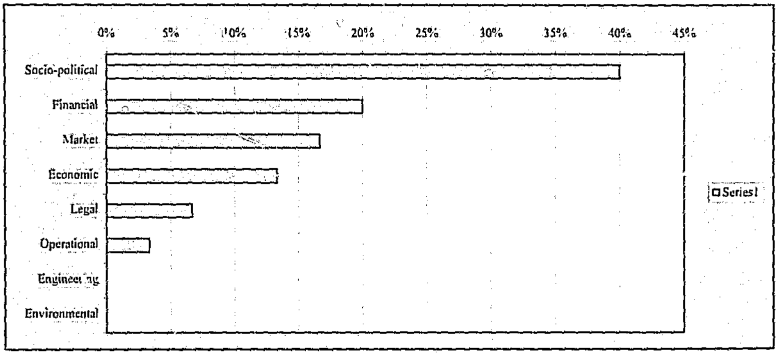
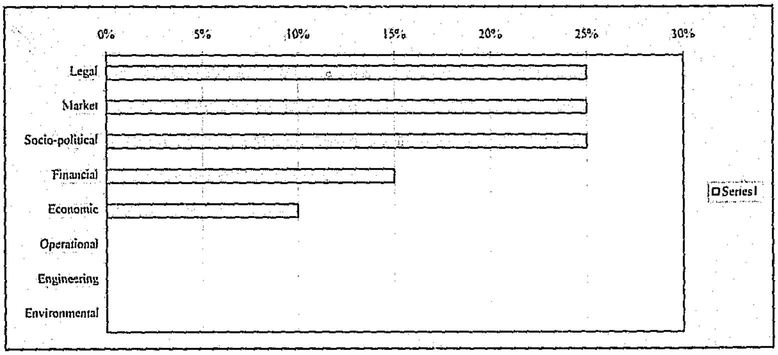


FIGURE E1.10	STAKEHOLDER GROUP 9 - PSP ADVISORS		
#	Risk	Score	Total
1	Legal	25%	5
4	Market	25%	5
7	Socio-political	25%	5
3	Financial	15%	3
2	Economic	10%	2
5	Operational	0%	0
6	Engineering	0%	0
8	Environmental	0%	0
	Total	100%	20



APPENDIX E-2

RISK MANAGEMENT IN PSP IN WATER SERVICES

CONSTRAINT RANKING

RESULTS FROM QUESTIONNAIRE - Part 2

TABLE E2.1 : SURVEY RESULTS

STAKEHOLDERS Group Interviewee	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	Pcntg
Legal	3	1	3	5	4	4	1	4	2	6	0	7	1	3	1	2	1	0	3	2	53	27%
Economic	2	0	1	1	2	0	0	2	0	0	1	1	0	0	1	0	0	1	0	2	14	7%
Financial	2	2	1	0	1	2	1	3	0	0	1	0	3	1	0	2	4	2	1	2	28	14%
Market	1	2	0	1	2	2	3	0	4	3	2	1	3	3	2	0	1	2	2	3	37	19%
Operational	0	1	1	0	1	0	2	0	1	0	2	1	0	1	0	1	0	1	0	0	12	6%
Engineering	0	1	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0	5	3%
Socio-political	1	2	4	3	0	1	3	1	2	1	1	0	3	2	6	4	4	4	4	1	47	24%
Environmental	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	4	2%
Total	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	200	
Commercial	6	7	3	2	6	5	6	5	6	3	9	3	6	5	3	4	5	6	3	7	100	50%
Non-commercial	4	3	7	8	4	5	4	5	4	7	1	7	4	5	7	6	5	4	7	3	100	50%

TABLE E2.2 : FREQUENCY ANALYSIS

	0	1	2	3	4	5	6	7	8	9	10	Sum
Legal	2	5	3	4	3	1	1	1	0	0	0	20
Economic	10	6	4	0	0	0	0	0	0	0	0	20
Financial	5	6	6	2	1	0	0	0	0	0	0	20
Market	3	4	7	5	1	0	0	0	0	0	0	20
Operational	10	8	2	0	0	0	0	0	0	0	0	20
Engineering	16	3	1	0	0	0	0	0	0	0	0	20
Socio-political	2	6	3	3	5	0	1	0	0	0	0	20
Environmental	16	4	0	0	0	0	0	0	0	0	0	20
Total	64	42	26	14	10	1	2	1	0	0	0	160
Commercial	60	31	20	7	2	0	0	0	0	0	0	120
Non-commercial	4	11	6	7	8	1	2	1	0	0	0	40
Cumulative	64	106	132	146	156	157	159	160	160	160	160	
Cumulative %	40%	66%	83%	91%	98%	98%	99%	100%	100%	100%	100%	

NOTES:

1 To ensure the confidentiality of the interviewees, the interview numbers shown in Table 1 are assigned arbitrarily, and do not correspond with the numbers given in the stakeholder list in Appendix C.
The association between the interviewee and the stakeholder group is not shown for the same reason.

FIGURE E2.1	TOTAL SECTOR RISK		
#	Risk	Score	Total
1	Legal	26.5%	53
7	Socio-political	23.5%	47
4	Market	18.5%	37
3	Financial	14.0%	28
2	Economic	7.0%	14
5	Operational	6.0%	12
6	Engineering	2.5%	5
8	Environmental	2.0%	4
	Total	100%	200

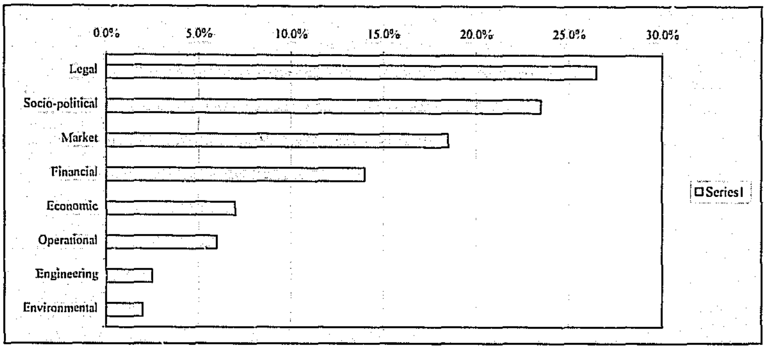


FIGURE E2.2	STAKEHOLDER GROUP 1 - NATIONAL GOVERNMENT		
#	Risk	Score	Total
1	Legal	23.3%	7
7	Socio-political	23.3%	7
3	Financial	16.7%	5
2	Economic	10.0%	3
4	Market	10.0%	3
5	Operational	6.7%	2
8	Environmental	6.7%	2
6	Engineering	3.3%	1
	Total	100%	30

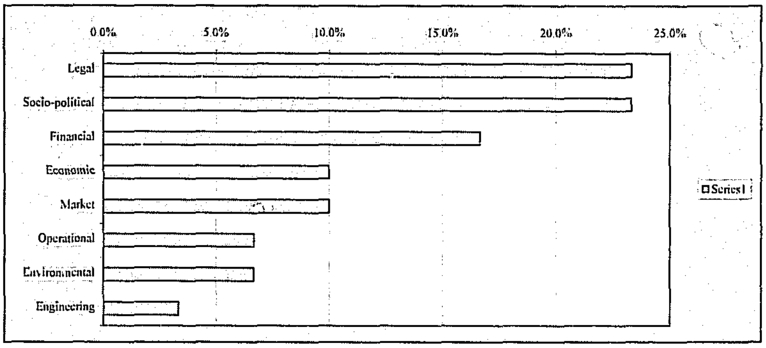


FIGURE E2.3	STAKEHOLDER GROUP 2 - LOCAL GOVERNMENT		
#	Risk	Score	Total
1	Legal	45.0%	9
7	Socio-political	15.0%	3
2	Economic	15.0%	3
4	Market	15.0%	3
3	Financial	5.0%	1
5	Operational	5.0%	1
6	Engineering	0.0%	0
8	Environmental	0.0%	0
	Total	100%	20

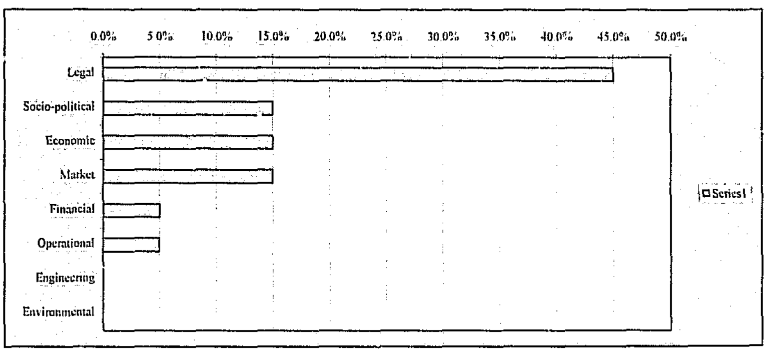


FIGURE E2.4	STAKEHOLDER GROUP 3 - CONSUMERS		
#	Risk	Score	Total
1	Legal	25.0%	5
4	Market	25.0%	5
7	Socio-political	20.0%	4
3	Financial	15.0%	3
5	Operational	10.0%	2
6	Engineering	5.0%	1
2	Economic	0.0%	0
8	Environmental	0.0%	0
	Total	100%	20

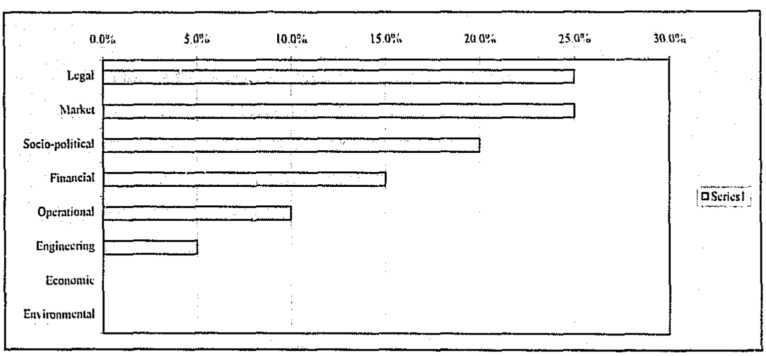


FIGURE E2.5 | STAKEHOLDER GROUP 4 - BULK SERVICE PROVIDERS

#	Risk	Score	Total
1	Legal	40.0%	4
3	Financial	30.0%	3
2	Economic	20.0%	2
7	Socio-political	10.0%	1
4	Market	0.0%	0
5	Operational	0.0%	0
6	Engineering	0.0%	0
8	Environmental	0.0%	0
	Total	100%	10

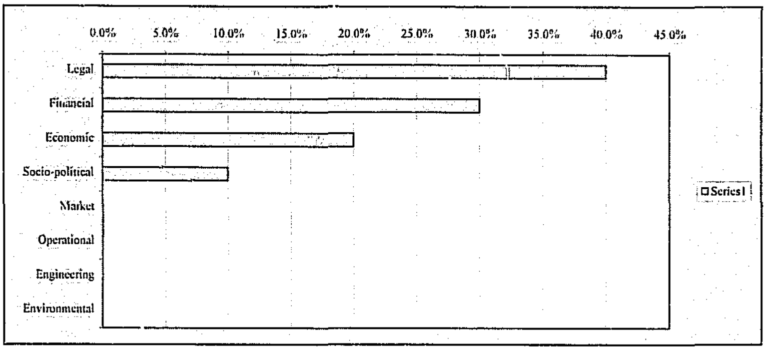


FIGURE E2.6 | STAKEHOLDER GROUP 5 - DEVELOPMENT FINANCE (UNDERWRITERS)

#	Risk	Score	Total
4	Market	30.0%	9
1	Legal	26.7%	8
7	Socio-political	13.3%	4
5	Operational	10.0%	3
6	Engineering	10.0%	3
2	Economic	3.3%	1
3	Financial	3.3%	1
8	Environmental	3.3%	1
	Total	100%	30

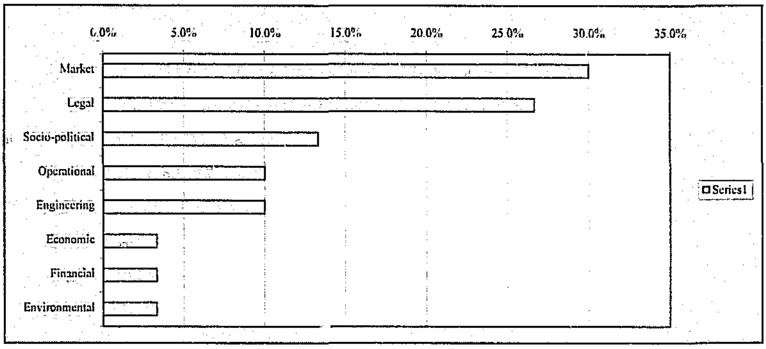


FIGURE E2.7 | STAKEHOLDER GROUP 6 - PRIVATE LENDERS

#	Risk	Score	Total
1	Legal	36.7%	11
4	Market	23.3%	7
7	Socio-political	16.7%	5
3	Financial	13.3%	4
5	Operational	6.7%	2
2	Economic	3.3%	1
6	Engineering	0.0%	0
8	Environmental	0.0%	0
	Total	100%	30

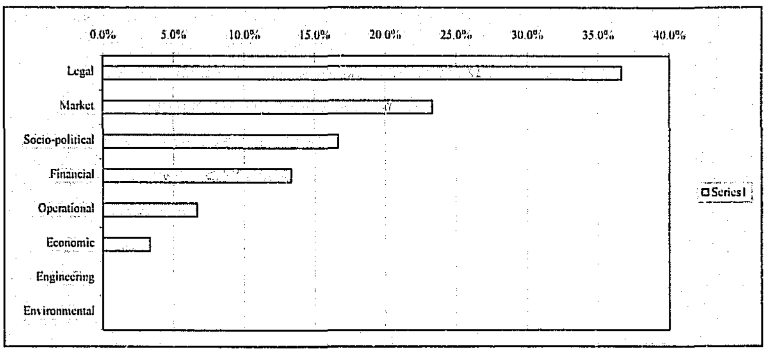


FIGURE E2.8 | STAKEHOLDER GROUP 7 - UNIONS

#	Risk	Score	Total
7	Socio-political	60.0%	6
4	Market	20.0%	2
1	Legal	10.0%	1
2	Economic	10.0%	1
3	Financial	0.0%	0
5	Operational	0.0%	0
6	Engineering	0.0%	0
8	Environmental	0.0%	0
	Total	100%	10

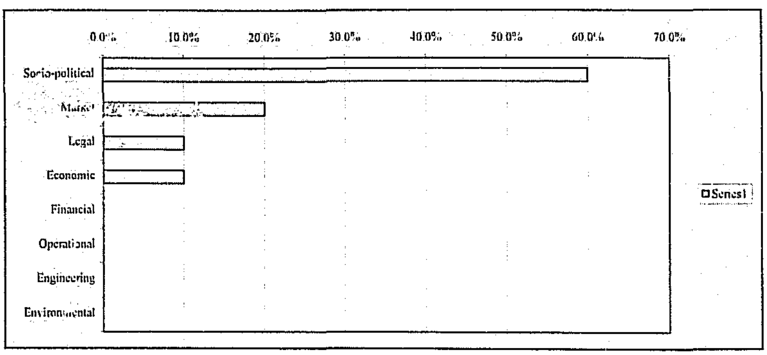


FIGURE E2.9 STAKEHOLDER GROUP 8 - SERVICE PROVIDERS

#	Risk	Score	Total
7	Socio-political	40.0%	12
3	Financial	26.7%	8
1	Legal	10.0%	3
4	Market	10.0%	3
5	Operational	6.7%	2
2	Economic	3.3%	1
8	Environmental	3.3%	1
6	Engineering	0.0%	0
	Total	100%	30

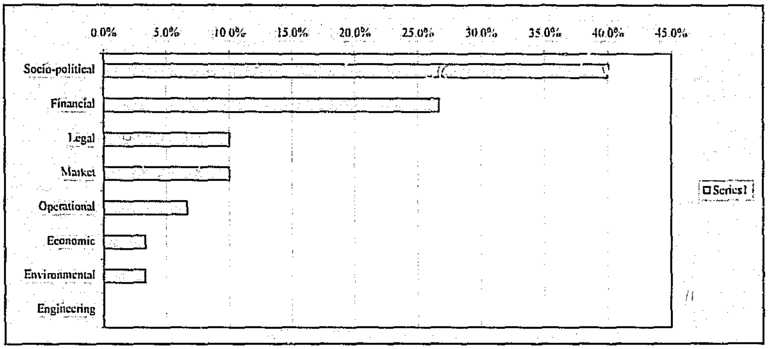
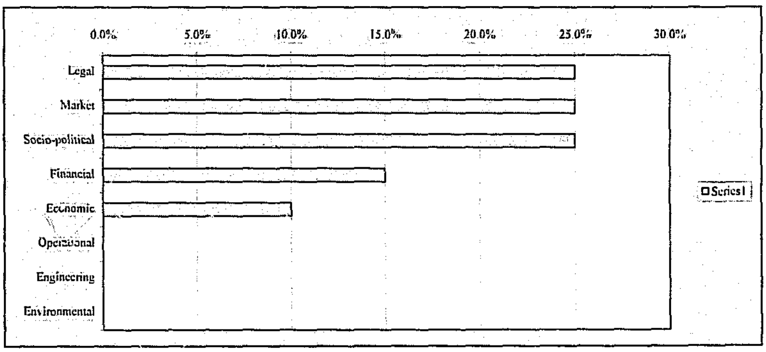


