

INVESTMENT LIFECYCLE GUIDELINES

Supplementary guidance

#2. Project Risk Management Guideline

Overview

Strategic
assessment

Options
analysis

Business
case

Project
tendering

Solution
implementation

Post-
implementation
review

Supplementary
guidance

#2

Investment Lifecycle Guidelines

Supplementary Guidance

#2. Project Risk Management Guideline

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Overview

Strategic Assessment

Options Analysis

Business Case

Project Tendering

Solution Implementation

Post-implementation Review

More information at: www.lifecycleguidance.dtf.vic.gov.au

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Abbreviations

BMP	benefit management plan
CEO	Chief Executive Officer
CFO	Chief Finance Officer
DTF	Department of Treasury and Finance
DPC	Department of Premier and Cabinet
ERC	Expenditure Review Committee (Cabinet Committee)
GRP	Gateway Review Process
GSC	Gateway Supervisory Committee
ICT	information and communications technology
ICB	investment concept brief
ILM	investment logic map
IMS	Investment Management Standard
IPA	Information Privacy Act 2000
IPP	information privacy principle
IT	information technology
IEPG	Investment Evaluation Policy and Guidelines
KPI	key performance indicator
MAM	meaningful; attributable; measurable
MYS	multi-year strategy
PPM	project profile model
SRO	Senior Responsible Owner
TEI	total estimated investment
VGRMF	Victorian Government Risk Management Framework

Executive summary

Managing risk is an integral part of good management practice and an essential element of good corporate governance. It is something many managers do already in one form or another but when undertaken effectively across an organisation it enables continuous improvement in decision-making and facilitates continuous improvement in performance.

The objective of risk management is to identify and analyse risks and manage their consequences. Organisations that have risk management embedded into their culture are able to manage risk effectively and efficiently and are more likely to achieve their objectives and at a lower overall cost.

This project risk management guideline aims to provide those responsible for managing project risks with a common source of risk terminology and definitions.

The guideline also identifies issues and processes involved in managing project risks. It includes:

- A general overview of project risk management
- Common sources of risk
- The Victorian Government's approach to risk management
- Examples of the project risk management process
- A guide for risk management by phase of the project lifecycle
- An example checklist for risk management; and
- A risk management case study

The guideline also provides references to material that will assist project teams and managers in identifying and managing project risks.

Tips for successful risk management

For the risk management process to be successful, it is imperative to address the following issues:

- Know what you want to get out of the process. It may seem obvious but many people start a risk management process without knowing what they want to get out of it.
- Determine ownership. It is imperative for people to be accountable for risks, controls and action plans.
- Undertake cost-benefit analysis. Many treatment plans are not cost-effective and will never get done. There must always be an opportunity to reject recommended treatments, and look for alternative treatments.

1. Context

This Project Risk Management Guideline is designed as supplementary guidance to the State's Investment Lifecycle Guidance series – which are intended to be applied to Victorian Government investments so they provide the maximum benefit for the State's individuals, communities, and businesses.

The need for a Project Risk Management Guideline for all Victorian Government agencies and departments was identified in December 2006, when the Gateway Supervisory Committee (GSC) approved a proposal to address a Whole-of-Victorian Government (WoVG) approach to project risk management.

Gateway Review teams consistently identify project risk management as an issue. Specifically in the following areas:

Comprehensive identification of project/program risks

Thorough analysis and assessment of identified project/program risks by key stakeholders

Identification and development of risk treatment & strategies

Effective allocation of risk roles and responsibilities

Regular monitoring, evaluation and updating of risk management plans and risk registers, and maintenance of risk management processes for the duration of the project/ program

Understanding of the risk management processes (AS/NZS4360) and application in a project management context

Awareness that risk management is an iterative process throughout the lifecycle of a project, where some risks will disappear and new ones will emerge

One of the key deliverables highlighted by this proposal was the development of risk management guidelines as a supplementary guide to the Investment Lifecycle Guidance series. The Risk Management Guideline was developed by a working group comprising Risk/Project Managers from across Government, including representatives from the State Services Authority (SSA) and the Victorian Managed Insurance Authority (VMIA). The intention is to provide a broad guide reflecting good practice, rather than a prescriptive document. Its inherent value is intended to encourage adoption across Government.

2. What is project risk management?

Project risk management is the culture, processes and structures, adopted by an organisation, directed towards the effective management of risk in projects. It should be a pervasive management discipline that is integrated with all other project disciplines. The goal of risk management is to ensure informed decisions are made at the right time, and that there is visibility of sources of uncertainty that may impact on the success of a project.

From a project management perspective, risk management seeks to identify, prevent, contain and reduce negative impacts and maximise opportunities and positive outcomes

in the interests of projects and stakeholders. It is a systematic approach that allows risks to be embraced, avoided, reduced or eliminated through a logical, comprehensive and documented strategy.

Risk management should be viewed as an ongoing process throughout a project that begins at the 'Strategic Assessment' stage of an investment's lifecycle, and continues throughout its entire lifecycle. (Detailed guidance on this phase is set out in the Strategic Assessment Guideline and is available at www.lifecycleguidance.dtf.vic.gov.au).

Risk assessment can be applied at all stages of the investment life cycle and should be applied many times with different levels of detail to assist in the decisions that need to be made at each phase.

For example, during the concept and definition phase, when an opportunity is identified, risk assessment may be used to decide whether to proceed or not.

Where several options are available risk assessment can be used to evaluate alternative concepts to help decide which provides the best balance of positive and negative risks.

During the design and development phase risk assessment contributes to ensuring that system risks are tolerable; contributes to the design refinement process; contributes to cost effectiveness studies and identifies risks impacting upon subsequent life-cycle phases.

As the activity proceeds risk assessment can be used to provide information to assist in developing procedures for normal and risk event conditions.

Understanding risk management entails comprehending the underlying factors that contribute to project risks. Fundamentally, this includes considering sources of risk – see Appendix 1 for "Common Sources of Risk".

3. The Victorian Government's approach to risk management

In Victoria, risk management is mandatory under legislation including the 'Managed Insurance Authority Act 1996', the 'Financial Management Act 1994', (S. 44B) the Victorian Government's 'Management Reform Program' and policies associated with 'Partnerships Victoria'.

In July 2007 the Victorian Government adopted a Victorian Government Risk Management Framework (VGRMF), which was endorsed by the Minister for Finance. This framework, which has been applied across the Whole of Victorian Government, includes an attestation by accountable officers, principally Departmental Secretaries to ensure that risk management requirements are built into annual corporate planning and reporting processes. Project risk is a source that needs to be linked to this. The release of the VGRMF did not signal a change in policy but formalised and built upon existing risk processes; as part of the Government's commitment to continuous improvement in public sector governance.

Further information can be found on the DTF website (www.dtf.vic.gov.au) – search for 'risk management'.

4. Project risk management process

4.1. Risk management and the project lifecycle

The project lifecycle is widely understood and is reflected in the DTF Gateway Review processes. Risk management in projects begins with concept development and continues throughout the lifecycle of the project.

While the concept of a project lifecycle can be applied to all projects, it is acknowledged that different types of projects may have different project strategies. The project strategy defines how a project is partitioned into different stages, or phases. While an individual projects life-cycle or development and delivery strategy may be unique, they can most often be aligned to the generic Investment Lifecycle and associated Gateway review process as set out below in Figure 1.

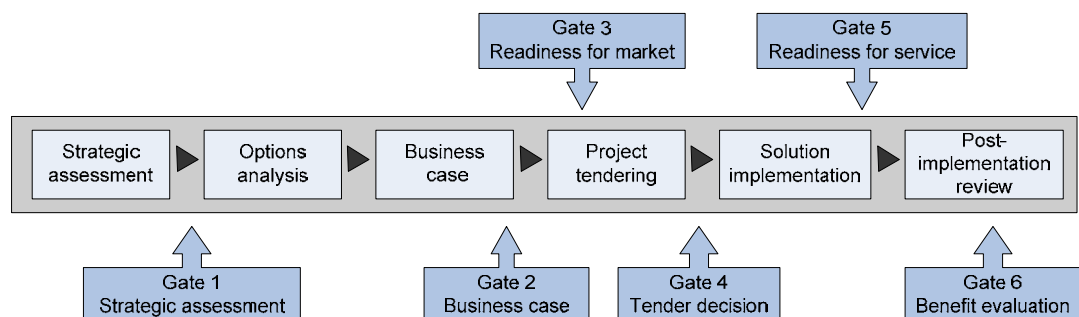


Figure 1 Investment lifecycle and Gateway reviews

Project phase or stage boundaries usually represent key deliverable and decision points throughout the project. It is at these stage or phase boundaries that detailed risk assessments should occur. The risk assessment coincides with stage reviews and stage plans, and informs both the planning process and the governance board, facilitating prudent decision making.

