Sustainable Minerals Institute
Project Management Handbook

The project handbook is to be used as a general guide to good project management. It draws from the Project Management Body of Knowledge (Project Management Institute 2012) and is for general reference only.

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<tr>
<th>Document Owner</th>
<th>Portfolio Support Office</th>
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<td>Document Status</td>
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1. Introduction

The Sustainable Minerals Institute Project Management Framework provides a structured approach to managing projects within the Institute. The Framework provides the essential components of project management that should be applied to all projects delivered by the Institute. This Project Management Handbook is a support document for staff managing projects across the Institute. The Handbook, Project Lifecycle, Templates and a series of Project Guidelines that expands the Lifecycle in detail, form the total Project Management Framework documentation.

The Handbook and associated Project Guidelines provide a definitive reference source for SMI Project management, gain formal agreement to proceed and for considering the project management methodology that is relevant to the project.

2. What is a Project

A project is a temporary endeavor undertaken to create a unique product, service or result’ (PMBOK, Project Management Body of Knowledge, PMI 2013). Characteristics of a project include a:

• Defined start and end point.
• Clear scope and objectives.
• Dedicated budget and resource base.
• Is usually unique in nature.
• Has a degree of risk or uncertainty that must be managed.

Project Management involves the planning, delegating, monitoring and controlling of all aspects of the project. It also includes the motivation of those involved to achieve the project objectives within the agreed targets for scope, time, cost and quality. Project management draws on ten areas of knowledge as outlined in the PMBOK these are:

<table>
<thead>
<tr>
<th>Cost</th>
<th>Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Resources</td>
<td>Time</td>
</tr>
<tr>
<td>Stakeholder Management</td>
<td>Procurement</td>
</tr>
<tr>
<td>Scope</td>
<td>Risk Management</td>
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<tr>
<td>Quality</td>
<td>Integration</td>
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The Sustainable Minerals Institute Project Framework can be used for academic, research, education or consultancy orientated projects and follows a seven step Lifecycle.
Key Project Documents at a Glance

These are the specific project documents, rather than research deliverables. They are a mixture of mandatory and non-mandatory documents.

Health Check and Early Warning Signs

Positive Health Check

<table>
<thead>
<tr>
<th>Lifecycle Phase</th>
<th>Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idea Creation</td>
<td>☐ Ideas are being generated and captured on the SMI Project Register</td>
</tr>
<tr>
<td>Opportunity Identification</td>
<td>☐ Opportunities have a peer facilitated Go/No Go decision prior to heavy investment is made in forming up a proposal</td>
</tr>
<tr>
<td>Project Development</td>
<td>☐ Time is taken to plan and estimate the project time and level of effort to the level required to manage it effectively</td>
</tr>
<tr>
<td>Lifecycle Phase</td>
<td>Checklist</td>
</tr>
<tr>
<td>----------------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td>☐ Budget estimates are accurate and fully costed</td>
</tr>
<tr>
<td></td>
<td>☐ Legal and Finance are being consulted where necessary</td>
</tr>
<tr>
<td></td>
<td>☐ Project Proposals are of high quality and consistent</td>
</tr>
<tr>
<td></td>
<td>☐ The project sponsor is satisfied and the relationship is conducive to a contract being signed</td>
</tr>
<tr>
<td>Contracting</td>
<td>☐ Contracting process is occurring in compliance with UQ and Institute policy and procedure.</td>
</tr>
<tr>
<td></td>
<td>☐ SMI/UQ staff time expended in completing the contracting process is appropriate given the value, risk and complexity of the project and project contract.</td>
</tr>
<tr>
<td></td>
<td>☐ Contract is signed in a timely manner.</td>
</tr>
<tr>
<td>Delivery</td>
<td>☐ IP is being notified and protected in accordance with UQ and Institute policy and procedure.</td>
</tr>
<tr>
<td></td>
<td>☐ Detailed plans are being used to guide the work</td>
</tr>
<tr>
<td></td>
<td>☐ Is being managed in accordance with the contract</td>
</tr>
<tr>
<td></td>
<td>☐ Status is being monitored and regularly communicated to the Sponsor and internal management.</td>
</tr>
<tr>
<td></td>
<td>☐ Outputs are delivered on time in accordance with contracted milestones.</td>
</tr>
<tr>
<td></td>
<td>☐ Risks and issues are being managed promptly and recorded in the Project Log.</td>
</tr>
<tr>
<td></td>
<td>☐ Quality of outputs are being checked and verified regularly.</td>
</tr>
<tr>
<td>Close Out</td>
<td>☐ The project is delivered to the original contracted budget.</td>
</tr>
<tr>
<td></td>
<td>☐ The Sponsor is satisfied.</td>
</tr>
<tr>
<td></td>
<td>☐ An internal project debrief is completed and lessons learned captured</td>
</tr>
<tr>
<td></td>
<td>☐ IP resulting from project is notified and protected in accordance with UQ and Institute policy and procedure.</td>
</tr>
<tr>
<td>Impact Demonstration</td>
<td>☐ Publications or other positive benefits are coming out of the research</td>
</tr>
<tr>
<td></td>
<td>☐ Repeat business coming back to the Institute</td>
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</table>

