



Project Governance - TSOP-15

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2	2015-07-24	Second Release	B. Jennings
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5	2019-03-26	Minor changes: proponent -> project leader, role of each Gate Reviews, more details on Graded approach	E. Guetre
5	2021-04-19	Release 5 confirmed as compliant with N286-12	V. Saenz Balderas
6	2021-11-23	Baseline at Gate 2; added Director's Review, Director/CEO not a Sponsor; Director/CEO's letter after successful Gate 0 and 2	E. Guetre

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1 PURPOSE AND SCOPE

Purpose: This document describes how a TRIUMF project is governed from conception to completion, to achieve success. Success is defined as delivering on a project's objectives, safely, on time and on budget.

Scope: The document applies to all projects requesting or using TRIUMF. For multi-institution projects, it is the TRIUMF component that is subject to this document, not the whole project.

Project management is an organizational tool and its application requires sound judgement, given the diversity of projects and the requirements of TRIUMF's quality management system.

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2 REFERENCED DOCUMENTS

2.1 TRIUMF References

- [Project Management Oversight Group - Terms of Reference - Document-24703](#)
- [Gate Review Report for Projects \(Template\) – Document-53865](#)
- [Status Review Report Template \(Project\) – Document-135128](#)
- [Project Initiation Sheet – Document-119917](#)

2.2 Abbreviations

- ALD – Associate Laboratory Director
- CFI – Canadian Foundation for Innovation
- FMEA – Failure mode and effects analysis
- HAZOP – Hazard and operability study
- PI – Principal Investigator
- PIS – Project Initiation Sheet
- PM – Project Manager
- PMO – Project Management Office
- PMOG – Project Management Oversight Group
- TSOP – TRIUMF Standard Operating Procedure
- WBS – Work Breakdown Structure

2.3 Projects at TRIUMF

TRIUMF distinguishes between operational and project commitments, both of which are maintained in Workday¹

Operational commitments are ongoing and typically the same from year to year. Sometimes, a new operational commitment is created upon the completion of a project that has ongoing operational requirements².

In general, a project is a *“temporary endeavor undertaken to create a unique product, service or result. A project is temporary in that it has a defined beginning and end in time, and therefore defined scope and resources”*³.

Projects at TRIUMF cover, among others, accelerators, experiments, plant and support systems, information technology, civil construction, and conferences. As a minimum threshold, any project that plans to use more than 0.5 FTE years of TRIUMF staff or more

¹ Workday is TRIUMF's enterprise management system for HR and Finance.

² Initial operational requirements are initially defined in the Project Initiation Sheet and later refined by the project.

³ Source: PMI's Project Management Book of Knowledge

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than \$100k total cost will by default require a TRIUMF project commitment. Projects below the threshold may still require a TRIUMF project commitment, depending on the project's importance or risk level.

For multi-institutional projects, the TRIUMF portion of the project is the project commitment.

2.4 Size and Importance

Table 1: Project Importance and Size

Importance	
Crucial	A project whose outcome is critical to TRIUMF's mission. It is usually funded externally, with funding agencies having cash flow and milestone expectations. TRIUMF's mission and ability to secure future funding is at stake.
High	A project whose outcome is important to TRIUMF's mission but that can be delayed to meet the needs of crucial projects. It is often funded externally.
Medium	A project of lesser importance to TRIUMF that will have resources supplied when available and usually funded internally.
Low	A project with no external expectations. It is internally funded with no time constraints. The outcome, and thus the value is uncertain. It could result in nothing, or it could be a first step in something big.

Size	
Large	A project with TRIUMF related portion of the budget exceeding \$10M CAD. Large projects are usually technically or scientifically complex.
Medium	A project with TRIUMF related portion of the budget between \$1M and \$10M CAD. Medium projects may be technically or scientifically complex.
Small	A project with TRIUMF related portion of the budget less than \$1M CAD (but more than \$100k CAD). Small projects are not usually technically or scientifically complex.

3 ROLES AND RESPONSIBILITIES

3.1.1 Director/CEO

The Director/CEO determines the mission and objectives for TRIUMF and sets the priorities for the laboratory, both for operations and for projects. As final arbitrator for the allocation of resources, the Director/CEO will not normally be a Sponsor for a project.

3.1.2 Director, Project Management

The Director Project Management provides guidance on project management, tools and techniques.

3.1.3 PMOG

The Project Management Oversight Group has the following Terms of Reference, [Document-24703](#). PMOG will be the committee deciding on Gate 0 and may elect to be the committee for Gate 1 or even follow-on reviews, if a project is risky or critical. The Director Project Management is the chair of PMOG.