The main outputs from the risk management process throughout the project lifecycle are as follows:

- High level risk assessments coinciding with concept and options development.
- Risk management plan coinciding with options development.
- Detailed risk assessment for the life of the project, coinciding with business case development.
- Detailed risk assessment reviews coinciding with project phase or stage boundaries.
- Treatment plans and other implementation outputs as required.

The risk management processes described by Standards Australia and supported by the VGRMF are depicted in Figure 2.

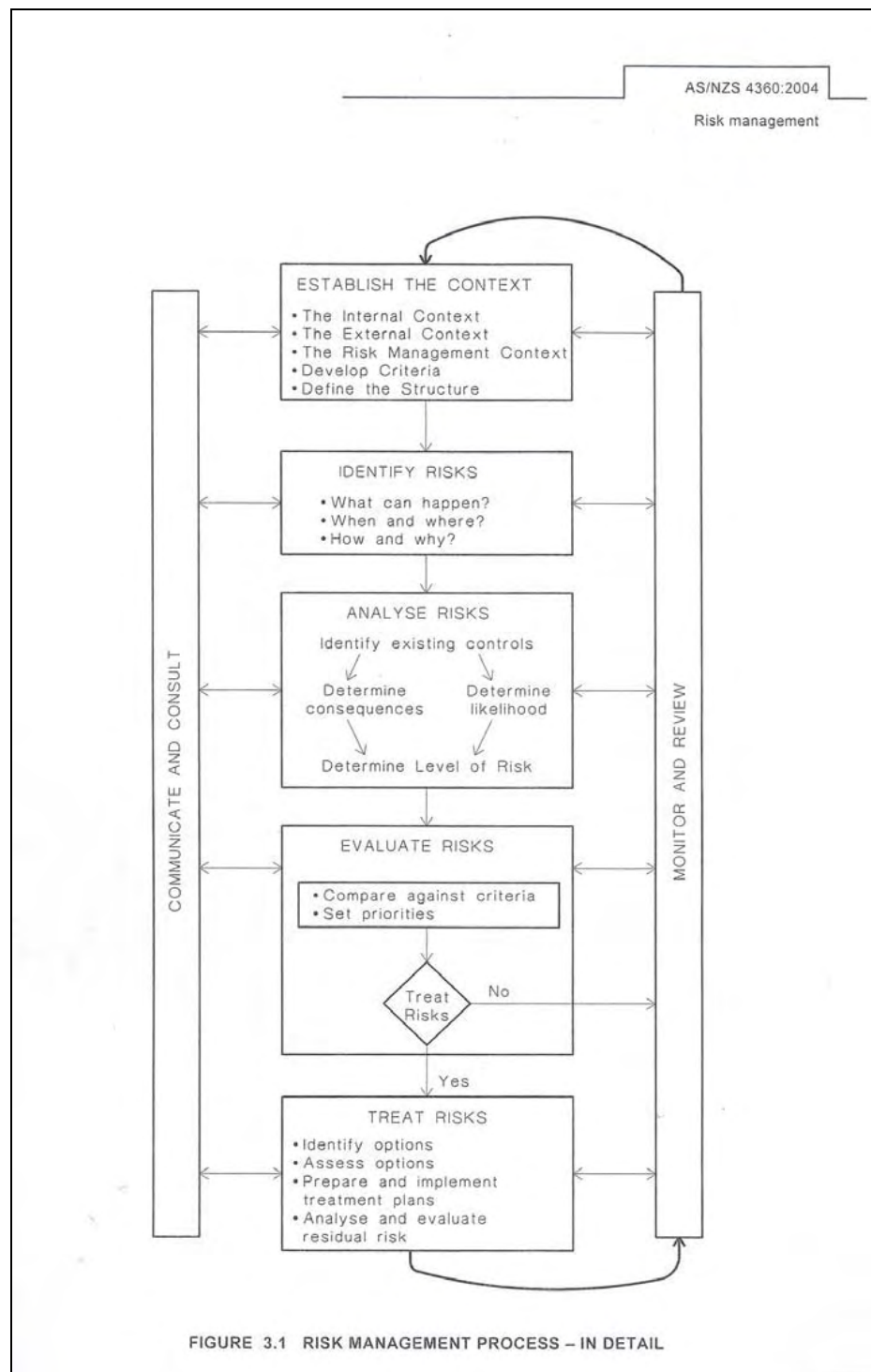


Figure 2: 'Risk management processes as described by the 'Risk Management Standards Australia (AS/NZS 4360:2004)'. 'Australian/New Zealand Risk Management Standard (AS/NZS 4360)'

As outlined in Figure 2, the process of risk management should commence at the strategic planning stage of a proposed project. The steps in the process are:



4.2. Establishing context

Risk management should align to the context of project management processes and the internal and external environment.

- Ensure that the risk management strategy has been developed in accordance with best practice, including establishing criteria for risk evaluation (see Risk Management Framework below)
- Define proposal/project scope and objectives including key performance indicators
- Develop the risk management methodology to be used for assessing the proposal or project
- Define the objectives and expected benefits of the risk management process
- Consult with key stakeholders (internal and external) to agree appropriate levels of materiality. See Table 1

Table 1: Example risk management context and consequence table

Consequences				
Rating				
5	4	3	2	1
Description				
Catastrophic	Major	Moderate	Minor	Insignificant
Objective				
Project Objective as stated in the Project Statement not achieved	Objective delayed by 50% or more	Objective delayed by less than 50%	Milestone not achieved	Negligible impact on milestones
Human				
Multiple fatalities or significant irreversible effects to <50% persons	Single fatality and / or severe irreversible disability (>30%) to one or more persons	Moderate irreversible disability or impairment (<30%)	Significant but reversible disability requiring hospitalisation	No medical treatment required
Financial				
50% variance to budget	30% variance to budget	20% variance to budget	10% variance to budget	5% variance to budget
Environmental				
Very serious long-term environmental impairment of ecosystem functions	Serious long-term environmental impairment of ecosystem functions	Serious medium-term environmental effects	Moderate short-term effects but not affecting ecosystem functions	Minor effect on biological or physical environment
Legal				
Significant prosecution and fines	Major breach of regulation	Serious breach of regulation with investigation or report to authority with prosecution powers, moderate fine possible	Minor legal issues, non-compliances and breaches of regulation	
Reputation				
Serious public or media outcry (international coverage)	Serious public or media outcry (National coverage)	Significant adverse attention by media, public, or NGO (State based)	Media attention of local concern	Minor, adverse local public or media attention or complaints

4.3. Risk identification /analysis

This is the process of identifying risks relevant to the project and their causes, determining the likelihood of risks materialising, who is responsible for their management and how they might impact on the attainment of project objectives and outcomes.

- Identify all risks which could influence the achievement of the proposal or project's objectives, using risk management workshops, or other appropriate research and consultation
- Assess the potential likelihood and consequences of each risk using a risk scoring matrix (as set out in Table 2 below)
- Screen risks to filter the minor risks having low impacts and low likelihood of occurrence (be mindful that minor risks can aggregate to higher level risks, and may still need to be monitored)
- Identify the 'medium to high' level risks that require management attention

Contingency shifting should be applied where risks change throughout the lifecycle of the project.

Appendix 3 identifies a number of types of risks which might be encountered.

Table 2: Sample risk scoring matrix:

Consequence ► ▼ Likelihood		Overall Rating				
		Insignificant	Minor	Moderate	Major	Catastrophic
		1	2	3	4	5
Almost Certain	5	Medium (5)	Medium (10)	Significant (15)	High (20)	High (25)
Likely	4	Low (4)	Medium (8)	Significant (12)	Significant (16)	High (20)
Neutral	3	Low (3)	Medium (6)	Medium (9)	Significant (12)	Significant (15)
Unlikely	2	Low (2)	Low (4)	Medium (6)	Medium (8)	Medium (10)
Rare	1	Low (1)	Low (2)	Low (3)	Low (4)	Medium (5)

4.4. Risk evaluation

Risk evaluation uses the understanding of risk obtained during risk analysis to make decisions about future actions. Ethical, legal, financial and other considerations including perceptions of risk are also inputs to the decision. Factors affecting decisions include:

- Whether a risk needs treatment;
- Priorities for treatment;
- Whether an activity should be undertaken;
- Which of a number of paths should be followed?