FIGURE E2.10 STAKEHOLDER GROUP 9 - PSP ADVISORS

#	Risk	Score	Total
1	Legal	25.0%	5
4	Market	25.0%	5
7	Socio-political	25.0%	5
3	Financial	15.0%	3
2	Economic	10.0%	2
5	Operational	0.0%	0
6	Engineering	0.0%	0
8	Environmental	0.0%	0
	Total	100%	20



APPENDIX E-3

RISK MANAGEMENT IN PSP IN WATER SERVICES

RISK / CONSTRAINT COMPARISON

RESULTS FROM QUESTIONNAIRE - Part 2

TABLE E3.1: SURVEY RESULTS

STAKEHOLDERS Group Interviewee	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Legal	0	1	1	-4	-1	0	0	-2	-2	-4	0	-3	0	0	1	-1	0	0	0	0	-14
Economic	0	2	0	-1	-1	0	0	-1	0	0	-1	0	1	0	1	2	1	0	0	0	3
Financial	0	-2	0	0	-1	0	0	-2	0	0	0	1	0	0	0	-2	0	0	0	0	-6
Market	0	-2	0	3	1	0	0	2	-2	2	1	2	-2	0	0	2	0	0	0	0	7
Operational	0	0	-1	2	0	0	0	2	-1	0	1	0	1	0	0	-1	0	0	0	0	3
Engineering	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
Socio-political	0	2	0	0	2	0	0	0	2	1	0	0	0	-1	-2	1	-1	0	0	0	4
Environmental	0	-1	0	0	0	0	0	0	2	1	-1	0	0	1	0	-1	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	-3	-1	4	4	-1	0	0	2	0	3	0	3	0	1	1	0	1	0	0	14
Non-commercial	0	3	1	-4	-4	1	0	0	-2	0	-3	0	-3	0	-1	-1	0	-1	0	0	-14

TABLE E3.2: FREQUENCY ANALYSIS

	-5	-4	-3	-2	-1	0	1	2	3	4	5	Sum
Legal	0	2	1	2	2	10	3	0	0	0	0	20
Economic	0	0	0	0	4	11	3	2	0	0	0	20
Financial	0	0	0	3	1	15	1	0	0	0	0	20
Market	0	0	0	3	0	10	2	4	1	0	0	20
Operational	0	0	0	0	3	13	2	2	0	0	0	20
Engineering	0	0	0	0	0	18	2	0	0	0	0	20
Socio-political	0	0	0	1	2	12	2	3	0	0	0	20
Environmental	0	0	0	0	3	14	2	1	0	0	0	20
Total	0	2	1	9	15	103	17	12	1	0	0	160
Commercial	0	0	0	6	11	81	12	9	1	0	0	120
Non-commercial	0	2	1	3	4	22	5	3	0	0	0	40
Cumulative	0	2	3	12	27	130	147	159	160	160	160	
Cumulative %	0%	1%	2%	8%	17%	81%	92%	99%	100%	100%	100%	

TABLE E3.3: FREQUENCY ANALYSIS

	<0	0	>0	Sum
Legal	7	10	3	20
Economic	4	11	5	20
Financial	4	15	1	20
Market	3	10	7	20
Operational	3	13	4	20
Engineering	0	18	2	20
Socio-political	3	12	5	20
Environmental	3	14	3	20
Total	27	103	30	160
Commercial	17	81	22	120
Non-commercial	10	22	8	[illegible]
Cumulative	[illegible]	130	160	
Cumulative %	17%	81%	[illegible]	

NOTES:

1 To ensure the confidentiality of the interviewees, the interview numbers shown in Table 1 are assigned arbitrarily, and do not correspond with the numbers given in the stakeholder list in Appendix C. The association between the interviewee and the stakeholder group is not shown for the same reason.

FIGURE E3.1 TOTAL SECTOR RISK

#	Risk	Score	Total
1	Legal	-14	-14
2	Financial	-6	-6
3	Environmental	1	1
4	Engineering	2	2
5	Economic	3	3
6	Operational	3	3
7	Socio-political	4	4
8	Market	7	7
	Total	-	0

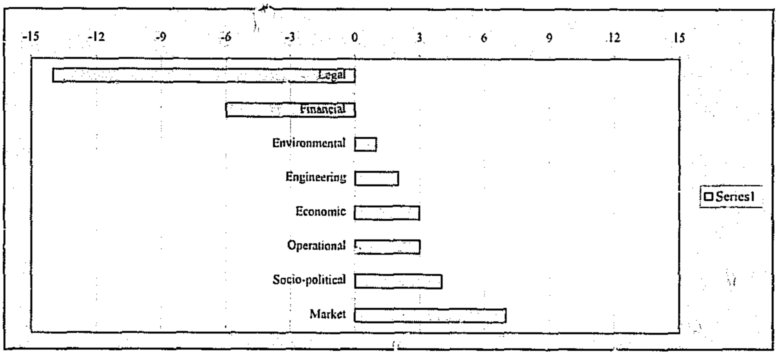


FIGURE E3.2 STAKEHOLDER GROUP 1 - NATIONAL GOVERNMENT

#	Risk	Score	Total
3	Financial	-2	-2
4	Market	-2	-2
5	Operational	-1	-1
8	Environmental	-1	-1
6	Engineering	0	0
1	Legal	2	2
2	Economic	2	2
7	Socio-political	2	2
	Total	0%	0

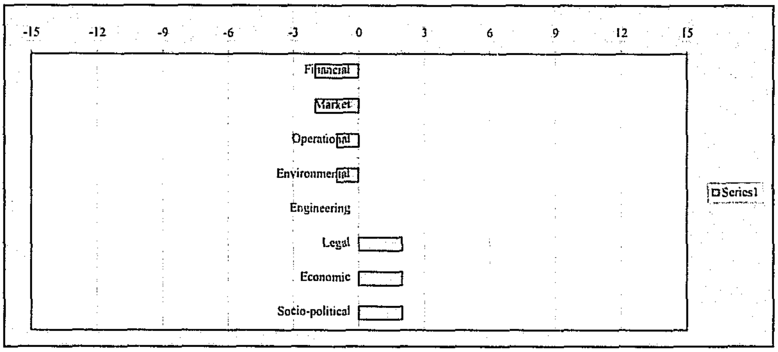


FIGURE E3.3 STAKEHOLDER GROUP 2 - LOCAL GOVERNMENT

#	Risk	Score	Total
1	Legal	-5	-5
2	Economic	-2	-2
3	Financial	-1	-1
6	Engineering	0	0
8	Environmental	0	0
5	Operational	2	2
7	Socio-political	2	2
4	Market	4	4
	Total	0%	0

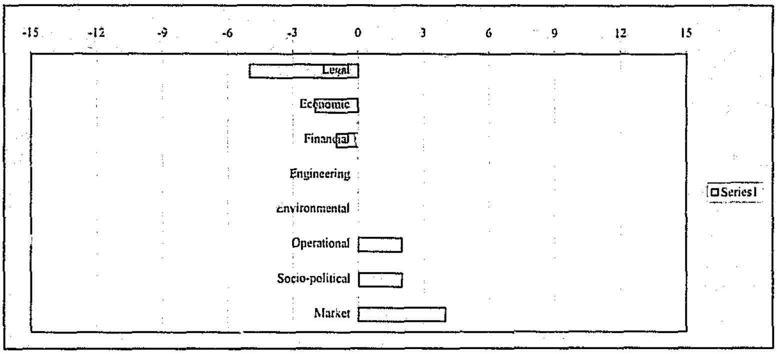


FIGURE E3.4 STAKEHOLDER GROUP 3 - CONSUMERS

#	Risk	Score	Total
1	Legal	0	0
2	Economic	0	0
3	Financial	0	0
4	Market	0	0
5	Operational	0	0
6	Engineering	0	0
7	Socio-political	0	0
8	Environmental	0	0
	Total	0%	0

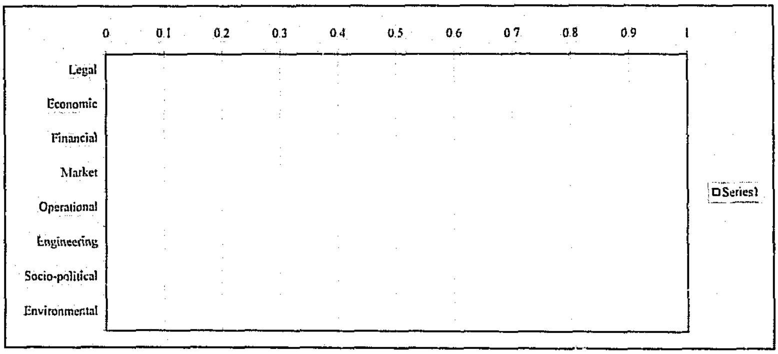


FIGURE E3.5 STAKEHOLDER GROUP 4 - BULK SERVICE PROVIDERS

#	Risk	Score	Total
1	Legal	-2	-2
3	Financial	-2	-2
2	Economic	-1	-1
7	Socio-political	0	0
8	Environmental	0	0
6	Engineering	1	1
4	Market	2	2
5	Operational	2	2
	Total	0%	0

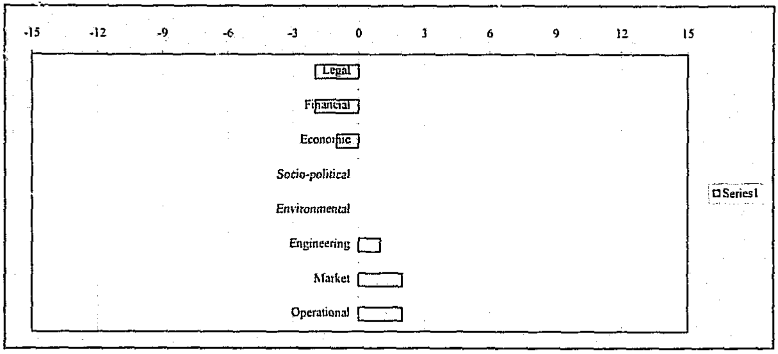


FIGURE E3.6 STAKEHOLDER GROUP 5 - DEVELOPMENT FINANCE (UNDERWRITERS)

#	Risk	Score	Total
1	Legal	-6	-6
2	Economic	-1	-1
3	Financial	0	0
5	Operational	0	0
4	Market	1	1
6	Engineering	1	1
8	Environmental	2	2
7	Socio-political	3	3
	Total	0%	0

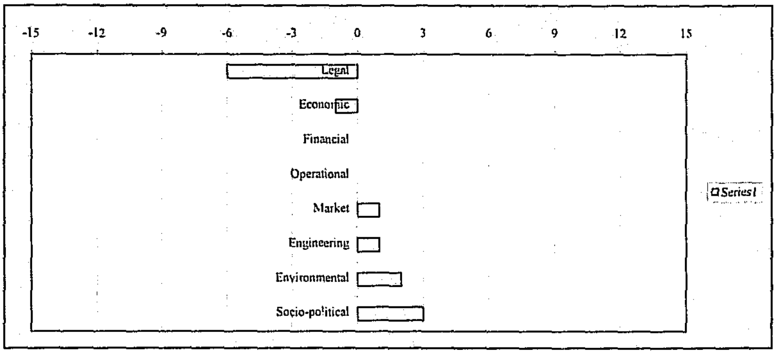


FIGURE E3.7 STAKEHOLDER GROUP 6 - PRIVATE LENDERS

#	Risk	Score	Total
1	Legal	-3	-3
7	Socio-political	-1	-1
4	Market	0	0
6	Engineering	0	0
2	Economic	1	1
3	Financial	1	1
5	Operational	1	1
8	Environmental	1	1
	Total	0%	0

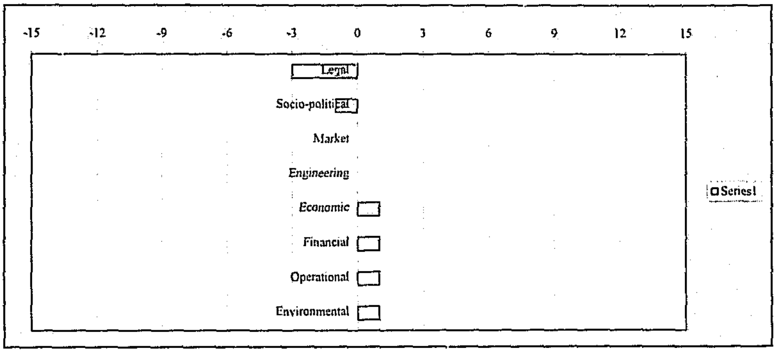


FIGURE E3.8 STAKEHOLDER GROUP 7 - UNIONS

#	Risk	Score	Total
7	Socio-political	-2	-2
3	Financial	0	0
4	Market	0	0
5	Operational	0	0
6	Engineering	0	0
8	Environmental	0	0
1	Legal	1	1
2	Economic	1	1
	Total	0%	0

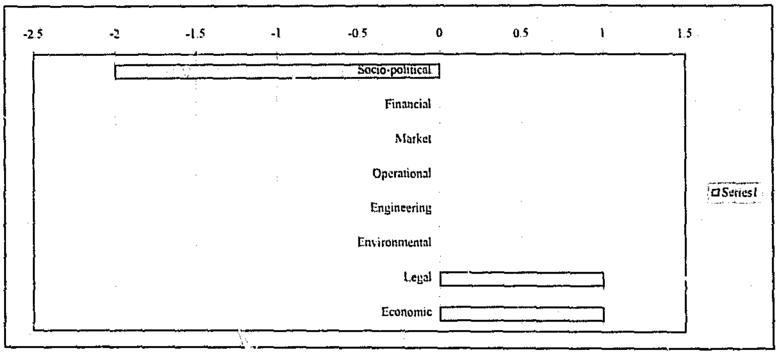


FIGURE E3.9	STAKEHOLDER GROUP 8 - SERVICE PROVIDERS	

#	Risk	Score	Total
3	Financial	-2	-2
1	Legal	-1	-1
5	Operational	-1	-1
8	Environmental	-1	-1
6	Engineering	0	0
7	Socio-political	0	0
4	Market	2	2
2	Economic	3	3
	Total	0%	0

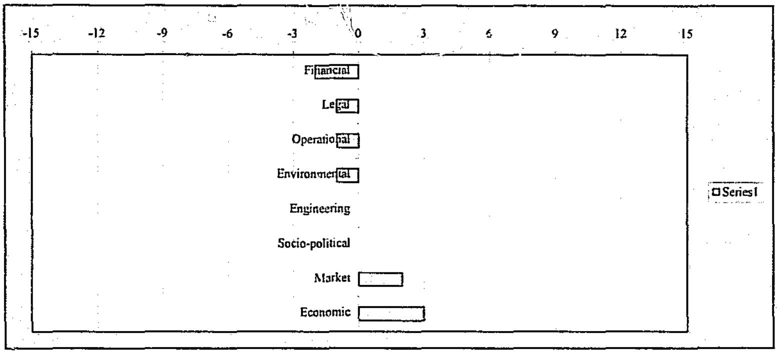
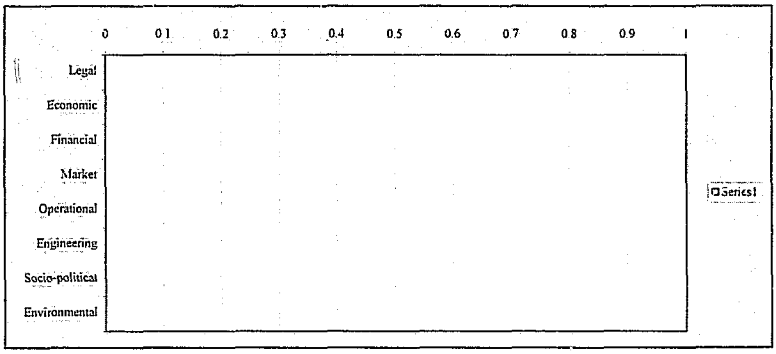


FIGURE E3.10	STAKEHOLDER GROUP 9 - PSP ADVISORS	

#	Risk	Score	Total
1	Legal	0	0
2	Economic	0	0
3	Financial	0	0
4	Market	0	0
5	Operational	0	0
6	Engineering	0	0
7	Socio-political	0	0
8	Environmental	0	0
	Total	0%	0



APPENDIX F

Analysis of Results : Questionnaire – Parts 1 and 2

APPENDIX F

CONTENTS

APPENDIX F-1

RISK MANAGEMENT IN PSP IN WATER SERVICES

RISK RATING / RANKING COMPARISSON

RESULTS FROM QUESTIONNAIRE - Part 1 & 2

TABLE F1-1: SURVEY RESULTS - PART 1

STAKEHOLDERS Group Interviewee	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	Pcntg
Legal	3	4	4	3	3	3	4	3	2	1	3	4	2	4	3	2	2	2	4	4	60	13%
Economic	4	4	3	2	2	2	2	2	1	3	3	3	2	3	3	2	2	2	3	4	52	11%
Financial	4	3	3	2	3	3	3	4	1	4	3	3	3	3	2	2	3	2	3	4	58	13%
Market	4	3	2	4	4	3	4	2	3	5	3	4	2	4	3	2	4	3	3	5	67	15%
Operational	4	4	3	3	3	2	4	3	2	3	3	3	2	3	3	2	2	3	3	2	57	13%
Engineering	5	3	2	2	2	4	2	2	3	2	3	2	2	3	2	1	2	1	2	2	47	10%
Socio-political	3	4	4	4	4	2	4	3	4	2	4	2	3	5	4	2	4	4	4	3	69	15%
Environmental	3	3	2	3	2	2	2	2	3	3	3	3	2	3	2	2	3	1	1	1	46	10%
Total	30	28	23	23	23	21	25	21	19	23	25	24	18	28	22	15	22	18	23	25	456	
Commercial	24	20	15	16	16	16	17	15	13	20	18	18	13	19	15	11	16	12	15	18	327	72%
Non-commercial	6	8	8	7	7	5	8	6	6	3	7	6	5	9	7	4	6	6	8	7	129	28%

NOTES:

1 To ensure the confidentiality of the interviewees the interview numbers shown in Table 1 are assigned arbitrarily, and do not correspond with the numbers given in the stakeholder list in Appendix C.