3.1.4 Project Sponsor

The Project Sponsor is the TRIUMF ‘customer’ for the project and ultimately accountable for the project, by setting parameters for project scope, budget and timeframe, as well as influencing the project’s importance. The Project Leader reports to the Project Sponsor. The Project sponsor is not part of the Project team. The Project Sponsor may be a member of the TRIUMF Leadership but may also be a Department Head or Group Leader, depending on the size of the project. Table 2 is a guideline for assigning project sponsorship.

Table 2: Recommendation for Project Sponsor

Importance → Size ↓	Crucial	High	Medium	Low
Large >\$10M	Deputy Director	Deputy Director or ALD	ALD	ALD or Department Head
Medium \$1-10M	Deputy Director or ALD	ALD	ALD or Department Head	Department Head or Group Leader
Small <\$1M	ALD	ALD or Department Head	Department Head or Group Leader	Group Leader

A Project Sponsor is often in a position of control or influence with respect to allocating resources and budgets to a project and sets objectives that are in-line with TRIUMF’s mission and priorities. The Sponsor should escalate to PMOG any serious issue outside of his or her purview.

The Sponsor will decide on exceptions to TRIUMF process, escalated by the Project Leader, for example the decision to spend money on a very long-time item prior to the Gate 2 review. As required, the Sponsor should consult with the Director, Project Management for advice on handling process exceptions.

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For CFI projects, the TRIUMF Sponsor needs to work closely with the external Principal Investigator (PI) and the TRIUMF Project Leader to ensure that TRIUMF’s objectives and capabilities are in-line with the PI organization’s expectations.

3.1.5 Project Leader

The Project Leader is responsible for justifying the project, demonstrating its technical feasibility, and defining its scope. The Project Leader is responsible for securing, with the support of the Project Sponsor, internal and/or external resources for the project. For projects that involve external project partners (e.g. collaborations) the Project Leader takes responsibility for securing and delivery of third-party commitments to the TRIUMF component of the project.

The Project Leader leads the project initiation and definition including preparation of the Project Initiation Sheet. He or she participates in project planning and in developing the Project Plan.

The Project Leader supports the Project Manager or, for smaller projects or small TRIUMF components of a larger external projects, acts as Project Manager. The Project Leader assists with major issues, problems, and policy conflicts; removes obstacles; determines the scope; approves minor scope changes; and signs off on major deliverables.

The Project Leader represents the project in Gate and Status Reviews.

The Project Leader will typically be the account holder for the budget and sign off on weekly timesheet submissions.

The Project Leader will also get agreement from the Sponsor on any process exceptions, such as starting spending on very long lead time items prior to Gate 2.

The Project Leader also ensures their Gate Review status on Workday is up-to-date.

3.1.6 Project Manager (PM)

The Project Manager is responsible for delivering the approved project scope on time and within budget, safely. The Project Manager develops the Project Plan together with the Project Leader and the project team and manages the team’s performance of the project tasks. It is also the responsibility of the Project Manager to secure acceptance and approval of deliverables from the Project Leader, Project Sponsor and other stakeholders. The Project Manager is typically an account holder or alternate for the project budget.

The Project Manager is also responsible for tracking and communicating project progress including issues and risks that are or may be affecting schedule, budget, or technical objectives. He or she escalates issues that cannot be resolved in the team to the Project Leader and the Project Sponsor. He or she also works with the finance department to prepare project spending reports.

The Project Manager should have an appropriate level of project management training and experience.

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For large and complex projects, the role of the Project Manager may be distributed to several individuals in the framework of a Project Management Office.

Details for the project governance, including the authorization of the Project Manager in managing schedule and resources, must be laid out in the Project Plan.

The Project Manager is either a full-time member of the TRIUMF Project Management Office (PMO) and reports directly to the Director Project Management, or is assigned on a part-time basis to the project from any of TRIUMF's Divisions or the Directorate. In the latter case, the Director Project Management provides dotted-line management and guidance for setting project specific goals and provides input into performance reviews.

For Small- projects and some Medium-sized projects, the Project Leader may also be the Project Manager.

The Project Manager is usually nominated between Gates 1 and 2.

3.1.7 Project Team Member

An individual is assigned by his or her Line Manager to work on a project, for a given time-period and percentage allocation, based on the request from the Project Leader or Project Manager.