Risks are compared using criteria established to determine treatment options, costs, benefits and priorities. It is worth noting that treating a single risk can have implications elsewhere and can impact on other activities. Consequently, impacts and risk dependencies need to be understood to ensure that in managing one risk, an intolerable situation is not created elsewhere. Understanding the complexity of a single risk or of a portfolio of risks of an organisation is crucial for the selection of the appropriate risk responses.

- A sound starting point is to create a risk register in which to identify the feasible responses and treatment actions to amend and moderate major risks (see below).
- Risk responses may include:
 - Risk prevention
 - Impact mitigation
 - Risk transfer
 - Risk acceptance

- Select the best response
- Develop risk action schedules (treatment plans) for major risks
- Develop management measures for moderate risks

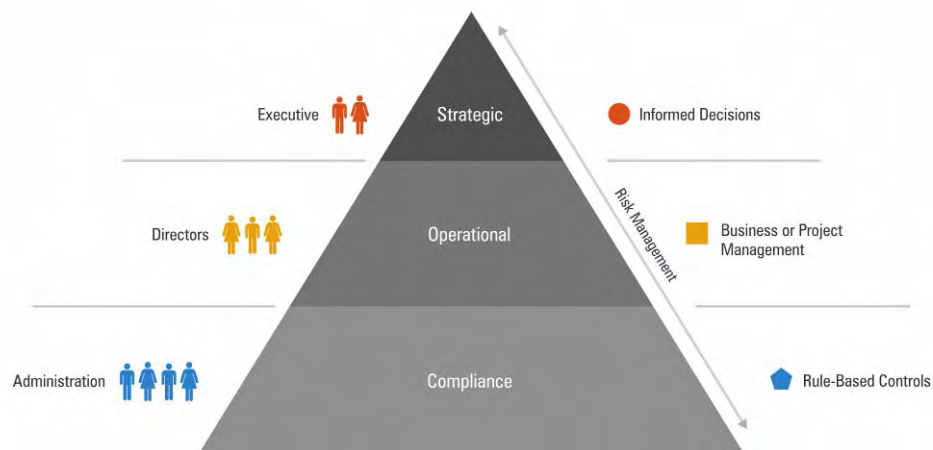
Table 3: Risk register content

Risk		Part X: (Stage of the Project)	State the risk
Description			Provide description on the risk
Description of Consequence			Describe consequence resulting from the risk
Pre-Treatment Risk Assessment	Likelihood		What is the likelihood of the risk occurring pre-treatment?
	Consequence		What is the consequence of the risk occurring pre-treatment?
	Risk Rating		What is the Risk Rating pre-treatment (low, medium, significant or high)
Treatment Strategies			How will the risk be managed or dealt with to reduce its impact?
Post-treatment Risk Assessment	Likelihood		What is the likelihood of the risk occurring post-treatment?
	Consequence		What is the consequence of the risk post-treatment?
	Residual Risk		What is the remaining Risk Rating post-treatment (low, medium, significant or high)

4.5. Risk treatment

Risk treatment involves developing strategies and action plans to maximise potential benefits and minimise the potential adverse impacts of risks.

- For major undertakings, prepare a risk management plan and ensure that it aligns with the project scope
- For other projects, compile and collate risk action schedules and measures

Figure 3 Alignment of roles and risk types

(Source: risk treatment diagram developed by Ian Hord)

In considering risk treatments it is sometimes helpful to categorise, or organise the risks into named categories or tiers aligned with the context of the project and aligning the function of the treatment to particular project outcomes. Figure 3 demonstrates this split of risk types and responsibilities. The treatments can then be viewed clearly in terms of their desired effect on particular elements of the project, assisting in identifying the appropriate tools and workforce required to assess and treat each risk. For example:

Tier 1 (or Strategic) – Strategic level risks are generally those risks that will have an impact on the strategic (or high level) outcomes for the project. These risks generally give rise to ‘treatment strategies’ or deliberate treatment actions that may become part of the

scope of work of the project, or be provided for in the form of pre-planned actions which may draw upon various contingent reserves of time, funding or scope negotiation.

They are generally monitored at the highest levels of direction or governance in the project. Tools such as the Investment Logic Map or Strategic Risk Workshops (SWOT or other methods) involving senior executives, strategic planners or key stakeholders would identify the key sources of uncertainty which may impact on the desired project outcomes - "what are the strategic objectives for this project and what might prevent us achieving them?"

Tier 2 (or Operational) – These risks pertain more to the delivery of the project and will be the focus of the Project Director (or Project Manager). "What do we need to deliver, when do we need to deliver it, to what quality should it be delivered and how much do we have to spend? What could prevent us delivering against these objectives?"

Tier 3 (or Compliance) – These risks relate more to administration and operational standards, for example with mandatory design standards or standard financial and operating procedures (compliance with the Financial Management Act for example). "What standard procedures and audit mechanisms do we need?" "What skills and capabilities should the auditors have?"

Treatment options should be specific, accountable and clear enough for others to understand how the risk is to be treated. Risk treatments need to be assessed to ensure good cost benefit. Where cost benefit is poor, alternative treatment should be sought.

Examples of treatments include:

- Establish contingency plans
- Change plans to reduce risk
- Initiate further investigations to reduce uncertainty through the gathering of more detailed information
- Purchase insurance
- Transfer risk via contracts
- Set contingencies in cost and schedule estimates
- Set tolerances in specifications

Table 4: Risk treatment schedule (template example):

	Identified Project Risks	Cause	Risk Ranking	Treatment Strategies	Responsible Person	Due Date	Status
1							
2							
3							

4.6. Risk monitoring and review

Monitor the current known risks to the project and the effectiveness of the respective treatments and controls. Review the identified risks and consider whether new risks may be evident and should be included on the risk register and treatments developed.

- Ensure that the risk has an identified owner (the person/s with the authority and resources to decide on the appropriate response, and give effect to the selected treatment)
- Implement the risk treatment plan in accordance within the intended schedule and other key parameters
- Ensure that risk management activities continue to occur in accordance with the project risk management plan
- Periodically review risks via the risk register/risk log/consultation and evaluate the need for additional risk management effort

- Monitor the progress and effectiveness of implemented treatment strategies. Are existing contingencies still applicable and resourced to treat remaining risks?

The main output from the project risk management process is the definition of action schedules and management measures and assignment of responsibility for implementation. For designated undertakings, the risk management plan summarises the risk analysis process and details the action strategies for managing individual risks.

Consistently applying all of the stages identified by the risk management process is vital to ensure project success. The implementation or 'Treat Risks' stage, is generally the most poorly executed of the process. Planning for implementation requires particular attention to resources required, defining responsibilities for all personnel and suitable timing of tasks.

It is important that each project team has sufficient resources to implement their risk management plan effectively. Further to this, each team member must have a clear understanding about their role in mitigating the projects risks. The key questions/tasks for each of the key project team members at the various stages of the project's lifecycle has been summarised in Appendix 2 'Risk management roles and responsibilities'.

4.7. Techniques to assist managers with risk management

Many specialised tools have been developed to enhance the role of the manager in risk management. Such techniques provide assistance in analysis and evaluation of tasks – some of which are summarised in Table 1 'Specialist risk management techniques'.

Table 5: Specialist risk assessment techniques

Technique	Application
Decision Analysis (1)	Choice amongst uncertain alternatives
Event Tree Analysis (2)	Identifies the consequences of an initiating event
Failure Modes, Effects & Criticality Analysis (1)	Analysis of designs and operating plants; may be directed to safety, plant integrity or ensuring production is maintained
Fault Tree Analysis (2)	Identifies the causal factors that may lead to a risk arising
Hazard Analysis (1)	HAZOP Safety analysis for operating plant
Scenario Analysis (3)	Economic appraisals and feasibility studies
Sensitivity Analysis (3)	Very wide application, from economic appraisal and financial feasibility to operations and maintenance models

(1) Ward, E 2007, Advances in Decision Analysis: From Foundations to Applications

(2) Zio, E 2007, Introduction to the Basics of Reliability and Risk Analysis

(3) Cox, D 2006, The Mathematics of Banking and Finance

A risk management checklist is another simple tool that managers can use to keep track of risks throughout the lifecycle of their project and seek approval that risk processes have been followed before moving onto the next phase. An example checklist for managing risks can be found in Appendix 4 'Checklist for risk management' and is a useful starting point for projects to develop their own.