**Early Warning Signs**

<table>
<thead>
<tr>
<th>Lifecycle Phase</th>
<th>Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idea Creation</td>
<td>☐ Ideas are not being openly shared for the good of the Institute</td>
</tr>
<tr>
<td></td>
<td>☐ Ideas are not being approved</td>
</tr>
<tr>
<td>Opportunity Identification</td>
<td>☐ Expectations are not set up with the funding body appropriately</td>
</tr>
<tr>
<td></td>
<td>☐ Opportunities are pursued without approval</td>
</tr>
<tr>
<td>Project Development</td>
<td>☐ Project Manager not clear on their responsibilities and accountabilities</td>
</tr>
<tr>
<td></td>
<td>☐ Lessons from the past indicate this type of project needs careful and considered governance and management and that is not occurring</td>
</tr>
<tr>
<td></td>
<td>☐ Not enough time spent in the plan for commencement of work</td>
</tr>
<tr>
<td></td>
<td>☐ Relationship with the Project Sponsor is strained</td>
</tr>
<tr>
<td>Contracting</td>
<td>☐ Contracting process is not occurring in compliance with UQ and Institute policy and procedure.</td>
</tr>
<tr>
<td></td>
<td>☐ SMI RPM and/or SMI Legal is not receiving timely, well-considered and clear instructions required for contracting phase from CI.</td>
</tr>
<tr>
<td></td>
<td>☐ SMI Legal not being kept up-to-date with contract negotiations.</td>
</tr>
<tr>
<td>Lifecycle Phase</td>
<td>Checklist</td>
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<td>----------------</td>
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</tbody>
</table>
|                | ☐ Contracting process is excessive given the value, risk and complexity of the project and project contract.  
|                | ☐ Project Sponsor is unresponsive or unreasonable in project contract negotiations.  
|                | ☐ Contract is not negotiated and signed in a timely manner.  
|                | ☐ The Project Sponsor is frustrated with the contract negotiation process.  
|                | ☐ The Project Sponsor pulls out of proceedings  
|                | ☐ Commencement of delivery to Project Sponsor and/or commitment of significant SMI staff (and/or contractor) time to project without a signed contract. |
| Delivery       | ☐ People not being available to commence delivery tasks  
|                | ☐ Unexpected staff departure  
|                | ☐ Debtors are over 90 days  
|                | ☐ Scope creep and over servicing not being managed and regularly controlled  
|                | ☐ If the project is not tracking to time and meeting a milestone is in doubt.  
|                | ☐ Project is not being delivered in line with contract.  
|                | ☐ A contract variation is required but has not been arranged.  
|                | ☐ Risks originally anticipated are becoming real.  
|                | ☐ No peer review occurring to check quality of deliverables.  
|                | ☐ The budget is being expended faster than expected so an over-run is looking likely.  
|                | ☐ Issues are being raised that will impact on the delivery of time scope and cost targets.  
|                | ☐ Internal conflict in the project management team. |
| Close Out      | ☐ The sponsoring body is not satisfied with the quality of the deliverables they are receiving.  
|                | ☐ No formal project closure or debrief meaning we are not learning from our good practice or mistakes. |
| Impact Demonstration | ☐ No Impact Demonstration occurring due to not factoring in at the Project Development Phase |

### 3. Project Governance

Project governance refers to the process by which the project is directed, controlled and held to account. The aim of project governance is to authorise key phase gates and monitor the project throughout its life.

