



**Science & Technology
Facilities Council**

The STFC Project Management Framework

Version 5 – June 2017

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1 Overview

1.1 Introduction

This document sets out the programme management framework within which projects are appraised, funded and managed by STFC and must be followed for all funded projects and programmes. It is intended as a reference for anyone involved in the development and execution of an STFC-funded project, including participants from non-STFC organisations (e.g. universities), and for all other projects managed within STFC.

The purpose is not to provide a comprehensive guide to project management but to set out core project management policies and principles together with techniques which have been found either to be particularly useful, or where an STFC implementation is required. The Framework is available through the [STFC intranet](#). The latest version is that available on the web and hardcopies are uncontrolled. Additional documentation has been developed for the management of [Change Projects](#) in STFC.

Participating organisations are free to develop and implement their own internal project management systems and procedures, but these must conform to the best practice laid out in this Framework. Within STFC it is the responsibility of the relevant Director to ensure that documented procedures, meeting the minimum requirements set out here, are followed for all projects in their Department or Directorate.

This framework does not describe the specific methodologies for projects funded from other sources (e.g. European Commission) although the key principles adopted by this STFC project management framework are consistent.

This Framework will be reviewed on an **annual basis** by the Project Review Committee and updated to reflect good practice and lessons learned. More detailed guidelines and advice on key aspects of project management (e.g. project planning, risk management) will be provided where considered helpful. For further information, including guidance on how to submit a project proposal to STFC, you should contact the relevant Department or nominated STFC programme manager.

1.2 Relationship to other standards

This Framework reflects government and industry best practice in project management and is based on the methodology set out in the Association of Project Management Body of Knowledge (BoK). It also takes into account, and is compatible with, other recognised standards:

- BS6079 (Guidance on the planning and execution of projects and the application of project management techniques)
- ISO9001-2008: Quality Management Systems
- The HM Treasury/Cabinet Office's [Infrastructure and Projects Authority \(IPA\)](#) assurance toolkit (incorporating OGC Gateway™)
- The OGC 'Managing Successful Programmes'
- PRINCE 2™

Within central government, the Infrastructure and Projects Authority (IPA) provides the centre of expertise for major projects and is responsible for the overall project delivery process in central government, supporting complex and high risk projects, developing project skills and capability and overseeing and providing assurance on the project life-cycle. The STFC framework is intended to be consistent with the IPA assurance process and the equivalent OGC Gateway™ reviews are referenced at the appropriate points within these guidelines.

Inevitably there will be differences in detail and terminology between this Framework and these standards, but the underlying principles remain the same.

Project Management Framework

Some customer organisations, for example ESA, require that we follow their processes or use their pro forma documentation. In these circumstances the Project Specification and Project Management Plan can be used as a 'wrapper', defining where customer processes and documentation will be used and where our documentation will fill the gaps to ensure our Framework requirements are met.

1.3 Professional Development

STFC's scientists and engineers are recognised internationally for their expertise and contribution to delivering major projects and ensuring the continuing professional development of its staff is recognised by STFC as being critical to ensuring this reputation is maintained.

STFC is a corporate member of the [Association for Project Management](#) (APM) which provides access to a range of services together with the latest thinking and information about all aspects of project and programme management.

Project management is a core competence in successful project delivery and a specific training programme has been developed by STFC aligned with the APM professional qualifications and training framework. This can be booked via the RCUK SBS Oracle portal along with training for those with Project Sponsor responsibility within the STFC environment and other general project management training courses. This is summarised below.

This qualification is not offered as part of the L&D syllabus but is the responsibility of each candidate and Department to arrange

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Equivalent to International Project Management Authority (IPMA Level C)

Those who have at least three years of PM experience managing complex projects on a full time basis. This course builds on the theory explored in the Project Practitioners. Equivalent to International Project Management Authority (IPMA Level D)

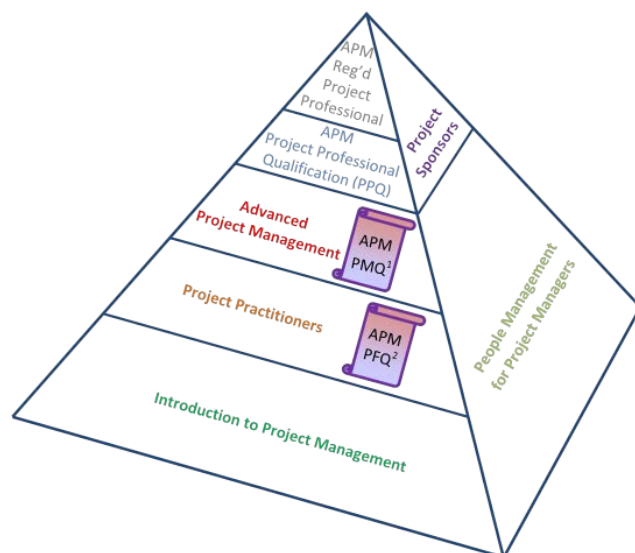
Those who are starting out on their project management career at STFC, work package managers, or managers of small projects. This course will introduce the STFC PM framework and develop your understanding of PM practices.

Those with no PM experience and who wish to gain an understanding of PM terminology, its importance in STFC and the STFC Project Management Framework

Notes:

¹ APM Project Management Qualification

² APM Project Fundamentals Qualification



The Project Practitioner course incorporates the APM Introductory Certificate in Project Management and provides a route for experienced project managers to continue their professional development through the Advanced Project Management APMP qualification.

1.4 What is a project

A project is defined under BS6079 as:

"A unique set of co-ordinated activities, with definite starting and finishing points, undertaken by an individual or organisation to meet specific objectives within defined schedule, cost and performance parameters."

If a piece of work conforms to this definition, and/or can benefit from the use of project management tools and techniques, then it should be treated as a project.

A piece of work is not a project if it consists of carrying out a well-established set of tasks, in an environment that is well understood and stable, with personnel who are experienced in those tasks; this is a routine operation although many of the techniques described here will still be relevant.