It is common for lessons learned exercises to reflect on negative examples of risk management to assist learning. Appendix 5 offers a different perspective by exploring the positive risk management process that was applied to a Barwon Water Project. One of the highlights of this particular project was the risk management mindset embedded across the Project Team along with the quality of the documentation created to support this. Examples of risk management documents such as a risk management plan (or framework), risk scoring matrix and risk register have been included for Project Managers who are documenting risk management for their own projects.

5. Resource directory

Further information may be obtained from the following publications/websites. Please advise the Department of Treasury and Finance if your agency, or other agencies, have additional information that should be included in this listing.

Resource name	Access details
Investment Management Standard	
Problem Definition (Investment Logic Map)	www.dtf.vic.gov.au/investmentmanagement investmentmanagement@dtf.vic.gov.au
Solution Definition (Investment Concept Brief)	
Benefit Definition (Benefit Management Plan)	
Business Case	
Investment Reviews	
Benefit Report	
Gateway Review Process	
Project Profile Model	www.gatewayreview.dtf.vic.gov.au gateway.helpdesk@dtf.vic.gov.au
Program Reviews	
Gate 1 Review: Strategic Assessment	
Gate 2 Review: Business Case	
Gate 3 Review: Readiness for Market	
Gate 4 Review: Tender Decision	
Gate 5 Review: Readiness for Service	
Gate 6 Review: Benefits Evaluation	
Investment Lifecycle Guidance	
Overview	www.lifecycleguidance.dtf.vic.gov.au
Strategic Assessment	
Options Analysis	
Business Case	
Project Tendering	
Solution Implementation	
Post-implementation Review	
Supplementary Guidance	
Investment Evaluation Policy and Guidelines	www.lifecycleguidance.dtf.vic.gov.au
Project Alliancing Practitioners' Guide	
Procurement Strategy Supplementary Guideline	
Melbourne Water Triple Bottom Line	
Asset Investment Reporting	www.dtf.vic.gov.au/assetinvestmentreporting
Asset Management Policy	www.dtf.vic.gov.au/assetmanagementpolicy
Multi Year Strategy	www.dtf.vic.gov.au/multiyearstrategy
Partnerships Victoria Guidance	www.partnerships.vic.gov.au
Other Guidance	
Building Commission Guidance	www.buildingcommission.com.au
Capital Development Guidelines	www.dhs.vic.gov.au/capdev.htm
Construction Supplier Register	www.doi.vic.gov.au
Environmental Sustainability Framework	www.dse.vic.gov.au
Health Privacy Principles	www.health.vic.gov.au/hsc/
Human Rights Charter	www.justice.vic.gov.au
Information Privacy Act	www.privacy.vic.gov.au
Multimedia Victoria	www.mmv.vic.gov.au/policies
Standards Australia	www.standards.org.au
Tender Documentation	www.tenders.vic.gov.au
Whole of Government Contracts	www.vgpb.vic.gov.au

Glossary

Asset management framework: A Victorian Government initiative to allow the Expenditure Review Committee to exercise greater strategic control over the asset base, with a tighter focus on adapting the asset base to better support output delivery. The framework has a series of linked strategies (service strategy, asset strategy and multi-year strategy) that guide investment planning in departments and agencies.

Appraisal: The process of defining objectives, examining options and weighing up the costs, benefits, risks and uncertainties of those options before a decision is made.

Asset option: An asset option is a means of satisfying service needs by investing in existing assets or creating new assets.

Asset strategy: Sets the direction and communicates up-front the assumptions and decisions about levels of service and who provides them; is the means by which an entity proposes to manage its assets over all phases of their lifecycle to meet service delivery needs most cost-effectively.

Assets: Service potential or future economic benefits controlled by an entity (e.g. a department) as a result of past transactions or other past events. Assets may be physical (e.g. plant, equipment or buildings) or non-physical (e.g. financial investments). Assets may also be current (having a store of service potential which is consumed in one year or less) or non-current (having a store of service potential that is consumed over a period of more than one year).

Base case: The base case is a realistic option that involves the minimum expenditure to sustain existing standards of service delivery or to achieve previously agreed service standards. Therefore, the base case does not always mean 'do nothing'; rather it is the minimum essential expenditure option (e.g. carrying out obligatory works to meet safety and health regulations).

Benefit: The value that the investment will provide to the organisation or its customers. Benefits are normally a positive consequence of responding to the identified driver. Each claimed benefit must be supported by key performance indicators that demonstrate the investment's specific contribution to the identified benefit.

Benefit management plan: A short document that defines the pre-requisites for delivering each expected benefit, how the delivery of each benefit will be measured, and who will be responsible for measuring and realising each benefit.

Benefit reports: Regular reporting of the delivery of benefits, which are tracked and reported consistently with the benefit management plan.

Business case: A document that forms the basis of advice for executive decision-making for an asset investment. It is a documented proposal to meet a clearly established service requirement. It considers alternative solutions, and identifies assumptions, benefits, costs and risks. The development of the business case is based on the logic in the investment logic map.

Capital expenditure: Expenditure involved in creating or upgrading assets.

Change: The things that must be done by the business if the benefits are to be delivered. The changes provide detail of how the strategic intervention defined in the objective will actually happen.

Communication and consultation: Continual or iterative processes that an organisation conducts to provide, share or obtain information and to engage in dialogue with stakeholders regarding the management of risk.

Cost: An expense incurred in the production of outputs.

Cost-benefit analysis: Cost-benefit analysis is a technique that can express in a comparable (monetary) way the net effect of the costs and benefits associated with an investment proposal.

Demand management: A management technique used to identify and control demand for services.

Depreciation: The allocation of the cost of an asset over the years of its useful life.

Disposal: The process in which an asset is disposed of or decommissioned – resulting in removal from an entity's balance sheet.

Dis-benefit: A negative impact that might occur as a direct consequence of implementing a particular solution.

Driver: The reason that action needs to be considered at this time. Drivers are normally couched in negative terms such as 'Climate change is demanding new ways of living in Australia'. A driver should capture the essence of what is broken and the consequences.

Economic cost (or opportunity cost): The value of the most valuable of alternative uses.

Enabling asset: Any physical asset that must be built or purchased for the identified changes to occur. This may be, for example, a hospital, a pipeline or an IT system.

Evaluation: The process of defining objectives, examining options and weighing up the costs and benefits before a decision is made to proceed.

Financial analysis: An investment evaluation technique that is confined to the cash-flow implications of alternative options and is undertaken from the perspective of the individual department or agency or government as a whole.

Foreseen risks (known unknown risks): Foreseen risks are those that are reasonably foreseeable and thus identified through the risk assessment process and included in the estimates. To prepare for these risks we have several strategies available, including contingency plans to be executed should risks materialise. Where there is a cost associated, it makes sense that these contingency plans are funded in advance. The term known unknown refers to circumstances or outcomes that are known to be possible, but it is unknown whether or not they will be realized. The term is used in project planning and decision analysis to explain that any model of the future can only be informed by information that is currently available to the observer and, as such, faces substantial limitations and unknown risk.

Gateway Review Process: A review of a procurement project carried out at critical points of project development by a team of experienced people, independent of the project team. These critical points are known as Gateways or Gates. There are six Gateways during the lifecycle of a project.

Growing Victoria Together: A ten-year Government vision that articulates what is important to Victorians and the priorities that the Victorian Government has set to build a better society.

ICT-dependent: Information and communications technology (ICT)-dependent projects meet any of the following conditions: The ICT component of the project is critical to the overall success of the investment; or \$5 million or more of the total estimated investment (TEI) is assigned to the ICT component; or 50 per cent or more of the TEI is assigned to the ICT component. Examples of ICT components include hardware purchases, software development and IT project management costs (i.e. anything that is covered by the whole-of-Victorian Government ICT classification).

Impact: The cost, benefit or risk (either financial or socio-economic) rising from an investment option.

Impact mitigation: Contingency (funding, time, plans or all three) for proactive treatment of likelihood, or consequence.

Investment: The expenditure of funds intended to result in medium to long-term service, or financial benefits rising from the development or use of infrastructure or assets by

either the public or private sectors. A single investment proposal may contain a number of related investment expenditures addressing the same service need.

Investment concept brief: A two-page document that shows the logic underpinning an investment and identifies the likely costs, risks, dependencies and deliverables of the proposed solution. It summarises the merits of an investment and allows decision-makers to prioritise competing investments before proceeding to the business case.