3.1.8 Review Chair

Each project commitment has a Review Chair who is responsible for organizing and leading the Gate and Status Reviews from Gate 1 through Gate 4B. Dates for the reviews are determined in consultation with the Project Leader and Project Manager. The Review Chair is guided by this document and the Gate Review Template ([Document-153865](#)) and should ensure, in consultation with the PMOG chair, that reviews are carried out at a level of detail appropriate for the size and importance of the project.

It is recommended that the Sponsor also be the Review Chair. This ensures that the Sponsor fulfills his or her role of being ultimately responsible for the Project, plus can act quickly to resolve issues within his or her purview.

3.1.9 Principal Investigator

For some Projects with external funding, for example CFI projects, a Principal Investigator (PI) from another institution obtains the funding. The Project Leader or Project Manager may report periodically to the PI on expenditures, progress, risks and milestones.

The PI also collaborates closely with the TRIUMF Sponsor to ensure that the external institution's expectations for the project are in-line with TRIUMF's goals and capabilities.

3.1.10 Review Committee

For each project commitment, the Review Committee is responsible for carrying out the Gate and Status Reviews under the leadership of the Review Chair. The Review Committee is usually a standing committee that will convene for all Gate and Status Reviews, except Gate 0⁴, which is assessed by PMOG. The Review Committee's function is to audit a

⁴ Gate 0 decisions are documented in PMOG meeting minutes: Docushare Collection-20524.

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project's status, with respect to the gate review criteria and terms of reference (section 4.2). On occasion, a project may not be ready to move to the next stage. In that case, the Chair of the committee, if it is the Sponsor, should intervene to help the project team move forward. If the Chair of the committee is not the Sponsor, then the Chair needs to inform the Sponsor and Project Leader that action is required to help the team move forward. Some issues, outside the purview of the Sponsor, may need to be escalated to PMOG.

The composition of the Committee is determined by the Project Sponsor, in consultation with the Project Leader. The Review Committee must have members external to the Project Team, plus have enough knowledge and experience to properly evaluate a Project's status with respect to the Gate Review criteria. The Committee may also have one or more members external to TRIUMF, such as the Principal Investigator or an expert from another institution, for example for a Large project of Crucial Importance.

In some cases, and at Gate 0, PMOG may elect to also be the committee that reviews Gate 1. One reason for this may be expediency, for a time-critical project, because PMOG meets bi-weekly while forming a gate review committee might take months. Another reason may be that the project's scope and deliverables are considered crucial and affect all TRIUMF divisions, such that all ALDs want a say in the project's Gate 1 approval. At its discretion, PMOG may decide to keep being the review committee, for a given high-risk or high-visibility project, for some or all of the gate reviews.

3.1.11 Line Manager

In a matrix organization like TRIUMF's, functional Line Managers manage teams that look after operations, maintenance and administration⁵. Line Managers are administratively responsible for their people and assign work based on TRUMF priorities.

Project Leaders and Managers need to request human resource, to work on work packages or to be assigned to a project, directly to Line Managers or via work requests, whichever is appropriate. The resource assignment made by the Line Manager must be consistent with TRIUMF priorities, as determined by the Director/CEO.

3.1.12 Project Management Office

The TRIUMF Project Management Office (PMO) is a part of the TRIUMF Directorate and reports to the Deputy Director, Research. The mandate of the PMO includes:

- Project Management support for TRIUMF project commitments
- Oversight of and reporting on TRIUMF project commitments
- Creation of a toolkit (software, processes, metrics, templates, etc...) for project management at TRIUMF
- Development, delivery and promotion of training of project management and coordination skills, for all applicable TRIUMF staff
- Maintain high level metrics to keep track of project progress
- Getting updates from projects on progress
- Assisting projects that need help

⁵ TRIUMF's organizational charts: <http://www.triumf.ca/home/about-triumf/governance-organization/organizational-structure>