Particular examples of projects within STFC that will be covered by the corporate methodology are:

- New facilities and facility upgrades, within STFC laboratories and elsewhere
- New instruments or detectors, including as part of major international collaboration
- Commercial or externally funded contracts, including packages of work from scientific collaborations or consortia
- R&D projects, including design studies
- Other infrastructure projects

1.5 What is a Programme

A programme can be defined as a group of projects managed in a co-ordinated way to gain benefits that would not be achieved if the constituent projects were managed independently. Examples which are applicable in STFC include:

- Corporate: multiple activities and projects driving a business change initiative
- Programmatic: a portfolio of related projects managed in a coordinated way to achieve specific strategic science and technology goals
- Business cycle: projects coordinated within cyclic financial constraints such as Service Level Agreements
- Single objective: a complex multi-disciplinary project, for example building a new facility, which is best managed as a closely coupled group of projects
- Research and Development: independent projects which are managed within overall strategic R&D goals
- Partnership: where organisations collaborate to achieve a shared vision while meeting their own business objectives

1.6 STFC Programme Management Environment

STFC's programme is delivered through the Council's own facilities, universities (through grants), industry and other research institutes (through contracts) and/or in international organisations (through subscriptions). The commissioning and delivery of projects, including the design and build of new research infrastructures, are a major part of its mission to support science and innovation.

STFC-funded projects can be divided into two broad programme areas: the Science Programme, which is commissioned and overseen by the STFC Programmes Directorate (PD); and other programme activities, including facility and infrastructure development, technology or business change, which are managed and delivered internally through other STFC Directorates and Departments. Commercial and other externally funded (or contract) project work sit alongside these STFC-funded programmes and are also managed through its Directorates and Departments.

The STFC Executive Board takes an overarching view of the STFC's programme and project portfolio as part of its governance of project management. This takes into account alignment with STFC strategy and objectives, project initiation and approval, efficient and effective delivery and the means by which the executive and other stakeholders are kept informed on progress and performance. Project delivery within STFC is also reviewed by the Programmes Directorate and the National Laboratories Operations Board. STFC directorates are responsible for the commissioning, delivery and oversight of projects within their areas, subject to the structures and processes set out in this Framework document.

An advisory body structure provides independent expert advice and support to the STFC executive on major investment decisions and on its long-term strategy and priorities. The top-level strategic advisory to the STFC's Council and Executive on its science and technology programme is the [Science Board](#). The STFC Executive and Advisory Structure is described on the [STFC website](#).

Many of STFC's research projects are large, international and collaborative in nature. The UK contribution to these projects will often involve STFC's own laboratories working with the UK universities and, in some cases, projects will be managed externally to STFC. While the key principles of STFC's project management policies must be met, the approach taken to project management also has to work with that of project partners, collaborators or customers. This means that there is no "one size fits all" solution and the governance, management and legal structures need to be defined at the outset.

All projects are approved on the basis of the full cost to STFC over their whole life - from conception to completion / closure. The total cost of the project to STFC must be captured as part of the business case process and its affordability validated. STFC's [Finance Directorate](#) is responsible for policy on project costing and budgeting and on contractual, procurement and other finance matters.

The sheer scale of new research facilities and instruments are increasingly beyond the capability of individual funding agencies such as STFC in terms of scope, cost and complexity. Increasingly, this requires national (and international) cooperation, pooling scientific expertise and funding on a global scale in formal collaborations. Guidelines on the cost control and management issues associated with such large global research infrastructure (RI) projects are described in the [2010 report](#) commissioned by the European Commission.

Projects and programmes will typically have a variety of stakeholders, both individuals and groups, with different and sometimes competing interests. Stakeholder management and communications is key to effective programme management, ensuring that relationships are developed and maintained and taking account of stakeholder interests and influence. Responsibility for this rests with the programme or project sponsor and relevant programme or project manager(s).

There are important legal and commercial issues associated with undertaking project work in collaboration with other organisations or on behalf of external customers and only representatives from the [STFC Legal and Commercial team](#) are authorised to make formal offers and sign contracts/agreements on behalf of STFC. STFC can operate either as contractor (i.e. for other organisations to meet their project specification) or as contract manager (i.e. engaged by a partner organisation to effectively provide and/or lead a project) on commercial projects. The Legal team should be consulted before committing to any project work of a collaborative or contractual nature, including involvement in EU funded programmes (e.g. Research Infrastructures).

In order to meet its responsibilities and ensure project progress and performance can be tracked and controlled throughout their lifecycles, STFC has established a governance and oversight framework for project management which is described in section 3. This framework is equally relevant to individual projects and portfolios of related projects (or programme) and in each case requires an approved Business Case and Project Management Plan.

Projects funded through the STFC's baseline programme allocations should follow the processes and documentation described in this Framework. However, where the scale of investment needed exceeds or is outside the approved STFC programme, funding must be sought through the BEIS Capital Investment Programme which requires a different process.

