Risk Management Procedure

2017

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Contents

Amendment and Review

The content of this procedure must be reviewed on an annual basis or after a major change within NQBP. NQBP's Manager Risk and Assurance is responsible for coordinating any review and sign off of this procedure.
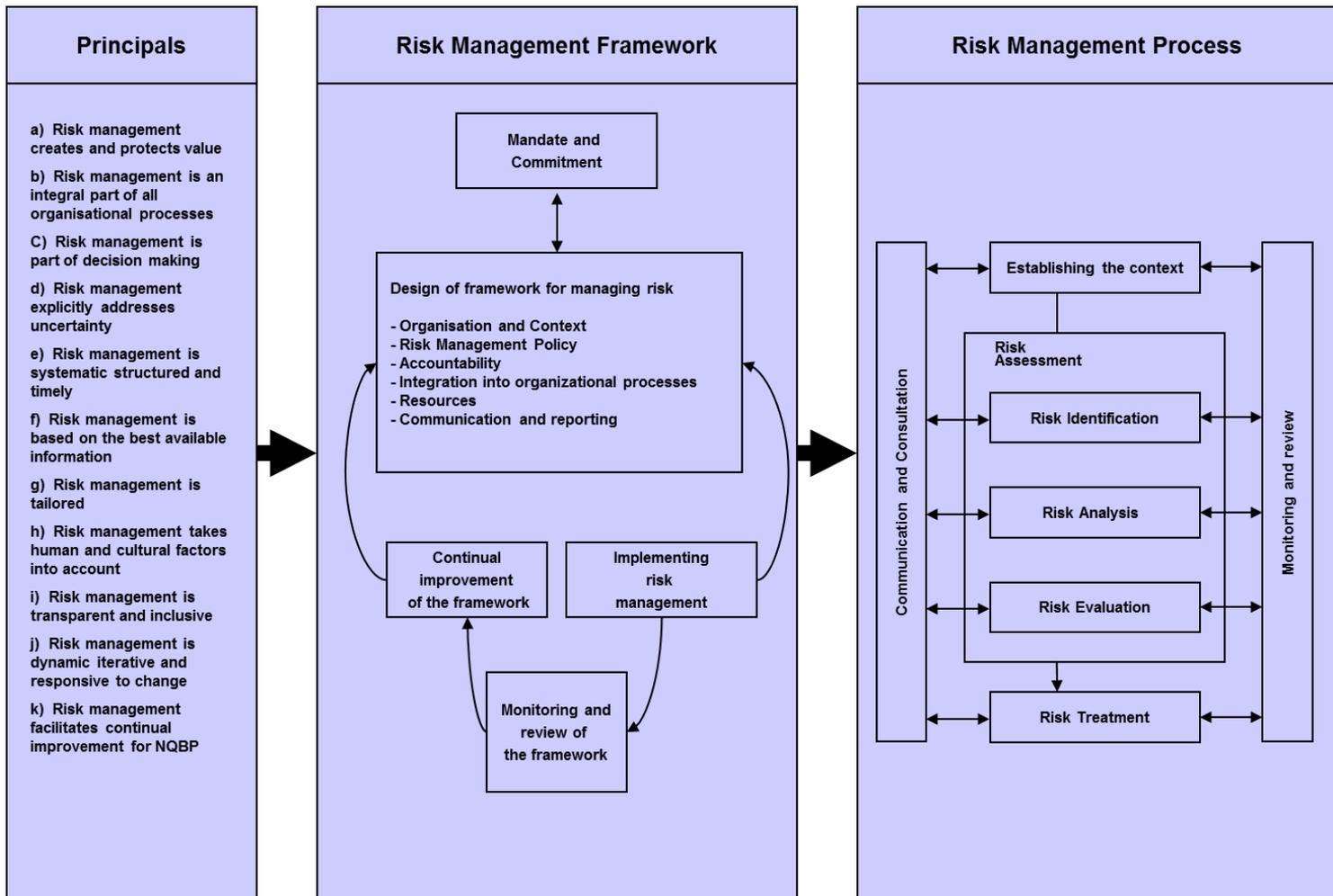
Document Control / Amendments

Revision No	Date	Amendment Description	Author	Reviewed	Approved By
Draft	06.01.2012	Procedure redraft (Draft v3)	Brett Spink	Brett Spink	
1.0	22.03.2012	Revision following CGAP meeting	Brett Spink	Brett Spink	Bernie Wilson
2.0	13.08.2013	Revision to include projects	Brett Spink	Brett Spink	Bernie Wilson
3.0	23.12.2014	Revision Update	Susan Moss	Brett Spink	Bernie Wilson
4.0	15.12.2016	Review	Brett Spink	Brett Spink	Bernie Wilson

Introduction

The purpose of this Risk Management procedure is to provide a framework for the systematic and structured management of risk within NQBP.

NQBP's risk principles and organisational arrangements for designing, implementing, monitoring, reviewing and continually improving the management of risk reflects the "Risk Management - Principles and Guidelines" as adapted from AS/NZS ISO 31000:2009. These are as follows:

Principals	Risk Management Framework	Risk Management Process
a) Risk management creates and protects value b) Risk management is an integral part of all organisational processes C) Risk management is part of decision making d) Risk management explicitly addresses uncertainty e) Risk management is systematic structured and timely f) Risk management is based on the best available information g) Risk management is tailored h) Risk management takes human and cultural factors into account i) Risk management is transparent and inclusive j) Risk management is dynamic iterative and responsive to change k) Risk management facilitates continual improvement for NQBP	**Mandate and Commitment** **Design of framework for managing risk** - Organisation and Context - Risk Management Policy - Accountability - Integration into organizational processes - Resources - Communication and reporting **Continual improvement of the framework** **Implementing risk management** **Monitoring and review of the framework**	Communication and Consultation Establishing the context Risk Assessment Risk Identification Risk Analysis Risk Evaluation Risk Treatment Monitoring and review

Introduction - Risk Management Principles and Guidelines for NQBP

The North Queensland Bulk Ports Corporation's (NQBP) Risk Management Policy is supported by this NQBP Risk Management Procedure. Other policies and procedures related to risk management support the overall management of risk within individual areas / departments.

The Risk Management Policy and Procedure together make up the Risk Management Framework and are applicable to all parts of the organisation and to all employees, contractors, business partners and volunteers working for NQBP or any affiliated entity, program or initiative.

The justification for the adoption of each of the overarching principles underlying the design, implementation and continuance of NQBP's risk management procedure are detailed as follows:

Ref	Principle	Justification for adoption
1	Risk management creates and protects value	Adoption of this principle will assist in improving the overall performance of NQBP and reduce uncertainty and variation in achieving corporate objectives
2	Risk management is an integral part of all organisational processes	Adoption of this principle will ensure the practice of risk management is integrated with all processes including strategic planning and projects
3	Risk management is part of decision making	Adoption of this principle will ensure informed choices are made
4	Risk management explicitly addresses uncertainty	Adoption of this principle will ensure, where possible, risks are reduced, uncertainty and variation are better managed
5	Risk management is systematic, structured and timely	Adoption of this principle will ensure NQBP's risks are efficiently and consistently managed as part of good management, not as part of a separate process
6	Risk management is based on the best available information	Adoption of this principle will ensure risks are managed on the best, most up to date and reliable information
7	Risk management is tailored	Adoption of this principle will ensure practices are aligned with the organisation's external and internal context, risk profile and way of doing things
8	Risk management takes human and cultural factors into account	Adoption of this principle will ensure recognition of the capabilities, perceptions and intentions of external and internal resources that can impact achievement of the organisation's objectives
9	Risk management is transparent and inclusive	Adoption of this principle will ensure that appropriate stakeholders at all levels within NQBP are involved in a timely manner to validate that risk management remains relevant and up to date
10	Risk management is dynamic iterative and responsive to change	Adoption of this principle will ensure risk management continually senses and responds to change
11	Risk management facilitates continual improvement for NQBP	Adoption of this principle will ensure strategies are in place to mature NQBP's risk management practices over time

Risk Management within NQBP

Mandate and commitment

Risk management is an integral part of good business and project management.

NQBP is committed to risk management and embedding this as part of our operating culture.

The focus of risk management within NQBP is to ensure effective integration over time into operational and project processes so that risk management not only protects value, but creates value.

This is achieved through the integration of risk management into the organisation's philosophy, practices, training programs, business operations and project plans.