4 PROCESSES

4.1 Project Stages and Gates

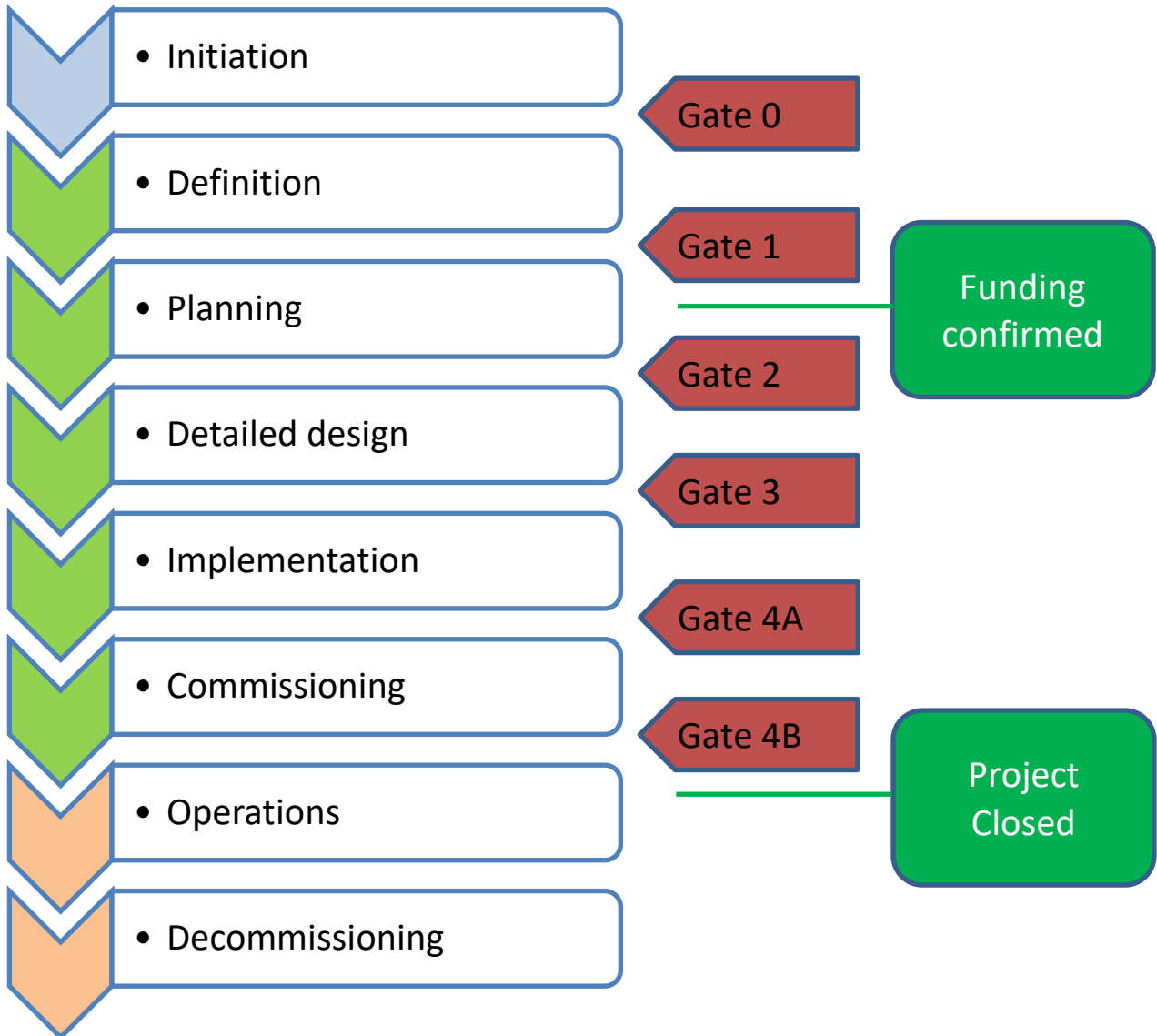


Figure 1: TRIUMF Project Management Gate Process.

TRIUMF follows a project management process with Gate reviews in between project stages. Pre-Project is the Initiation. The Project starts at the Definition stage and ends after the Commissioning stage is complete. Post-project is Operations and then eventually De-commissioning.

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A Gate Review will determine if the project is ready to move forward to the next stage. For Small- and even some Medium-sized projects, the Project Leader, in consultation with the Sponsor, may agree to combine Gate Reviews, if appropriate. For example, the review for Gates 1 and 2 may be combined if the definition and planning stages for the project are relatively simple or substantially overlap.

A Status Review is any review in-between Gate Reviews that is deemed necessary by the project leadership (Project Leader and Manager) in consultation with the Project Sponsor.

It is the Director/CEO's prerogative to request a Status Review, known in this case as a Director/CEO's Review, for any project that the Director/CEO believes requires it.

4.2 Terms of reference for each gate review

The following questions form the terms of reference, for each gate review.

Gate 0: Has merit for TRIUMF and in-line with strategy?

Gate 1: Clear project objectives, deliverables, and top level requirements?

Gate 2: Technical concept reviewed and accepted, and the basis for cost and time estimates. Ready for baselining the budget and schedule?

Gate 3: Detailed design is done, ready for manufacturing and/or procurement?

Gate 4A: Ready for commissioning?

Gate 4B: Project complete and ready for operations?

The criteria for each gate review are in the template for a gate review report, [Document-153865](#).