1.7 15 Key Principles for Project Success

1	<p>Successful projects utilise a proven project life cycle model. We know what works - stick to it and ensure that best practice is implemented at the appropriate stages.</p>	<p>“Planning is an unnatural process – it’s much more fun to get on with it. The real benefit of not planning is that failure comes as a complete surprise and is not preceded by months of worry” Sir John Harvey-Jones</p>
2	<p>Insist upon a well-defined <i>Project Specification</i> that has Customer approval and sign-off. Thorough analysis and documentation of the need for project deliverables is essential. When a project results in deliverables that meet a thoroughly documented need, then there is a greater likelihood of project success.</p>	
3	<p>Fight for the time to do things right. “We always have the time to do the project over; but not the time to do it right in the first place!” Project Managers must demonstrate to sponsors and senior managers why it’s necessary to make this time available in the pursuit of quality deliverables.</p>	
4	<p>Planning is everything – and ongoing. Detailed, systematic and team-involved plans that can be easily changed to reflect the inevitable changes.</p>	
5	<p>Project Risk must be assessed, reviewed and actively managed throughout the project life cycle. All projects should be assessed for technical, safety, financial and other risks, with contingency plans developed for the more significant risks.</p>	
6	<p>Project Managers must focus on the three measures of project management success:</p> <p>Remember that these are interdependent and that the correct balance between them must be established at the outset and maintained on an ongoing basis.</p>	
7	<p>Project Managers must transmit a sense of urgency to their team members. Projects will have limited time, money and other resources available, and team members will have other priorities – keep the project moving.</p>	
8	<p>Acquire the best people available, for the project in hand, and look after them. Protect them from outside interruptions, and help them acquire the tools and working conditions to apply their talents.</p>	
9	<p>Make use of Post Implementation Reviews from previous projects. Learn from the past.</p>	
10	<p>Use trend and forecasting techniques. Understand exactly where you are, where you are to end up, where you should be and what you need to do to get you back on track.</p>	
	<p>A successful project is not just on-time & budget but must also deliver the desired outcomes. Using Key Performance Indicators (KPIs) is one technique to monitor progress and ensure benefits are realised</p>	
11	<p>Manage the inevitable changes. Formal change control procedures are a must. Evaluate all potential changes but implement only those that are beneficial.</p>	
12	<p>Deliverables must evolve gradually. Build a little at a time, obtain incremental reviews and approvals, and maintain a controlled evolution.</p>	
13	<p>Projects must obtain clear Customer approvals and formal sign-off and take account of stakeholder interests and influence. Anyone who has the power to reject or demand revision of deliverables after they are complete must be required to examine and approve them. Deliverables must also be monitored and evaluated to ensure that the benefits are realised</p>	
14	<p>Customers must be active – not merely passive - participants. Customers should help define deliverables in the early stages, and complete reviews of interim and final deliverables in a timely fashion.</p>	
15	<p>Senior management must actively set priorities. This helps provide the leadership necessary to reduce the frequency of scarce resource induced multi-project log-jams.</p>	

2 STFC Project Lifecycle

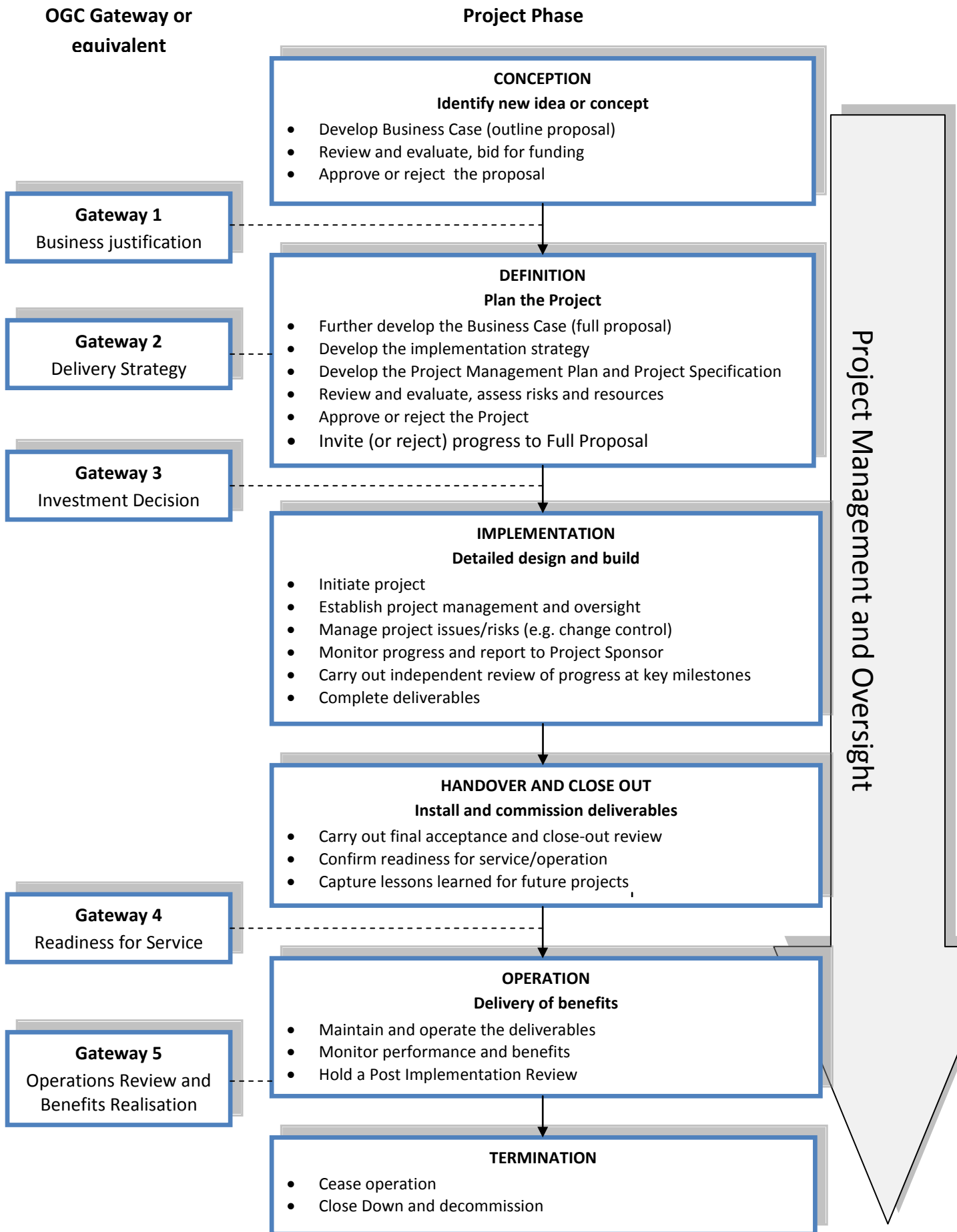
This section provides an overview of the life cycle applicable to all our projects. The relationship with the Government's Infrastructure and Projects Authority (IPA) assurance process (which incorporates the previous OGC Gateway™ review process) is also covered.

This Framework covers the core project lifecycle from its conception through to handover of the specific output to the customer. This normally consists of the design, build and installation/ commissioning of new (or upgrades to) science instruments and facilities, and also includes R&D activities (e.g. design studies, prototyping). The completion of a project will normally be defined by a specific deliverable, for example, a new detector, instrument or beamline. Final acceptance by the customer will normally follow the successful commissioning of the project but performance will continue to be monitored and evaluated to ensure the intended benefits are realised. The ongoing operation, support and maintenance of the end deliverable is addressed as part of the STFC's operational management processes.