2 The association between the interview number, the interviewee, and the stakeholder group is not shown for reason of confidentiality.

TABLE F1-2: SURVEY RESULTS - PART 2

STAKEHOLDERS Group Interviewee	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	Pcntg
Legal	3	2	4	1	0	4	0	2	0	2	0	4	1	3	2	1	1	0	3	2	35	19%
Economic	2	2	1	0	0	0	0	1	0	0	0	1	1	0	2	2	1	1	0	2	16	9%
Financial	2	0	1	0	0	2	0	1	0	0	1	1	3	1	0	0	4	2	1	2	21	12%
Market	1	0	0	4	0	2	0	2	2	5	3	3	1	3	2	2	1	2	2	3	38	21%
Operational	0	1	0	2	0	0	0	2	0	0	3	1	1	1	0	0	0	1	0	0	12	7%
Engineering	0	1	0	0	0	1	0	1	2	0	2	0	0	0	0	0	0	0	0	0	7	4%
Socio-political	1	4	4	3	0	1	0	1	4	2	1	0	3	1	4	5	3	4	4	1	46	26%
Environmental	1	0	0	0	0	0	0	0	2	1	0	0	0	1	0	0	0	0	0	0	5	3%
Total	10	10	10	10	0	10	0	10	10	10	10	10	10	10	10	10	10	10	10	10	180	
Commercial	6	4	2	6	0	5	0	7	6	6	9	6	6	6	4	4	6	6	3	7	99	55%
Non-commercial	4	6	8	4	0	5	0	3	4	4	1	4	4	4	6	6	4	4	7	3	81	45%

FIGURE F1-1: TOTAL SECTOR RISK

#	Risk	Q1	Q2
7	Socio-political	15%	26%
4	Market	14%	21%
1	Legal	13%	19%
3	Financial	13%	12%
5	Operational	12%	7%
2	Economic	12%	9%
6	Engineering	11%	4%
8	Environmental	10%	3%
	Total	100%	100%

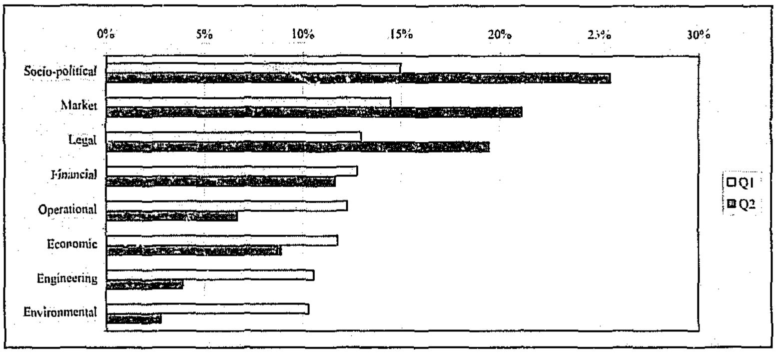


FIGURE F1-2: STAKEHOLDER GROUP 1 - NATIONAL GOVERNMENT

#	Risk	Q1	Q2
1	Legal	14%	30%
2	Economic	14%	17%
5	Operational	14%	3%
7	Socio-political	14%	30%
3	Financial	12%	10%
6	Engineering	12%	3%
4	Market	11%	3%
8	Environmental	10%	3%
	Total	100%	100%

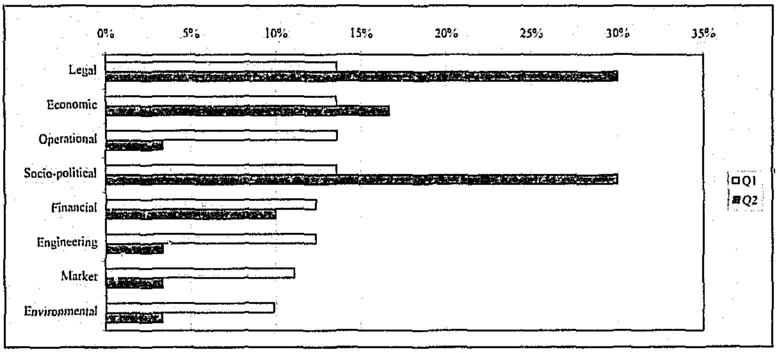


FIGURE F1-3: STAKEHOLDER GROUP 2 - LOCAL GOVERNMENT

#	Risk	Q1	Q2
4	Market	17%	40%
7	Socio-political	17%	30%
1	Legal	13%	10%
5	Operational	13%	20%
8	Environmental	13%	0%
2	Economic	9%	0%
3	Financial	9%	0%
6	Engineering	9%	0%
	Total	100%	100%

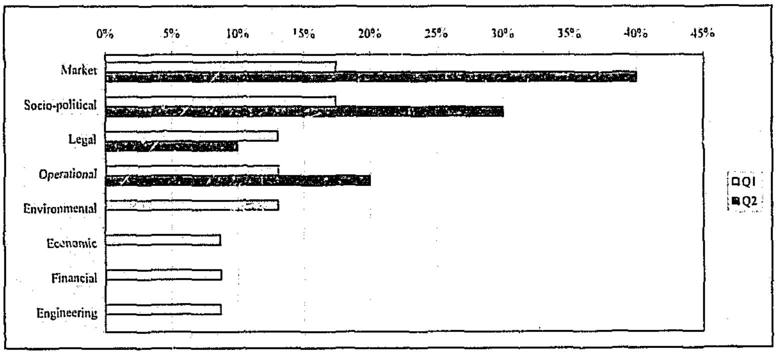


FIGURE F1-4: STAKEHOLDER GROUP 3 - CONSUMERS

#	Risk	Q1	Q2
6	Engineering	19%	10%
1	Legal	14%	40%
3	Financial	14%	20%
4	Market	14%	20%
2	Economic	10%	0%
5	Operational	10%	0%
7	Socio-political	10%	10%
8	Environmental	10%	0%
	Total	100%	100%

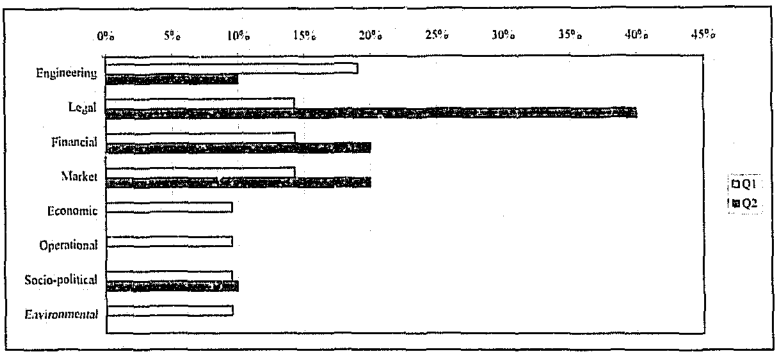


FIGURE F1-5: STAKEHOLDER GROUP 4 - BULK SERVICE PROVIDERS

#	Risk	Q1	Q2
3	Financial	19%	10%
1	Legal	14%	20%
5	Operational	14%	20%
7	Socio-political	14%	10%
2	Economic	10%	10%
4	Market	10%	20%
6	Engineering	10%	10%
8	Environmental	10%	0%
	Total	100%	100%

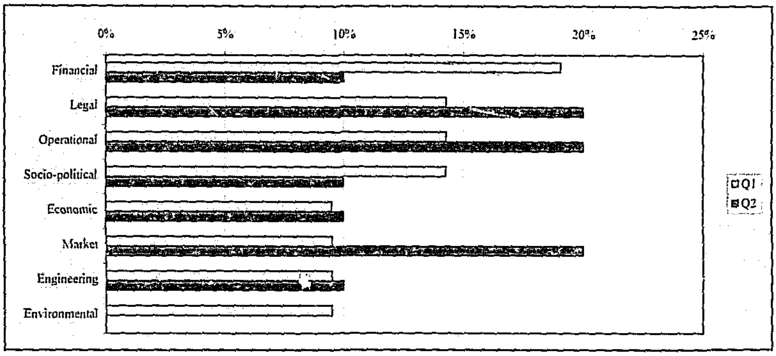


FIGURE F1-6: STAKEHOLDER GROUP 5 - DEVELOPMENT FINANCE (UNDERWRITERS)

#	Risk	Q1	Q2
4	Market	16%	33%
7	Socio-political	15%	23%
8	Environmental	13%	10%
3	Financial	12%	3%
5	Operational	12%	10%
6	Engineering	12%	13%
2	Economic	10%	0%
1	Legal	9%	7%
	Total	100%	100%

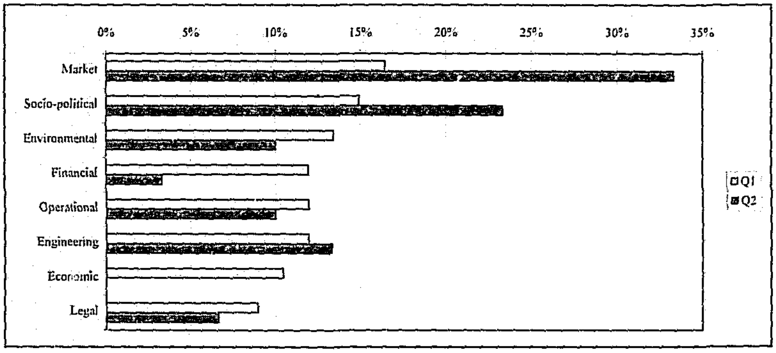


FIGURE F1-7: STAKEHOLDER GROUP 6 - PRIVATE LENDERS

#	Risk	Q1	Q2
1	Legal	14%	27%
4	Market	14%	23%
7	Socio-political	14%	13%
3	Financial	13%	17%
2	Economic	11%	7%
5	Operational	11%	10%
8	Environmental	11%	3%
6	Engineering	10%	0%
	Total	100%	100%

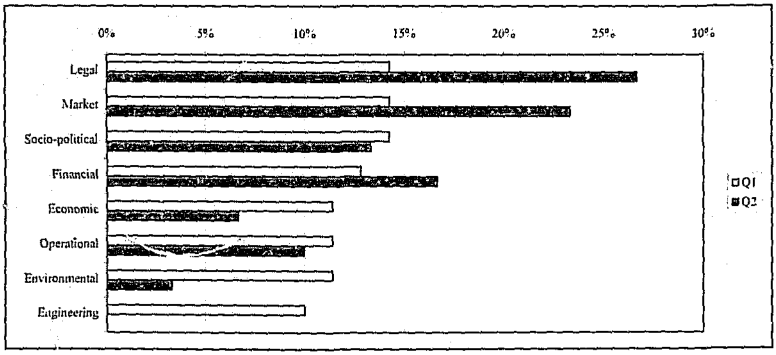


FIGURE F-8: STAKEHOLDER GROUP 7 - UNIONS

#	Risk	Q1	Q2
7	Socio-political	18%	40%
1	Legal	14%	20%
2	Economic	14%	20%
4	Market	14%	20%
5	Operational	14%	0%
3	Financial	9%	0%
6	Engineering	9%	0%
8	Environmental	9%	0%
	Total	100%	100%

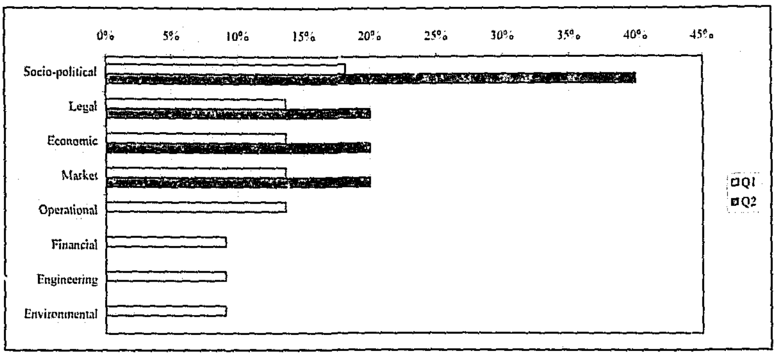


FIGURE F1-9: STAKEHOLDER GROUP 8 - SERVICE PROVIDERS

#	Risk	Q1	Q2
7	Socio-political	18%	40%
4	Market	16%	17%
3	Financial	13%	20%
5	Operational	13%	3%
1	Legal	11%	7%
2	Economic	11%	13%
8	Environmental	11%	0%
6	Engineering	7%	0%
	Total	100%	100%

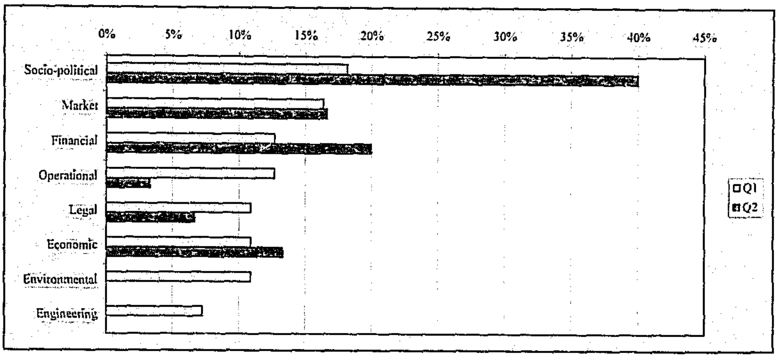
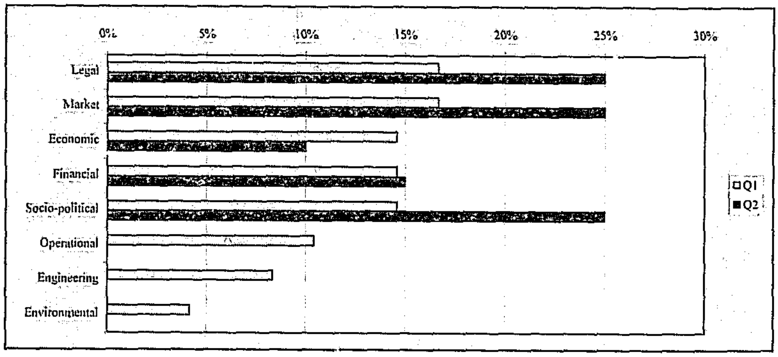


FIGURE F1-10 STAKEHOLDER GROUP 9 - PSP ADVISORS

#	Risk	Q1	Q2
1	Legal	17%	25%
4	Market	17%	25%
2	Economic	15%	10%
3	Financial	15%	15%
7	Socio-political	15%	25%
5	Operational	10%	0%
6	Engineering	8%	0%
8	Environmental	4%	0%
	Total	100%	100%



APPENDIX F-2

RISK MANAGEMENT IN PSP IN WATER SERVICES

ONSTRAINT RATING / RANKING COMPARISSO

RESULTS FROM QUESTIONNAIRE - Part 1 & 2

TABLE F2-1: SURVEY RESULTS - PART 1

STAKEHOLDERS Group Interviewee	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	Pentg
Legal	3	3	3	3	4	4	4	2	3	5	3	4	2	4	4	2	2	2	4	4	65	15%
Economic	3	3	2	2	4	2	2	2	1	2	3	3	2	3	4	1	1	2	2	4	48	11%
Financial	4	3	2	2	2	3	3	3	2	4	3	2	3	2	2	2	3	2	3	5	55	13%
Market	4	3	2	3	4	3	4	3	4	5	3	3	3	4	3	1	3	4	4	5	68	16%
Operational	2	3	3	2	3	2	4	2	2	3	3	2	2	3	3	2	1	2	3	2	49	11%
Engineering	2	3	2	1	2	3	2	2	2	2	3	2	1	2	2	1	1	1	2	2	38	9%
Socio-political	2	3	3	2	3	2	4	4	3	4	4	2	3	4	5	2	3	5	4	3	65	15%
Environmental	3	3	2	2	2	2	2	2	2	3	3	2	2	2	2	2	1	2	1	1	41	10%
Total	23	24	19	17	24	21	25	20	19	28	25	20	18	24	25	13	15	20	23	26	429	
Commercial	18	18	13	12	17	15	17	14	13	19	18	14	13	16	16	9	10	13	15	19	299	70%
Non-commercial	5	6	6	5	7	6	8	6	6	9	7	6	5	8	9	4	5	7	8	7	130	30%

NOTES:

1 To ensure the confidentiality of the interviewees, the interview numbers shown in Table 1 are assigned arbitrarily, and do not correspond with the numbers given in the stakeholder list in Appendix C.

2 The association between the interview number, the interviewee, and the stakeholder group is not shown for reason of confidentiality.