While there is enormous flexibility in developing a governance structure for a project and the roles within it, there are some general principles that should be applied when planning and managing a project:

- It is vital to establish a governance structure for the project that identifies the specific team roles, their responsibilities, accountabilities and the interaction between them for the life of the project.
- Ultimate responsibility and accountability for the project must be clearly defined, accepted and exercised within the project governance structure by individuals who have the authority and appropriate delegation.
- If a Project Steering Committee is required it should include and represent the Project Sponsor and key stakeholders or contributors as appropriate.
- Status reporting to the Project Sponsor and/or Project Steering Committee should be against the milestones outlined in the Project Controls Plan (Part B) and should include identified risks and issues for the project.
- If necessary, the membership of the Project Steering Committee should change according to the phase
or stage of the project to ensure the best expertise and experience are made available.

At the SMI there are various layers of governance that oversee the progress of a project:

**Portfolio Steering Committee** - The SMI Director is ultimately accountable for the successful delivery of the SMI Portfolio as a whole. In relation to the portfolio delivery, the SMI Leadership Team provide portfolio governance, alignment and strategic insight. The SMI Leadership Team have a regular portfolio analysis and management function and monthly have agenda items covering SMI Portfolio of Work reporting.

The SMI Leadership Team has a responsibility for analysing the projects across the portfolio and ensuring that they are able to support the SMI Director by having the systems in place to feed information up and provide advice on portfolio issues. Membership of this group includes:

- SMI Director
- Director - People
- Director - Environment
- Director - Production
- Deputy Director Operations
- SMI Finance Manager

**Sub Portfolio Group (Centre Pair)** - The Centre Director is accountable for making sure they have all the information they need to make decisions about the Centres and an accountability to feed up sub-portfolio issues to the SMI Portfolio Committee. The Centre Director chairs a regular meeting of the program leaders under their Centres with the remit to monitor progress. The Program Steering Committee meetings would generate the information to support this Sub-Portfolio focused meeting. The opportunity of the Centre Pair meeting is for the Centre Director to mentor newer Program Leaders, share good practice and to discuss common issues, and raise risks. The membership of this group includes:

- Centre Director (Chair)
- Program Leaders
- Relevant cluster portfolio support

**Program Steering Committee** - The Program Steering Committee is a guiding and monitoring body to the Program and has a key role to play in the successful commencement and completion of projects within the Program. The functions of the committee are performed in tandem with the SMI Finance Program level meetings. It is recommended that there be one Program Steering Committee per Program, meeting regularly (minimum monthly) and membership could include:

- Program Leader (chair)
- Lead Chief Researchers
- Portfolio Support – including Finance Representative

**Project Steering Committee (Optional)** – the project steering committee is a monitoring body for the delivery of the project. In the case of a project steering committee not being in place, the Program Leader is the default accountability and authorisation point that a Lead Chief Investigator reports to.

4. **Managing Project Resources**

In projects, resource management relates to the human, physical and information resources that are required to deliver a project, regardless of project size or complexity. Planning how to manage these resources is vital. The planning might not be documented for small projects, but for large and/or more complex projects detailed documentation will ensure resources are better managed and provide transparency for key stakeholders.

4.1 **Project Team**
During the Project Development phase of a project, there should be a detailed analysis to determine who will be on the Project Team. This analysis should include a study of the mix of skills required and the number of staff needed for the life of the project.

It is important to adequately estimate recruitment timeframes and the associated budget in the UQ budget spreadsheet. It is also advisable to establish the project’s critical path in order to predict realistic project end dates to allow for periods of recreation leave before project closure.

Any approved changes to the initially approved Project Team should be documented, and any issues that arise as a result of the skills mix or Project Team structure can be recorded for reference during the project evaluation. In some cases, changes to personnel may require formal approval of the Project Sponsor, so the contract should be checked for this when personnel change. The SMI Leadership team are accountable for the balance of human resources across Programs.

4.2 Physical Resources

During the Project Development phase of a project, a detailed analysis should be undertaken to identify the physical resources required to complete the project's activities and tasks. This analysis may include accommodation, which may require modifications and/or fit-out to accommodate the team, vehicles, computers and infrastructure, testing equipment, phones and any other equipment or assets. The costs for these physical resources should be reflected in the project budget.

In Project Close Out, there should be plans for disposal of any assets that were acquired for the project and formal confirmation of who will manage them on completion of the project. Including disposal within specific environmental and safety guidelines.