Investment logic map: A simple single-page depiction of the logic that underpins an investment. It provides the core focus for an investment and is modified to reflect any changes to the investment logic throughout its lifecycle.

Investment Management Standard: A best-practice approach applied over the life of an investment that aims to reduce the risk of investment failure, provide greater value-for-money and drive better outcomes. It has been designed to enable the *investor* to shape and control investments throughout their lifecycle.

Investment reviews: Formal scheduled periodic reviews that aim to confirm that the logic for an investment remains valid.

Investor: The person who has an identified business problem (or opportunity), who will be responsible for making (or advocating) a decision to invest, and who will be responsible for delivering the expected benefits. This person is often referred to as the 'Senior Responsible Owner'.

Lifecycle cost: Lifecycle cost is the total cost of an item or system over its full life. It includes the cost of development, production, ownership (operation, maintenance, support), and disposal, if applicable.

Key performance indicator (KPI): A measure that has been selected to demonstrate that a benefit expected from an investment has been delivered. The KPI must be directly attributable to the investment.

Monitoring: Continual checking, supervising, critically observing or determining the status in order to identify change from the performance level required or expected.

Multi-year strategy: An agreed listing of asset and non-asset initiatives intended to be implemented in the medium term (generally, the next 5-10 years).

New asset option: Acquisition, transfer or commissioning of an existing asset, or creation of a new asset.

Non-asset option: Under this option, service capacity is met without creating additional assets. This could be done through reconfiguration of the way the services are provided (contracting out, increased use of existing or private assets, or reduction of demand through selective targeting).

Objective: The high-level action (or strategic intervention) that is proposed as the response to the identified driver. This intervention must be framed within the context of the organisation's purpose.

Optimism bias: The demonstrated systematic tendency for appraisers to be over-optimistic about key project parameters, including capital costs, operating costs, works duration and benefits delivery.

Options analysis: A process in which a range of options (both asset and non-asset) are evaluated. The most cost-effective options are then selected for more detailed evaluation through a business case.

Outcome(s): In the Government's output/outcome framework, outcomes equate to benefits.

Partnerships Victoria: The Victorian framework for a whole-of-government approach to the provision of public infrastructure and related ancillary services through public-private partnerships. The policy focuses on whole-of-life costing and full consideration of project risks and optimal risk allocation between the public and private sectors. There is a clear approach to value for money assessment and the public interest is protected by a formal public interest test and the retention of "core" public services. *Partnerships Victoria* is

most useful for major and complex capital projects with opportunities for innovation and risk transfer.

Phased estimating: A phased estimating approach recognises that it is impractical to demand a complete estimate at the beginning of a project lifecycle. It breaks down the full project into phases, or stages. The beginning and end of stages, or phases are sometimes known as boundaries or gates. They are important because they often represent important decision points in the project lifecycle. Phased estimating recognises the uncertainty in estimates without detailed requirements or design and breaks the full project down into phases (or stages).

Project alliancing: A form of procurement where the State or another government entity collaborates with one or more service providers to share the risks and responsibilities in delivering the capital phase of a project. It seeks to provide better value for money and improved project outcomes through a more integrated approach between the public and private sectors in the delivery of infrastructure. Project alliancing should generally only be considered in the delivery of complex and high-risk infrastructure projects, where risks are unpredictable and best managed collectively.

Project lifecycle: The stages of an asset lifecycle between the identification of the need and the delivery and handover of an initiative.

Project profiling model: A qualitative assessment tool that helps project proponents understand the risk profile of particular projects.

Project risk management plan: A Project Risk Management Plan (RMP) is a key component of a Project Management Plan (PMP). In simple projects, it may be described as a narrative within the PMP, or in more large, complicated or complex projects it may be a stand alone document describing the projects approach to risk management. The RMP is not a Risk Treatment Plan. The RMP is a higher level document that describes how risk management activities will be executed throughout the life of a project. The RMP links the risk management activities to essential project management functions such as, the overarching project strategy, key milestones in the project strategy, project governance, roles and responsibilities (with respect to risk management) for project participants, stakeholder engagement and management, schedule management, cost management etc. The project RMP should describe to all participants how all risk is going to be managed throughout the project, rather than how individual risks are to be managed. (See Appendix 6 for common elements of a project risk management plan).

Residual risk: Risk remaining after risk treatments, which can contain unidentified risk. Also known as retained risk.

Residual value: The net value applied to the asset at the end of the investment lifecycle or evaluation period; this may result in either a positive or a negative value.

Revenue: Inflows or other enhancements, or savings in outflows, of service potential or future economic benefits in the form of increases in assets or reductions in liabilities of the entity (other than those relating to contributions by owners) that result in an increase in equity during the reporting period.

Risk: Risk is often characterised by reference to potential events, consequences, or a combination of these and how they can affect the achievement of objectives. Risk is often expressed in terms of a combination of the consequences of an event or a change in circumstances, and the associated likelihood of occurrence.

Risk assessment: Overall process of risk identification, analysis and evaluation.

Risk acceptance: This is often where the residual risk is accepted, or the risk of some extremely low likelihood events but high consequence events are accepted. Residual risk acceptance is the acceptance of the risk remaining after deliberate treatment and control.

Risk avoidance: The decision not to be involved in, or to withdraw from, an activity based on the level of risk. Risk avoidance can be based on the result of risk evaluation and/or legal obligations.

Risk financing: A form of risk treatment involving contingent arrangements for the provision of funds to meet the financial consequences should they occur.

Risk identification: The process of finding, recognising and describing risks.

Risk management: Coordinated activities to direct and control an organisation with regard to risk.

Risk management policy: The overall intentions and direction of an organisation related to risk management.

Risk mitigation: The measures taken to reduce an undesired consequence.

Risk owner: The person or entity with the accountability and authority for managing the risk and any associated risk treatments.

Risk prevention: This involves direct action to remove the possibility of the risk impacting on the outcome. This action could include adjustments to scope or other proactive prevention.

Risk retention: Acceptance of the benefit of gain, or burden of loss, from a particular risk.

Risk sharing: A form of risk treatment involving the agreed distribution of risk with other parties.

Risk source: Anything which alone or in combination has the intrinsic potential to give rise to risk.

Risk treatment: The process of developing, selecting and implementing controls.

Risk transfer: Insurance (treatment of last resort)...we are still going to manage our key risks despite the fact they may be insured! Some project risks, but not all, can be transferred to contractors. It is important to understand how effective or complete the transfer is in reality.

Risk versus uncertainty: Uncertainty is the extent of variability in the capacity to achieve the desired outcomes or the outcomes themselves. Risks lead to uncertainty.

Scenario analysis: Scenario analysis is a procedure for providing the decision-maker with some information about the effect of risks and uncertainties on an investment. In a scenario analysis, a set of critical parameters and assumptions that define a particular scenario are identified and varied to reflect a best-case and a worst-case scenario.

Service strategy: The strategy for the supply of appropriate services to the community, which is consistent with the entity's corporate goals. It is based on strategic analysis and review of how services are presently provided.

Social benefit: The estimated direct increase in the welfare of society from an economic action. It is the sum of the benefit to the agent performing the action, plus the benefit accruing to society as a result of the action.

Social cost: The estimated direct total cost to society of an economic activity. It is the sum of the opportunity costs of the resources used by the agent carrying out the activity, plus any additional costs imposed on society from the activity.

Strategic assessment: The phase of the project lifecycle during which a need is translated, where justified, into a proposal where outcomes, purpose, critical success factors and the level of strategic alignment are clearly defined.

Unforeseen risks (unknown unknown risks): No matter how diligently risks are identified, no project can avoid the unforeseen risks. These risks may be attributable to a change in government policy and consequential shifts in project objectives, with a potential impact on scope. Whilst we can reasonably expect changes in government, or policy, we cannot foresee the degree of impact on project scope, budget or schedule. The term unknown unknown refers to circumstances or outcomes that were not conceived of by an observer at a given point in time.

Value management: Value management is a technique that seeks to achieve optimum value for money, using a systematic review process. The essence of value management

is a methodical study of all parts of the product or system to ensure that essential functional requirements are achieved at the lowest total cost. Value management examines the functions required from a product, functions actually performed, and roles of the product's components in achieving the required level of performance. Creative alternatives which will provide the desired functions better or a lower cost can also be explored.

Weighting and scoring: A technique that assigns weights to criteria, and then scores options in terms of how well they perform against those weighted criteria. Weighted scores are summed, and then used to rank options.