TABLE F2-2: SURVEY RESULTS - PART 2

STAKEHOLDERS Group Interviewee	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	Pentg
Legal	3	1	3	5	4	4	1	4	2	6	0	7	1	3	1	2	1	0	3	2	53	27%
Economic	2	0	1	1	2	0	0	2	0	0	1	1	0	0	1	0	0	1	0	2	14	7%
Financial	2	2	1	0	1	2	1	3	0	0	1	0	3	1	0	2	4	2	1	2	28	14%
Market	1	2	0	1	2	2	3	0	4	3	2	1	3	3	2	0	1	2	2	3	37	19%
Operational	0	1	1	0	1	0	2	0	1	0	2	1	0	1	0	1	0	1	0	0	12	6%
Engineering	0	1	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	0	0	5	3%
Socio-political	1	2	4	3	0	1	3	1	2	1	1	0	3	2	6	4	4	4	4	1	47	24%
Environmental	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	4	2%
Total	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	200	
Commercial	6	7	3	2	6	[illegible]	6	5	6	3	9	3	6	5	3	4	5	6	3	7	100	50%
Non-commercial	4	3	7	8	4	5	4	5	4	7	1	7	4	5	7	6	5	4	7	3	100	50%

FIGURE F2-1: TOTAL SECTOR RISK

#	Risk	Q1	Q2
4	Market	16%	19%
1	Legal	15%	27%
7	Socio-political	15%	24%
3	Financial	13%	14%
5	Operational	11%	6%
2	Economic	11%	7%
8	Environmental	10%	2%
6	Engineering	9%	3%
	Total	100%	100%

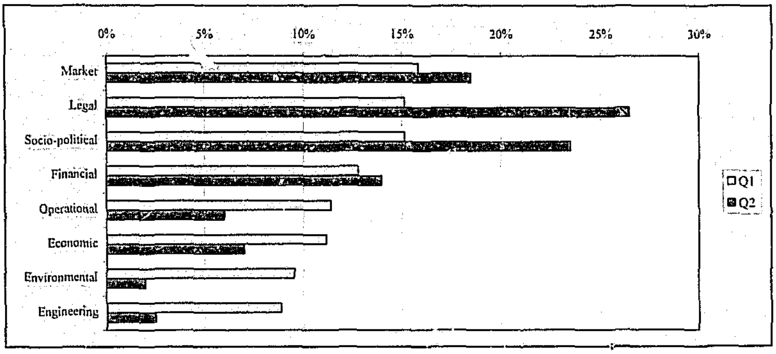


FIGURE F2-2: STAKEHOLDER GROUP 1 - NATIONAL GOVERNMENT

#	Risk	Q1	Q2
1	Legal	14%	23%
2	Economic	14%	10%
3	Financial	14%	17%
4	Market	12%	10%
5	Operational	12%	7%
6	Engineering	12%	3%
7	Socio-political	12%	23%
8	Environmental	11%	7%
	Total	100%	100%

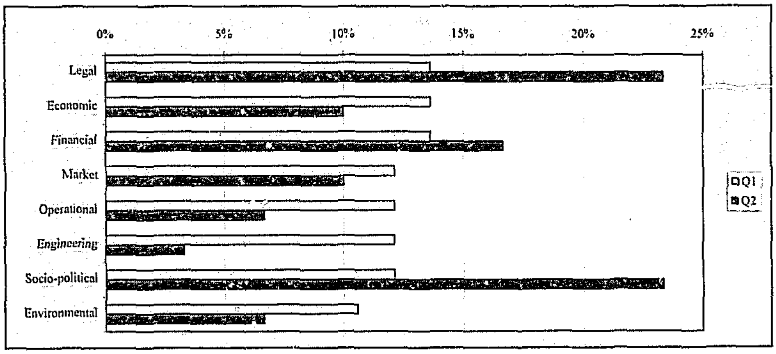


FIGURE F2-3: STAKEHOLDER GROUP 2 - LOCAL GOVERNMENT

#	Risk	Q1	Q2
1	Legal	17%	50%
2	Economic	17%	10%
3	Financial	15%	0%
4	Market	12%	10%
5	Operational	12%	0%
6	Engineering	10%	0%
7	Socio-political	10%	30%
8	Environmental	7%	0%
	Total	100%	100%

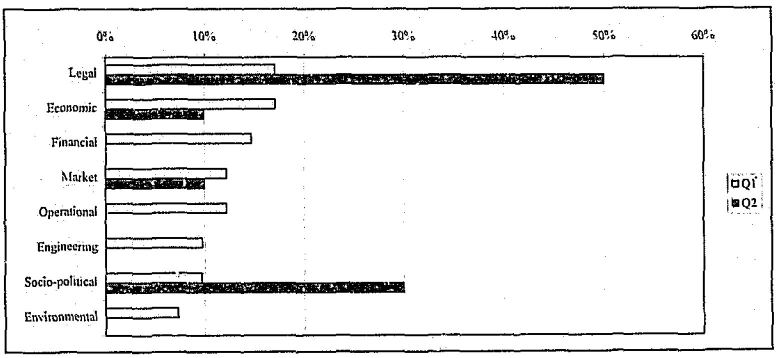


FIGURE F2-4: STAKEHOLDER GROUP 3 - CONSUMERS

#	Risk	Q1	Q2
1	Legal	17%	40%
2	Economic	15%	0%
3	Financial	13%	20%
4	Market	13%	20%
5	Operational	13%	0%
6	Engineering	11%	10%
7	Socio-political	9%	10%
8	Environmental	9%	0%
	Total	100%	100%

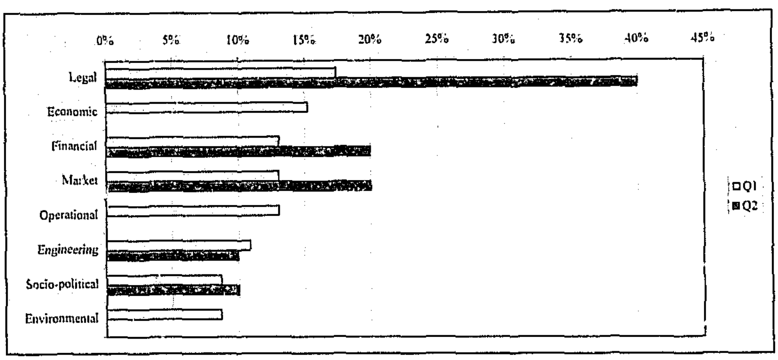


FIGURE F2-5: STAKEHOLDER GROUP 4 - BULK SERVICE PROVIDERS

#	Risk	Q1	Q2
1	Legal	20%	40%
2	Economic	15%	20%
3	Financial	15%	30%
4	Market	10%	0%
5	Operational	10%	0%
6	Engineering	10%	0%
7	Socio-political	10%	10%
8	Environmental	10%	0%
	Total	100%	100%

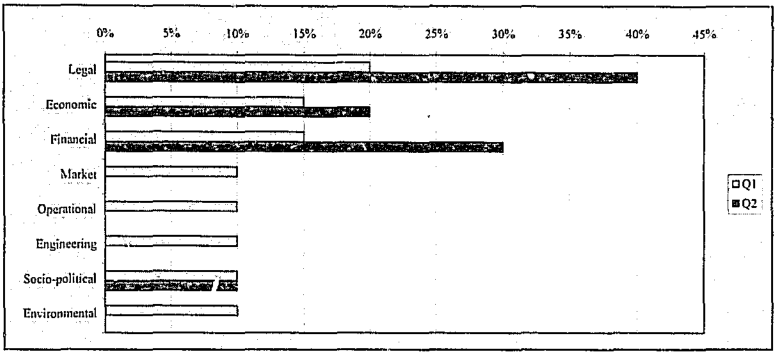


FIGURE F2-6: STAKEHOLDER GROUP 5 - DEVELOPMENT FINANCE (UNDERWRITERS)

#	Risk	Q1	Q2
1	Legal	17%	27%
2	Economic	15%	3%
3	Financial	15%	3%
4	Market	13%	30%
5	Operational	11%	10%
6	Engineering	11%	10%
7	Socio-political	10%	13%
8	Environmental	8%	3%
	Total	100%	100%

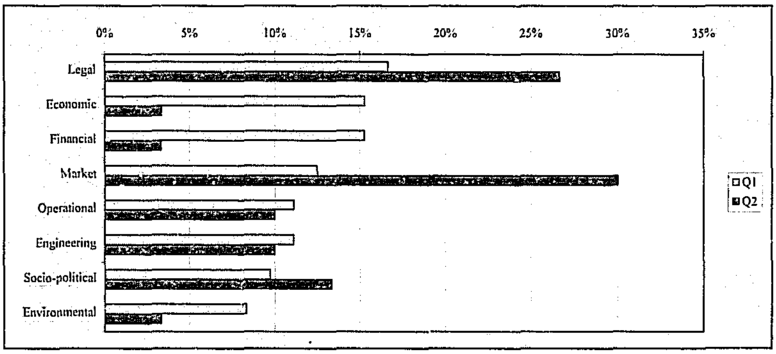


FIGURE F2-7: STAKEHOLDER GROUP 6 - PRIVATE LENDERS

#	Risk	Q1	Q2
1	Legal	16%	37%
2	Economic	16%	3%
3	Financial	15%	13%
4	Market	13%	23%
5	Operational	11%	7%
6	Engineering	11%	0%
7	Socio-political	10%	17%
8	Environmental	8%	0%
	Total	100%	100%

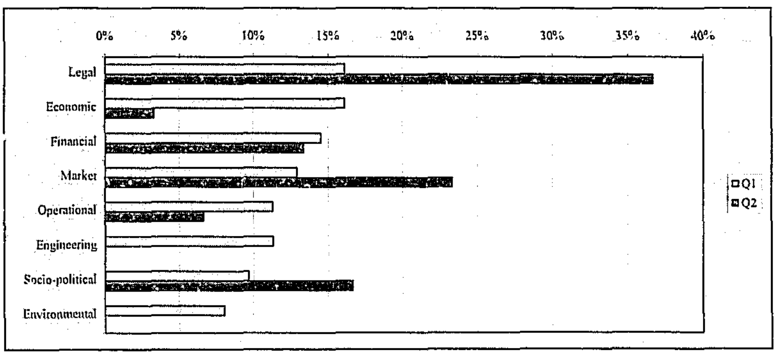


FIGURE F2-8: STAKEHOLDER GROUP 7 - UNIONS

#	Risk	Q1	Q2
1	Legal	20%	10%
2	Economic	16%	10%
3	Financial	16%	0%
4	Market	12%	20%
5	Operational	12%	0%
6	Engineering	8%	0%
7	Socio-political	8%	60%
8	Environmental	8%	0%
	Total	100%	100%

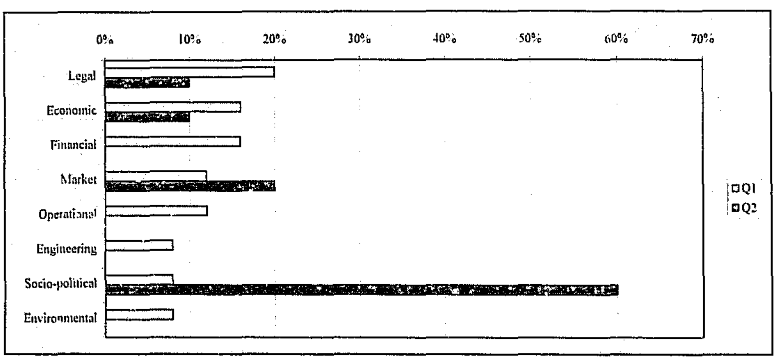


FIGURE F2-9: STAKEHOLDER GROUP 8 - SERVICE PROVIDERS

#	Risk	Q1	Q2
1	Legal	21%	10%
2	Economic	17%	3%
3	Financial	15%	27%
4	Market	13%	10%
5	Operational	10%	7%
6	Engineering	10%	0%
7	Socio-political	8%	40%
8	Environmental	6%	3%
	Total	100%	100%

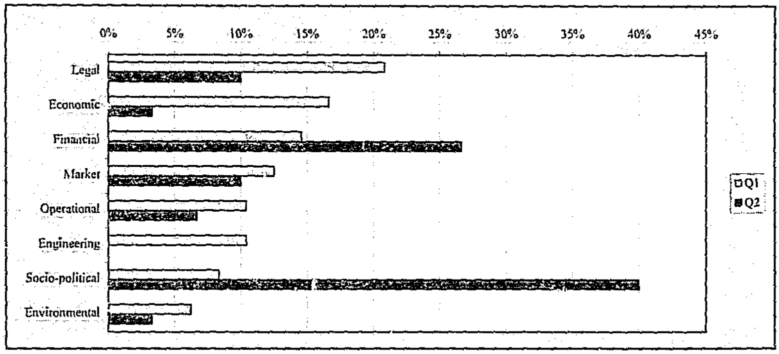
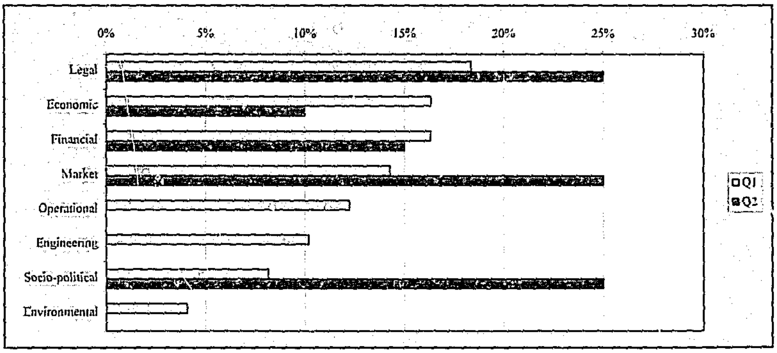


FIGURE F2-10 STAKEHOLDER GROUP 9 - PSP ADVISORS

#	Risk	Q1	Q2
1	Legal	18%	25%
2	Economic	16%	10%
3	Financial	16%	15%
4	Market	14%	25%
5	Operational	12%	0%
6	Engineering	10%	0%
7	Socio-political	8%	25%
8	Environmental	4%	0%
	Total	100%	100%



APPENDIX F-3

RISK MANAGEMENT IN PSP IN WATER SERVICES

RISK / CONSTRAINT COMPARISSON

RESULTS FROM QUESTIONNAIRE - Part 1 & 2

TABLE F3-1: SURVEY RESULTS - PART 1

STAKEHOLDERS Group Interviewee	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Legal	0	1	1	0	-1	-1	0	1	-1	-4	0	0	0	0	-1	0	0	0	0	0	-5
Economic	1	1	1	0	-2	0	0	0	0	1	0	0	0	0	-1	1	1	0	1	0	4
Financial	0	0	1	0	1	0	0	1	-1	0	0	1	0	1	0	0	0	0	0	-1	3
Market	0	0	0	1	0	0	0	-1	-1	0	0	1	-1	0	0	1	1	-1	-1	0	-1
Operational	2	1	0	1	0	0	0	1	0	0	0	1	0	0	0	0	1	1	0	0	8
Engineering	3	0	0	1	0	1	0	0	1	0	0	0	1	1	0	0	1	0	0	0	9
Socio-political	1	1	1	2	1	0	0	-1	1	-2	0	0	0	1	-1	0	1	-1	0	0	4
Environmental	0	0	0	1	0	0	0	0	1	0	0	1	0	1	0	0	2	-1	0	0	5
Total	7	4	4	6	-1	0	0	1	0	-5	0	4	0	4	-3	2	7	-2	0	-1	27
Commercial	6	2	2	4	-1	1	0	1	0	1	0	4	0	3	-1	2	6	-1	0	-1	28
Non-commercial	1	2	2	2	0	-1	0	0	0	-6	0	0	0	1	-2	0	1	-1	0	0	-1

NOTES:

1 To ensure the confidentiality of the interviewees, the interview numbers shown in Table 1 are assigned arbitrarily, and do not correspond with the numbers given in the stakeholder list in Appendix C.

2 The association between the interview number, the interviewee, and the stakeholder group is not shown for reason of confidentiality.