To demonstrate the Board, Sub-committees and Senior Management's commitment to the management of risk within NQBP, we make the following commitments:

Mandate and commitment		
Ref	Activity	Reference within the Risk Management procedure
1	Implementation of a Risk Management policy	Section 2
2	Alignment of risk management to NQBP's culture	Sections 2, 3, 4 & 6
3	Alignment of risk management performance indicators as defined within this conceptual framework to performance indicators of NQBP	Sections 3, 4 & 6
4	Alignment of risk management objectives as defined within this procedure with the objectives and strategies of NQBP	Section 1
5	Ensuring the procedure addresses legal and regulatory compliance matters	Sections 1 & 5
6	Ensuring accountabilities and responsibilities for risk management as defined within this procedure are appropriate	Section 3
7	Ensuring the resources defined within this procedure allocated to manage risks are adequate	Section 3
8	Ensuring timing and means of communication for risk management as defined within this procedure are appropriate	Sections 3, 4 & 5
9	Ensuring reviews scheduled for managing risks on an ongoing basis as defined within this procedure are appropriate	Sections 4, 5 & 6

1. ORGANISATION AND CONTEXT

Organisational Context

To understand the organisational context of NQBP, a brief profile of the company is detailed below:

The origin of NQBP

North Queensland Bulk Ports Corporation Limited (NQBP) became a port authority on 1 July 2009, under the Transport Infrastructure Act 1994, for the seaport facilities at Hay Point, Mackay, Abbot Point, Weipa and Maryborough.

NQBP will provide safe, sustainable and competitive sea port services.

NQBP will manage its ports in accordance with its values to deliver excellent, commercial and sustainable outcomes for customers, employees, communities and shareholders.

NQBP's aim is to be the recognised as a global leader in bulk ports.

NQBP Company Overview

NQBP is a company under the Corporations Act and the Government Owned Corporations Act 1993 (GOC Act) and a port authority under the Transport Infrastructure Act 1994.

Under the GOC Act, NQBP's activities are governed by:

➢ a Statement of Corporate Intent, which is an agreement between the organisation's Board and its shareholding Ministers;

➢ a five year Corporate Plan.

As a GOC, NQBP operates according to commercial principles, raises its own revenue and make the dividend and tax equivalent payments to the Queensland Government.

What NQBP does

The sea port facilities we manage are vital to the export and import performance of Queensland and Australia. As a port authority, NQBP is responsible for:

➢ strategic port planning

➢ port business development

➢ port infrastructure development

➢ environmental management and marine pollution (within port limits)

➢ port security and safety

➢ port efficiency

➢ maintaining navigable port depths for shipping

➢ issuing licences, leases and permits to other organisations for use of port land, infrastructure, and facilities (NQBP has a multi-user access policy in place at its ports to facilitate highest possible utilisation of port infrastructure, and greatest possible operational efficiency)

➢ Marine pilotage.

Risk Management Context

NQBP takes a proactive approach to managing the risks in its business.

The scope of this procedure is to identify, assess and manage risks that threaten the strategic objectives of NQBP and identify opportunities to increase certainty in NQBP meeting its objectives. This Risk Management procedure also provides the framework for managing risk in NQBP projects.

Risks include financial risks such as fraud, foreign exchange and contract control; project governance risks; safety risks for employees and members of the public; security risks for port facilities and users; risks of environmental releases, land contamination or nuisance impacts; information technology risks, reputational risks, strategic risk issues and risks of breaches of legislation or licences.

Risks are to be managed through a detailed process of identification and quantification of the risks, followed by determination of appropriate and cost-effective risk controls. Control measures are then implemented to mitigate the risk to acceptable levels. Identified risks are ranked to ensure appropriate attention to the higher risks of the business.

Individual risks and controls will be documented in a Risk Register. Each risk will be assigned a Risk Owner for monitoring and review.

Project risk management

Most projects by their nature are "risky". They are taking advantage of a new opportunity to deliver improved financial return to the investors (eg, New infrastructure, Expansion to an existing operation, efficiency improvements).

The challenge is to establish an appropriate risk management methodology for any project that identifies a risk early in the project development process or prior to key decision making times. Project stages where risk management will be considered will include (but may not be limited to):

- ➢ Conceptual
- ➢ Feasibility
- ➢ Basic Engineering
- ➢ Detailed Engineering
- ➢ Construction
- ➢ Commissioning
- ➢ Handover
- ➢ Operations

Whilst this procedure provides a framework for the management of risk in projects, the actual risk management methodology for each project (and project stage) will be determined based on the specifics of the project (eg, project value, timelines, complexity, regulation, etc).

Project risk activities will be determined by the Project Director in conjunction with the Manager Risk & Assurance in line with the **NQBP Project Management Framework** methodology.

Refer to **Appendix D** for a list of potential risk management activities for consideration within a project.

2. RISK MANAGEMENT POLICY

NQBP has in place a Risk Management Policy that provides the strategic framework for risk management. As part of a regular review process, the policy will be reviewed annually and re-endorsed by the Board.

In order to meet strategic objectives, the Risk Management Framework is designed to apply systematic and consistent risk management methodologies across NQBP in order to identify critical risk exposures as well as to focus on improving capabilities for predicting and managing uncertainties.

The Risk Management Policy seeks to maximise positive benefits and to minimise any potential negative impact on the achievement of NQBP's objectives.

The policy also seeks to engender an effective risk management culture, which is consistent with NQBP's values, by engaging and encouraging managers across NQBP to foster the development of this culture.

3. ACCOUNTABILITY

The framework for managing risk is built upon the premise of enhancing the certainty in the achievement of the organisation's objectives (including projects). A key element of the framework is the governance structure and the flow of risk information.

The Board is ultimately accountable for managing risk within NQBP. However, NQBP's key philosophy underlying the management of risk management incorporates the following:

➢ Risk is everyone's responsibility.

➢ The individual, business unit or project team most affected and/or has the greatest influence over a specific risk should have the greatest responsibility for its management.

➢ Risk management should not be seen as a separate activity or duty but an intrinsic part of normal business and for each and every project.

The following provides an overview of the risk management framework within NQBP:

ELEMENTS	TOOLS		ACCOUNTABLE	RESPONSIBLE	CONSULTED
RISK MANAGEMENT POLICY	• RM Policy • Board Reports • Management Information Reporting	STRATEGIC CONTROL	Board	CEO	CGAP ExCo
CORPORATE RISK MANAGEMENT MANUAL	• KPI Performance / Project Performance • Periodic Risk Audits • Project Risk Management Plan	MANAGEMENT CONTROL	CFO	Manager Risk & Assurance	ExCo Individual Managers
RISK REVIEWS RISK ACTION PLANNING	• Corporate Risks Registers • Project Risk Registers • Management information reports • Project Management information reports • Risk performance reports • Risk Action Plans	STRUCTURAL CONTROL	ExCo Manager Risk & Assurance	Individual Managers Project Directors	ExCo Individual Managers All Employees
RISK MONITORING / CONTROL / REPORTING All Employees	• Risk Registers • Project Risk Registers • Risk Action plans • Periodic Review • Management information	OPERATIONAL CONTROL	All Employees Project Teams	All Employees	ExCo Individual Managers All Employees

(Manager, Risk & Assurance spans all levels vertically between Accountable and Responsible columns.)

Table 3.1 - Risk management framework within NQBP

The Board is ultimately accountable for the oversight role and the mandate, ensuring that the CEO has in place appropriate tools, policies, procedures and guidelines for the effective management of risk and for supporting programs to embed a risk culture within NQBP. The Board is accountable for ensuring appropriate resources, management structures, reporting arrangements and committees are established to manage risk.

The **CGAP** as a sub-Committee of the Board provides a second level of oversight by advising the Board on the status of Risk Management within NQBP and providing insight on risk to the business.

The **CEO and CFO** are responsible for leading and championing the risk management framework, processes and culture within NQBP.

The **ExCo** is responsible for the embedment of a risk culture; ensuring compliance with policies, procedures and arrangements supporting risk management (including projects); the overall management and reporting on risk.

The **Project Directors/Managers** are responsible for the management of risk within their respective project reflecting NQBP's expectations for managing project risk, as determined in consultation with the Manager Risk & Assurance and the **Project Management Framework** methodology.

All **NQBP employees** and **Project Teams** are responsible for:

➢ complying with policies and arrangements established for the management of risk

➢ leading or assisting in the undertaking of risk reviews / assessments within their respective departments and/or projects

➢ leading or assisting in developing Risk Action Plans and mitigation strategies for dealing with risk

➢ leading or assisting in the support and communication of good practices and arrangements for the management of risk within NQBP.