4.3 Director/CEO's letter after Gate 0 and 2

Upon a successful Gate 0 review and Gate 2 review, the Director/CEO will send to the project's Leader, Manager and Sponsor (cc Director Project Management) a letter to state TRIUMF's support, expectations and any conditions.

The Director/CEO is notified of a successful Gate 0 review by virtue of being part of PMOG. For a successful Gate 2 review, the Director/CEO is notified by virtue of being on the email distribution list for a gate review report that is approved and released on Docushare.

The letter after a successful Gate 0 will typically affirm that the project has merit for TRIUMF and is in-line with TRIUMF's strategy, plus state any conditions. The letter after a successful Gate 2 will re-state the baseline budget and schedule milestones, affirm the commitments (people, funding, spaces) from TRIUMF, and state any conditions.

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4.4 Deliverables per Gate, a Graded Approach

The template for a gate review report, [Document-153865](#), lists the key questions for each Gate and the required deliverables due no later than at the Gate Review. The optional deliverables need to be considered as the project’s complexity (typically correlated with the size) increases.

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Projects that are Small or even some Medium-sized projects may decide, in consultation with their sponsor, to speed up the process by combining one, two or three gate reviews into one.

Because sometimes funding is spread over several years or a project is in fact funded in several distinct tranches, a project may be purposely divided into parts, for example one project stopping at the Planning stage then later another project doing Implementation, Commissioning and handing over to operations. Good judgement is needed to decide which gate review criteria from the previous project are considered to be completed for the follow-on project.

4.4.1 CFI Projects

The work to prepare for and submit a CFI application happens between Gate 1 and 2. A project team must develop a concept sufficiently well to be able to adequately prepare a proposal, including a resource-loaded schedule and a budget based on cost estimates (see Section 5.2). For CFI projects, the budget is typically submitted via an external PI, belonging to another Canadian institution affiliated with TRIUMF (see right-hand diagram of Figure 1).

The figure below shows the steps to get from Gate 1 to Gate 2, for a CFI project. The template for a TRIUMF review of a CFI funding finalization is [Document-153866](#). It is important that the PI and Sponsor be part of this review, to ensure that the expectations of the external institution(s) are aligned with TRIUMF’s goals and capabilities.

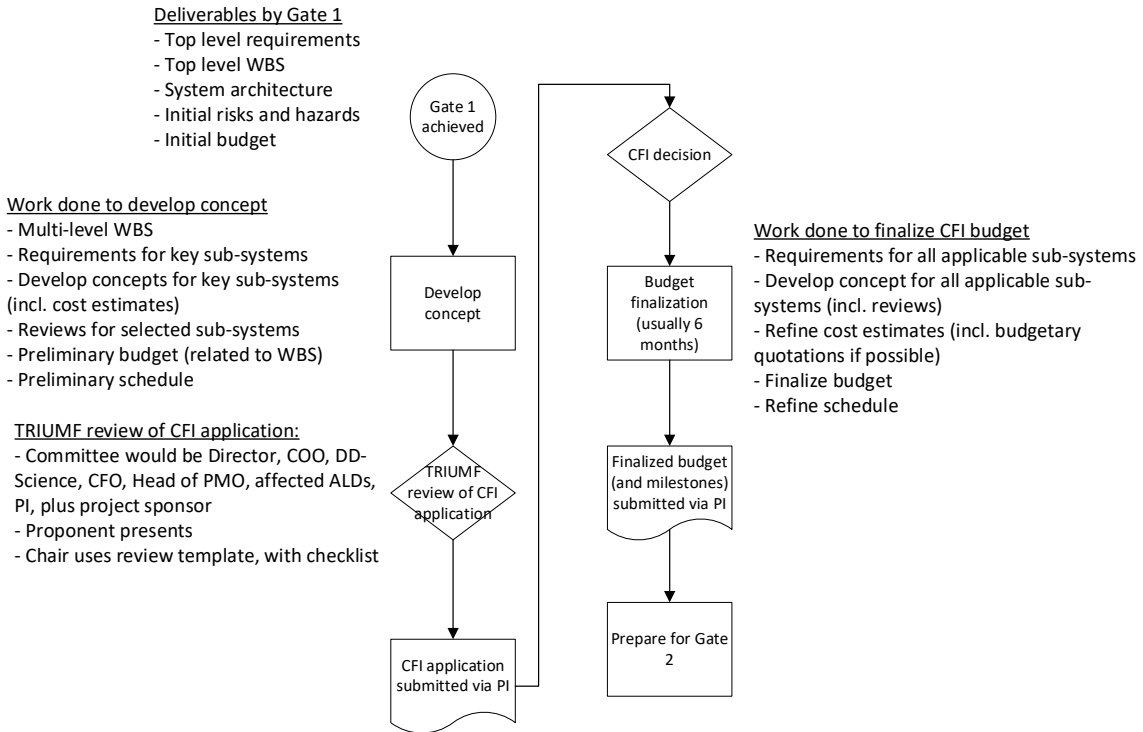


Figure 2: Typical workflow between Gate 1 and 2 to prepare a CFI application and finalize the budget.