TABLE F3-2: SURVEY RESULTS - PART 2

STAKEHOLDERS Group Interviewee	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Legal	0	1	1	-4	-1	0	0	-2	-2	-4	0	-3	0	0	1	-1	0	0	0	0	-14
Economic	0	2	0	-1	-1	0	0	-1	0	0	-1	0	1	0	1	2	1	0	0	0	3
Financial	0	-2	0	0	-1	0	0	-2	0	0	0	1	0	0	0	-2	0	0	0	0	-6
Market	0	-2	0	3	1	0	0	2	-2	2	1	2	-2	0	0	2	0	0	0	0	7
Operational	0	0	-1	2	0	0	0	2	-1	0	1	0	1	0	0	-1	0	0	0	0	3
Engineering	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
Socio-political	0	2	0	0	2	0	0	0	2	1	0	0	0	-1	-2	1	-1	0	0	0	4
Environmental	0	-1	0	0	0	0	0	0	2	1	-1	0	0	1	0	-1	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	-3	-1	4	-1	0	0	2	0	3	0	3	0	1	1	0	1	0	0	0	10
Non-commercial	0	3	1	-4	1	0	0	-2	0	[illegible]	0	-3	0	-1	-1	0	-1	0	0	0	-10

FIGURE F3-1: TOTAL SECTOR RISK

#	Risk	Q1	Q2
1	Legal	-5	-14
4	Market	-1	7
3	Financial	3	-6
2	Economic	4	3
7	Socio-political	4	4
8	Environmental	5	1
5	Operational	8	3
6	Engineering	9	2
	Total	27	0

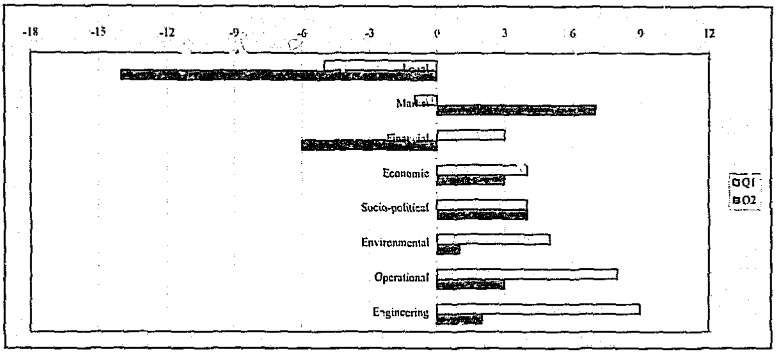


FIGURE F3-2: STAKEHOLDER GROUP 1 - NATIONAL GOVERNMENT

#	Risk	Q1	Q2
1	Legal	0	2
2	Economic	0	2
3	Financial	1	-2
4	Market	2	-2
5	Operational	3	-1
6	Engineering	3	0
7	Socio-political	3	2
8	Environmental	3	-1
	Total	15	0

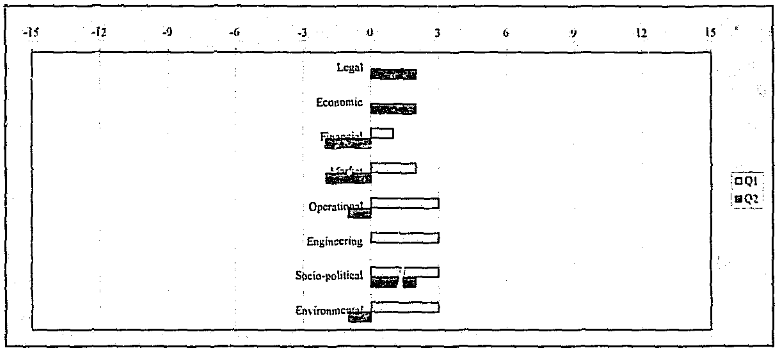


FIGURE F3-3: STAKEHOLDER GROUP 2 - LOCAL GOVERNMENT

#	Risk	Q1	Q2
1	Legal	-2	-4
2	Economic	-1	-1
3	Financial	1	0
4	Market	1	3
5	Operational	1	2
6	Engineering	1	0
7	Socio-political	1	0
8	Environmental	3	0
	Total	5	0

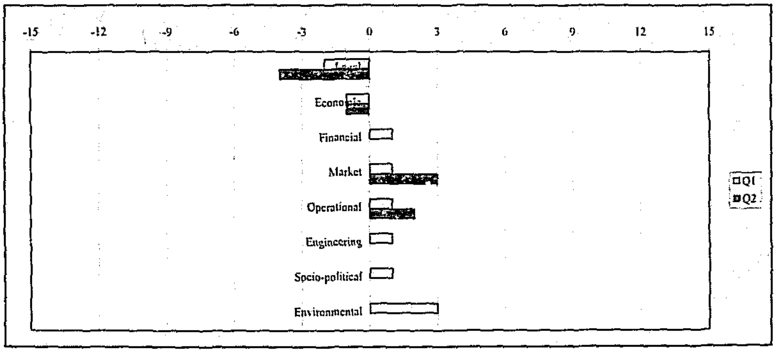


FIGURE F3-4: STAKEHOLDER GROUP 3 - CONSUMERS

#	Risk	Q1	Q2
1	Legal	-1	0
2	Economic	0	0
3	Financial	0	0
4	Market	0	0
5	Operational	0	0
7	Socio-political	0	0
8	Environmental	0	0
6	Engineering	1	0
	Total	0	0

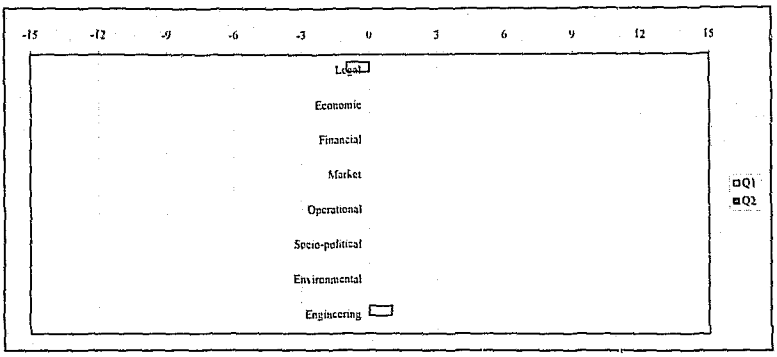


FIGURE F3-5: STAKEHOLDER GROUP 4 - BULK SERVICE PROVIDERS

#	Risk	Q1	Q2
1	Legal	-1	-2
2	Economic	-1	-1
3	Financial	0	-2
4	Market	0	2
5	Operational	0	2
6	Engineering	1	1
7	Socio-political	1	0
8	Environmental	1	0
	Total	1	0

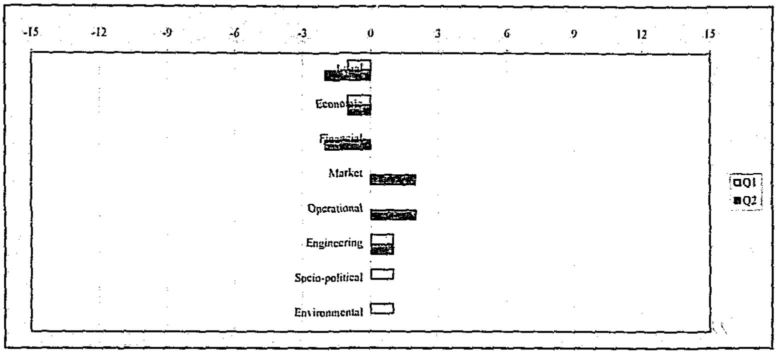


FIGURE F3-6: STAKEHOLDER GROUP 5 - DEVELOPMENT FINANCE (UNDERWRITERS)

#	Risk	Q1	Q2
1	Legal	-5	-6
2	Economic	-1	-1
3	Financial	-1	0
4	Market	-1	1
5	Operational	0	0
6	Engineering	1	1
7	Socio-political	1	3
8	Environmental	1	2
	Total	-5	0

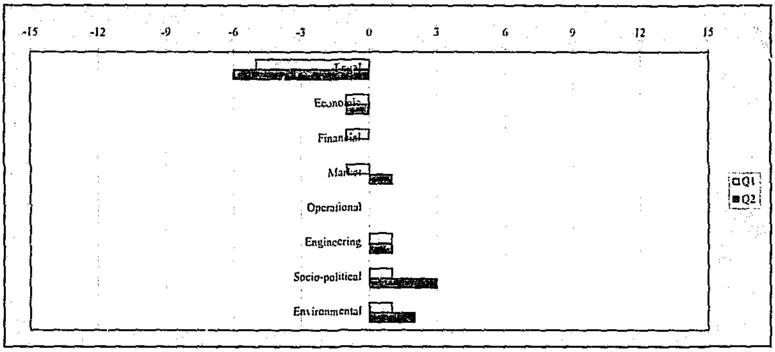


FIGURE F3-7: STAKEHOLDER GROUP 6 - PRIVATE LENDERS

#	Risk	Q1	Q2
1	Legal	0	-3
2	Economic	0	1
3	Financial	0	1
4	Market	1	0
5	Operational	1	1
6	Engineering	2	0
7	Socio-political	2	-1
8	Environmental	2	1
	Total	8	0

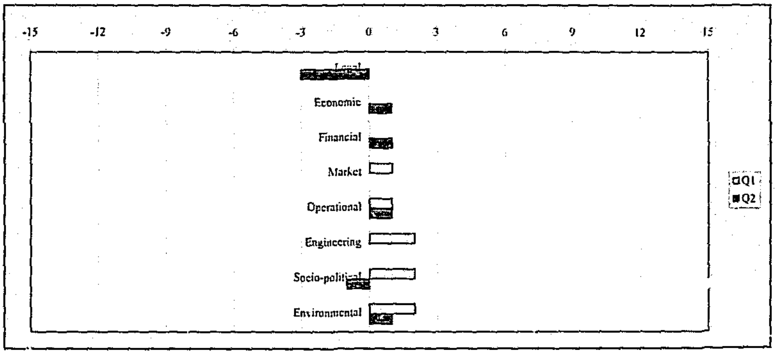


FIGURE F3-8: STAKEHOLDER GROUP 7 - UNIONS

#	Risk	Q1	Q2
1	Legal	-1	1
2	Economic	-1	1
3	Financial	-1	0
4	Market	0	0
5	Operational	0	0
6	Engineering	0	0
7	Socio-political	0	-2
8	Environmental	0	0
	Total	-3	0

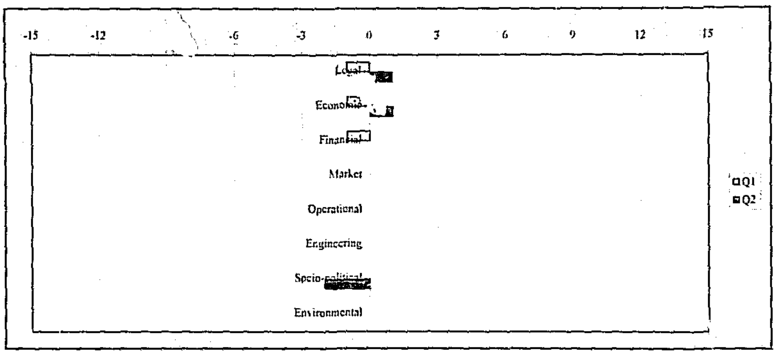


FIGURE F3-9: STAKEHOLDER GROUP 8 - SERVICE PROVIDERS

#	Risk	Q1	Q2
1	Legal	0	-1
2	Economic	0	3
3	Financial	0	-2
4	Market	1	2
5	Operational	1	-1
6	Engineering	1	0
7	Socio-political	2	0
8	Environmental	2	-1
	Total	7	0

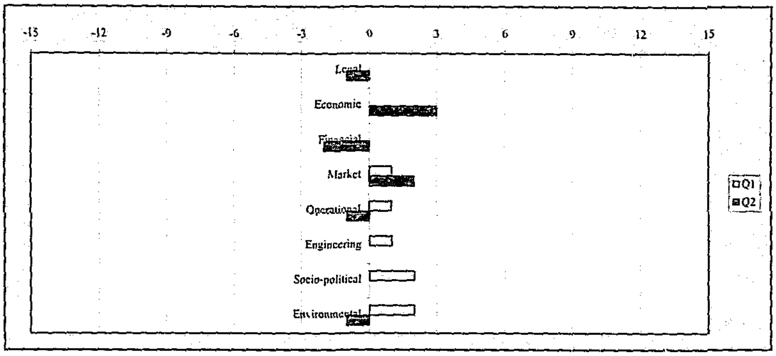
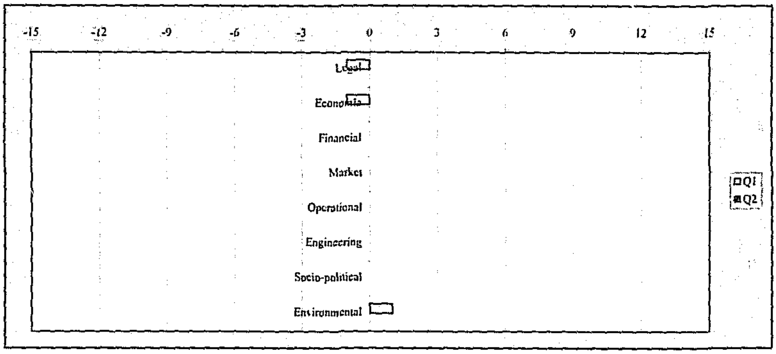


FIGURE F3-10 STAKEHOLDER GROUP 9 - PSP ADVISORS

#	Risk	Q1	Q2
1	Legal	-1	0
2	Economic	-1	0
3	Financial	0	0
4	Market	0	0
5	Operational	0	0
6	Engineering	0	0
7	Socio-political	0	0
8	Environmental	1	0
	Total	-1	0



APPENDIX G

Analysis of Results : Questionnaire – Part 3

APPENDIX G

RISK MANAGEMENT IN PSP IN WATER SERVICES

RESULTS FROM QUESTIONNAIRE - Part 3

TABLE G.1 SURVEY RESULTS

STAKEHOLDERS Group / Interviewee	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	Avg
Statement No																						
1	4	1	4	5	4	2	4	4	4	4	4	4	4	4	2	5	5	5	3	4	76	3.8
2	3	3	4	5	5	0	4	4	5	5	4	5	5	4	3	5	4	5	4	4	81	4.1
3	4	1	3	1	2	0	4	2	2	3	3	3	2	3	5	2	0	2	2	3	47	2.4
4	3	2	4	4	4	5	2	4	5	5	4	5	4	[illegible]	2	4	3	5	4	5	79	4.0
5	4	4	2	3	3	5	4	5	2	2	3	5	2		5	4	2	2	4	5	70	3.5
6	4	1	2	2	2	4	4	2	4	1	4	4	4	2	2	2	2	2	2	5	55	2.8
7	4	2	4	5	4	0	2	5	5	1	4	4	5	4	1	4	2	5	2	5	68	3.4
8	2	3	5	5	4	5	4	5	5	5	5	5	5	4	2	4	5	5	5	5	88	4.4
9	4	3	5	4	4	1	4	5	3	4	4	5	3	4	5	4	3	5	4	1	75	3.8
10	3	2	2	2	2	1	2	1	2	1	4	2	1	2	3	2	3	2	1	1	39	2.0
11	3	4	2	4	4	2	2	4	2	5	2	2	4	2	2	1	2	4	2	5	58	2.9
12	5	1	5	3	4	1	2	4	4	5	3	5	4	4	2	4	5	3	2	4	70	3.5
13	4	2	2	4	2	2	2	2	1	2	3	2	2	4	2	2	4	2	4	5	53	2.7
14	3	1	4	4	4	2	4	2	3	5	3	5	2	4	4	3	4	3	4	5	69	3.5
15	4	1	4	5	4	5	5	5	5	4	4	4	5	4	5	4	4	4	5	5	86	4.3
16	4	2	4	2	2	0	2	2	4	4	2	1	2	4	2	2	5	2	2	5	53	2.7
17	4	3	4	3	4	2	2	4	4	4	4	4	4	4	2	3	4	4	4	4	71	3.6
18	3	2	4	4	4	4	4	4	5	5	4	5	4	4	2	4	4	5	4	5	80	4.0
19	5	5	4	4	4	1	2	4	3	4	2	2	2	2	4	2	4	4	2	5	65	3.3
20	5	3	5	4	4	2	2	4	4	2	4	5	5	5	3	2	2	4	4	5	74	3.7
Total	75	46	73	73	70	44	61	72	72	71	70	77	69	73	58	63	67	73	64	86	1357	

TABLE G.2 FREQUENCY ANALYSIS

Frequency	0	1	2	3	4	5	Sum
1	0	1	2	1	12	4	20
2	1	0	0	3	8	8	20
3	2	2	7	6	2	1	20
4	0	0	3	2	8	7	20
5	0	0	6	3	6	5	20
6	0	2	10	0	7	1	20
7	1	2	4	0	7	6	20
8	0	0	2	1	4	13	20
9	0	2	0	4	9	5	20
10	0	6	10	3	1	0	20
11	0	1	10	1	6	2	20
12	0	2	3	3	7	5	20
13	0	1	12	1	5	1	20
14	0	1	3	5	8	3	20
15	0	1	0	0	10	9	20
16	1	1	11	0	5	2	20
17	0	0	3	3	14	0	20
18	0	0	2	1	12	5	20
19	0	1	7	1	8	3	20
20	0	0	5	2	7	6	20
Total	5	23	100	40	146	86	400

TABLE G.3 AGREEMENT ANALYSIS

Q#	Disagree	Neutral	Agree	Sum
1	15%	5%	80%	100%
2	0%	20%	80%	100%
3	45%	40%	15%	100%
4	15%	10%	75%	100%
5	30%	15%	55%	100%
6	60%	0%	40%	100%
7	30%	5%	65%	100%
8	10%	5%	85%	100%
9	10%	20%	70%	100%
10	80%	15%	5%	100%
11	55%	5%	40%	100%
12	25%	15%	60%	100%
13	65%	5%	30%	100%
14	20%	25%	55%	100%
15	5%	0%	95%	100%
16	60%	5%	35%	100%
17	15%	1[illegible]	70%	100%
18	10%	5[illegible]	85%	100%
19	40%	5[illegible]	55%	100%
20	25%	10%	65%	100%
Total	6.15	2.25	11.6	20

NOTES:

1 To ensure the confidentiality of the interviewees, the interview numbers shown in Table 1 are assigned arbitrarily, and do not correspond with the numbers given in the stakeholder list in Appendix C.

2 The association between the interview number, the interviewee, and the stakeholder group is not shown for reason of confidentiality.