Risks will be owned by individuals ("**Risk Owners**") who will be responsible for monitoring the status of any risk including reviewing the control effectiveness, coordinating risk action planning and delivery and reporting on any change in the risk.

The **Manager Risk & Assurance** has the principle role in the execution and delivery of NQBP's risk management framework. This includes leading and coordinating Risk Assessments, Risk Reporting, Risk Action Planning and Risk Review and Communication within NQBP. This will include working with Project Directors to establish the risk management framework and associated activities for each and every project in line with the **Project Management Framework** methodology. This may include responsibility for engaging risk specialists to assist project directors and project teams achieve project risk management objectives.

The following chart summarises the risk management reporting and communication structure within NQBP:
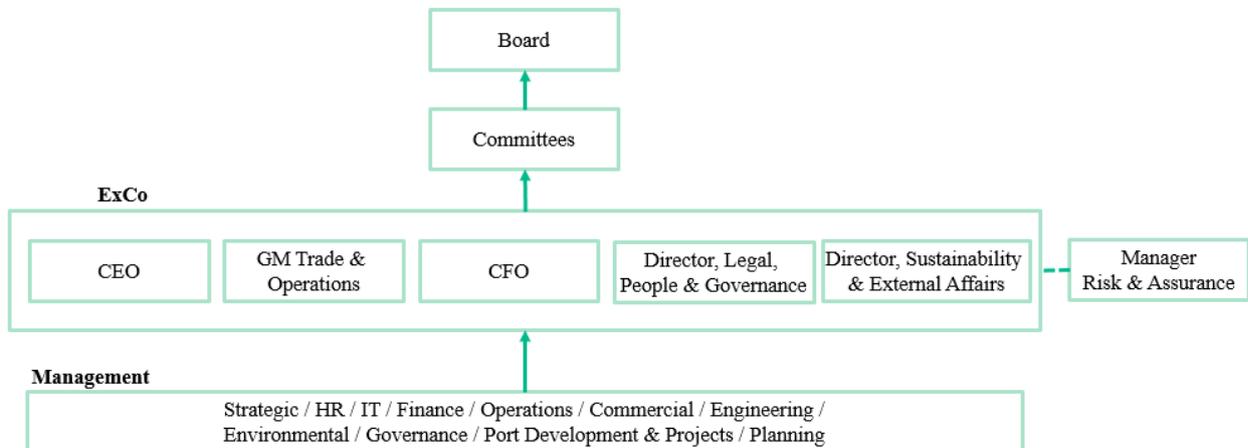
Table 3.2 – Risk Management Reporting and communication structure within NQBP

The following table sets out the Risk Management accountabilities within NQBP:

Table 3.3 - Risk management accountabilities within NQBP		
Function	**Accountabilities and Responsibilities**	**Key Activity / Area of focus**
Board	**Overview** The Board's role, on behalf of its shareholders who have entrusted the organisation and its assets in their hands, is to: ▪ Ensure appropriate governance arrangements, direction and actions taken to manage risk are reasonable and integrated into the overall management and governance of the business. ▪ The quality of the overall risk management framework including internal processes, management information and reporting; and ▪ Oversight to ensure compliance with the legislative and regulatory framework including relevant guidelines issued for GOCs. **Responsibility** Duties and responsibilities in this area include: ▪ Mandate and commitment of an organisation wide risk management framework and related risk management policy. ▪ Review annual reports on the adequacy of the organisation's risk management practices (including the organisation's project risk management practices) ▪ Question whether appropriate actions are being taken to manage risks at NQBP, levels of risk are being maintained within acceptable parameters; and all reasonable opportunities are being realised.	**Activity** ▪ Review of risk management reports (exception based reporting) presented by the Manager Risk & Assurance on a monthly basis **External Reporting** ▪ Reviewing and endorsing statements and information on risks and risk management within public and Annual reports describing the Corporations performance and activities **Area of focus** ▪ Risks rated as "Extreme" or "High" ▪ Risks of lower severity / New risks and Issues / Incidents as determined by the Board ▪ Overall effectiveness of the risk management practices and governance arrangements
Corporate Governance and Planning Committee (CGAP)	**Overview** ▪ The committee's charter details its role in relation to the Board's responsibilities in risk management. Specific detail is documented in the committee's terms of reference and in their reporting responsibilities to the Board. ▪ Part of CGAP's role is to provide independent (from management) advice to assist the Board to discharge its risk management responsibilities. **Responsibility** Duties and responsibilities in this area include: ▪ Review of appropriate reports highlighting risks to which NQBP is exposed along with information on how the risk profile has changed overtime. ▪ Review of reports on actions taken to address identified risks ▪ Provision of advice and recommendations to the Board on the status of NQBP's risk management framework, processes and culture.	**Activity** ▪ Review of risk management analytical reports presented by the Manager Risk & Assurance on a quarterly basis (ie, risk profile, changes in risk profile, numbers of risk etc) **Area of focus** ▪ Risks rated as "Extreme" or "High" ▪ Risks of lower severity / New risks and Issues / Incidents as determined by the Board/CGAP ▪ Advice to the Board on overall effectiveness of the risk management practices and governance arrangements

Table 3.3 - Risk management accountabilities within NQBP		
Function	**Accountabilities and Responsibilities**	**Key Activity / Area of focus**
EXCO **CEO/CFO included**	**Overview** ▪ To provide leadership, oversight and champion the development and implementation of risk management within their business units / projects **Responsibility** Duties and responsibilities in this area include: ▪ To be the Risk Champion in their individual Business Units / Projects ▪ To ensure communication of risk occurs within NQBP and within their business unit / projects ▪ Attendance at risk reviews / assessments ▪ Review and sign off of risk assessments / reports ▪ To ensure Risk Action Plans are developed as required ▪ Ensuring risk action plans are actioned / followed up and design updated to reflect actions ▪ Providing details on identified actions to Manager Risk & Assurance for ongoing monitoring	**Activity** ▪ Review of risk management reports (exception based reporting) presented by the Manager Risk & Assurance on a monthly basis ▪ Review of risk management analytical reports presented by the Manager Risk & Assurance on a quarterly basis (ie, risk profile, changes in risk profile, numbers of risk etc) ▪ Champion risk reviews for respective business unit / projects ▪ Maintain a status of risk action planning within respective business unit / projects **Area of focus** ▪ Risks rated as "Extreme", "High", "Significant" or "Moderate" ▪ Risks of lower severity / New risks and Issues / Incidents as determined by the Board/EXCO
Individual Managers **Project Director/s**	**Overview** ▪ Functional / project risk ownership ▪ Risk action delivery **Responsibility** ▪ Risk ownership ▪ Risk monitoring ▪ Risk report (eg, risk issues, control effectiveness etc) ▪ Tracking of risk action plans ▪ Recalibration of functions risk assessments into the corporate risk profile	**Activity** ▪ Coordinate and attend risk reviews ▪ Assist with risk action planning ▪ Review and report on control effectiveness ▪ Liaise with team to understand status of risk action planning ▪ Create Project Risk Management Plan in line with the **Project Management Framework**. **Area of focus** ▪ All risks in their business area / projects
Manager Risk & Assurance	**Overview** ▪ Owner and co-ordinator of the risk management framework ▪ To steer the continuous improvement of risk management within NQBP ▪ Implementation and day to day management of the NQBP risk management framework ▪ Determination of risk management expectations / framework for each and every project in conjunction with project manager/s ▪ Ensure appropriate governance arrangements, direction and actions taken to manage risk are reasonable and integrated into the overall management and governance of the business. **Responsibility** Duties and responsibilities include:	**Activity** ▪ Develop an annual schedule of risk reviews for each business unit ▪ Set risk management expectations / framework for each and every project (ie, Endorse Project Risk Management Plan) ▪ Facilitating risk reviews within each business unit / project ▪ Facilitating ad hoc risk reviews in support of business processes / functions / projects ▪ Coordinating the follow up of risk action planning

Table 3.3 - Risk management accountabilities within NQBP		
Function	**Accountabilities and Responsibilities**	**Key Activity / Area of focus**
	• Custodian of the NQBP Risk Management Framework, procedure and supporting tools • Demonstrate leadership in the analysis and investigation of risks • Working with the EXCO to support the culture and awareness of risk across NQBP • Working with Project Director/s to establish risk management expectations for projects • Communication and periodic reporting of risks to respective stakeholders • Ensuring the follow up of risk actions from risk assessment • Providing a summary of the risk assessment, risk issues and any associated actions as part of management reporting requirements	from risk assessments • Management of risk management platform (RISKWARE) • Periodic reporting as required **Area of focus** • All risks in the business / projects • Risk Assessments – status and forward planning • Risk Action Planning – status • Risk capability within the business including training needs analysis
All Employees **Individual project teams**	**Overview** • All employees have a responsibility to identify and report risks to their respective managers / project directors **Responsibility** Duties and responsibilities include: • Participate in risk reviews / assessments where directed • Undertake risk action planning where directed / tracking risk action plans • Take ownership of risk where directed • Ensure reporting of risk is undertaken (ie, status of control effectiveness, change in risk profile, new risks, incidents etc)	**Activity** • Attend risk reviews • Act as Risk Owners, report on controls, their effectiveness, change s to the risk profile, status of risk action planning **Area of focus** • All risks

Other stakeholders not listed in the table above may also be required to perform activities in the execution of risk management within NQBP. These stakeholders will be identified at the relevant and appropriate time and their specific responsibilities (eg, in respect of risk workshop attendance) defined and communicated by the Manager - Risk & Assurance.