4.3 Information Resources and Intellectual Property

During the Project Development phase of a project, a detailed analysis should be undertaken to identify what might be the information and intellectual property produced (often referred to as “foreground” or “project” IP) or used (often referred to as “background IP”) during the course of the project. UQ requires a data management plan to be created and any specific intellectual property to be notified to the SMI IP Committee Coordinator. The need for IP Notifications can also arise during the Delivery, Close Out and Impact Demonstration phases. The UQ IP policy can be found here on the UQ intranet.

4.4 Stakeholders

Project stakeholders are those who have a ‘stake’ (investment, involvement, concern, interest in the success of the project. They are individuals or organisations who have interests that are positively or negatively impacted by the project, or who can positively or negatively impact the interests of the project processes, outputs or outcomes.

Project success depends in part on:

- maintaining the commitment and confidence of those providing resources;
- gaining the agreement of those who will utilise the Project Deliverables; and/or
- responding appropriately to the people and groups who are impacted by (or who can impact the interests of) the project.

As part of managing resources, it is important to understand the stakeholders that will be the end users of the final project deliverables as well as those that might need to be consulted as part of the development. One process follows a six-stage process starting with identifying stakeholders:
1. Identifying stakeholders – think about those stakeholders who will use the end product and those who need to input into the delivery. Create a list of who they are and their primary interest and contact details.

2. Creating and analysing stakeholders – once we know who the stakeholders are it is a good idea to understand the level of these stakeholders. One option is to analyse the stakeholders in accordance to their influence or interest in the project (see example below):

3. Defining the stakeholder management strategy – it is a good idea before you plan your engagements to have a strategy for how you will do this. What approach will you take, what are the restraints or key messages you wish to give, are there any specific techniques you wish to utilise such as online surveys or workshops.

4. Plan the engagements – then we plan how we do each engagement, some engagements might need more detailed planning than others. Such as a workshop will need to have the invitations, purpose, venue, the location, time, agenda and materials prepared in advance.

5. Engage stakeholders – conduct the engagement.
6. Measure effectiveness – measure how effective the engagement was and how things can be improved for the next engagement process.

For larger projects you can use the project stakeholder matrix in the project controls log to list your stakeholders and their particular needs.

5. Planning your project

5.1 Determining Scope and Estimating Time

Defining what is needed is the first step toward establishing a project timeline, setting of project goals and allocating project resources.

In order to define the scope of a project, it is necessary to first establish the project objectives. The objective of a project may be to produce a new product, research a particular client problem or to provide a consultancy solution. There are any number of objectives that could be central to a given project - and it is the role of the project manager to deliver a result that meets the specified functions and features.

Steps for defining the scope of a project

To define a project scope, the following things must be in place as part of the Project Proposal Part A:

- Project objectives
- Expected Outcomes and Benefits
- Work Program
- Inclusions and Exclusions
- Key Deliverables and Milestones
- Key Personnel
- Budget and other resources
- Schedule

Once these have been established, limitations or parameters of the project will need to be clarified and any aspects that are not to be included need to be noted. In specifying what will and will not be included, the project scope must make clear to the Project Sponsor and team members involved, what product or service will be delivered.

Understanding the scope provides the foundations for managing project change and risk management.

As the scope is becoming clear then a planning process needs to be followed that analyses the key deliverables and then maps activities and any dependencies. A standard planning process is as follows:
Documenting the Project Proposal is a key aspect of defining the scope (Part A). Part A is then sent to the Project Sponsor for approval of funding.

5.2 Preparing a Schedule

As the above diagram outlines preparing a project schedule relies on being clear about the end output you are creating and then the journey to create those major deliverable. A schedule needs to be at the level of detail that will be useful for the Project Manager as well as project governance to understand if the project is tracking according to plan.

Milestone level might be OK for a Project Proposal to a Project Sponsor, but to manage and control delivery some more detail to key task or activity level might be required. In the diagram below it outlines the concept of a ‘planning horizon’. Often at the beginning of a project we cannot accurately schedule with total confidence the detail we need to manage the day to day tasks and activities of the project. So therefore schedules are often created in more detail to cover the area we do have more confidence in and are progressively updated.