FIGURE G - 1 QUESTION 1

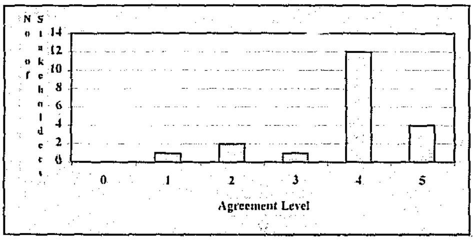


FIGURE G - 2 QUESTION 2

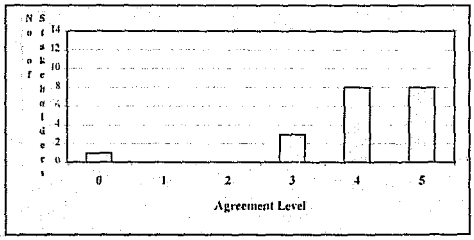


FIGURE G - 3 QUESTION 3

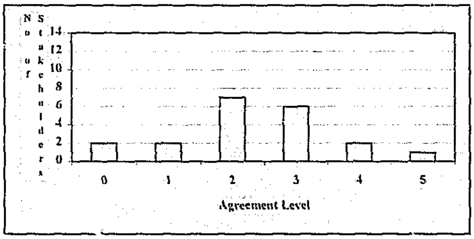


FIGURE G - 4 QUESTION 4

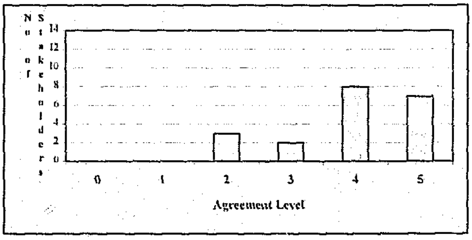


FIGURE G - 5 QUESTION 5

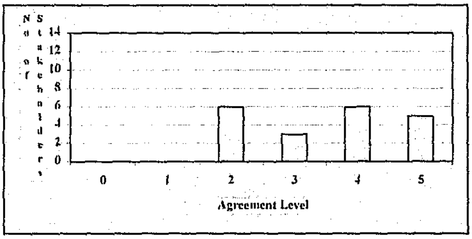


FIGURE G - 6 QUESTION 6

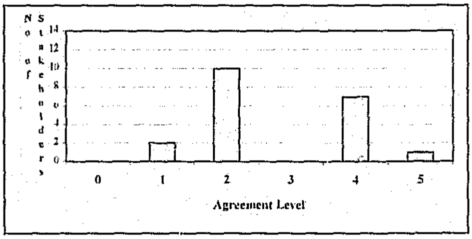


FIGURE G - 7 QUESTION 7

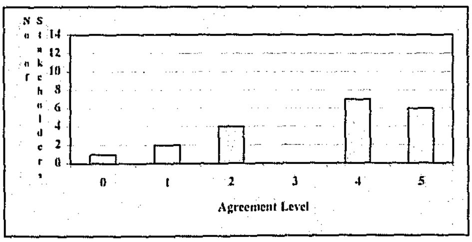


FIGURE G - 8 QUESTION 8

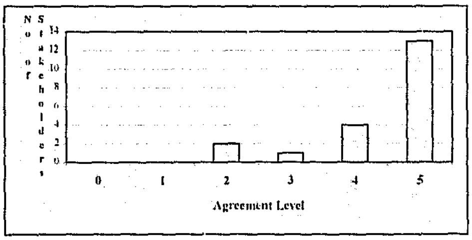


FIGURE G - 9 QUESTION 9

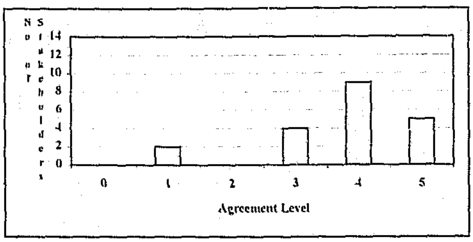


FIGURE G - 10 QUESTION 10

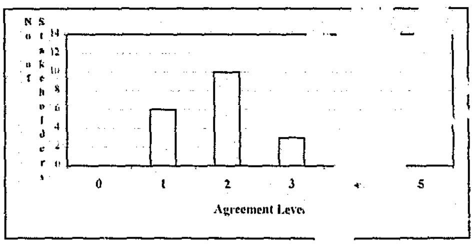


FIGURE G - 11 QUESTION 11

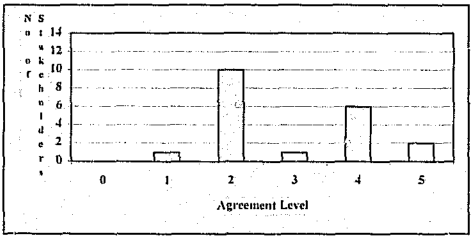


FIGURE G - 12 QUESTION 12

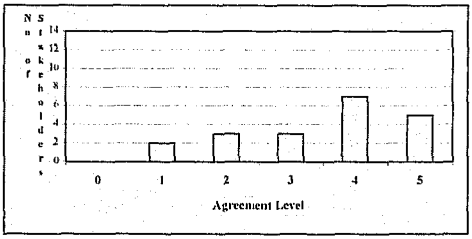


FIGURE G - 13 QUESTION 13

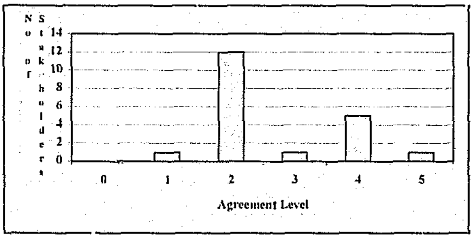


FIGURE G - 14 QUESTION 14

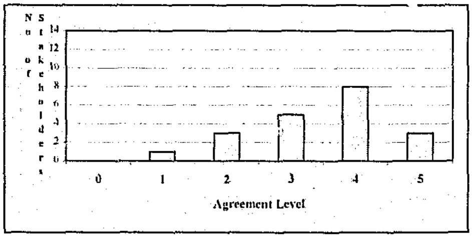


FIGURE G - 15 QUESTION 15

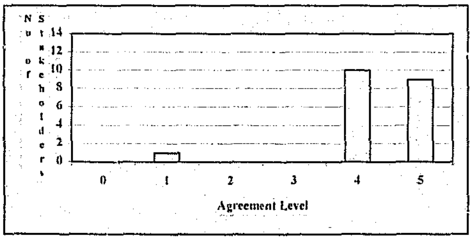


FIGURE G - 16 QUESTION 16

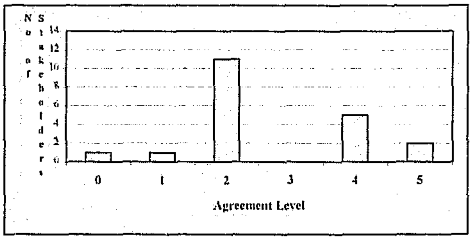


FIGURE G - 17 QUESTION 17

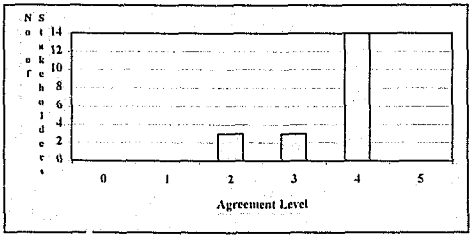


FIGURE G - 18 QUESTION 18

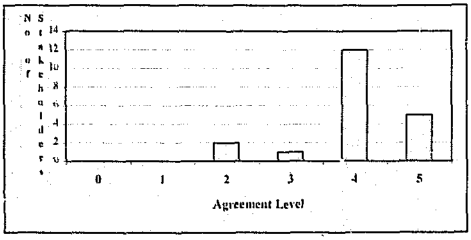


FIGURE G - 19 QUESTION 19

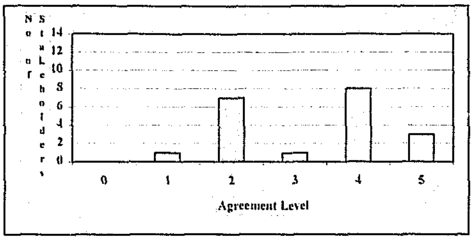
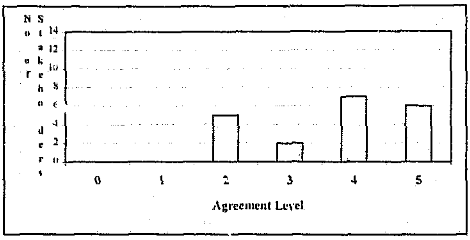


FIGURE G - 20 QUESTION 20



APPENDIX H

Analysis of Results :
Interview Schedule Summaries
& Case Study

STAKEHOLDER #1

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Socio-political	• Willingness to pay for poor services is low. • Strong community awareness, specially among women in rural and peri-urban areas who spend large part of day collecting water. • Despite the wording of the Water Services Act, there is considerable political unwillingness.	• Affects commercial viability of project. • Affect the ability to service debt finance. • Influences all other categories in some way	• National Government to carry country risk. • Local Government to carry community based socio-political risk • Black Empowerment Partner to be included in the private sector company to get involved. • Joint venture company includes local government and NGO's.	• Break the vicious circle of poor service and poor cost recovery by improving service levels. • Joint Venture company identity: fully private or a public private partnership. • Involve community in the process. • Mitigate by political stability and policies.
Engineering	• Cost of projects are ill controlled. • Private sector tends to regard public fund as limitless. • Use of inappropriate technology and service levels.	• Cost overruns and depletion of budgets before objectives are achieved. • Ill perceived project • Community dissatisfaction, and not willing to pay.	• Transfer of risk to private sector provides incentive to become more efficient in time.	• Risk transfer to private sector through service contract.
Financial	• Additional financial resources from private sector come at a price.	• Private capital more suitable to finance services to business and high income domestic users.	• Community is responsible to carry the cost of services	• Development of model contracts. • Implementation of appropriate and affordable service levels.
Legal and regulatory	• Certain sections of the Water Services Act (ie 10 and 19) allow minister to intervene in the setting of tariffs and place limits on profit and return on investments.	• Legal and regulatory framework are in development and under continuous review. This constant change leads to increased risk. • Aim to protect the public.	• Government as regulator can not allocate these risks to other parties. • Involve community in process.	• Remove Inconsistencies in the policies of different regulatory bodies. • Issue of policy statements to mitigate perceived risk.

PROJECT FINANCE	PRESENT SITUATION
• National government has annual budget for project development (new development or refurbishment of existing). Priorities set by regions. • Special department to manage international development finance. These are usually grants or loans at preferential rates. • Responsibility of loan servicing is usually passed on to the project and the community it serves. In some instances where communities cannot service the loan the department takes on the responsibility. • Inexperience in in-house finance lead to mistakes. Department is on steep learning curve.	**Opportunities** • Educate the sector participants. • Build capacity at local level. • Educate communities on payment for services. • Change the mindset and perception of community towards PSP. **Constraints** • Lack of capacity at local level to manage PSP effectively. • Sector has difficulty in keeping trained employees. • Local governments have no track record in managing services. • Lenders are sceptical of local governments capacity to enforce payment for services.

STAKEHOLDER #2

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Socio-political & Country	• Government Commitment to provide basic services to all. • Mission is to provide services for the poor. • Large backlog in service infrastructure, especially among the low income urban and rural communities.	• Charged with national responsibility for service delivery. • Limited capacity and financial resources. • Political and social risk of non-delivery. • Management of entire supply chain.	• National Government to retain responsibility for service delivery. • Service delivery is decentralised to Local Government structures. • Act as both national regulator and local service provider.	• Involve stakeholders in process. • Institute development funds. • Mitigate by performance bonds.
Legal and Regulatory	• Government accepts the role of private sector, but under controlled conditions. • Need to protect society.	• Use of policy and legislative power to set the playing field and legal framework.	• National government is responsible for legal and regulatory environment.	• Ensure consistency of policy and regulation among the regulators • Involve stakeholders in process.
Economic and Financial	• Long term financial viability of projects. • National economy affects budget allocation to the provision of services to the poor.	• National economy affects the viability of projects. • Financial failure of projects has implications for government expenditure. • Pressure to provide financial guarantees.	• National and local government to share according to capacity.	• Provide economic stability through macro-economic policy. • No government guarantee. • Use of funding power to provide subsidy and as a bargaining chip in contract negotiations.
Operational	• Non delivery of services. • Operator's perception and reputation in the market.	• Local government do not have capacity and financial resources to provide service.	• Unable to allocate responsibility to local government. • National government to provide services at local level. • Seek participation of other public sector organisations, or the private sector.	• Clear definition of parties responsibilities in contract.

PROJECT FINANCE	PRESENT SITUATION
• Consolidated Municipal Infrastructure Programme (CMIP) – provides capital grants to municipalities for the installation, upgrading and rehabilitation of infrastructure. • Criteria for funding are the state of the local economy, the sustainability of the project, the element of empowerment, and the projects contribution to social development of the communities served.	**Opportunities** • Local governments are under pressure to deliver services and improve efficiency of operation. Private sector can bring management skills and access to finance. • Key areas of opportunity are the urban areas. • Private sector to improve the financial viability of project through significant increases in efficiency. **Constraints** • Private Sector involvement not per definition a good solution. PSP is not the long awaited miracle. • Government priority is to meet the need of the poor. PSP in this area is less likely to make major inroads. • Public utilities enjoy greater acceptance among communities than profit orientated private sector.

STAKEHOLDER #3

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Socio-political and Country risk	• Impact on social structures and unions. • Government commitment to payment for services and total cost recovery.	• Manageable but presently high, could be different next year.	• Risk to be born by the public sector as this sector is best able to control and mitigate.	• Set up of Private Sector Infrastructure development unit to stimulate and guide other departments to into PSP. • Send out strong message to the sector and the communities at large.
Legal and Regulatory	• Legal and regulatory framework shows inconsistencies between government department policies.	• Inconsistent policies bring uncertainty and risk to the sector. • Inconsistent regulations create regulatory risk, but also increase commercial risks.	• Public sector is in best position to manage risk, and should thus carry the risk.	• Active participation in providing a legislative and regulatory framework. • Provision of a consistent regulatory frame work will reduce the risk .
Economic / Financial	• Sector requires long term investments into infrastructure. • Emerging economies tend to be less stable an vulnerable to.	• Sound economic policy will provide economic stability. • Inefficient provision of services cause services to run at a loss. These losses need to be subsidised by government.	• Transfer of risk to private sector, as an incentive for increasing efficiency. • Without risk transfer there are no efficiency gains (refer to govmt. BOT schemes).	• Increased efficiency leads to more viable projects, needing less subsidies, and generating tax revenue • Risk mitigation by stimulating efficiency in market.
Environmental	• Compliance with environmental regulations.	• Public Utilities tend to comply less stringent with regulations.	• Transfer risk of compliance to private operator.	• Private sector operators likely to comply better to regulations, as compliance is policed

PROJECT FINANCE	PRESENT SITUATION
• Mature local capital market, willing to invest in sector. • Ample supply of local finance, no need for foreign investors to provide finance. • Foreign financing tends to be more expensive as it is subject to exchange rate risk. • Subsidies for local governments. • Equitable share subsidy of R88 per month per low income household.	**Opportunities** • Present management of utilities is inefficient. PSP can deliver real efficiency improvements (reduce revenue losses and budget support for municipalities). • Trend toward private development of dams (further up in the supply chain). • Consolidation & co-ordination of policies and regulations from different departments. • Mature capital market: private sector willing to invest. **Constraints** • PSP is relatively new in SA, not much practical experience. The sector is still learning. • Lack of working examples (too few concessions). • Policies and regulations of departments not in line. • DWAF Water Services act, gives Minister the power to intervene and regulate profits and rates of return.

STAKEHOLDER #4

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Legal and Regulatory	• Legal framework does not set the stimulating environment.	• Water services Act allows the Minister to intervene in tariff setting and limit rates of return. • Legal framework is presently to risky for full concessions. • Legislation an regulation framework prescribe unrealistic quality standards. These can be met but a considerable cost.	• Legal and regulatory framework is the responsibility of the public sector.	• Various public departments to reformat the legal and regulatory framework to remove inconsistencies and to make the environment in general more private sector friendly. • Make presentations to government on legislative changes.
Market	• Payment risk	• Culture of non-payment for services. • Resistance to privatisation from union and consumers.	• Transfer risk to private sector, who are much better placed to manage it at minimum cost.	• Public participation in the process and management of service. • Educate the consumers on the cost of services and the need to pay for services. • Provision of appropriate and affordable service levels.
Operational	• Cost of bulk water supply. • Bulk supply is monopoly. No alternative suppliers. • Efficiency of management.	• Cost of water supply to a public utility or private operator are set by DWAF and Water Board.	• Transfer risk to operator (public utility or private sector. • Create incentives for operators.	• Specify performance benchmarks in contract. • Engage into long-term contracts with bulk suppliers.
Socio-political and Country	• Political willingness is ambiguous.	• Resistance to privatisation from unions and certain civic associations. • In rural areas the anarchists seem to win.	• This risk category clearly needs to be born by national government and local authorities. • Assume risk imposed.	• Create awareness among all stake holders of the benefits of PSP. • Need success stories from the sector's pilot projects.

PROJECT FINANCE	PRESENT SITUATION
• Institutional project finance through municipal loans. • National government subsidy. • Grant money from national government. • Cash flow finance. • Investment depend on budget allocation, development plans and maintenance plan.	**Opportunities** • Improve legislation. • Educate the public (unions and consumers). • Increasing public pressure for efficient service delivery. • Appropriate level of PSP for present time. **Constraints** • Prevailing negative perception among policy makers. • Lack of success stories. • Culture of non-payment. • Bureaucracy in process. • Public mindset that water should be free.