4. COMMUNICATION AND REPORTING

RISK REVIEW SCHEDULE

Corporate

An annual Risk Review Schedule (ie, for the Risk Registers) will be developed by the Manager Risk & Assurance.

The Manager Risk & Assurance will be the owner of the Risk Review schedule and is responsible for maintaining, reviewing, updating and communicating the schedule on a periodic basis to stakeholders.

The Risk Review Schedule is a dynamic planning document in that it is to be updated on a periodic basis and provided as part of monthly reporting (refer Appendix C for example).

The Risk Review Schedule will be supplemented by a 3-month look-ahead schedule.

Project Specific

The Risk Management requirements for a project with be determined by the Manager Risk & Assurance in conjunction with the respective Project Director/s and in line with the **Project Management Framework** methodology.

A project Risk Management Plan will be developed setting out the risk management expectations for the duration of the project (ie, project stage / risk management activity etc)

A Project Risk Review Schedule will be developed by each respective Project Director in conjunction with the Manager Risk & Assurance.

The Project Director will be the owner of the Risk Review schedule and is responsible for maintaining, reviewing, updating and communicating the schedule on a periodic basis to stakeholders. Any changes to the original schedule should be endorsed by the Manager Risk & Assurance.

The Project Risk Review Schedule is a dynamic planning document for project risk management in that it is to be updated on a periodic basis and provided as part of monthly project reporting (refer Appendix C for example)

RISK WORKSHOP REQUIREMENTS

Effective risk workshop planning includes the specification of a number of requirements including: workshop facilitation, workshop location and workshop attendees.

Organisation and resource requirements for each type of risk assessment workshop will be determined by the Manager Risk & Assurance in conjunction with the specific Manager / Project Director.

RISK REVIEWS / ASSESSMENTS

General

It is a requirement that all risk workshops are facilitated by a person with an adequate level of knowledge and experience with NQBP's risk assessment methodology and its application.

All risk reviews / assessments are to be completed using the risk assessment methodology as set out in this procedure, or as determined appropriate in liaison with the Manager Risk & Assurance.

Each stage of the risk management process must be documented to show evidence of decisions made during the process.

Risk reviews / assessments will be executed and documented in the correct format required by this procedure.

The output from all risk workshops will be captured and maintained in respective NQBP Risk Register templates as determined by the Manager Risk & Assurance

The Risk Registers will be incorporated either into RISKWARE (ie, Corporate / business unit risk reviews) or NQBP's document management system (ie, task / function / project based risk reviews)

Project Specific

Where appropriate, project risks are to be identified and assessed using the NQBP project risk management process as defined within this procedure. (nb, risk assessment criteria should be calibrated for the specifics of the project – project value, timelines etc).

The project risk assessment process should be undertaken in structured workshop sessions and documented in the respective risk register, as determined by the Manager Risk & Assurance in liaison with the Project Director

This process of risk reviews will occur through all stages of a project. The risk information captured at each stage will be recorded and made available to the next stage for review and update within the respective project risk register.

A Project Risk Register is to be maintained by the Project Director within Riskware through the life cycle of each project.

Alternative risk management tools / methods (eg, Fatal Flaw, HAZOP, etc) may be required for specific activities throughout a project. The appropriate tool / method will be determined by the Manager Risk & Assurance in liaison with the Project Director (Refer Appendices D & G).

RISK COMMUNCIATION & MONITORING

Risk communication in NQBP is an interactive process of exchange of information and opinion between the Board, Committees, Managers, Project teams, Risk Owners and the Manager Risk & Assurance.

Risk Registers are to be monitored and reviewed regularly to ensure that all risks are identified and managed and that treatment is effective and appropriate for the current business / project circumstances.

Individual business areas / project teams are accountable for maintaining (ie, monitoring, reviewing, updating) their respective risk profiles, including monitoring risk action planning.

As part of the monitoring and review process, the Manager Risk & Assurance in conjunction with respective manager / project director will:

- Check on the status of the individual risk profiles at a business unit level / project (when was it last reviewed)

- Identify any risks which need to be escalated (eg, risks which have been identified as high or extreme at the business / project level)

- Review the status of risk action planning via the Risk Owner

- Notification to the business / project of any specific changed requirements for risk management

- Reviewing the overall risk profile to identify any areas where there may be synergies, duplication or gaps in the risk profile as well as any likely trends and trouble spots.

- Consider any opportunities for cost reduction through rationalisation of mitigation actions and controls.

The following table provides a summary of the risk monitoring / reporting that will occur within NQBP. The type and frequency of risk reporting will be determined by the Manager Risk & Assurance in conjunction with the relevant stakeholder.

Table 4.1 - Risk management risk monitoring / reporting within NQBP			
Level within NQBP	**Risk severity and / or characteristics**	**Variations to rule**	**Reporting timeframe**
Board	Top 10 Risks	Risks of lower severity / New risks and Issues / Incidents as determined by the Board	▪ Monthly Board Reporting (targeted high level exception based report)
Sub Committees	Risks rated "Significant", "High" or "Extreme" relevant to the Sub-Committee	Risks of lower severity / New risks and Issues / Incidents as determined by Board	▪ Post Risk Reviews ▪ Quarterly analytics reports
ExCo	Risks rated "Moderate", "Significant", "High " or "Extreme"	Risks of lower severity / New risks and Issues / Incidents as determined by the EXCO / Project Director	▪ Post Risk Reviews ▪ Monthly Reporting ▪ Trend analysis

5. RISK MANAGEMENT PROCESS

The proposed process for managing risks within NQBP is consistent with the Australian / New Zealand Standard for Risk Management AS/NZS ISO 31000:2009.

The risk management process is essentially just a good management process of systematically identifying, assessing and treating or managing risks so that NQBP has better control over their risks and are empowered to make sound management decisions.

This is a structured process that must be undertaken in conjunction with key stakeholders. Appropriate communication and consultation is essential.

The risk management process involves the following seven steps:

> ➤ Establishing the context
> ➤ Risk Identification ⎤
> ➤ Risk Analysis ⎬ Risk Assessment
> ➤ Risk Evaluation ⎦
> ➤ Risk treatment
> ➤ Monitoring and reviewing, and
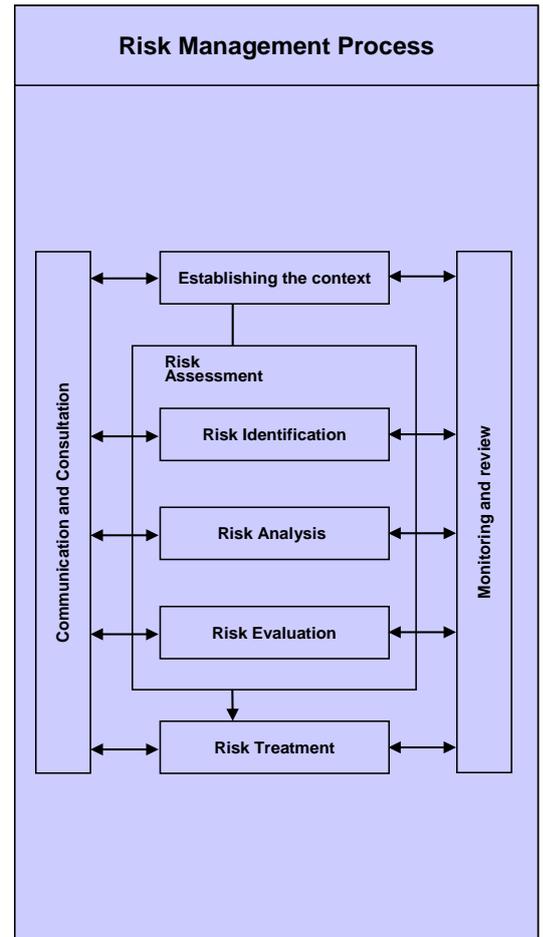> ➤ Communication and Consultation.