In order to progress through each phase, a project has to pass key decision points or approvals. Across STFC's programme of activities, project phases may be defined in different ways dependent on the industry standard for that sector (e.g. Space), but the key steps and decision points are the same. These phases, and the associated steps and decision points, are described in the following sections.

A typical project lifecycle for an STFC project is illustrated on the following page.

2.1 STFC Project Lifecycle



2.2 Description

All projects are divided into four lifecycle phases: Conception, Definition, Implementation, and Handover and Close Out. There is an additional phase, Operation and Termination, when ongoing support is required

2.3 Conception

The aim of the Conception phase is to manage new opportunities and to select the appropriate opportunities to go forward as formal Projects. The Project Sponsor and Project Manager will be identified in this phase; these roles are described in section 4.

STFC funded projects are initiated and approved through corporate mechanisms set up by STFC, which take account of factors such as scale, significance and/or complexity. The process for approving projects funded by the Programmes Directorate (PD) as part of the STFC science programme is described in section 6.2. Externally funded work is approved through a bid approval process set out in section 6.3.

For minor projects, the Conception phase is managed within the sponsoring STFC Department, and each department should maintain a list of the New Opportunities under consideration and is responsible for their regular review.

Before STFC commits to participate in a project, guidance must be sought on governance, financial and legal issues. The Executive Director, or in the case of very large or business critical projects the STFC Executive Board, is responsible for authorising new projects in accordance with STFC's [Delegation Framework](#).

The key document in this phase is the Business Case (also called the Case for Support) which spells out why the work is being done (e.g. fit to strategy), the likely costs, and the potential benefits and risks. The initial or strategic Business Case will be continue to be developed as the project moves from conception through the definition stage and will also be the core documentation used in order to seek formal project approval through STFC's internal processes.

The review of the strategic Business Case is equivalent to **OGC Gateway 1 (Business Justification)**.

If the Business Case is approved, and the funding is in place, the project moves to the Definition Phase.

For externally funded work, if approval of the Business Case results in the submission of a bid then the project remains in Conception until the outcome of the bid is known. If the funding offered differs significantly from the bid then a re-scope of the project and a further review is required before the project moves to the Definition phase.

2.4 Definition

A key aim of the Definition Phase is to fully develop the Business Case, including an agreed Project Management Plan, and if required, a separate Project Specification. For STFC science programme proposals, this must include a scientific case for support at this stage. Regular monitoring of progress takes place during this phase with the Project Manager reporting to the Project Sponsor.

Exploratory R&D, including prototyping, may be included in this phase.

The Project Management Plan (PMP) will be produced during this phase and in almost all cases detailed planning and changes to the plan will continue into the implementation stage.

In larger or more complex projects this phase can be split into two – starting with the development of the project strategy before developing detailed project management plans. The strategy includes the definition of the roles in any collaboration or partnership, and any decision on whether to

outsource aspects of the project. The review of this project strategy is equivalent to **OGC Gateway 2 (Delivery Strategy)**. In many projects Gateways 1 and 2 are combined.

The BC and PMP may be supplemented by other documents including Scientific and/or Technical Cases and a detailed Technical Specification. Some projects will also require a Project Specification, to sign off with the Customer. For commercial (or externally funded) projects, a contract management plan should be included in the PMP (see section 5.4).

Where STFC intends taking on leadership roles, for example as international project manager and/or host laboratory, the roles and associated responsibilities should be clearly defined at this stage in the Business Case.

This phase will also include obtaining agreement and sign-off on any collaboration or contractual arrangements, and completion of tendering exercises where major parts of the project are being outsourced. For international collaborative projects it is important that an agreement is in place between the partners prior to any investment decision.

A review of the BC and PMP after this step is equivalent to the **OGC Gateway 3 Review (Investment Decision)**.

This phase ends with final project approval and formal agreement of the PMP with the Project Sponsor, and if required, agreement of the Project Specification with the Customer. In the case of externally funded work the contract with the customer is agreed with input and advice from appropriate contract experts (e.g. STFC Legal/Commercial).

2.5 Implementation

The agreement of the Project Management Plan (PMP) and/or Project Specification with all the relevant stakeholders initiates the Implementation phase. From this point forward changes to the PMP or Project Specification can only be made by formal agreement. These documents will define the approvals required.

The Project Sponsor, in conjunction with the Project Manager, should ensure that the appropriate governance and oversight arrangements are set up, project management roles and responsibilities agreed and that the budgets are secured.

A start up meeting at the beginning of this phase should be held between the Project Manager and Project Team to ensure a shared understanding of the project objectives, plans and deliverables, and how the Team will work together.

The PMP is used as a baseline against which project progress and performance towards agreed project deliverables and success criteria may be monitored and controlled. Progress against specification, timescales and costs, and the risk and stakeholder management plans are regularly monitored within the project and progress reports are produced for oversight. Technical and management reviews are held at times defined in the PMP.

Any changes to plans or specifications are made in a controlled way. Where there are significant changes or external factors which impact on the project, it may be necessary for the project to be re-baselined and a further review and approval required before the project continues. A detailed final review is always undertaken before the final deliverables are signed off/accepted.

Delivery to the Customer, including any installation, marks the end of this phase.

2.6 Handover and Close Out

Project Handover and Close Out is normally the final phase of the project. During this phase the project deliverables are commissioned and handed over to the customer.

Commissioning is normally the first stage in the Handover phase. A work programme will define acceptance criteria and include training and the finalisation of operating documentation for the deliverable. Final acceptance by the customer will normally follow the successful completion of commissioning of the project.

Close Out should be considered as the 'technical' completion of the project and will be undertaken by the Project Manager after commissioning to check that all aspects of the project have been completed, and to ensure the orderly close-down of the project.

The whole project has been about achieving defined goals to achieve the specified deliverables and defined performance criteria. The Project Manager needs to keep the team focused until the clearly defined point when the project is declared complete.