STAKEHOLDER #5

RISK MANAGEMENT

Risk Category	Identification	Evaluation and Assessment	Allocation	Control and Mitigation
Market	• Revenue risk • Demand risk	• Management of market boundaries (ring fencing). • Tariff increases may result in the service becoming unaffordable for the low income consumers. • Service levels to be appropriate for community served.	• Revenue risk transferred from the local government to the private sector service provider. • Risk transfer is essential to achieve efficiency [illegible]	• Contractual arrangements to include a service development programme, and service levels and performance standards. • Community participation in the definition of service levels.
Socio-political	• Social risk • Political risk	• Local government is responsible for service delivery. Outsourcing to the public sector to get efficiency gains. • Local government carry ultimate responsibility for delivery of service.	• This risk belongs with the national and local governments as the are the elected representatives of the community.	• Community participation in decision making regarding contractual matters governing the provision of the service.
Legal and Regulatory	• Regulatory risk	• Inconsistencies in the present regulatory framework. • National government intervention in local government affairs.	• National and local government are in the best position to manage and control these risks.	• Provide an enabling rather than a restricting environment. • Regulate and provide incentives.
Operational	• Development risk	• Ensure private service provider dedicates resources to service network extensions to service to all household in the area of jurisdiction. • Need to balance service quality , extent , and sustainability.	• Operational risk to be shared by the local government, the project company, and the consumer.	• Contractual arrangements to include water services extension. programme • Performance measurement. • Service level standards.

PROJECT FINANCE	PRESENT SITUATION
• Municipal bonds. • Government subsidies. • Taking an equity share in the project company.	**Opportunities** • Improve efficiency of existing services (volume sold, reduction of unaccounted for water, billing etc). • Large scope for PSP as there are a considerable number of cities / towns of sufficient size that make PSP a feasible proposition. • Private capital investment and loan financing . **Constraints** • Strong opposition of unions. • Inconsistent regulatory framework. • Financial institutions perceived market risk makes debt finance relatively expensive.

STAKEHOLDER #6

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Engineering	Technology risk.	• Specifications prescribed are not met. Particularly with water treatment. • Business / the consumer is held responsible for producing the waste water that was not treated.	• Transfer to private sector, and provide incentives for quality improvements.	• Service providers with extensive international experience are able review the processes and technology used , and assess the appropriateness of further renovations. • Continued pursuit of operating efficiency.
Legal and Regulatory	Regulatory risk	• Regulator does not know what they are asking for. • Specifications and standards are inappropriate. • Regulatory administration may change the rules over night.	• National government as regulator / watchdog. • Local government as project regulator.	• Active lobbying to national government. • Proactive participation in policy formulation.
Market	Tariff risk.	• Uncontrolled tariffs are source of risk for business and consumers.	• Risk sharing between service provider and service consumer.	• Regulation of tariffs is essential. It removes some the uncertainty of the cost of the service. • Risk sharing clearly defined in service provider contract.
Operational	Operational reliability risk.	• Provision of sub-standard service increase business risk • Business and the consumer are ultimately responsible • Affects operation of businesses.	• Poor service quality by the service provider transfers risk to the consumer, or producer of wastewater. • Private sector able to affect operational efficiencies.	• Mitigation through partial self provision of waste water treatment services. • Risk mitigation by providing a reliable, sustainable service, affordable, responsive to consumer's needs.

PROJECT FINANCE	PRESENT SITUATION
• Service tariffs to reflect the subsidies or grants received • Provided the finance for the infrastructure required for providing part of the wastewater treatment service themselves.	**Opportunities** • Extend of backlog – much bigger than thought. • Cost effective and reliable service. • New consolidation of municipalities, makes for financially robust entities, and recognises economies of scale. • Present poor and unreliable services delivery in both water supply and waste water treatment. **Constraints** • Mindset about PSP , there is a negative perception that it causes tariffs to increase, service levels to decrease (particularly to the low income groups). • Extent of backlog is underestimated. • PSP is associated with expectations which exceed the ability to pay. • Some bad examples from the past.

STAKEHOLDER #7

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Market	• Revenue risk. • Demand risk.	• Culture of non-payment increases market risk and thus makes area less attractive for PSP. • Community does not pay for poor service. • Expectations for standard of services are often higher than the level of affordability. • Payment of the full cost of the services will reduce the demand.	• Tariff regulation by government. • Community responsible to change the culture of non-payment for services.	• Community participation in decision making and in defining the service levels and tariffs. • Tariff regulation to serve the interest of the consumer and the service provider. • Definition of service quality standards.
Socio-political	• Social risks. • Political risks.	• Backlog in service delivery needs to be addressed. • Services to be provided freely up to a certain volume. • Unions are opposed to PSP, but are looking after the interest of only those municipal workers employed in the water section.	• Community to take responsibility to create culture of payment for services • Community leaders need to look after the interests of the community as a whole. • Government to provide political environment for service delivery.	• Community participation in all aspects of the process • Water is a basic human need, irrespective of the politics. • Water services are important for the development of the community, risk mitigation must have high priority.
Operational	• Unreliable supply. • Poor quality of water. • Inaccurate billing.	• Consumers suffer inconvenience, and potential health hazards. • Willingness to pay for services is closely related to quality of service.	• Operational risk is to be shared by operator and consumers.	• Contractual arrangements with provider. • Community support for service delivery.

PROJECT FINANCE	PRESENT SITUATION
• Paying consumers provide secure cash flow. • Government subsidy for the provision of basic services.	**Opportunities** • Large backlog in provision of water services. • Communities to be actively involve in the solution. • Communities to recognise that risk mitigation will enhance the prospects of improved service delivery. • Provision of regulatory framework that protects the community of service monopolies, and market security for the service provider. **Constraints** • Political agendas at local and national level. • Operators without South African track record. • Local government does not have sufficient capacity to manage existing systems efficiently, but also do not have capacity to manage, regulate and oversee the private sector water service providers.

ST KEHOLDER #8

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Socio-political and Country	• Social risk. • Political interference.	• Community force is very dominant leads to one-on-one relationship. • First world expertise may not be appropriate or excepted by communities.	• These risks are best managed by the public sector at national level.	• Stakeholder participation in the formulation of policies will reduce risks. • People / organisations feeling left out will be rebellious towards it.
Economic and Financial	• Economic stability is paramount. • Government has reasonable control over economy.	• Water board are fairly recession proof. • Elasticity of demand is not related to GDP, but more dependent on rainfall. • Sustained financial viability of project is needed to service debt	• These risks are presently borne in-house. • Risk could be shared in a Public Public Sector Partnership between local governments and water boards.	• Mitigation of financial risk through own treasury.
Market	• Revenue risk. • In water services sector the consumer pays for the entire supply chain (pay for the service, not the water).	• Ability to pay is the main factor. • Willingness to pay is small factor, and relates to quality of service. • Revenue stream is vital for PSP project.	• Market risk belongs with the operator (public or private).	• Manage the service supply chain by extending into reticulation provision. • Provide technical assistance to local governments which lack capacity.
Legal and Regulatory	• Legislation regulating the provision of water services is fairly new and relatively untested.	• Legislation is in flux and constant change.	• Water Boards to extend their services along the supply chain and becc e service provider.	• Introduction of competition ensures operating efficiencies in the long term. • Build in self regulatory mechanisms. • Stakeholder participation in process.

PROJECT FINANCE	PRESENT SITUATION
• Own treasury issues bonds for capital expenditure on infrastructure development. • Cash flow financing the daily operation of the services. • Finance only bulk supply projects. • Presently do not finance reticulation projects.	**Opportunities** • The large backlog in the provision of services means great opportunity for new developments, and thus for bulk suppliers. • Local authorities have limited management capacity. Bulk suppliers could supply management skills. • Private management of operations. **Constraints** • People's mindset concerning PSP, that it raises tariffs, does not extend services to the poor, and leads to job loss.

STAKEHOLDER #9

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Legal and Regulatory	• Regulatory risk.	• Water Services Act (section 10) allows Minister to place limitations on profits and the use of income generated. • Water Services Act (section 19) allows a contract with private sector service provider only after all known public sector service providers have been considered. • Significant risk for finance providers.	• Private sector service providers are subject to possible intervention from national government. • These regulations clearly favour public sector service providers.	• National government can mitigate this risk by making modifications to the Act. • Limit the discretion of the ministerial intervention in the service contract. • Rigorous monitoring and control.
Market	• Revenue risk.	• Culture of non-payment. • Consumer pays for entire service delivery supply chain, payment for services is vital for viability of project.	• To be born by the service provider as an incentive for quality service delivery and customer focus.	• Risk is conducive to quality service provision. • Controlled by commitment to disconnect payment defaulters. • Involve communities in process.
Socio-political	• Attitude of unions toward PSP.	• Target PSP in water services to spearhead national campaign against privatisation.	• National government to address this at national level rather than at local level. • Service provider to bear the risk of employment offer.	• Private sector service contract to stipulate that no retrenchments will occur.

PROJECT FINANCE	PRESENT SITUATION
• Stakeholder provides debt funding. • Insist on empowerment shareholding to have equity stake in the provision of services. • Private sector lenders tend to find the present situation in the sector to risky. Underwriter can provide bridging finance for project, to be sold down thereafter.	**Opportunities** • Training of local governments in engaging of private sector, and to be a controller rather than a service provider • Consolidation of local government structures to make financially viable entities. • Review of management of service, extend research in pre-payment methods. • Create enabling environment by reducing and improvement of regulation. **Constraints** • Largest constraint is the attitude of the unions. • Gap between aspiration and affordability. • Bad examples set elsewhere and locally. • Poor credit ratings of majority of municipalities.

STAKEHOLDER #10

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Legal and Regulatory	• Regulatory risk.	• Inconsistent legislation increases the risk to all parties.	• Legal and regulatory risk should be born by national government as they can manage this risk best.	• Modify the existing legislation to provide consistency among departments.
Financial	• Debt service ability.	• Private lenders hesitant to provide loans. • Credit worthiness and rating of municipalities are presently not good.	• Private lenders ask for guarantees from government or development finance underwriters. • Limited recourse or non –recourse finance puts emphasis on cash flow of project, which is the service provider's risk.	• Underwriter to provide bridge finance for project. • Debt to be sold later to private lenders. • Undertake financial due diligence prior to contract negotiation.
Market	• Revenue risk. • Risk of non-payment.	• Non-reliable services. • Price of water is afforuable.	• Transfer risk to private operator as incentive for operator to enhance efficiency	• Performance standards defined in the contract. • Control through measurement of performance standards against international benchmarks.
Socio –political	• Political risk. • Social risk.	• Political willingness is questionable. • Community / unions not satisfied with process of privatisation.	• Service provider to bear the local social political risk. • Municipalities to share in this risk.	• Black empowerment partner in consortium. • Community participation in entire process mitigates some of the social risks.

PROJECT FINANCE	PRESENT SITUATION
• Provider of long term loans. • Equity portion and finance differs from project to project. • Political risk cover on investment. • Project finance (maximum 33% loan finance). • Project finance on the basis that interest rates reduce gradually over time as risks reduce. Main project risk is incurred in the first five years.	**Opportunities** • Country not ready for concessions, awaiting first results of concessions. • In the mean time great opportunity for management and lease contracts. • Market is ready. **Constraints** • Fear and reluctance to change . • Political unwillingness. • Foreign banks are not interested. • Unions form main constraint. • High legal and technical fees.

STAKEHOLDER #11

RISK MANAGEMENT

Risk Category	Identification	Evaluation and Assessment	Allocation	Control and Mitigation
Socio-political and country	• Social risk.	• Raised expectations in terms of service delivery. • Active opposition of unions. • Country risk varies as time passes.	• Organisation is able to take on more of this type of risk others in the sector.	• Need to monitor country risk and adjust risk profile as necessary. • Risk profile is updated on a daily basis. • Set asset limits per country.
Financial	• Exchange rate. • Inflation.	• Reduce the ability of the borrower / operator to service the debt.	• As financial institution in best position to bear risk.	• Financial hedging instruments. • Detailed risk assessment and analyses. • Detailed project due diligence. • Review of risk portfolio. • Set asset limits per country.

PROJECT FINANCE

- Prepared to take on more risk for same return.
- Do not aim to compete with local private investors.
- Mature capital market makes it difficult to compete in raising finance, as finance is raised overseas.
- Overseas capital perceive increased risk, and is thus more expensive than local finance.
- Seen locally as financier of last resort.
- Not actively marketing itself to the sector.
- Provide lending and co-lending services.
- Equity finance by taking shares in the project or concession.
- Provide credit enhancement facilities and guarantee.
- No ' soft" loans, but willing to take more risk, especially the social-political risk.
- Main shareholder / investor in the Africa Infrastructure Fund totalling $500 million, focussed on 8 countries in Africa (including SA).
- Most appropriate debt/equity ratio is very much project specific.
- Typically finance that portion of finance not taken up by private investors.

PRESENT SITUATION

Opportunities

- Large backlog in provision of services.
- As an underwriter prepared to take on larger risk for same return.
- Compared to rest of Africa SA risk profile is much better than most only Botswana is marginally better.
- PSP in water services has considerable growth potential.
- Significant opportunity to improve efficiency and grow the economy.

Constraints

- Finance raised on foreign markets, perceive more risk, and are therefore more expensive.
- Mature local capital market constrain foreign investors and limit their competitiveness.

STAKEHOLDER #12

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Legal and Regulatory	• Regulatory risk.	• Legislative framework does not allow concessions. • Various acts applicable to the sector are inconsistent. • Fundamental risk. Considered a 'fatal flaw' and 'deal breaker'. • New environmental legislation exposes investor to operational and environmental risk.	• Seek investment partners to syndicate debt and share risks.	• Obtain senior legal advise on present situation. • Mitigate political interference by seeking investment partner who can manage this risk (e.g. DBSA).
Financial	• Interest rates. • Foreign exchange.	• Affect the return on investment. • Affect the ability of the service provider to service debt.	• As a financial institution we are in the best position to manage this risk our self. • Seek investment partner(s) to syndicate risk.	• Hedging instruments for interest rate and foreign exchange.
Market	• Revenue risk. • Credit risk.	• Culture of non-payment. • Ability of operator to service debt. • Extent of risk determines the cost of finance.	• Transfer risk to service provider in return for lower finance cost. • Conduct extensive due diligence.	• Control risk by price of finance. • Good in-house financial model to analyse the operators propensity to service debt. • Control risk by providing finance for shorter period (max 5-7 years).
Socio-political and country	• Social risk. • Political risk.	• Political non-commitment. • Strong union opposition.	• Seek partner who can best manage risk .	• Attempt to mitigate by lobby with the relevant government institutions .

PROJECT FINANCE	PRESENT SITUATION
• Loan finance to service provider. • Empowerment finance to empowerment shareholders. • Direct equity. • Direct equity through sponsors. • Finance criteria are project specific, with no set rules. Depends on extensive analysis of project risk, and detailed analysis of expected returns. • No investment portfolio restrictions.	**Opportunities** • Education of market. In particular the unions, general public (consumers) and government (policy makers and regulators). • Growing backlog in provision of services. **Constraints** • Legislative framework. • Lack of synergy between government departments. • Inflexible labour market. Strong union resistance. • Willingness to pay. • Water sector ranks lowest on investment rating among the infrastructure development sectors, due to least favourable risk/return ratio.

STAKEHOLDER #13

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Socio-political and country	• Social risk. • Political risk.	• Labour militancy. • Crime keeps out foreign investors. • HIV/Aids increases labour cost, has significant economic impact, and affects demand patterns.	• Insurance of financial consequences of risk. • Country portfolio allocation. • Use of country credit ratings. • Local partner involvement.	• Export insurance through World Bank or MIGA. • Political risk insurance is more difficult and expensive to obtain. • Limit exposure per country. • A good local partner on the project is vital to bring local knowledge and control local risks.
Economic	• Economic growth. • Population growth.	• Affects the financial performance of the service provider / operator, and thus represents a financial risk to the investor, as it affects the ability to service debt.	• Country portfolio allocation. • Use of country credit ratings.	• Limit exposure per country.
Financial	• Interest rates. • Exchange rates. • Exchange controls.	• Exchange controls limit repatriation of earnings to foreign investors. • Exchange rate risk for foreign capital investors getting their return in local currency.	• Financial risks are best born by financial institutions. This is their key area of expertise. • Participation of other (foreign) investors - investment syndication.	• Exchange control risks are controlled by putting clauses in the contract. • Exchange rate risks are mitigated through various forms of financial engineering and hedging.

PROJECT FINANCE

- Suitable sources are: infrastructure funds (local and international).
- Project finance from private banks in the form of non-recourse or limited recourse loan finance.
- Operating company and equity investors.
- Government equity and , grant funding and or subsidies.
- Bilateral or multilateral funding agencies.
- Employee shareholding.
- Organisation provides equity finance.
- Investment criteria include rate of return on investment, management capability and experience, regulatory and tariff structures, investment portfolio, present size and potential growth of the project, availability of government subsidies, cash flow projections, degree of cross subsidisation, social obligations, and the value and state of assets involved.

PRESENT SITUATION

Opportunities

- Need for increased service provision.
- Government policy permits (limited) profitability.
- Overall trend toward privatisation.
- Availability of large service areas, give potential economies of scale.
- International interest in investment in South Africa
- Mature capital market.
- Number of infrastructure funds focus on South Africa.
- Transparent system of regulation and enforceability.