Bibliography

Cervone, FH 2006, 'Managing Digital Libraries: The View from 30,000 Feet - Project Risk Management', OCLC Systems & Services: International Digital Library, vol. 22, no. 4, pp 256.

Department of Treasury and Finance 2005, Part One: Partnerships Victoria Risk Allocation Principles, viewed 1 April 2008

<[http://www.partnerships.vic.gov.au/CA25708500035EB6/WebObj/RiskAllocationandContractualIssues2-PartOne/\\$File/Risk%20Allocation%20and%20Contractual%20Issues2%20-%20Part%20One.pdf](http://www.partnerships.vic.gov.au/CA25708500035EB6/WebObj/RiskAllocationandContractualIssues2-PartOne/$File/Risk%20Allocation%20and%20Contractual%20Issues2%20-%20Part%20One.pdf)> pp 16.

Department of Treasury and Finance 2006, Business Case Development Guidelines, viewed 1 April 2008

<[http://www.dtf.vic.gov.au/CA25713E0002EF43/WebObj/GatewayBusinessCaseDevelopmentGuidelines/\\$File/Gateway%20Business%20Case%20Development%20Guidelines.pdf](http://www.dtf.vic.gov.au/CA25713E0002EF43/WebObj/GatewayBusinessCaseDevelopmentGuidelines/$File/Gateway%20Business%20Case%20Development%20Guidelines.pdf)>.

Department of Treasury & Finance 2007, Victorian Government Risk Management Framework, viewed 1 April 2008,

<[http://www.dtf.vic.gov.au/CA25713E0002EF43/WebObj/VicGovtRiskMgmtFramework/\\$File/VicGovt%20Risk%20Mgmt%20Framework.pdf](http://www.dtf.vic.gov.au/CA25713E0002EF43/WebObj/VicGovtRiskMgmtFramework/$File/VicGovt%20Risk%20Mgmt%20Framework.pdf)>.

E. Verzuh, 2005, The Portable MBA: The Fast Forward MBA (2nd Ed) in Project Management. John Wiley & Sons Incorporated, Hoboken, New Jersey, USA.

'Financial Management Act 1994' –

[http://www.dms.dpc.vic.gov.au/Domino/Web_Notes/LDMS/PubLawToday.nsf/2184e627479f8392ca256da50082bf3e/3c6c890003c66d43ca256e7d001d68d0/\\$FILE/94-18a050.pdf](http://www.dms.dpc.vic.gov.au/Domino/Web_Notes/LDMS/PubLawToday.nsf/2184e627479f8392ca256da50082bf3e/3c6c890003c66d43ca256e7d001d68d0/$FILE/94-18a050.pdf)

ISO/TMB WG on Risk management N 066, Date: 01 April 2008, **ISO/IEC CD 2 Guide 73**, ISO/TMB WG on risk management, Risk Management Vocabulary.

'Managed Insurance Authority Act 1996' –

[http://www.dms.dpc.vic.gov.au/Domino/Web_Notes/LDMS/PubLawToday.nsf/2184e627479f8392ca256da50082bf3e/59CD9B3D4DB39A4DCA2573D6008398B2/\\$FILE/96-11a032.pdf](http://www.dms.dpc.vic.gov.au/Domino/Web_Notes/LDMS/PubLawToday.nsf/2184e627479f8392ca256da50082bf3e/59CD9B3D4DB39A4DCA2573D6008398B2/$FILE/96-11a032.pdf)

New South Wales Treasury 2004, Total Asset Management: Risk Management Guideline, viewed 8 April 2008.

<http://www.treasury.nsw.gov.au/__data/assets/pdf_file/0009/5103/risk_management.pdf>

'Partnerships Victoria Risk Allocation Principles' –

[http://www.partnerships.vic.gov.au/CA25708500035EB6/WebObj/RiskAllocationandContractualIssues2-PartOne/\\$File/Risk%20Allocation%20and%20Contractual%20Issues2%20-%20Part%20One.pdf](http://www.partnerships.vic.gov.au/CA25708500035EB6/WebObj/RiskAllocationandContractualIssues2-PartOne/$File/Risk%20Allocation%20and%20Contractual%20Issues2%20-%20Part%20One.pdf)

Standards Australia 2008, Standards Australia, viewed 1 April 2008,

<<http://www.riskmanagement.com.au/>>.

Victorian Auditor General's Office 2004, Managing Risk Across the Public Sector, viewed 1 April 2008,

<http://archive.audit.vic.gov.au/reports_better_practice/Risk_guide_final.pdf> pp 3.

Victorian Managed Insurance Authority (VMIA) 2007, Risk Attestation, viewed April 8 2008.

<<http://www.vmia.vic.gov.au/skillsEDIT/clientuploads/48/WhatDoesitMean.pdf>>

Ward, E 2007, *Advances in Decision Analysis: From Foundations to Applications*, Cambridge University Press.

Zio, E 2007, *Introduction To The Basics Of Reliability And Risk Analysis*, World Scientific, Singapore.

Appendix 1: Common sources of risk

Source of Risk	Example
Political	Parliamentary support, community support, government endorsement, policy change.
Economic	Economic growth, exchange rate variation, inflation.
Socio-Cultural	Community expectations, pressure groups.
Technological	Technological change, technology and obsolescence, communications or network failure.
Legal	Change in legislation.
Commercial & Strategic	Competition, market demand levels, stakeholder perceptions, market share private sector involvement.
Organisational	Industrial relations, resources shortage, management capabilities/structures, operational policies, work practices, personnel skills.
Environmental	Site availability/zoning, approval processes, endangered species, conservation/heritage, degradation/contamination, visual intrusion, force majeure events, natural events/disasters.
Procurement and Contractual	Contract selection, client commitment, consultant/contractor performance, negligence of parties, damages and claims, errors in documentation, insurance and indemnities.
Construction and Maintenance	Contractor capability, design viability, geotechnical conditions, quality controls, equipment availability and breakdowns, OH&S procedures.

PROJECT RISK MANAGEMENT ROLES AND RESPONSIBILITIES

Risks will, and do, change throughout the project lifecycle

STRATEGIC ASSESSMENT	OPTIONS ANALYSIS	BUSINESS CASE	PROJECT TENDERING	SOLUTION IMPLEMENTATION	POST-IMPLEMENTATION REVIEW
 <p>What is the business need and likely solution - is it a strategic fit? What are the time-horizons? What are the Critical Success Factors? (1) Is it high risk? [Yes – Submit – Project Profile Model (PPM)]</p>	<p>Have the user requirements been clarified and stakeholders identified? Which option provides the best solution? Are there any reputational risks?</p>	<p>What are the critical risks to achieving project objectives? Is there a compelling case to invest – delegate approval? (3)</p>	<p>Is the priority plan and procurement/ tendering strategy sound? What is the preferred delivery option? Are governance arrangements effective?</p>	<p>Is the project going to deliver on my objectives? Is the Business Case still valid? Are risks associated with the implementation phase being properly identified and managed? When is completion? What is the reputational risk?</p>	<p>What benefits were delivered – are they being tracked? What were the investment lessons?</p>
 <p>Senior Responsible Owner/Investor (Investment focus)</p>	<p>Have you registered for Gateway Reviews? (2)</p> <p>Have we defined the context (internal/external drivers, or demands) for risk management in the project? (4) What is the high level risk assessment? (5) What contingency should be included?</p>	<p>Have all Gateway recommendations been addressed?</p> <p>Have we undertaken a detailed risk assessment? (9) Have we activated the Risk Management Plan? Are the contingencies adequate and appropriate?</p>	<p>Have all Gateway recommendations been addressed?</p> <p>Do we involve stakeholders in the tender process? Are the supplier's project, risk and management plans adequate and realistic? Have we used the procurement risk assessment plan? (10) How do the bids impact on the contingency?</p>	<p>Have all Gateway recommendations been addressed?</p> <p>What are the delivery risks? Are risks being tracked? Are we managing the use of contingency funds? What are the major milestones I need to be thinking about? What is being done to ensure a smooth handover? If there are any unresolved issues, what are the risks of implementing rather than delaying? What is the residual contingency?</p>	<p>Have all Gateway recommendations been addressed?</p> <p>Have we achieved the outcomes required? Have ongoing risks been effectively transferred or managed? What went well, what can be improved next time, and what risk lessons have been learnt?</p>
 <p>Project Director (Quality assurance focus)</p>	<p>Is the project feasible? What is the market appetite, resource availability, risk profile? (11) What past lessons learnt should we take into account? (12)</p>	<p>What is the top priority for this project (time, cost, quality)? Has the Project Manager and team been identified and recruited?</p>	<p>Do we have enough / too many tender responses? Do we have a Contract Risk Allocation Plan? (13) What resources do I need to deliver this?</p>	<p>Is the project on time and on budget? Are we using the Risk Register? What is the transition plan looking like?</p>	<p>What lessons have been learnt? What caused any deviations such as over or under-runs?</p>
 <p>Project Manager (Delivery focus)</p>	Proactive management of risks including maintenance of risk register				
 <p>Operational Manager (User focus)</p>	<p>What options will have best service delivery and transition outcomes – is this being considered? Do short-listed options meet current needs, with flexibility to meet future needs?</p>	<p>Does the Business Case consider whole of life costs and the transition strategy? Have lessons learnt from past projects been considered?</p>	<p>Have the operational issues and requirements been adequately addressed in the tender? Do bid proposals differ in operational impacts?</p>	<p>Is a Communications Plan developed and being implemented? Are we resourced to manage the current operations in parallel to the new project? What are the major milestones that I need to be aiming for? Are transition plans in place?</p>	<p>The defects aren't being addressed – who do I talk to? Who is now responsible for the project?</p>
<p>What lessons can we learn?</p>					