Monitoring and evaluation of the outputs, outcomes and impacts arising from the project are a part of this phase of the project. This should consider both the immediate benefits realised from the project and the long term impacts achieved by the investment. The Business Case and PMP should be used as the starting point for post implementation evaluation

The Close Out review is to check that all aspects of the project have been completed to specification. The Project Sponsor and/or Customer must ensure that the project meets their needs and that issues are resolved before signing off the review report. This review is equivalent to **OGC Gateway 4 (Readiness for Service)**.

A Post Implementation Review (PIR) is normally held sometime after the Close Out Review when there has been the opportunity to evaluate the performance of the deliverables in operation. The PIR differs from Close Out in that it concentrates on the success of the deliverables and the benefits achieved, and on the effectiveness of the management of the project rather than technical completion. The PIR should:

- Confirm that the deliverables are performing as expected and that the expected benefits are being realised
- Evaluate the scientific and economic impact and identify further routes for exploitation
- Enable other Project Managers to learn from the experiences of this project
- Enable the continuous improvement of the Project Management System.

This review is equivalent to **OGC Gateway 5 (Operations Review and Benefits Realisation)**.

2.7 Operation and Termination

This phase includes the ongoing support and maintenance of the project deliverables. Where continued support is being provided as part of the project, a plan for this support will be developed and agreed with the Project Sponsor and/or Customer. The plan will include the processes for regularly reviewing the support, dealing with further orders where applicable, and terminating the project.

Termination concludes the operational life of the project deliverables and completes their disposal.

3 Governance and Oversight

3.1 Principles

STFC is responsible for all the projects undertaken on its behalf and has to be able to demonstrate good value for money for its government funded work. STFC has put in place a governance framework to provide the necessary oversight and control to enable it to meet its responsibilities. Effective oversight is particularly critical where the overall project management is undertaken jointly with other bodies or by external organisations or is contracted-out.

This Framework is designed to establish robust monitoring and control measures over the project to ensure its delivery to the defined schedule, cost and performance parameters, and provide assurance to management, customers and funding agencies that projects are being well managed. Following this Framework ensures that:

- The project operates a robust project control environment;
- Project issues/risks are mitigated effectively; and
- Senior STFC management and Council are kept aware of progress and performance.

The STFC Project Sponsor has responsibility for the success of the project and this role is assigned to the appropriate level in STFC. For smaller projects, typically <£100k, the Division Head will typically be the Project Sponsor, for the larger projects it will normally be the relevant Director supported by a Project Board or Oversight Committee.

3.2 Project Registers

STFC Departments or Directorates must maintain registers of New Opportunities and active Projects and there must be internal processes in place for their regular review.

The STFC Project Review Committee maintains the corporate Project Register of high risk projects which it regularly reviews and reports on to Operations Board. This is one route by which project risks may be escalated to the Corporate Risk Register.

The [STFC Framework for Managing Change Projects](#) sets out the requirements for Corporate and Department Change Agendas.

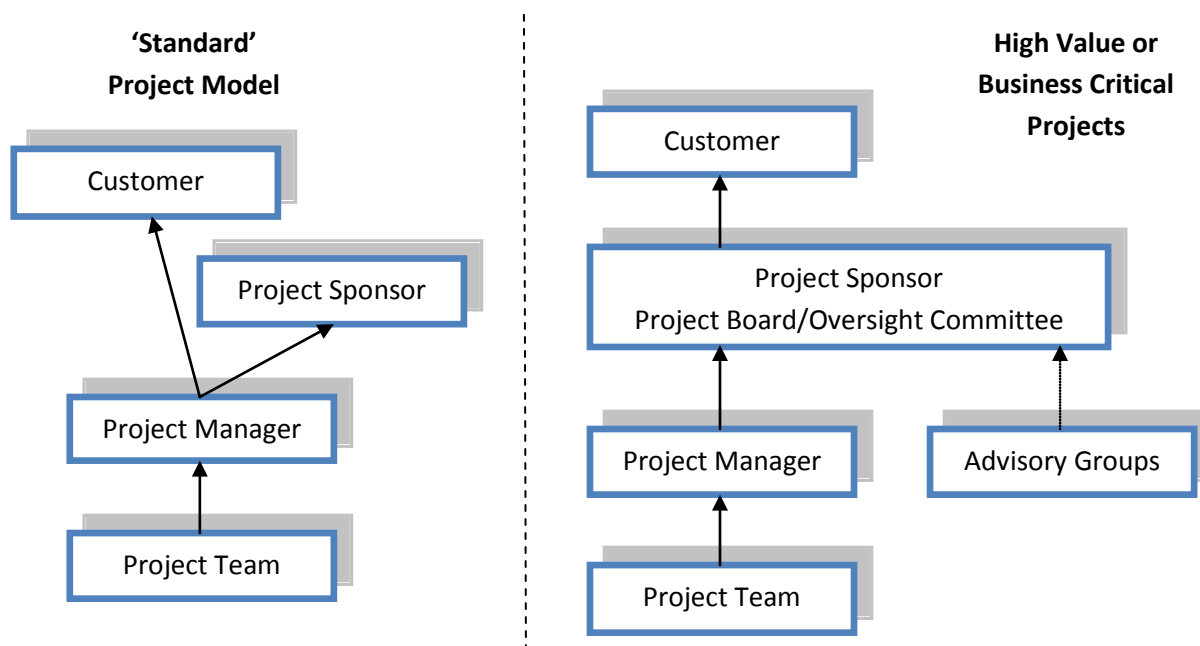
3.3 Project Structures

The simplest projects, typically run within Departments, have a structure where the Project Manager deals directly with the Customer and reports to the Project Sponsor. In some cases the Project Sponsor is the Customer.

More complex projects have a Project Board chaired by the Project Sponsor. The Project Manager reports to the Project Board. The Project Board may set up Advisory Boards where required.

The project structure is determined during the Definition phase and captured in the Project Management Plan.

Some typical structures are set out below.