4.5 Relationship to other TSOPs

Table 3: How other TSOPs Fit with the TRIUMF Project Management Process

Stage	Stage	Stage Description	TSOP
Pre-Project	Initiation	Initiate Project	
Project	Definition	Define Project	TSOP-01
	Planning	Develop design and project plan	TSOP-01
			TSOP-06
	Detailed Design	Complete design and project plan	TSOP-01
	Construction	Construct the device or facility	TSOP-06
TSOP-04			
TSOP-05			
Commissioning	Commission the device or facility	TSOP-06	
		TSOP-13	
		TSOP-01	
Post-Project	Operating	Operate the device or facility	TSOP-04
			TSOP-11
	TSOP-12		
Decommissioning	Decommission the device or facility	TSOP-01	

4.6 Gate Review Responsibility Chart

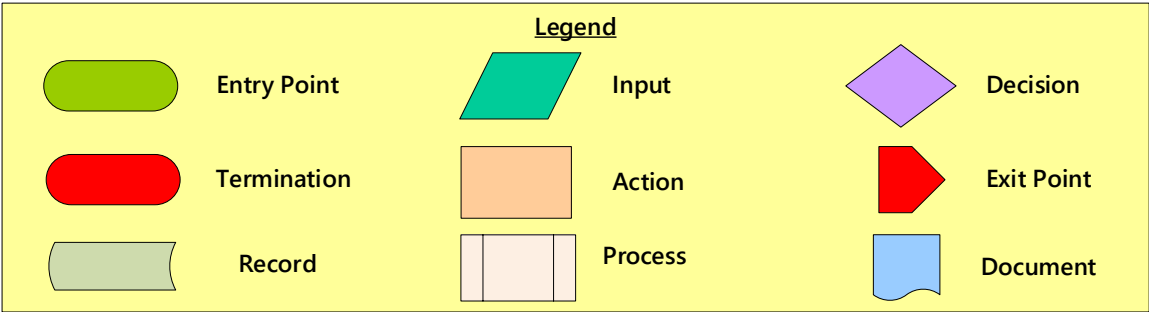
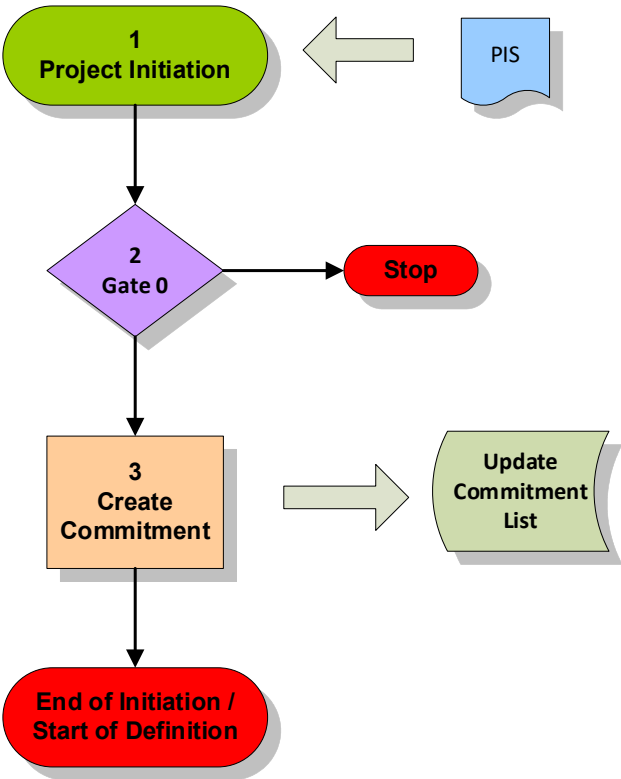
Table 4: Roles and Responsibilities for a Gate Review

R = Responsible A = Accountable C = Consulted I = Informed	Director/CEO	Sponsor	Committee ⁶ chair	Review committee	Project Leader	Project Manager	Project team	Deputy Directors	Members of PMOG	Document controller
Work on gate review deliverables		A			R	R	R			
Organize gate review		C	R	C	C	C	C			
Hold gate review		I	R	I	R	R	C			
Write gate review report		I	R	C	I	I				
Gate review report release	I	I	I	I	I	I	I	I	I	R
Respond to review recommendations		A	I	I	R	R	C			

⁶ The gate review committee chair may also be the project sponsor. For many cases, the project sponsor will be the Project Leader's ALD.