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Risk management commonly required by project team members at each phase of the project lifecycle

1. A risk assessment by itself is of little value. Evidence that the risk information is being integrated into project strategies is shown through linkages between risk assessment and other key areas of project planning and management.
2. Projects deemed medium or high risk via the Project Profile Model (PPM) should undertake the Gateway Reviews at key decision points: Strategic Assessment, Business Case, Readiness for Market, Tender Decision, Readiness for Services and Benefits Evaluation.
3. Delegate approval represents the acknowledgement, understanding and acceptance of the risk management process (risk management plan, risk assessment) by the delegate. Delegate sign-off would normally be expected for the risk management plan as well as the initial, detailed risk assessment.
4. A statement of context describes the environment in which the project exists. A description may also include other projects/programs that the project interacts or shares dependencies. It should link the project's existence to strategic outcomes, government policy and other relevant objectives.
5. A high level risk assessment makes allowance for the early stages of planning. Detailed information on risks is often not available however it is possible to identify the key categories and potential sources of risk.
6. A start stage risk assessment is undertaken to identify any risks to the successful development of the particular project stage. Risks to strategic fit may include lack of access to adequately skilled resources, poorly defined outcomes and lack of adequate data.
7. At options assessment detailed information on risks is not always available however the risk assessment is part of the ongoing development of the risk database. It is possible to gather information from like projects and begin to consider risks of a like nature
8. The project risk management plan describes the approach to risk management throughout the project.
9. A detailed risk assessment may be undertaken at business case phase that expands on the higher level risk assessments and focuses on one (but sometimes two) of the preferred options.
10. The risk assessment at Project Tendering is a stage/start risk assessment that should consider all issues to do with procurement. The procurement risks are further developed in the detailed risk assessment and again at the project tendering stage.
11. A risk profile can be a narrative or graphical representation of key risk exposures for the project. Inherent project risks are linked to the environment and the desired outcomes that culminates with a statement of the overall risk level for the project. The risk level in many respects will relate to the 'inherent' risk of the project.
12. Capturing 'lessons learned' is an iterative process, commencing at the beginning of the project lifecycle and recurring at every stage in the lifecycle. A lessons learned log can be kept in conjunction with a risk register.
13. The purpose of the contract risk allocation plan is to make explicit the thought process applied to the selection or construction of a particular contract for engagement with a service provider or supplier. The risk allocation must be realistic, taking account of which risks can be realistically borne by each party to the contract.

Appendix 3: Common types of risk

Type of risk and definition	
Context	Examples
Site Risk: the risk that the project land will be unavailable or unable to be used at the required time, in the manner or at the cost anticipated, or that the site will generate unanticipated liabilities, with the result that the contracted service delivery and/or projected revenues are adversely affected.	
Site risk is a significant issue at the inception of the project and during construction, and becomes less important in the operational phase. However, environmental risk may materialise during the operational phase if previously unidentified problems come to light or the project operation itself gives rise to pollution or to land or groundwater contamination	Unanticipated land acquisition costs and delays in acquisition; Planning permission being refused or granted on onerous terms; Delays and costs arising from environmental impact assessments, including the risk of route-diversion of linear infrastructure and the costs of special measures to protect environmental values; contamination risks and liability for clean-up; Liability for contamination of adjacent land; Costs and delays associated with archaeological and cultural heritage discoveries; Costs and delays arising from negotiating indigenous land use agreements (ILUAs) on land which may be subject to native title; The site subsequently proves to be an inefficient/unsuitable location for delivery of the services; and Existing infrastructure on the site proves to be unsuitable for the project proposed for the site, e.g. it may not complement the proposed infrastructure.
Design, construction and commissioning risk is the risk that the design, construction or commissioning of the facility or certain elements of each of these processes, are carried out or not carried out in a way which results in adverse cost and/or service delivery consequences. The consequences if the risk materialises may include delays and/or cost increases in the design, construction and commissioning phases, or design or construction flaws which may render the infrastructure inadequate for effective service delivery, either immediately or over time.	
Design, construction and commissioning risks are the core risks of the development phase and are among the most likely risks to materialise.	The design of the facility is incapable of delivering the services at anticipated cost Events occur during construction which prevent the facility being delivered on time and on cost Either the physical or the operational commissioning tests which are required to be completed for the provision of services to commence, cannot be successfully completed
Sponsor risk is the risk that: where the SPV (Special Purpose Vehicle) and/or its sub-contractors are unable to fulfil their contractual obligations to government, government will be unable to enforce those obligations against the sponsors or recover some form of compensation or remedy from the sponsors for any loss sustained by it as a result of the SPV's breach; or that the sponsor(s) is, for security or other probity reasons, inappropriate or unsuitable to be involved in, or (through the private party) connected with, the delivery of a Partnerships Victoria project, and in so being may harm the project or bring it into disrepute.	
Sponsor and financial risks stem from the complex structure involved in these public private partnership arrangements.	The risk that the private party: Is unable to provide the required services or becomes insolvent Is later found to be an improper person for involvement in the provision of these services or financial demands on the private party or its sponsors exceed its or their financial capacity causing corporate failure Is subject to a change in ownership

Type of risk and definition		
Context	Examples	
Financial risk refers to the following risks: the risk that the financiers (debt and equity) will not provide or continue to provide funding to the project (risk of financial uncertainty); the risk that financial parameters will change prior to the private party fully committing to the project, potentially adversely affecting price (financial parameter risk); and the risk that the financial structure is not sufficiently robust to provide fair returns to debt and equity over the life of the project (and hence calls into question the continuing viability of the project) (risk of robustness of financial structure).		
	Sponsor and financial risks stem from the complex structure involved in these public private partnership arrangements.	Interest rates pre-completion Financing unavailable Further finance Refinancing benefit Tax changes
Operating risk is the risk that the process for delivering the contracted services — or an element of that process (including the inputs used within or as part of that process) — will be affected in a way which prevents the private party from delivering the contracted services according to the agreed specifications and/or within the projected costs.		
	Operating risks typically relate to production and operation, availability and quality of inputs, quality and efficiency of management (including contract management) and operation, maintenance and upgrade requirements.	Operating costs may vary from original budgeted projections due to: higher production costs, higher input costs, reduced input quality, unsuitable design, reduced equipment reliability, higher maintenance costs, occupational health and safety issues, unplanned equipment/plant upgrades, inherent defects, technical obsolescence Performance standards may deteriorate below project specifications or may not be maintained due to: reduced input quality, unsuitable design, reduced equipment reliability, inherent defects, force majeure events
Market risk is the risk that: <i>demand</i> for a service will vary from that initially projected; or <i>price</i> for a service will vary from that initially projected, so that the total revenue derived from the project over the project term varies from initial expectations.		
	Private businesses and government are exposed to various levels of market risk in delivering services. Various events (see next column) may result in the materialisation of market risk each of which may have demand or price consequences, or both.	General economic downturn Change in government policy Competing substitute products or introduction of new competitors Competitive pricing for alternate services Change in target market composition or demographics Technical obsolescence or innovation Shift in industry activity/focus
Industrial relations risk is the risk of any form of industrial action — including strikes, lockouts, work bans, work-to-rules, blockades, picketing, go-slow action and stoppages — occurring in a way which, directly or indirectly, adversely affects commissioning, service delivery or the viability of the project.		
	Industrial relations risk may materialise at both the construction and operational phases of the project, but it is likely to be more pronounced at the construction phase. Where the risk does materialise, it may have a major effect on the economics of a project and may affect both inputs and outputs.	Delay in delivering construction materials and on site stop-work action may cause delay costs, including increased finance and construction costs. Delay through industrial action may also result in loss of revenue to the private party by delaying the start of the payment regime. During the operational phase, industrial action may delay or frustrate service delivery and may cause interface risks to materialise where provision of core services is dependent on the service that is being disrupted.