Three Point Estimation

The critical element of preparing a schedule is to estimate accurately. A good way to check the accuracy is by involving others in the estimating. One commonly used estimating technique is called Three-point estimating:

- In Three Point Estimation three project or activity durations are produced for every estimate:
  - \( a \) = the best case estimate
• \( m \) = the most likely estimate
• \( b \) = the worst case estimate

- These values are used to calculate an \( E \) value for the estimated duration and a **Standard Deviation (SD)** where:
  - \( E = (a + (4\times m) + b) / 6 \)
  - \( SD = (b - a)/6 \)

- \( E \) is a weighted average which takes into account both the most optimistic and pessimistic estimates provided and **SD** measures the variability or uncertainty in the estimate.

- The choice then is to go for the most realistic estimate based on the variability and the weighted average.

Other ways of estimating include looking for lessons learned from past experience and then again looking ideally at how long something might take in terms of hours and then those hours over weeks or days. For example it might take 10 hours to complete but given my other commitments over 10 days to deliver. This is especially relevant when the resource might not be full time on this particular project.

### 5.3 Consider your contracting strategy

As part of project planning, consider the form of contract that will be used for the project. A description or copy of the contract to be used should be referred to in your Project Proposal. The SMI Portfolio Support team can assist you in determining the appropriate form of contract. Turning your mind to the contracting mechanism, and getting input from the SMI Portfolio Support team at the project planning stage can lead to a significantly smoother and more efficient contracting process for your project.

### 6. Estimating and Managing Project Budgets

During the Project Development stages of a project, a detailed project budget is developed that reflects the resources required to complete the activities and tasks of the project. The budget needs to include the costs required for:

- All project staff salaries and on-costs including any training costs required to ensure the team can meet the project’s initial and ongoing skills requirements;
- Project Team travel and accommodation costs;
- Physical equipment and resources;
- Services or consultancies necessary to undertake the project; and/or
- Project management costs, ie any costs associated with risk mitigation strategies and quality reviews;
- UQ administration fees
- Impact demonstration costs (post project operational expenditure or in project costed prior to closure).

The project budget also may include an estimate of the financial contribution (real or notional eg staff or equipment) made by another organisation to provide an accurate cumulative total cost for the project. At this stage the funding arrangements (source) for the project should be known and documented in the UQ Budget Spreadsheet and summarised in the Project Proposal (Part A).

It is important to plan purchases during the project. This can be achieved by these details within your Project Management Plan or be included as an appendix to either of these documents in the schedule. A procurement plan might also be required in some cases to:

- record the procurement methods, the proposed contractual arrangement and the related performance measures;
- establish a realistic timescale and sequence for the procurement activity. This activity is particularly important if an open tender process is to be followed, as the tender process has the potential to be time consuming; and
• identify important issues arising through the procurement cycle, and document how they are to be dealt with and by whom.

Once individual costs has been estimated and linked to project activities or milestones, an overall project budget can be developed. This linking enables monitoring and reporting on a regular basis of actual expenditure against the planned expenditure. Depending on the size and complexity of the project, information on actual project expenditure can be maintained by the Project Team (for small projects), or by using the SMI and UQ financial management information system, where cost coding can be used to uniquely identify project expenditure (for large and/or more complex projects).

Any changes to the initial project budget that are approved through formal change control by the Project Sponsor and/or Project Steering Committee should be documented, and any issues that arise as a result of the budget or the funding arrangements can be recorded for later reference during a debrief and close out of the project. Refer to the SMI and UQ budget guidelines for further information.

7. Reporting your Status (Progress)

Formalised regular reporting on the status of the project is an integral part of the management of the project. Both internal SMI (Program Leader and/or Program Steering Committee) and external governance (Project Sponsor and/or Project Steering Committee) need to be properly informed about the status of the project in order to make appropriate decisions. The Project Manager should establish this reporting as part of the management controls for the project (Project Controls Part B).

Note that sometimes project reports are generated and they are immediately out of date. The purpose is a point in time check and verification based on the most accurate information. Normally external reports are provided at key milestones, whilst internal reports are provided on a more regular basis to inform SMI decision making and internal risk management processes:

Developing a Project Status Report provides an opportunity to assess how much progress the project is making to achieve the agreed project milestones. It also reports on how the budget is tracking against actuals and identifies any issues or risks that may require action. This constitutes an objective review of the project’s progress against the agreed scope.

Another purpose of the Project Status Report is to provide an ongoing history of the project, which is useful for tracking progress, evaluation and review. Project Status Reports are used during any formal project review/debrief, both during and after completion of the project.