4.7 Process Flowcharts

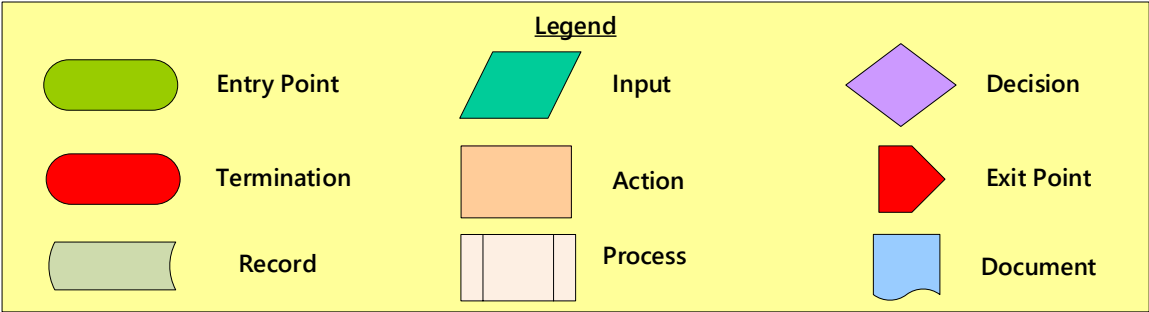
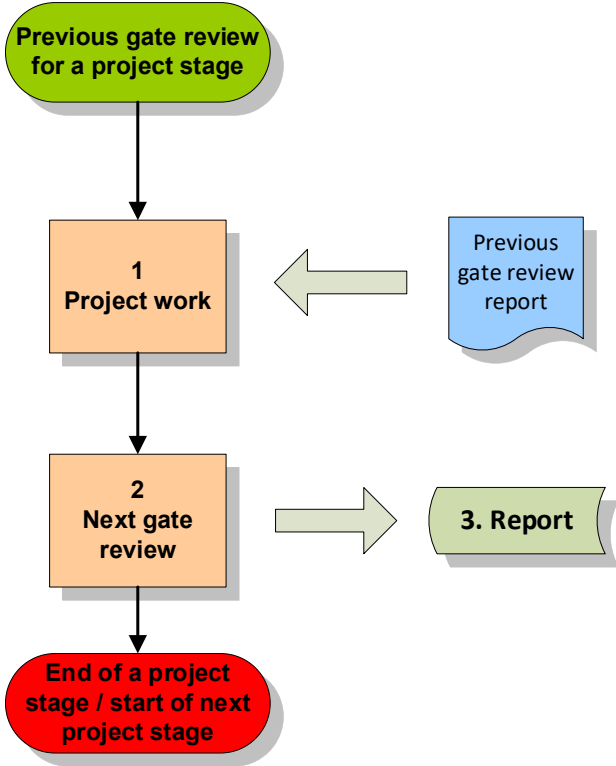
4.7.1 Project Initiation



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Action	Responsibility	Key Points
1. Email the project initiation sheet to projectmanagement@triumf.ca	Project Leader	PIS Template: Document-119917
2. Gate 0 review	PMOG chair PMOG is the committee	Gate 0 is a decision point, where a project is approved or is stopped. Gate Review Template: Document-153865
3. Create a project commitment in Workday	Director Project Management	

4.7.2 Process between Gate Reviews



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Action	Responsibility	Key Points
1. Carry on the project work	Project Leader, Project Manager, Project Team	Considering actions and recommendations from the previous review report
2. Gate review	Chair will usually be the sponsor and will form the Committee	Post-Gate 0, a gate review is accepted or rejected. Acceptance can be conditional on fulfilling certain actions. Rejection usually means that a re-review will be planned, once certain critical actions are fulfilled.
3. Create the report and have it released	Chair	Gate Review Template: Document-153865

5 APPENDIX A: PROJECT MANAGEMENT TOOLKIT

All templates referenced to in this section are on DocuShare's "Project Management Toolkit", [Collection-21886](#).