3.4 Project Boards

For larger, more complex or business critical projects an oversight body, independent of the project, must be set up by the STFC Project Sponsor to oversee progress and performance and provide expert advice on cost, schedule and scope issues. Oversight bodies normally take one of two forms:

- Project Boards, which are responsible for overseeing the delivery of the project, performing both an oversight and top-level management function on behalf of STFC or its partners. The board is chaired by the STFC Project Sponsor, and therefore has authority to make cost, scope and schedule decisions. Project Boards will often be used where a STFC laboratory has lead responsibility for project delivery.
- Oversight Committees, which provide independent scientific, technical and management advice to the STFC, and report to the Project Sponsor responsible for overseeing the delivery of the project. This mechanism is often used by the Programmes Directorate for collaborative or international projects where lead responsibility may lie elsewhere.

The role, operation and membership of STFC oversight bodies will be determined based on an assessment of the risks and complexity of the project, and will be considered on a case by case basis by the STFC Project Sponsor. These bodies will normally meet **at least** every six months, but often more frequently, and will receive a defined suite of information and reports from the Project Manager. The membership should provide the Sponsor with the appropriate technical, financial, and managerial advice. Note that projects will require either a Project Board **or** Oversight Committee **but not both**.

For major projects, typically over £10M, the Project Board must have an element of independence from the Department that owns the project. Examples of good practice are:

- Including a representative of the funding body, eg BIS
- Appointing a Board member(s) from a Department or management position that is independent of the project
- Including an independent Project Management specialist
- Observer status for the Research Councils' Audit & Assurance Services Group (AASG)

3.5 Project Monitoring and Reporting

All projects must be regularly reviewed with monitoring of progress against scope, time and cost reported to the Project Sponsor. The scope and frequency of information and reporting requirements will vary depending on the scale and complexity of the project and will be agreed as part of the project's approval. Wherever possible the project's internal project management reports should be tailored to match the STFC project oversight requirements so the process does not become duplicated or onerous. The project reporting format used must enable tracking of performance and cost at completion.

As a minimum, reports should include:

- Progress summary, including overall status of the project and whether it is on track (e.g. key successes, opportunities, failures or threats)
- Financial summary, including spend against plan and latest forecast of future requirements
- Key Milestones/Deliverable Summary showing progress against plan (e.g. baseline, revised and completion dates)
- Active issues or risks (not just costed engineering risks)
- Changes to specification

3.6 STFC Project Review Committee

The Project Review Committee (PRC) receives regular reports on all business critical projects, typically on a monthly basis. PRC membership comprises senior experts from each STFC Directorate and relevant departments. It provides regular reports to the STFC's Operations Board on the status of the major projects within STFC summarising key issues or risks identified within each project and the proposed mitigation action being taken in a "Traffic Light" report format. The PRC is also responsible for the STFC Project Management Framework and will review this on an annual basis.

The Committee Terms of Reference are:

- To meet monthly and report to STFC's Operations Board
- To monitor STFC's major or business critical projects, and maintain the STFC Project Register
- To maintain and develop the STFC Project Management Framework

A business critical project is typically deemed to be a project >£1M per year in value (or >£5M total value) or where there is a high reputational or other risk to STFC. It is the responsibility of the Project Sponsor to assess the business criticality of the project based on its risk and complexity. The STFC Risk Management policy provides guidelines to undertake this assessment.

3.7 Project Review and Escalation

Project Sponsors need to satisfy themselves that the project continues to meet the Business Case and objectives set out in the Project Management Plan, and remains aligned with the broader programme objectives of the organisation. If this is not the case then the project should be re-planned (e.g. de-scoped) or terminated.

Problems identified should be investigated, particularly if they will mean a call on the project's working margin or contingency. An appropriate action plan should be put in place to mitigate the problem. The precise arrangements for accessing working margin/contingency must be agreed and defined within the PMP.

The Project Manager can escalate issues or risks if required to the Project Sponsor, through the oversight body (e.g. project board) where appropriate; for example, where there is a significant change to the cost, scope or schedule. The Project Sponsor can further escalate through the line

management chain, ultimately to the Executive Board. In this way issues/risks are also captured on the STFC Corporate Risk Register.

During the project definition and implementation phases periodic review points will be established, the frequency of which should be defined in the Project Management Plan. This will include technical design reviews as well as gateway reviews during implementation including final close out prior to handover to the customer. For commercial project work, this will include contract performance reviews. **Use of the OGC Gateway Review process should be implemented where appropriate (see below).**

Where significant changes to specification are required or there are external factors that impact on the project deliverables, then a cost and schedule review should be undertaken and, if necessary, the project re-baselined. No project should remain in the programme at any cost. When serious issues are identified that the project cannot resolve satisfactorily within approval levels these will be investigated (e.g. by the Project Board/OsC with additional expertise brought in as required) and subject to a formal independent expert review. The outcome of these reviews will be either:

- De-scope and/or re-schedule
- Release of contingency or re-approval at a higher level
- Phased withdrawal
- Cancellation – e.g. where a project cannot be de-scoped to within original approval limits.

A cancellation review may be triggered by financial or technical factors and any decision will take account of the risk and complexity of the project. If a decision is made not to cancel the project, the relevant STFC advisory board may be asked to re-assess the scientific return from the project at the revised level. The final decision will be made by the Executive.

3.8 Gateways

The OGC Gateway™ Process examines programmes and projects at key decision points in their lifecycle, and looks ahead to provide assurance that they can progress successfully to the next stage. The process is mandatory in central government for procurement, IT-enabled and construction programmes and projects.

This Framework shows how the principles of the OGC Gateway™ process are already built into our project review process (e.g. through the use of independent expert review panels at key decision points). Following this Framework should provide a sufficient degree of compliance for the majority of our projects.

Note that for Programmes there is a modified Gateway structure. An additional **Gateway 0** review is held to approve the programme and then repeated at key stages in the programme to confirm that the strategy is still appropriate and that the planned outcomes are being achieved.

Formal OGC Gateway™ reviews will only need to be applied to the largest and high risk projects in STFC. Determining the requirement for OGC Gateway™ Reviews is the responsibility of the Project Board or Project Sponsor. Completing the Risk Potential Assessment form found on central government's Infrastructure and Projects Authority (IPA) [website](#) will show whether formal Reviews are required, and if the Departmental Assurance Coordinator for BIS should be informed.