CHART 5.1 –RISK MANAGEMENT PROCESS

The following provides a breakdown of the activities required in each step:

STEP 1 – Establishing the context

The context in which NQBP assesses risk should be established and documented prior to commencing a risk assessment. Establishing the context requires an examination of the external and internal environment in which the risk identification, analysis and treatment options will be considered.

NQBP is committed to ensuring that all risks are managed appropriately to increase the likelihood of achieving our stated vision, purpose and strategic objectives by providing the basis for integration of effective risk management within strategic and operational planning and decision making at all levels and across all activities (eg, projects).

STEP 2 – Risk Identification

The next step is to carry out a risk identification review and document the risks to be managed.

A risk is the chance of something happening that will have an impact upon objectives. It is the exposure to the possibility of economic / project value loss (or gain), any kind of damage, injury or damage, business interruption, project delay, environmental; impact, and/or reputation damage resulting from a course of action.

Identify where, when, why and how events could prevent, degrade, delay or enhance the achievement of NQBP's strategic objectives. Ask the pessimistic question – "What could go wrong?"

Refer to **Appendix E** for examples of methods for risk identification.

A Risk Owner (the person accountable for managing the risk) should be identified for each risk.

STEP 3 – Risk Analysis

Risk analysis is about developing an understanding of the level of risk.

Identify & evaluate existing controls
Once risks have been identified and described, it will be necessary to document the controls currently in place to mitigate the identified risk.

In order to highlight any risks with poor risk controls, an assessment regarding the effectiveness of existing controls can be made using the following criteria which are based on good risk management practice. The Control Effectiveness shall be given a rating based on the following criteria:

Control Effectiveness Rating	Definition
Fully effective	Significant attention to the risk. Have undertaken all feasible economic controls. Are maintaining an ongoing monitoring system.
Substantially effective	Controls in place provide a reasonable certainty of control, although will not allow management of all potential risk events.
Partially effective	Controls in place are insufficient to prevent or mitigate this risk.
Ineffective	Outside the control of the organisation in respect of likelihood, although there is the ability to manage the consequences.

This assessment will generate discussion regarding additional controls for consideration.

Measurement of Risks

Once the effectiveness of the existing controls has been assessed, the risks are then analysed in terms of the possible Consequence (ie, impact) of the risk event, and the Likelihood (ie, how likely the risk event is to occur).

> **"Risk Severity = Consequence x Likelihood"**

Determine the Consequence and Likelihood with the identified current controls and their effectiveness rating. This assessment of the risk is called the residual risk level.

Risks are measured against criteria for consequence and likelihood by referring to rating scales. Likelihood can be scored from 1 (Rare) to 5 (Almost Certain) and Consequence can be rated from A (Insignificant) to E (Catastrophic). The NQBP risk rating scales are provided over (see Chart 5.3).

➢ The Consequence scale is used to allocate a consequence level for each type of consequence. Where the consequence levels for a risk span more than one type of consequence, the most credible foreseeable consequence should be utilised.

➢ The Likelihood Level for identified risks is documented in the appropriate likelihood column to indicate the estimated likelihood which best reflects the scenario being assessed.

Once a risk has been given a Consequence and Likelihood rating, it is plotted on the Risk Matrix. This rates the severity of the risk and thus allows risks to be ranked (see Chart 5.3).

			Project Schedule	Project Cost Escalation	Health & Safety	Shareholder value (financial / contractual / legal liability costs (appetite)	Environment & Heritage	External Relations (Image and Stakeholder Relations)	Business Interruption	Rare 1 Once in 50 Years	Unlikely 2 Once in 10 Years	Moderate 3 Once in 2 Years	Likely 4 Twice per Annum	Almost 5 Each Month
										LIKELIHOOD RATING				
						CONSEQUENCE CATEGORIES								
CONSEQUENCE RATING	Catastrophic	E	>30%	>30%	Fatality, multiple fatalities	Greater than A$20 Million	Offsite permanenet severe impact/loss	Prolonged national adverse media coverage Total loss of political support	Total service cessation for greater than 1 month	Moderate (15)	Significant (19)	High (22)	Extreme (24)	Extreme (25)
	Major	D	>20% – 30%	>20% – 30%	Loss of body part/function, permanent disability	Between A$5 Million – A$20 Million	Offsite severe impact/loss	Prolonged state adverse media coverage Persistent Parliamentary discussion	Total service cessation for a week to less than 1 month	Low (10)	Moderate (14)	Significant (18)	High (21)	Extreme (23)
	Moderate	C	>10% – 20%	>10% – 20%	Multiple serious injuries and hospitalisation	Between A$1 Million – $5 Million	Offsite localised impact/loss	Prolonged local adverse media coverage Arbitration Ministerial interest	Total service cessation for less than a week but greater than 2 days	Very Low (6)	Low (9)	Moderate (13)	Significant (17)	High (20)
	Minor	B	>5% – 10%	>5% – 10%	Medical treatment	Between A$100k – $1 Million	Onsite event with recoverable impact/loss	Low level stakeholder dissatisfaction and localised or state 1 off media interest	Total service cessation for up to 2 days and subsequent interruption	Very Low (3)	Very Low (5)	Low (8)	Moderate (12)	Significant (16)
	Insignificant	A	0 – 5%	0 – 5%	First aid treatment	Lss than A$100,000	Single onsite event negligible impact/loss	Isolated media interest	Minor service disruption (part of a day)	Very Low (1)	Very Low (2)	Very Low (4)	Low (7)	Moderate (11)

Extreme	Extreme risk - should be brought to the attention of ExCo and Board / Committees and continuously monitored
High	High risk - requires attention of ExCo and Board / Committees
Significant	Significant risk - appropriately monitored by Management Team and ExCo
Moderate	Moderate risk - monitored by the Management Team
Low	Low risk - monitored by the Management Team
Very Low	Very Low risk - monitored by the Management Team

Chart 5.3 – NQBP Risk Matrix with Risk Assessment Criteria (Consequence & Likelihood)

The next step in the risk analysis is to evaluate the risk. This process determines which risks can be accepted and those which require treatment (ie, additional controls) to reduce the level of risk.

STEP 4 – Risk Evaluation

Risk evaluation is completed in order to assist in making decisions about which risks need treatment and treatment priorities.

The significance of the risk and the degree of controls is to be considered when evaluating risks.

Factors that need to be considered when determining the tolerance or acceptability of any risk include the following:

➢ Level of Risk as assessed

➢ Consequence

➢ Likelihood

➢ Compliance.

The first factor assists the responsible person to establish how important the risk is relative to all other risks. The second allows for the Consequence to be considered balanced against the Level of Risk. The fourth indicates whether or not the response is mandatory.

It is generally accepted that NQBP will seek to manage all risks down to As Low As Reasonably Practicable (ALARP). OHS risks will be managed by way of the OHS Procedure. However, a final decision on the acceptable level of risk to NQBP will be determined by the oversight level as detailed below.

The following provides a guide as to the level of risk oversight and reporting as required by NQBP:

Table 5.4 – NQBP level of risk oversight and reporting for risks	
Risk Rating	**Oversight / Level of reporting**
Extreme	**Extreme risk** – should be brought to the attention of ExCo and Board / Committees and continuously monitored
High	**High risk** – requires attention of ExCo and Board / Committees
Significant	**Significant risk** – appropriately monitored by Management Team and ExCo
Moderate	**Moderate risk** – monitored by Management Team
Low	**Low risk** – monitored by Management Team
Very Low	**Very Low risk** – monitored by Management Team

Once the identified risk has been evaluated, the level of Oversight must decide whether to accept the respective risk severity and/or level of control effectiveness.

➢ If the Risk is "Accepted", then the risk is managed as part of ongoing monitoring and review protocols outlined in this procedure.

➢ If the Risk is "Not Accepted", the respective manager / project director must develop & implement specific cost-effective strategies & action plans for reducing the risk to an acceptable level ("Target Risk level").

In order to achieve the Target Risk level, Additional Risk Treatment options for consideration are to be identified.

For each identified Additional Risk Treatment, the following information is to be recorded in the respective Risk Register:

➢ Risk Treatment description (including links to specific risk issue / cause / consequence)

➢ Person responsible for completing the action

➢ Due date for completion, and

➢ Status (ongoing, completed, etc).

The Additional Risk Treatments for consideration will be coordinated by the Risk Owner.