5.1 Gate Reviews

Use this template ([Document-153865](#)) to prepare for a gate review. The Project Sponsor will normally be the chair of the review, is responsible for forming a review committee, and is responsible to fill the report (using the template) plus have the report released. A gate review is either accepted or rejected. A review that is accepted will commonly also have actions that need to be fulfilled, either by a certain date or by the next gate review. A review that is rejected will commonly have to be re-scheduled, pending specific actions to be fulfilled. The chair of the review is expected to follow up with the action item owners.

5.2 Cost Estimation

5.2.1 Work Breakdown Structure

A proven method to estimate cost is to de-compose the project's deliverables and activities using a work breakdown structure (WBS). Deliverables are often fabricated or procured, while activities are done by human resources.

The following are characteristics of a WBS:

- covers all the project work, technical or management, and all the deliverables, hardware or software
- de-composed into the smallest work package that can be reasonably done by an individual, team, partner or vendor

Cost is then estimated for each lowest level WBS items, the sum of which will be the integrated project cost.

This template, [Document-154816](#), can be used to develop the WBS.

5.2.2 Quality of Cost Estimates

For hardware and software:

High quality	Catalog item
	Non-expired vendor quotation
	Based on identical and recent purchase
	Includes installation cost, currency conversion, taxes, transportation and inflation
Medium quality	Expired vendor quotation
	Vendor budgetary estimate
	Based on similar and recent purchase
	Based on industry standard
Low quality	Based on a purchase that is several years old
	Parametric estimate (example 1: the cost of concrete is \$XX/yard and we need 50 yards; example 2: it takes the welder 30 minutes per weld, and our structure has 50 welds)

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For human resources, it may be difficult to estimate the time needed to complete certain activities because these activities are new to the organization. In this case, conservative estimates by senior personnel are probably the best possible type of estimate. Higher quality estimates are those that are based on past timesheet data or those estimated by experts.

5.2.3 Cost Considerations

When calculating the total cost for an item, consider the following:

- Inflation (for example, assuming 2% inflation per year if the purchase is planned more than one year in the future)
- Currency exchange rate fluctuations
- Packaging costs (for example, a custom shipping crate needs to be built)
- Transportation costs
- Transportation insurance (to cover theft, damage, accidents)
- Costs to clear Customs (example, find out what TRIUMF's customs broker normally charges for a scientific item originating from overseas)
- Installation costs
- Taxes & fees

5.2.4 Building a Budget using the WBS

It is recommended to use the WBS as line items in the budget, to make it easier later to manage changes in scope. Examples: a small or medium project would have one account, with sub-accounts corresponding to 1st level WBS items. A large project would have accounts that correspond to 1st level WBS items and sub-accounts that correspond to 2nd level WBS items. The TRIUMF PMO has developed a template, [Document-154816](#), for a WBS.

5.3 System block diagram and key interfaces

A system block diagram is useful to illustrate how the major components of your systems are connected and for showing your system's external interfaces. Defining these internal and external interfaces early in the project, for example by Gate 2 before detailed design starts, will help to prevent future integration problems.

[Document-154268](#) is an example of a generic system block diagram. In this example, each inter-connecting line represents an interface that should be defined, ideally before Gate 2.

5.4 Requirements

More information at this link:

https://www.triumf.info/wiki/internal/engineering/index.php/Requirements_Specification

5.5 Resource-loaded Schedule

TRIUMF uses MS Project 2016 as the scheduling tool for projects.

The schedule is as a basic management tool and consists of a list of tasks (activities), milestones (events) and deliverables. Resources are allocated to project tasks, not to

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milestones or deliverables. Human resources are planned by referring to named individuals if known, or using “generic resources”, which are professional categories.

The TRIUMF Resource Pool file for MS Project is [Document-154179](#). The instructions on how to use this file are in [Document-154182](#).

5.6 Managing Risks and Hazards

5.6.1 Risk Management

All TRIUMF projects need to identify, assess and mitigate risks (see TRIUMF Enterprise Risk Management Program - [Document-134918](#)). Specifically, Medium- and Large-sized projects should be systematic and use a Risk Register. The recommended template is [Document-135160](#).

When using the template, the project manager should first involve other project stakeholders, to modify and agree on the Severity Criteria tab of the template, according to thresholds that make sense for their project.

The recommended frequency to re-assess risks and follow up on mitigating actions is bi-monthly.

5.6.2 Hazard Analysis

Refer to this template, [Document-24611](#), for a list of potential hazards, and use the template if your project has any hazards that need avoidance or mitigation.

5.7 Project Plan

Medium-sized projects may need a written plan and certainly Large-sized projects do need one, to inform stakeholders and team members of what the project’s objectives are, plus how the project will be organized and controlled. The template is [Document-135233](#).