4 Roles and Responsibilities

The ultimate success of the project, delivery to time, cost and specification relies on the quality of the planning and management, and the people involved. To ensure the best possible chance of success, it is important that everyone knows what they are responsible for and what they should be doing.

The roles that are found in all projects are:

- Customer
- Project Sponsor
- Project Manager
- Team Member

In the STFC research environment it is also necessary to define the role of Principal Investigator (PI).

4.1 Customer

There are a variety of Customer types for our projects. They include staff from STFC Departments, universities, international partners (e.g. other funding agency or laboratory) or other Research Councils for projects delivered as part of the STFC programme, or industrial companies for commercial contracts.

The role of the Customer is:

- Approving the final Project Management Plan or Project Specification in consultation with the Project Manager or Sponsor
- Approving any other documentation as agreed
- Keeping the Project Manager or Sponsor informed of changes, if any, in their requirements
- Taking responsibility for any contribution to the project by the Customer's organisation

The relationship with the customer can vary from the formal, contractual approach with a commercial company, to the completely open and collaborative relationship with an internal or university partner. Managing this relationship effectively is an important role for the Customer and Project Manager or Sponsor

4.2 Project Sponsor

The term Project Sponsor is widely used, and is the term used in this Framework, but other names for the role include Senior Responsible Owner (SRO), Project Executive, and Project Director. The Project Sponsor has the management ownership of the project. Within STFC, the Project Sponsor is the person who essentially commissions the activity and who has delegated responsibility within STFC for the project.

A Project Sponsor will be appointed in the case of larger projects; he or she is advised by the Oversight Committee and would be a member of the Project Board. In other cases the role will default to the Division Head or Director that owns the project. For smaller projects, or where STFC is a legal partner in a large international collaborative project, the Project Sponsor can also be the Customer.

The roles of the Sponsor include:

- Chairing the Project Board where applicable
- Providing the senior management ownership of the project
- Ensuring that the project is actively managed and meets its objectives
- Ensuring the benefits of the project to STFC as defined in the Business Case, are realised
- Representing the Customer's interests

- Agreeing the Project Management Plan with the Project Manager
- Ensuring, for commercial project work, that the agreed contract conditions are met and liabilities managed.

4.3 Principal Investigator

The Principal Investigator (PI) is a member of the scientific community who leads the science team and is essentially responsible for the scientific success of the project. The PI may often take the role of Project Manager. Larger projects or those reporting to a Project Board may appoint a Project Director who will have overall responsibility for all aspects of project's performance and delivery. Particle Physics projects may have a UK Spokesperson who will fill the PI role for the purposes of project oversight.

4.4 Project Manager

The key role in the project team is that of Project Manager (PM). Their primary responsibility is to deliver the project to specification, in time, and on budget within the constraints and critical success factors in the project specification, strategy, and management plan. The PM is responsible for the day to day planning and execution of the project, within the budget and timescale agreed with STFC or the Customer organisation, and ensuring effective oversight of sub-contractors.

The Project Manager is responsible to the PI, where appointed, and accountable to the Project Sponsor for the efficient delivery of the project to specification, cost and schedule, and his or her main duties can be summarised as:

- Working with the Project Sponsor and/or Customer to develop and agree the Project Management Plan and Project Specification, including consultation with the STFC Legal/Commercial team on any contract management commitments.
- Leading and motivating the project team and maintaining a proactive management environment. This means foreseeing problems and taking appropriate and timely pre-emptive action
- Ensuring that the project team, both internal and external, is thoroughly familiarised with the contents of the agreed Project Management Plan, and that roles and responsibilities are fully understood
- Ensuring that any changes to the Project Specification, throughout the life of the project, are reviewed, agreed with the Customer or Project Sponsor and controlled
- Identifying, and where appropriate agreeing with line managers, the correct skills and resources to achieve the objectives and the training required to ensure the health and safety of STFC and non-STFC staff working under their direction as part of the project
- Establishing detailed budgets and schedules, allocating individual responsibilities and defining the budgetary control process
- Monitoring and controlling progress against milestones and deliverables, managing project risks, and reporting on cost and schedule to the Project Sponsor and Customer
- Acting as a common focal point throughout the project lifecycle from initiation to closure, liaising with specialists, sub-contractors, suppliers and commercial departments as required
- Working closely with the Project Sponsor and/or Customer so that the project objectives are fully satisfied with respect to time, cost, quality and performance
- Undertaking reviews as defined in the quality plan
- Ensuring that that comprehensive project Close Out and Post Implementation Reviews are carried out.

4.5 Project Team Member

Team members are responsible to the Project Manager. In all projects the team members' duties will include:

- Ensuring that their tasks, work packages or sub-projects, are completed to the agreed specification, time and budget
- Reporting to the Project Manager on the progress and performance of their task
- Escalating issues that are outside their authority to the Project Manager. Escalation points should be determined before the start of the project
- Taking part in reviews as required

4.6 Roles and Responsibilities in Programmes

An overview of the management of programmes in STFC is given in section 1.6. Programmes in STFC are normally sets of related projects, some with their own Project Board or Oversight Committees, but which may also report to a top level management board. Roles such as Programme Sponsor and Programme Manager mirror those used in projects. Some programmes, particularly Business Change Programmes, will have a Benefits Manager who is responsible for the realisation of the business benefits and ensuring that the Programme remains focussed on these objectives.

The programme management board is chaired by the Programme Sponsor. Members will include the Programme and Benefits Managers and may include representatives of key stakeholders, some or all of the Project Managers (or Project Sponsors), and the chairs of any subcommittees such as scientific or technical advisory committees.

For major programmes, typically of over £10M, the Programme Board established must have an element of independence from the Department that owns the programme. Examples of good practice follow those for similar Project Boards, see section 3.4.

5 Documentation

5.1 Essential Documentation

A minimum set of documentation must be created for every project. Standard pro-forma are provided (see Section 7) for key documents but other formats can be used, including customer defined documentation, as long as the information requirements in the STFC pro-forma are met.