The following schematic shows the life cycle of a risk within NQBP:

Chart 5.5 – Lifecycle of a risk within NQBP
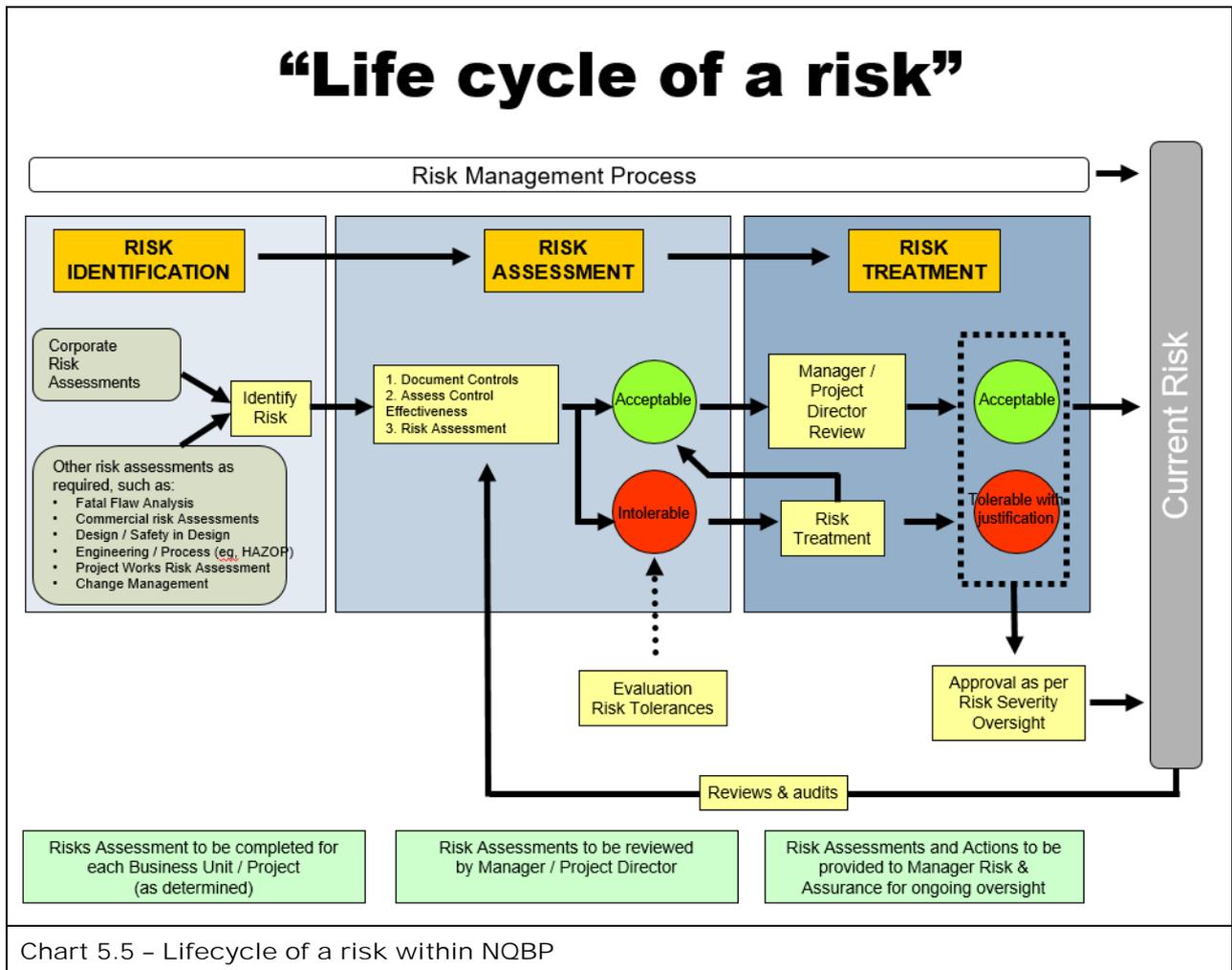
STEP 5 – Risk Treatment (Options)

Options for treating risks and assessing the options are to be coordinated by the nominated Risk Owner in conjunction with the Business Unit Manager / Project Director in consultation with the Manager Risk & Assurance.

As outlined in the Life Cycle of Risk (Refer Chart 5.5), Additional Risk Treatments should be identified for all risks above NQBP's tolerance level as guided by the Oversight / Level of Reporting guidelines (see Table 5.4). Options for treating risks include:

Option	
Avoid	the activity is avoided
Reduce	the level of risk is reduced by reducing the likelihood or consequence of the risk as identified during the risk analysis process
Transfer	insurance is a method used to transfer risks.
Retain	risks which are not avoided, reduced or transferred are retained and managed.

Once risks are treated, the risks are to be continually monitored to ensure they remain at an acceptable level.

For further details on the appropriate Risk Treatment Options / Strategies, refer Appendix F.

STEP 6 - Monitoring and Review

Individual risk are to be monitored and reviewed regularly (or as required in response to circumstances which impact on the business) to ensure that all risks are identified and managed and that treatment is effective and appropriate for the current business / project circumstances. These will be undertaken by the respective Risk Owners in consultation with the Manager Risk & Assurance.

Risks need to be monitored periodically to ensure changing circumstances do not alter the risk priorities. It is necessary to re-examine the risk context to ensure the way in which risks are managed remain valid.

Current controls are to be tested as part of the Internal Audit program of activity, utilising a risk based sampling method.

Timing of reviews is dependent on the individual area / function / project. As risk is related to achievement of objectives, it is appropriate that the review of the risk profile is related to the planning cycle / project timelines (e.g. to align with strategy reviews and business planning; to feed into gating reviews or key decision points for projects).

Specific monitoring requirements are detailed below:

➢ The Risk Owner, as indicated in the Risk Register, is responsible for managing the completion of actions for the risk

➢ The Risk Owner may delegate responsibility and/or form a team for risk response planning or risk studies, but must remain accountable for managing the completion of actions

➢ Each Risk Owner will be responsible for tracking, reviewing and reporting on risks and their management

➢ Additional Risk Treatments will be consolidated by the Manager Risk & Assurance for ongoing monitoring

➢ Any changes in status or action regarding the risk item must be advised to the respective Risk Owner and subsequently the Manager Risk & Assurance.

➢ Any changes to the risk register as a result of actions taken shall be documented for future reference.

The Manager Risk & Assurance will be responsible for the periodic status review of outstanding Treatment actions incorporating the following activities:

➢ Actions are assessed for completion and confirmation of implementation

➢ Risks are re-ranked according to the current status and impact of completed actions

➢ Action timelines adjusted or follow up with Risk Owners to obtain risk mitigation action, and

➢ Open actions are reviewed to ensure that adequate resources have been allocated and assigned to the action.

6.   CONTINUOUS IMPROVEMENT

The NQBP Risk Management Framework is to be reviewed and endorsed on at least an annual basis or when there is a significant change or following major incident which may impact the framework. This will ensure currency with International and Australian Standards, alignment with NQBP's purpose, vision, values & behaviours, strategic objectives and inclusion of continuous improvement opportunities.

The following table provides an overview of the frequency of all components of the risk management framework.

Risk Management Component	Monitoring / review activity	Responsibility / frequency				
		Board	CGAP	PAC & AFRM	Manager, Risk & Assurance	Managers / Project Directors
Governance & Principles	Risk Management Framework	Annually	Annually		Ongoing	
	CGAP Committee Charter (ie, Responsibilities for risk)	Annually	Annually			
Risk Processes	Business Unit (Corporate) Risk Assessment (Risk profiling)				Quarterly	Ongoing
	Task specific / Function / Ad hoc Risk Assessment				As required	As required
	Project Specific Risk Assessments				As required	As required
	Controls review				Quarterly	Ongoing
	Risk Action Planning - Status		Quarterly		Quarterly	Ongoing
	Emerging risk identification	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
Specific Risk Types	Emergency & Business Continuity Planning (incl Crisis Comms)		Annually			

Training

Training is an important aspect of risk management for the following reasons:

- Communicate NQBP's risk control rules, policies and procedures
- Maintain / increase the level of skills
- Affect the culture of the workplace, and
- Maintain compliance.

All staff will be inducted into NQBP's Risk Management framework and the expectations set out within this procedure.

All leadership will be provided with specific risk management awareness training in support of the implementation of this procedure.