Type of risk and definition		
Context		Examples
Legislative and government policy risk is the risk that government will exercise its powers and immunities, including but not limited to the power to legislate and determine policy, in a way which negatively impacts on or disadvantages the project.		
	The risk of changes in legislation, changes in government policy and the election of a new government are often viewed by the private party as critical risk factors when contracting with government. The risk of legislative and policy change is complicated further by Australia's character as a federation, where powers are divided between the Commonwealth and the States.	Government or the contracting agency (on behalf of government) will not have the power to enter the contract or its ability to do so will be limited; From the private party's viewpoint, government will be immune from legal action; No remedy being available at law to prevent government from legislating to affect the rights of the private party (often identified as sovereign risk); The relevant Minister(s) will grant or refuse to grant statutory consents in a way which disadvantages the project; Government will use its power to propose or alter legislation and subordinate instruments, or that Parliament will reject, accept or amend such legislation and subordinate instruments, in a way that negatively impacts on or disadvantages the project; Government will adopt or change policy, including policies with respect to the project, in a way which impacts on the project's mode of operation or alters the relationship between the project and competing public infrastructure; Statutory regulators will exercise their powers to disadvantage the project; and Government will require changes in service specifications or will otherwise interfere with the private party's business operation in a way which negatively impacts on or disadvantages the project.
Interface risk is the risk that the method or standard of delivery of the contracted services will prevent or in some way frustrate the delivery of the core services or vice versa.		
	Interface risk arises where a private party and government both provide services from within or in relation to the same infrastructure facility.	Sub-standard ancillary service provision will prejudice government's ability to deliver its core services. Private parties will encounter circumstances which inhibit their ability to deliver the contracted services to specification or at their projected cost.
Network risk is the risk that the network(s) needed for the private party to deliver the contracted services will be removed, not adequately maintained or otherwise changed — including being extended to include additional infrastructure or services not foreseen or anticipated at the date of the contract — in a way that either prevents or frustrates the delivery of the contracted services, affects the quality of the specified outputs or in some other way affects the viability of the project.		
	Network risk arises when the contracted services or method of delivery of those services are linked to, rely on or are otherwise affected by certain infrastructure, inputs and other services or methods of delivering the contracted services.	The network or part of the network which underpins or complements the provision of the contracted services will be removed, not maintained or otherwise changed so as to prevent or frustrate the private party's ability to deliver the contracted services. The existing network will be removed, developed or extended to include new systems or services or changed in some other way which, in each case, creates or increases competition with the contracted services, jeopardising project revenues.
Force majeure risk is the risk that a specified event entirely outside the control of either party will occur and will result in a delay or default by the private party in the performance of its contractual obligations.		
	Force majeure events traditionally fall into two categories. The first refers to events which can be described as an 'act of God' or a 'superior force'. The second refers to events which can be described as 'political'	'Act of God' events are: Storms, lightning, cyclones, earthquakes, natural disasters and actions of the elements; Tidal waves, floods and droughts; Landslides and mudslides; and Nuclear, chemical or biological contamination. 'Political' events are:

Type of risk and definition		
	Context	Examples
		Civil riots, rebellion, revolution, terrorism, civil commotion, insurrections and military and usurped power; Malicious damage; Acts of a public enemy; and War (declared or undeclared).
Asset ownership risk is the risk that events such as loss events, technological change, construction of competing facilities or premature obsolescence will occur, with the result that the economic value of the asset may vary, either during or at the end of the contract term, from the value upon which the financial structure of the project is based.		
	Asset ownership risk falls into two categories; during the contract term and at the end of the term.	Risks during the contract term: Maintenance and refurbishment risks; Risk of obsolescence; Risk of loss arising from force majeure events; and Risk of loss through contractual default. Risk at end of term: Residual value risk.

Appendix 4: Risk management checklist *

Stage	Tasks
Stage 1 Initiation	
	Assemble Risk Management resources Appoint the team leader and ensure a breadth of skills/experience within the team Assign Risk Management responsibilities appropriate to task
Stage 2 Proposal familiarisation	
	Specify objectives and criteria Familiarise the team with the proposal, assemble documentation and define the key objectives Assess the proposal in relation to the Agency's objectives and strategies Determine assessment criteria for proposal
	Define key elements Define key elements (target 20-50 elements, items or activities) to structure risk analysis
Stage 3 Risk analysis	
	Identify risks Prepare a comprehensive schedule of risks for each element Describe each risk and list the main assumptions
	Assess risk likelihoods and consequences Assemble data on risk and their consequences Assess risk likelihoods Assess risk impacts
	Identify significant risks Rank risks to reflect impacts and likelihoods Where applicable, estimate risk factors Discard/accept minor risks Identify moderate risks for management measures Identify major risks for detailed risk action planning
Stage 4 Risk response planning	
	Identify feasible responses For each moderate and major risk, identify the feasible responses Responses may include: <ul style="list-style-type: none"> • Risk prevention • Impact mitigation • Risk transfer and insurance • Risk acceptance Describe each feasible response and list main assumptions
	Select the best response Evaluate the benefits and costs for each response Select the preferred response
	Develop management measures and action schedules Specify Risk Management measures for moderate risks Develop risk action schedules for major risks <ul style="list-style-type: none"> • Actions required (what is to be done?) • Resources (what and who?) • Responsibilities (who?) • Timing (when?)
Stage 5 Reporting	
	For designated proposals, produce the Risk Management Plan

	For other projects, collate and summarise risk action schedules and measures
Stage 6 Risk Management implementation	
	<p>Implement measures and action strategies</p> <p>Monitor the implementation</p> <ul style="list-style-type: none">• Assign responsibilities• Timing <p>Undertake periodic review and performance evaluation</p>

*This is an example checklist only and should be adapted to fit specific project needs.

Appendix 5: Risk management case study

Risk management example of Best Practice – Barwon Water

In mid 2007 a Gateway Review was undertaken on a Barwon Water Project at the Gate 2: Business Case stage. One of the findings expressed by the Gateway Review Team was the comprehensive risk management process that had been undertaken at that point of the project. This example highlights the need for projects to approach risk management with a clear process and to manage risks on an ongoing and routine basis in order for project objectives to be achieved.

The strength in the risk management process for the project was not only in the quality of the documentation but the understanding across the Project Team that risks must be addressed on an ongoing and routine basis throughout the duration project. This was consistent with Barwon Water's risk management framework, which was based on the Australian Risk Management Standard AS/NZS 4360.

The attention to detail contained within the documentation including the risk register and risk management framework was deemed very high quality. The risk register represented an example of very good practice as it was used as a day to day project management document rather than a stand alone document; completed for the sake of general project document requirements.

An effective methodology for monitoring and managing risks was adopted, including risk review meetings that focussed on reviewing the risk profile of the project in line with changing circumstances. This included the development of a risk mitigation strategy that allocated risks to the group best able to manage them. The Review Team believed that this approach placed the project in a good position to proactively manage risks through current and future phases of the project.

Example documentation including a risk management framework, scoring matrix and risk register similar to those used by the Barwon Project has been included in this document. These examples provide a good starting point when projects are preparing to develop their own risk management documentation.

Appendix 6: Common elements of a project risk management plan

Project profile/context

- Project strategy
- Risk profile
 - overall project risk rating
 - organisations appetite and tolerance for risk
- Risk management policy
- Risk management objectives

Project governance and risk management

- Risk management responsibilities
- Communication and consultation
- Stakeholder engagement/management
- Relevance to other project management functions
- Escalation processes

Risk management methodology for the project

- Risk identification
- Analysis
 - qualitative methods?
 - quantitative methods?
- Evaluation
 - likelihood, consequence, risk level matrices
 - risk ratings
 - control effectiveness assessments
- Treatments
 - treatment options
 - process – cost benefit
 - treatment selection
 - treatment plan templates
 - treatment monitoring
- Risk monitoring

Issues management

Preliminary risk assessment and major/strategic risk categories

Strategic risk register (limited detail)

Templates

- risk register/log