The following areas are suggested, as the minimum information the report should include:

• **Overall status of the project**
  This should include description; milestones progress by activity for the last reporting period; key activities or milestones for the next reporting period and impact of achievement/non-achievement of milestones for the remaining period of the project;
• **Budget report**
  Reporting on planned expenditure, actual expenditure deficit/surplus and revenue against planned project delivery, if appropriate;

• **Risk management report**
  Specifying any changes to the major risks identified since the previous report, and modification to the strategies put in place to manage them; any new risks that have arisen since the last report (these should also be identified in the updated Risk Register);

• **Issues report**
  This should include areas of concern, specific problems and any action/decision that needs to be taken by the Project Sponsor and/or Project Team as identified in the Issues Register;

The frequency of external status reporting will vary, depending on the size of the project and the requirements of the Project Sponsor and/or Project Steering Committee. For large and/or more complex projects the Project Status Report forms an integral part of the project, as information for the reports is drawn from the project management processes (e.g. financial systems) in place for the project.

Team meetings are a good way to get status reports and can be brief 15 minute stand ups on a regular basis or a more detailed hour session. A regular team meeting agenda might include:

- Where are we up to in terms of our deliverables?
- Are there any new risks or issues that have emerged?
- What have we got coming up?
- How are we tracking against budget and resource estimates?

8. **Managing Risks**

8.1 **What is a Risk?**

Risk refers to any factor (threat or opportunity) that may adversely or positively affect the success of a project in terms of realising the agreed Project Outcomes, delivery of Project Deliverables, achievement of timeframes or meeting budgetary constraints.

A risk cause may produce a risk event which may affect an objective

![Image from Axelos – PRINCE2 (2011)](image)

There are always risks associated with a project. Successful project managers try to resolve risks before they occur, through a systematic risk management process.

The purpose of risk management is to ensure levels of risk and uncertainty are identified and then managed in a structured way, so any potential threat to the delivery of outputs (level of resourcing, time, cost and quality) is appropriately managed to ensure the project is completed successfully.
8.2 Risk management process

Risk management describes the processes to identify, analyse and respond to project risk. It includes risk identification, risk assessment, planning for mitigation and the implementation of the risk treatment.

Risk management processes are progressive throughout the life of the project and should be built into the project management planning and activities. Structured, proactive risk management allows risks to be anticipated and the effects minimised rather than taking a reactive approach to events as or after they occur, which can be costly.

Risk management is initially conducted during the Opportunity Identification phase when assessing the project concept’s viability. It is then reassessed again as part of Project Development processes prior to the formal proposal being developed and submitted to the sponsor. Risks should be reviewed regularly throughout the life of the project to ensure that changing circumstances are tracked and managed.

9. Managing Issues and Changes to Scope

9.1 Managing issues

Issues management and risk management are closely linked, as some risks, if not managed, may become issues. An issue is a present problem or concern influencing organisational objectives. In other words, an issue is raised when circumstances change that negatively impact project delivery.

A simple process for dealing with issues is to follow the simple five stage process (see below) ensuring all formal issues are logged in the issue register, or informal issues logged in your notebook or diary as a record of what it was and how it was dealt with:
9.2 Managing changes to scope

No matter how well a project is planned, there are likely to be unforeseen circumstances or issues that simply cannot be determined up-front. Change is often unanticipated and occurs regardless of the level of competency and preparation of the Project Manager. In research projects the definition about the outcomes are not wholly planned, as they tend to emerge over time as the research develops.

Under this Handbook, ‘scope creep’ or unmanaged change is defined as any modification to the scope of a project that has not been authorised or approved by the appropriate individual or group.

Project Managers must seek endorsement or approval from their Project Sponsor for a change of scope that changes contracted milestones. A scan of original contracted scope and the changes will assist in knowing what level of impact the changes will have and whether or not they need to be requested in the first place. Consequences of scope changes might include:

<table>
<thead>
<tr>
<th>Scope change</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased funding</td>
<td>Improve output quality and/or number or Reduce timeframe</td>
</tr>
<tr>
<td>Reduced funding</td>
<td>Compromise output quality and/or number (therefore timeframe can be reduced) or Maintain timeframe at no additional cost (and maintain output quality and number)</td>
</tr>
<tr>
<td>Timeframe increased</td>
<td>Possibly reduce budget or Improve output quality and/or number at no additional cost</td>
</tr>
<tr>
<td>Timeframe reduced</td>
<td>More funding required (to engage more resources) or Increase resources (personnel) at reduced cost per unit and/or Compromise output number and/or quality</td>
</tr>
<tr>
<td>Additional or new outputs required</td>
<td>More funding required and/or More time required</td>
</tr>
</tbody>
</table>
Unplanned change does not have to be unmanaged. The project’s quality controls document (Part B) should include processes for gaining agreement as to how emergent and unanticipated issues can be addressed.