Appendices

7.   APPENDIX A - DEFINITIONS

Term	Definition
Accountable	the one ultimately answerable for the correct and thorough completion of the deliverable or task, and the one from who the responsible person is delegated the work.
Consequence	the outcome of an event expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain. There may be a range of possible outcomes associated with an event
Likelihood	a qualitative measure of probability or frequency
Master Action List	a centrally managed list for use by the Manager Risk & Assurance in monitoring the status of identified mitigation strategies / Risk Action Plans currently being considered by the business to achieve a Target Risk Level for any specific risk issue
Monitor	to check, supervise, observe critically, or record the progress of an activity, action, or system on a regular basis in order to identify change
Responsible	those who are responsible for the task, ensuring that it is done as per the accountable person.
Risk	the chance of something happening that will impact on objectives. It is measured in terms of consequence and likelihood
Risk Action Plan	the means by which a risk treatment plan is to be documented
Risk Analysis	a systematic use of available information to determine how often specified events may occur and the magnitude of their consequences
Risk Communication	the process in which information about risks is communicated between stakeholders
Risk Control	see Risk Treatment
Risk Evaluation	the process used to determine risk management priorities by comparing the level of risk against pre-determined standards, target risk levels or other criteria
Risk Identification	the process of determining what can happen, why and how
Risk Management	the culture, processes, and structures that are directed towards the effective management of potential opportunities and adverse effects.
Risk Treatment	that part of risk management that involves the implementation of policies, standards, procedures and physical changes to eliminate or minimise adverse risks
Stakeholders	those persons and organisations who may affect, or be affected by, or perceive themselves to be affected by, a risk and related decisions or activities.
Target Risk level	the level of risk acceptable to NQBP

8. APPENDIX B – PROJECT RISK ACTIVITIES

The following table provides an overview of the types of risk management activities that would typically be required in a major project. A decision on the most appropriate risk management activity shall be determined by the Project Director in conjunction with the Manager Risk & Assurance.

Risk Activity	Concept Development Stage	Economic Feasibility Stage	Basic Engineering	Detailed Engineering	Construction	Commissioning	Handover	Operations
	Project Stage							
Risk Management Plan		✓	✓	✓	✓	✓	✓	
Project Risk Register (High Level)	✓	✓	✓	✓	✓			✓
Sensitivity Analysis for Contingency		✓	✓	✓	✓			
Advanced Loss of Profits analysis		✓	✓					
EPCM Function & Discipline Risk Registers				✓	✓	✓	✓	
Engineering Reviews (including Technology)			✓	✓	✓			
HAZOP[1]			✓	✓				
CHAZOP[2]			✓	✓				
SIL[3] determination study			✓	✓				
Construction risk reviews				✓	✓			
Commissioning risk assessments						✓	✓	
Topic specific risk assessments (as required)[4]	✓	✓	✓	✓	✓	✓		
Fire protection and machinery breakdown reviews			✓	✓				
Security risk reviews (site versus country)			✓	✓	✓			
Transportation risk reviews			✓	✓	✓			
Design Reviews[5]			✓	✓	✓			
Safety in Design reviews			✓	✓	✓			
Punchlisting[6]					✓			
Residual Risk Reviews for Handover[7]				✓	✓	✓	✓	✓

In developing this list of risk activities, it is recognised that some would typically be incorporated into intended Project procedures. They are included for completeness.

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[1] **HAZOP** - Hazard and Operability Study

[2] **CHAZOP** – Control Hazard and Operability Study

[3] **SIL** – Safety Integrity Level

[4] **Topic specific risk assessments** – this risk activity is included as it is typically used to assist in the decision making processes that occur along the way.

[5] **Design Reviews** – the focus of these reviews is on Maintenance and Operational activities and requires significant input from intended Operational and Maintenance personnel

[6] **Punchlisting** – focus on operability and maintainability issues at the completion (or near completion) of construction. Completed on a facility by facility basis.

[7] **Residual Risk Reviews** – for the Operations stage, the output effectively delivers the Area (or Facility) risk register. Any further risk reduction activity identified at this point will be considered beyond the scope of the Project and rest with Operations.

9.   APPENDIX C - METHODS FOR RISK IDENTIFICATION

A Risk Workshop
A Business Unit workshop will often be the best and most convenient method of identifying risks and developing the risk register. This method will benefit from the collective intellectual input together with the experience of a cross section of relevant people.

This method is usually structured by first conducting a 'brain storming' session. This is then followed by a session of transferring and organising these risks into the risk register. Finally, a checklist is used to prompt other risk issues and how these might apply to NQBP.

Other methods for risk identification

Type	Detail
Experience	Experience is unsurpassed when it comes to risk identification and evaluation. Wherever, it should be used as the first priority. Experience in this case can be any of the following: ▪ experience of an individual within NQBP ▪ experience of NQBP as a whole ▪ experience from within the industry ▪ experience relating to processes, plant and/or management techniques outside the industry Reviews can include use of statistical/actuarial analysis to predict future losses. However, this works best where there is a high frequency of loss (ie may be skewed otherwise).
Analysis of Past Losses/Incidents	Losses/incidents are an important tool from which to learn and identify risks. Losses can mean either of the following: ▪ incidents within a Business Unit's operations / project ▪ incidents within NQBP as a whole ▪ incidents within the Industry ▪ incidents relating to processes, plant and/or management technique outside the industry ▪ previous project experience Reviews can include use of statistical/actuarial analysis to predict future losses. However, this works best where there is a high frequency of loss (ie may be skewed otherwise).
Using Surveys, Questionnaires & Checklists	A pre-defined survey, questionnaire and/or checklist provide a means of prompting a thought process about well-known risks and how they may apply in the current context. An example of a checklist is provided below for tailoring by NQBP
Task and procedure based tools	Task based tools such as Plan-Do-Check-Act (PDCA) and Safe Work Method Statements (SWMS) can be used to as identification tools by planning the individual steps and stages involved in a process.
Consultations with Experts within and outside the Organisation	This will provide a benchmark for review of risks that may not have been identified in other methods. Other means may include participation in industry conferences and workshops.
Personal Inspections	Inspections and associated information gathering visits to critical sites of concern, both within and outside the organisation provide a first-hand look at the exposures to determine what entity is subject to loss, what values are subject to loss, and what perils are likely to strike these values.
Other Records and Documents	Sound risk management practice requires systematic approach to examining those records and documents most likely to reveal changes in loss exposures (eg Meeting minutes, architectural drawings).

10. APPENDIX D - RISK TREATMENT CONSIDERATIONS / STRATEGY

The risk treatment / management strategy for individual risks should give consideration to the following issues:
1. level of Risk
2. seriousness of Consequence
3. hierarchy of Controls
4. cost to benefit
5. budgetary constraints
6. compliance
7. practicality and influence

Each of these is outlined in more detail below:

Level of Risk and Consequence / Likelihood
Strong control should be used where the Level of Risk is above the risk tolerance level for the business unit. Extreme risk should be eliminated due to:
- "high" Level Risks being too costly for the business to sustain,
- high Likelihood risks are nuisance type risks that bring about inefficiencies

The type of controls for risks that are high in Consequence but are low in risk will depend on the category of the risk.

Hierarchy of Controls
The hierarchy of controls is a list of the forms of controls in order of priority. The most preferred forms of control are the controls that remove the hazard either by elimination, substitution, reduction or designing the hazard out. The hierarchy of controls are listed below in order of priority:
- Eliminate
- Substitute
- Attenuate (reduce)
- Engineering design
- Procedures
- Mitigation Strategies
    - Emergency Procedures
    - Crisis Management Plan
    - Business Continuity Plan
    - Disaster Recovery plan

For completeness, two other forms of specialist controls are:
- Financing / Treasury
- Transferring, eg., insurance

Cost to Benefit
All risk controls that are applied to treat or manage risks must be justified according to return on investment. There are two commonly applied methods for business justification which are outlined below.
- Cost Benefit Analysis - Cost benefit analysis is an assessment of the cost of implementing a particular control versus the expected risk reduction or other tangible benefit.
- Payback Period - Payback period is a time assessment of the payback in terms of risk reduction over the cost of the implementation of the control.

Budgetary Constraints
With regard to all business proposals, it is recognised there is budgetary constraints. Nevertheless, this is not to be regarded as an excuse for not managing risk as there are always ways and means to affect risk.

Compliance
If it is legislated then it must be done or the activity ceased.

Practicality and Influence
Controls must work and be able to be successfully implemented.

11. APPENDIX E – OTHER RISK MANAGEMENT TOOLS

In the field of risk assessment, particularly health and safety, a large number of techniques (eg, health based, safety based, pre event (risk estimation) and post event (investigations)) have been developed in an attempt to prevent occurrence or re-occurrence of events that have the potential to cause loss.