Constraints

- Labour militancy.
- Crime keeps out foreign investors.
- HIV/Aids increases labour cost, has significant economic impact, and affects demand patterns.
- Political pressures to move fast on service delivery, while non-commitment to PSP.
- Exchange controls, and exchange rate fluctuations.

STAKEHOLDER #14

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Socio-political and Country	• Social risk. • Political risk.	• Political non-commitment to PSP. • Militant labour unions opposed to PSP.	• Political risk to be born by government. • Involve local / empowerment partner.	• Educate the sector on the benefits and risks associated with PSP. • Government to moderate the unions' position on PSP.
Market	• Revenue risk.	• Present supply chain is fully public sector organisations. Despite PSP, supply chain will still be dominated by the public sector. • Present tariffs do not everywhere reflect the full cost. • Initially prices / tariffs are likely to go up, before gains in efficiency can reduce them.	• Government commitment to service cost recovery and discontinuation of services to defaulters. • Transfer of revenue risk to private sector as an incentive for service quality and efficiency.	• Sanction of disconnection reduces revenue risk. • Community participation in the definition of service levels and associate tariffs appropriate to expectations and ability to pay.
Legal and Regulatory	• Regulatory risk.	• Various Acts relating to the provision of water services are inconsistent in their regulation of the sector. • Powers of Minister to intervene in tariffs, profits and how profits are applied.	• National government to produce a consistent set of regulations.	• Consistent regulations bring a degree of certainty to the sector and mitigates risk.
Financial	• Interest rate.	• Affects the ability to service debt.	• Share risk through syndication with other stakeholders	• Financial hedging instruments.

PROJECT FINANCE	PRESENT SITUATION
• Sources of finance include: infrastructure funds, project finance, government grants, international funding agencies, and project cash flow. • Organisation provides debt finance (non-recourse or limited recourse) and empowerment equity finance. • Finance criteria depend entirely on project, and include quality of management and project team, results of financial analysis, and detailed risk assessment. • Finance conditions depend on risk associated with the project. • In water sector control risk by providing limited duration finance (5-7 years).	**Opportunities** • Large service backlog, large demand for services and development of new infrastructure and rehabilitation of existing services i.e. large market with many opportunities. • Enhancement of legislative and regulatory framework to reflect a consistent approach tot PSP from national government. **Constraints** • Strong opposition of labour. • Culture of non-payment. • Government non-commitment to PSP. • Negative perceptions of private provision of services. • No local track record of private service provision.

STAKEHOLDER #15

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Socio-political and Country	• Social risk. • Political risk.	• Politically opposed to privatisation in general. • Efficiency gains lead to job loss. • Opposed to private control over public good. • Less opportunity for community participation in decision making. • Less accountability and transparency.	• Transfer of service provision to the private sector may result in service delivery efficiency gains, but has numerous negative effects, resulting in a negative overall benefit.	• May be controlled by regulating the sector to a degree by which these risks are being managed acceptably all stakeholders. • Public-Public Partnerships are more acceptable alternative.
Market	• Price risk.	• Profit taking in monopolistic situation results in higher tariffs. • Less cross-subsidisation of service delivery, which affects the quality of service delivery to the low income groups. • Less participation in service level decisions, which affects willingness to pay.	• PSP in the delivery of water services has few positive effects while a number of serious negative effects, resulting in a negative overall benefit. • Public sector partnerships are preferred service provider.	• May be controlled by specific clauses in the service contract with the private sector operator. • Public-Public Partnerships are more acceptable alternative.
Operational	• Service quality.	• Less worker participation in operational management. • New technology often not worker friendly. • Reduced service quality to low income groups (urban and rural).	• PSI in the provision of [illegible]ater services is likely to gain in operational efficiency which are welcome but outweighed by the negative operational effects.	• May be controlled by specific contract clauses, performance standards and level of service agreements. • Public-Public Partnerships are more acceptable alternative.

PROJECT FINANCE	PRESENT SITUATION
• National government grant. • Project cash flow. • Municipal infrastructure finance programme. • Municipal and Water Board bonds. • Private sector finance. • Bilateral / multilateral funding agencies.	**Opportunities** • Private sector to be involved in the planning, design and construction of new infrastructure. • Water is a public good, service should be provided by public sector. **Constraints** • PSP propagates social inequities • PSP involves profit taking, which increases the cost of service provided. • PSP limits cross-subsidisation. • With PSP efficiency gains lead to retrenchments.

STAKEHOLDER #16

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Legal and Regulatory	• Regulatory framework. • Slow pace of change.	• Inconsistencies between the regulations provided by the various government departments. • Concerned about the Minister's ability to determine tariffs, application of surplus, and rate-of-return regulation. • Assumed position of Water boards as preferred provider of services in the Water Services Act.	• Seek public private partnership in which the government partner bear the regulatory risk.	• Government to review its regulatory framework and amend to make it more consistent and private sector friendly. • Risk can be controlled by provisions in the service contract.
Socio-political and Country	• Social risk. • Political risk. • Slow pace of change.	• Unions have provided most opposition to PSP and have constrained progress. • Slow pace of change show government is politically not fully committed.	• Transfer opposition from the unions to PSP to national government.	• National government to manage the unions.
Market	• Slow process of change.	• Bureaucracy slows process. • Lack of capacity at local level to engage n private sector contract negotiations and management. • Lack of advisors.	• Choose partners prepared to bear their full portion of the risk.	• Government to engage in providing support for municipalities and local government structures considering PSP in the provision of services.
General			• Choose partners prepared to bear their full portion of the risk	• Undertake thorough feasibility ad due diligence studies.

PROJECT FINANCE	PRESENT SITUATION
• Typical finance structure for water services project is about 80% debt and 20% equity. • Finance structure is project specific, and is determined by overall project risk. • Country risk and project risk are the main determinants for establishing the required internal rate of return. • Project risk depends on location, local economy, perceived business risk, political an social stability, attitude of community towards service delivery, payment for services, and PSP in the provision of these services. • SA is a strategic target for a number of multilater[illegible] funding agencies and infrastructure investment f[illegible]s.	**Opportunities** • Concessions in larger cities in South Africa. • Consolidation of municipalities / local governments. • Government commitment to service delivery, and payment for services. • Young market, with high potential for growth. • Aim to play a major role in the private provision of water services in Southern Africa. **Constraints** • Organisation is bullish about the market. • Regard none of the risks as serious constraints. • Government to make changes to the regulatory framework to make the sector more private sector friendly.

STAKEHOLDER #17

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Socio-political and Country	• Social risk. • Political risk.	• Unions opposition to privatisation. • Community support for service provided. • Assess willingness to pay for services.	• The union's opposition to PSP is not so much a problem for the private sector service provider, but more so for the national government. • Seek to include a local empowerment group as part of a joint venture.	• Many of the unions' concerns and reservations can be accommodated in the service contract. • Undertake process of community involvement in decision making. • Control social risk by finding out who the real decision makers are, and involve them.
Financial	• Interest rate. • Exchange rate.	• High and rising interest rates causes increases in the debt burden of the operator, and creates uncertainty about the ability to service the debt. • Equity investments in SA and an income m in local currency there is exposure to exchange rate risk.	• Seek the inclusion of lending institution in the joint venture, who can bear the interest rate risk. • The project sponsor in the home country of the will bear the exchange rate risk.	• Financial institutions can use financial hedging instruments available to minimise the risk of both interest rates and exchange rates.
Market	• Revenue risk • Project development risk	• Project viability assessment. • Establish the level of services to be provided in relation to the ability to pay. • Organisation faces high development cost due to the protracted tender process of 4 to 5 bidders for a project.	• Market risk are born by the operator / service provider directly. • Municipality share in the risk to a degree. In the event of failure to supply services, it is the municipality's responsibility to supply the service.	• In-depth project research. • Obtain local government and community commitment to the project.

PROJECT FINANCE	PRESENT SITUATION
• Organisation provides equity finance, the amount depends on the project. • As a global company, have global criteria for the rate of return on investments. Any project that meets that criteria will be considered. • Key considerations for investment are the rate of return, and the legal framework of the project i.e. do contracts stand up in court. • The debt / equity ratio is project specific, and depends on capital requirement and timing, cash flow, perceived risk, and expected return.	**Opportunities** • Large backlog in services. • Progress to address backlog has been slow. • Opportunities for wide range of PSP options in SA. • SA is young market with plenty of opportunity and demand for services. • Provided the service is good, the willingness to pay is there. **Constraints** • Regulatory framework allows PSP but favours public provision of services. • Unions are opposition to privatisation. • Tardiness of process, makes it expensive.

STAKEHOLDER #18

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Socio-political and Country	• Social risk. • Political risk.	• Unions opposition to privatisation. • Rising expectations of the consumers. • Opportunity to 'privatise blame'. • Tardiness of process due to bureaucracy. • Project development is costly.	• Opportunity to privatise the blame for backlog in services and inefficient management of the service to the private sector. • Seek competent local partner(s) to handle the social issues related to PSP. • Government to manage the opposition of the unions to PSP.	• Service contract to include clauses concerning service levels and tariff structure. • Involve the community in the decision making process. • Government build capacity in the municipalities and national government department to deal efficiently with project. • Networking with politicians at all layers • Show commitment by active involvement in social investment.
Market	• Revenue risk. • Cost overruns.	• The metering, billing and revenue collection are critical to the viability of the project. • Matching of rising expectations of the consumers and the ability to pay. • Rising project development cost due to tardy process and bureaucracy, reduces business confidence in market.	• Seek community involvement in the decision making process. • Seek government commitment to payment for services and the discontinuation of services in case of payment default i.e. transfer some of the revenue risk to the consumer	• Community involvement controls the revenue risk. • Agreed service levels and tariffs structures to be included in the service contract. • Educate communities and other stakeholders on private provision of services. • Use of best practices world wide in the structure of the contract.

PROJECT FINANCE	PRESENT SITUATION
• Small projects are financed from own balance sheet • Participate in larger projects by providing equity project finance. • Other source is passive equity from infrastructure funds such as SA Infrastructure Fund. • Debt finance through local lenders. International lenders tend to be more expensive. • Size of equity stake can vary up to 100% on small projects, but on average is about 15 – 20%. The equity stake is largely dependent on the perceived country risk and project risk. • Criteria for investment vary for each project. No loss leaders. • South Africa rates as the top of the second bracket in terms of investments . Malaysia, Chile are in the same group.	**Opportunities** • Private delivery of water services in major municipalities • Due to backlog, there are many new areas to be serviced • Management of existing utilities is inefficient, providing the opportunity to improve. • Government to create an enabling environment, show leadership and affect a change in perception of PSP. **Constraints** • Lack of political will to make PSP happen. • Political inertia. • Unions' opposition to privatisation. • Lack of successful track record in SA. Need pilot projects.

STAKEHOLDER #19

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Legal and Regulatory	• Regulatory framework.	• Water services act allows the minister to intervene in tariffs, the application of profits, and the return from investments. • Regulatory risk affects commercial risks and forms a constraint to PSP.	• The risks in this category need to be transferred to the government.	• Mitigation of risk can occur if government modifies the legal and regulatory framework to provide an enabling environment for PSP. • These risk may also be mitigated by adding certain clauses in the service contract
Socio-political and Country	• Social risk. • Political risk.	• Government has committed to service delivery of basic needs to all, and recognised that the private sector can contribute. • Government see benefits of PSP but under regulated circumstances. PSP is not the only solution.	• Transfer some of these risk to the community to be served and share with other stakeholders.	• Community and stakeholder participation and involvement in the decision making process will mitigate some of these risks.
Market	• Revenue risk.	• The culture of non-payment for services is a major risk for the private sector. • Raised expectations creates imbalances between expected service levels and ability to pay for the service.	• Seek to include empowerment organisation in the joint venture to address the issue of payment for services	• To control this risk the private sector operator will seek support or guarantees from the government. • Define, with involvement of the local stakeholders, the service levels, performance benchmarks and tariff structures in the service contract.

PROJECT FINANCE

- Potential sources include: government grants, private project finance, project cash flow, dedicated infrastructure development funds.
- As advisors no development finance is provided.
- Local capital market is mature, and local investors are interested to invest in this sector, foreign investment would be more cautious or risk averse and thus provide more costly finance.
- Project debt / equity ratio all depends on the perceived project risk and the balance sheet of the sponsor.

PRESENT SITUATION

Opportunities

- Private sector to appreciate and understand the position of communities both served and un-served. View delivery of water services not just as a business but also as a contribution to social development.
- Educate the sector about the potential benefits and risks of PSP, the need to pay for services, and the need to discontinue services in case of default.
- Wide variety of project situations in SA gives opportunity for diverse ways of PSP.

Constraints

- Political willingness is there, but commitment is lacking.
- Lack of local success-stories in the sector.
- Inconsistency in legal and regulatory framework creates uncertainty and risk in the sector.
- Strong opposition from unions and to a lesser degree from civic organisations.

STAKEHOLDER #20

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Socio-political and Country	• Social risk. • Political risk.	• Strong opposition from union. • Potential for political interference with service delivery.	• Involve the government the communities and other stakeholders to share in risk.	• Government can control and mitigate these risk by providing a consistent legislative and regulatory frame work across the industry. • Social risks can be mitigated by having broad stakeholder participation throughout the entire process.
Legal and Regulatory	• Regulatory framework.	• Legal framework allows for political interventions in service delivery via tariff setting, profit regulation, and rate of return regulation. • Legislation recognises benefits of PSP but favour the public sector for service provision .	• Transfer these risk to the government as they are in the best position to manage.	• Control of risk by strict implementation and enforcement of regulations.
Market	• Revenue risk.	• Service level expectations disproportionate to the ability to pay. • Policies on non-payment require strict enforcement, or they cause uncertainty on revenue.	• Seek to involve local empowerment) partners, and involve local governments as shareholders in the service provider.. • Transfer a portion of the market risk back to the market i.e. the consumers.	• Risk mitigated by involving the community in the definition of service levels • The Service contract can control some of the market risks by including service levels, tariff structures, and performance benchmarks.

PROJECT FINANCE	PRESENT SITUATION
• Potential sources of finance are: government grants, private equity/loan funding, project cash flow, bilateral or multilateral funding, specialist infrastructure funds, and municipal bonds. • As a PSP advisor, no project finance is provided.	**Opportunities** • Large backlog in the provision of services. • Population distribution and urbanisation is such that beside the big cities there are numerous medium sized towns with potential for PSP. • Market is young in SA and is in deed of a range of PSP options. **Constraints** • Strong trade union opposition. • Potential for political interference in sector. • Service level expectations in disproportion to ability to pay.

CASE STUDY

RISK MANAGEMENT				
Risk Category	**Identification**	**Evaluation and Assessment**	**Allocation**	**Control and Mitigation**
Socio-political	• Willingness to pay for poor services is low • Strong community awareness, specially among women in rural and peri-urban areas who spend large part of day collecting water. • Perceived political unwillingness to engage PSP. • Strong opposition from unions.	• Affects commercial viability of project. • Affect the ability to service debt finance. • Influences all other risk categories . • Resulted in extensive delays in PSP process.	• National Government to carry country risk. • Local Government to carry community based socio-political risk. • Project company includes Black Empowerment Partner. • Local government remains key stakeholder.	• Break the vicious circle of poor service and poor cost recovery by improving service levels. • Joint Venture company identity: fully private or a public private partnership. • Involve community in the process. • Mitigate by political stability and policies.
Market	• Payment risk. • Revenue risk. • Consumer pays or the entire supply chain.	• Culture of non-payment for services. • Resistance to privatisation from union and some consumers.	• Transfer risk to private sector,(operator and sponsor) who are much better placed to manage it at minimum cost.	• Community involvement in the process. • Appropriate and affordable service levels as part of service contract.
Financial	• Interest rates. • Debt service.	• Ability to service debt is main factor in the cost of debt. • Culture of non-payment creates revenue uncertainty.	• Community is responsible to carry the cost of services.	• Development of model contracts. • Implementation of appropriate and affordable service levels.
Legal and regulatory	• Sections of the Water Services Act allow minister to intervene in the setting of tariffs and place limits on profit and return on investments.	• Legal and regulatory framework are in development and under continuous review. This constant change leads to increased risk. • Aim to protect the public.	• Government as regulator can not allocate these risks to other parties. • Involve community in process.	• Remove inconsistencies in the policies of different regulatory bodies. • Issue of policy statements to mitigate perceived risk.

PROJECT FINANCE	PRESENT SITUATION
• DBSA provider of bridging fina e to get project on the started under present perceived risks. • DBSA intends to sell a large portion of the debt to private financial institutions, while retaining the social political risks. • By extending the service area from 24 000 households to 240 000 households by adding in mainly low income households, the project is eligible for a subsidy which provides it with a basic cash flow.	**Opportunities** • Large backlog in the provision of services in extended service area. • Meet service improvement targets. • Seen as concession pilot project. Success will improve perception of PSP, failure will worsen the perception of PSP. **Constraints** • Delayed implementation due to strong trade union opposition. • Regulatory framework shows inconsistencies. By the implementation of this concession these are now being tested for the first time, creating outcome uncertainty.

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Name of thesis Managing the Risks of Private Sector Participation in the Provision of Water Services. Wijers B E W 2000

PUBLISHER:
University of the Witwatersrand, Johannesburg
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