In practice, dealing with such issues within the scope of a project involves:

- anticipating and planning for possible changes through risk analysis and developing contingency plans (elevated or new risks may determine if the change is acceptable);
- keeping track of emerging or unanticipated issues through issues management procedures;
- bringing issues which could have a major impact on the nature or substance of the project to the Project Sponsor and/or Project Steering Committee so they can re-evaluate the project or make adjustments; and
- using an iterative process of change within the scope of a single project, with approval for the changes carefully documented in approved variations through the Project Contract.

It is essential to gain documented agreement to any change in project scope from the Project Sponsor by seeking a variation to the contract.

### 10. Managing and Reviewing Quality

The purpose of quality management in projects is to ensure that the project is managed within a quality framework and that Project Deliverables are delivered fit-for-purpose

Fitness-for-purpose relates to the features by which the quality of an output is determined. In other words, what criteria will be used to test whether the Project Deliverables meet the needs of the Project’s Sponsor and stakeholders, and will in turn enable Project Objectives to be realised.

Having a well defined scope of work and project deliverables is essential for quality to be assessed. Fitness-for-purpose is achieved by ensuring:

- that all project management processes are conducted in a quality manner; and
- by developing quality criteria for the Project Deliverables themselves.

When determining the appropriate level of quality, it is important to look at this in the context of project risk (e.g. if a lower level of quality is applied to the project, will this lead to new risks or will it change the likelihood and/or impact of current risks?) It is also important to look at this in consultation with key stakeholders (e.g. Project Sponsor, Research Ethics and Standards Committee’s etc). Any decision to alter quality standards should also take into account the impact on other project constraints, such as time and cost.

Effective quality management increases the likelihood that a project is delivered within agreed time and cost constraints. It decreases the risk of Project Deliverables not being fit-for-purpose by ensuring key stakeholders agree on the quality criteria.

### 10.1 Quality Control

<table>
<thead>
<tr>
<th>Output quality increased</th>
<th>More funding required and/or More time required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output quality reduced</td>
<td>Less funding required and/or Less time required</td>
</tr>
</tbody>
</table>
Quality control is about determining if the Project Output can do what it was intended to do and whether it meets identified business needs, expectations and requirements of the Project Sponsor(s) and other key stakeholders. It requires consensus with the Project Sponsor(s) and other key stakeholders about how the outputs will be delivered through the development and utilisation of the Project Deliverables. How Quality will be controlled is documented in the **Project Control Plan (Part B)**.

While there is a cost associated with quality control, it is generally more expensive to rectify a defect or fault in a Project Output at the end of the process than if the problem had been identified during the planning and development process.

Quality control of Project Output processes is also an effective preventative strategy to manage the risk profile of a project. A reduction in Project Output quality (fitness-for-purpose) is usually a consequence of a particular risk being realised (eg inadequate funding to complete the project caused by cost increases due to poor quality materials).

When quality management is effective, there will usually be areas identified of the project that are identified through regular checks where improvement in order for the project to meet the agreed level of quality. These identified improvements (changes) are then implemented through managing project change control or contract variation processes.

By incorporating regular peer or technical reviews of project management processes and Project Output development processes, quality improvement can be undertaken throughout the life of the project. At the SMI this would be determined by the Lead Chief Investigator with reference to the Program Leader. Sometimes the independent reviewers will be external to SMI and need to be procured separately for this task.

Quality improvement in project management can be assisted further through end-of-project and post-project reviews and debriefs that help to capture lessons learned.

### 11. Where to get more assistance

Improving project management practice takes time and a lessons learned approach. There are some resources available on the SMI Intranet under Project Management Lifecycle.

You can also get support from:

- Finance
- Legal
- Portfolio Support Office
- Research Partnerships Manager
- Business Manager