Risk assessments can also be used to identify opportunities which can be assessed and evaluated.

This section outlines risk analysis techniques that can be used. This list is not exhaustive and techniques should be used based on their relevance. All risk assessments require the participation of a relevant cross section of the workforce.

Risk assessment techniques available include:

- **Fatal Flaw Analysis** – an analysis using a checklist of factors which have the potential to prevent a project from meeting its objectives, including safety, environmental, community and financial.

- **Fault & Event Tree Analysis (FTA / ETA)** - detailed analysis of contributors to major unwanted events, potentially using quantitative methods

- **Force Field Analysis** - A qualitative (but can be quantified) approach to assisting in understanding the "weight" of contributing factors in a decision.

- **Hazard and Operability Study (HAZOP)** - systematic identification of hazards in a process design usually of the process, instrumentation drawing (PID).

- **Safe Work Method Statement (SWMS)** - general identification of hazards and controls in a specific task, usually for determining the basis of a Standard Operating Practice (SOP)

- **Risk Registers / Risk Matrices** – the basis of the risk management process. The opportunity exists to calculate a risk level (because risk level is Consequence x Likelihood)

- **Safety in Design** - A Safety in Design review provides a structured framework to guide a risk review on the design elements which could foreseeably contribute to safety related impacts during construction, operations, maintenance and decommissioning phases.

- **Semi-Quantitative Risk Analysis (SQRA)** an attempt to measure "risk level" semi quantitatively.

The risk assessment techniques listed above are outlined in more detail below:

Fatal Flaw Analysis
A Fatal Flaw Analysis can be used to assess the viability of a proposition or opportunity. It is a cost effective risk analysis technique for assessing the viability of new projects. A "fatal flaw" as an event or condition that could cause an unanticipated problem or prevent the opportunity from achieving its objectives and goals. Similar to due diligence investigations, a fatal flaw analysis can apply to any aspect of a project. As part of a fatal flaw analysis, it is customary to determine the impact should an event occur. Risks are assessed in terms of Consequence and the Likelihood of that particular consequence.

Fault Tree Analysis (FTA) - Used for Catastrophic Safety Risks analysis
Fault tree analysis is one of many symbolic "analytical logic techniques" found in operations research and in system reliability. Fault Tree analysis was developed by Bell Telephone Laboratories in 1962. They invented the concept for the US Air Force in conjunction with the Minuteman Rocket system, ie for "rocket science" The concept was then adopted and heavily used by the Boeing Company.

The fault tree analysis maps out all the contributing factors in a potential incident scenario. The FTA can be used by a team to identify critical initiating incident events, whilst identifying actual and proposed controls. The proposed controls can become a Risk Action Plan. The construction of the fault tree starts at the top event and proceeds through levels via "and" gates and "or" gates until all fault events have been traced to their basic contributing, or "root" causes. An "and' gate indicates that all initiating events below must occur to create the event above, while an "or" gate indicates that the event above will occur if any of the initiating events below occur.

In some instances, a more Quantitative Risk Analysis may be undertaken. This method offers the opportunity to be more objective and analytical than a qualitative or semi quantitative approach and

involves the calculation of probability and consequences using numerical data. The quantification of risk involves generating a number that represents the probability of a selected outcome, eg a fatality. A quantitative risk analysis may also be done by the use of fault tree methodology.

Event Tree Analysis

The event tree represents pictorially the logical order in which events can occur. It commences with an initiating event and works forward in time considering all the possible subsequent events until the consequences are known. Note that a number of consequences may arise from an event tree. These may include various levels of material damage, personal injury or economic loss, eg a release of material.

Upon completion of the event tree, probabilities can be assigned to each event using expert opinion and industry statistics. By then multiplying successive probabilities together, the probability that each final consequence will occur can be calculated.

Force field analysis

A Force Field analysis pictorially assists in identifying the factors that resist and drive change or decision. The relative importance of each factor is represented on the Force Field diagram by the length of the arrow. If quantified, force field analysis can also be used as a cost benefit tool.

HAZOP process

Essentially the HAZOP procedure involves taking a full description of a process and systematically questioning every part of it to establish how deviations from the design intent can arise. Once identified, an assessment is made as to whether such deviations and their consequences can have a negative effect upon the safe and efficient operation of the plant. If considered necessary, action is then taken to remedy the situation.

Safe Work Method Statement

A SWMS is a formal documented approach to tasks that are undertaken by a work group or team. The SWMS process is:
- Identify the scope of the task and associated high risk activities,
- Break the task into logical job steps,
- Identify the hazards for each job step,
- Identify or develop controls for each of the hazards,
- Ensure that barriers and/or controls are consistent with the Hierarchy of Controls, (eliminate, guard, PPE, signpost, administration)
- Review and update the SWMS at the completion of the job

The supervisor, team leader and the work group completing the proposed task manage the SWMS process. A copy of the SWMS is sent for review and will be formalised and registered for other teams to review for task consistency and information transfer.

Risk Registers

The objective of creating a Risk Register is to prepare a document that lists, outlines and prioritizes the risks. As such it is an exposure document intended to communicate and monitor the current status of priority risks during the project. The management of risk is the primary intention of a Risk Register. Regular review of the Risk Register is required. This is due to changes in exposure over time and possibly a better understanding of the hazards, their consequences and the likelihood of those specific consequences.

Safety in Design

The Queensland Workplace Health and Safety Act 1995 requires the designer/s of any structure to prevent or minimise risks in the design to ensure the design does not affect the workplace health and safety of persons during construction, operations, maintenance and decommissioning. The designer/s has an obligation to perform and document the risk assessment process and communicate residual risks to appropriate persons.

The Safety in Design review provides a structured framework to guide a risk review on the design elements which could foreseeably contribute to safety related impacts during construction, operations, maintenance and decommissioning phases. This promotes the opportunity to modify design to ensure that safety related issues for construction, operations, maintenance and decommissioning can be

eliminated or mitigated as part of the design process. Safety in Design guidewords are used to add rigour to the risk review process.

The risk review process also incorporates the identification of the controls in place. The identification of controls is a two-stage process involving the identification of principle (current) controls and proposed (additional) controls. The identification of controls is based on the application of the hierarchy of controls. The risk register captures higher order controls to address the underlying risks and lists these in accordance with the hierarchy of controls.

Formal risk analysis (quantified and semi quantified)
A formal risk assessment is used in the risk assessment of larger or complex tasks or jobs.
If using a semi quantitative approach, it is important not to interpret the results to a finer level of precision than is actually contained in the initial descriptions. Numbers should not be used to give an appearance of a level of precision which does not exist.

The level of risk can be calculated using a quantitative method in situations where the consequences and likelihood of occurrence can be quantified.

In most instances relatively straightforward methods are used effectively. However, more sophisticated techniques are sometimes necessary. Note: even sophisticated quantitative techniques have their weaknesses and these need to be kept in mind. Any assumptions used in quantitative assessments should be clearly stated and understood.

In undertaking any risk assessment and using a specific method or tool, consideration must be given to a formal risk assessment plan. This should be undertaken in consultation with technical and operational personnel. This plan should be signed off and distributed to relevant work groups for future reference. As a guide to undertaking more formal risk assessments, consideration must be given to the following:

- A risk assessment leader or facilitator - appropriate qualifications, knowledge and experience

- A team-based approach - must be used; the team must comprise personnel with relevant and varied experience of the subject matter.

- Checklist - The team must develop a comprehensive checklist of possible failure modes and other important issues.

- Definition of idealised outcome - The safety standard to be reached or the idealised outcome must be defined prior to the risk assessment being undertaken, this may be in the form of damage to people, equipment, the environment or financial loss.

- Identification of high-risk events – high risk events which need to be reduced and high consequence events that must be prevented, must be clearly identified, and effective controls developed.

- Identification of any risk action plans - The additional actions that must be taken to reduce or prevent undesired outcomes must be identified; a timetable for the implementation of the actions and an accountable person for the implementation must be listed.

- Control effectiveness - a strategy to monitor and review the effectiveness of the actions implemented to control high risk / high consequence events must be noted.

- Review of risk assessment - The department manager must review the risk assessment, and shall verify that the outcomes are acceptable, achievable and sustainable.

- SWMS development - Identified job steps or stages for SWMSs to be developed.

- Assumptions – A review and validation of assumptions must be undertaken of the risk assessment and tool(s) used.

- Reporting - Attach Reports and supporting documents to ensure that a future review of the process can be undertaken. All documentation should be retained in line with document management standards.