Project planning is a key process that will normally start during the project conception phase and will continue into the implementation phase. All projects that require Department level approval or above, typically those over £100k in value, should have a formal Business Case (BC) and Project Management Plan (PMP). The amount of detail should be tailored to the project's risk profile and complexity and may also require additional elements such as a Stakeholder Management Plan or (for commercial project work) a Contract Management Plan. A Project Specification may be required where a more focussed document is required for sign off, for example with an external Customer.

Any legal and commercial issues, including collaborative or contractual agreements and procurement guidelines also need to be resolved at this time with the STFC Legal and Commercial team. For international collaborative projects, these should be encapsulated in a formal founding document or agreement.

Once the BC and PMP (or Project Specification where required) are signed off all changes have to be formally recorded through Change Requests.

The process for monitoring the progress and performance of the project, including benefits realisation, should be set out in the PMP and must include a written record (e.g. STFC Project Report). Project Close Out and Post Implementation Reviews must also be recorded.

The requirements for these documents are set out in the following sections. Standard pro-forma available are listed in section 7.

5.2 Business Case

The Business Case is the key baseline document for the project and defines why the project should be undertaken, what benefits would be derived, and what level of resources is likely to be required. It evaluates the strategic fit, value for money, affordability and deliverability of the project.

The Business Case should consider different ways of meeting the project's objectives and how well these could be met, for example, under different financial scenarios. In all instances, a "do nothing" or "do minimum" option must be included to provide a benchmark and should demonstrate that the preferred option offers best value for money.

The business case process and information requirements set out here are consistent with the central government approach but have been adapted to the business needs of the STFC.

The Business Case is owned by the Project Sponsor and should include, but not be restricted to, the following areas:

- Project Overview/Executive Summary
 - Context – include project type/ source of funding (e.g. internal/commercial/grant/ EU funding); STFC's role in any consortium or collaboration; customers
 - Summary of objectives, scope, cost and timescales; participants
- Project Definition
 - Objectives – e.g. scientific/technical, economic and political
 - Business fit - alignment to STFC strategy, relevance/timeliness, impact
 - Scope – key deliverables and timescales; what is included and excluded; boundaries of responsibility (e.g. for collaborative projects)

- Key Stakeholders – include potential customers and/or partners
- Interdependencies – related projects/previous investment, longer term implications/liabilities, including key decision points for any future investment
- Benefits – describe benefits and how they will be measured (e.g.KPIs)
- Risks and limitations - including project risks (e.g. safety, technical, financial) and any external constraints (e.g. political, economic, legal)
- Option Identification and Selection
 - Options analysis – consideration of alternative ways of meeting objectives (e.g. financial scenarios) and consequences
 - Economic context – in terms of knowledge exchange and/or economic impact; include any confidentiality or IPR issues
- Funding, Costs and Schedule
 - Resources – estimated costs and overall budget (e.g. staff, equipment, consumables, travel) including working margin, contingency; availability of staff/expertise, infrastructure, equipment
 - Project Schedule – timescales; key milestones and deliverables
 - Funding/Affordability – expected funding sources, surplus/deficit including the funding of any deficits
- Project Organisation and Management (or Project Strategy)
 - Project management - organisation and responsibilities, management, monitoring and oversight
 - Outline plan – work breakdown, schedule of key deliverables and milestones
 - Monitoring and Evaluation (incl. Benefits Realisation) – focus on outputs, outcome and impact, i.e. how benefits will be realised
 - Risk Management - key risks and opportunities and how these are to be managed

The level of detail provided should be appropriate for the size and risk of the project and will be determined by the Project Sponsor /Department being asked to approve the project.

The Business Case is often aimed at people without a detailed knowledge of the subject area, so should also include an executive summary which should convey succinctly all the vital information about the project.

The Business Case will be developed from an outline to full case as the project moves from the conception to project definition phase and will also form the core documentation used to guide the project through the STFC project approval process (see sections 6.1 - 6.3). It will be a key input to the Project Management Plan.

5.3 The Project Management Plan (PMP)

The Project Management Plan (PMP) sits alongside the Business case and sets out the deliverables for the project, the timescales and costs, and the way in which the project will be managed. It is the reference document for managing the project. The PMP is owned by the Project Manager and formally agreed with the Project Sponsor or Customer and is equivalent to the Project Initiation Document (PID) in PRINCE2.

The Project Sponsor or Customer will either sign off the PMP or a subset of the information, a Project Specification, as appropriate. An example of the latter case is a commercial contract where the detailed planning is a matter for STFC.

A well-known characteristic of projects is the rapidly increasing cost of making changes as the project progresses. Investment at the beginning of the project in effective planning and careful review of requirements and specifications can be repaid many times over in the life of the project.

The PMP documents or references all of the planning information for the project including:

- A brief description of the project
- Project organisation
- Objectives and Deliverables
- Work Breakdown Structure (scope of work)
- Project schedule, including key review/decision points
- Finance (Cost plan and profile, budget structure, management of contingency)
- Funding and income profile
- Resources – including staffing, accommodation, equipment
- Contract Management Plan (for commercial project work)
- Procurement Plan
- Risk Management Plan
- Stakeholder Communication Plan
- Monitoring and reporting
- Quality plan including documentation control, change control, and project and technical reviews
- Impact Plan /Benefits realisation, including KPIs
- Safety, Health and Environment (SHE) Plan. The standards and controls expected can be found in the STFC SHE Codes
- Consideration of diversity issues

The chapter on techniques expands on the requirements in many of these areas.

As with the Business Case, the level of detail required varies from project to project and will be determined by the Project Sponsor in consultation with the Project Manager. In all except the simplest projects separate Risk Management and Stakeholder Management Plans should be produced and referenced from the PMP. In some cases the description of the objectives and deliverables will be supplemented by a detailed Project Specification.

For large and/or international collaborations this should include founding documents setting out the legal, governance and management arrangements between partners. Some of the other sections will also justify separate documentation for larger projects.

5.4 Contract Management Plan

Where STFC operates as contract manager on commercial projects for a partner organisation to effectively provide and/or lead a project, the PMP must include a Contract Management Plan. The plan should set out the responsibilities and procedures to ensure that, as the provider, STFC complies with the terms and conditions of the contract, that performance is effectively managed, that communications are managed, and that issues are appropriately escalated with the contracting body.

The STFC Legal/Commercial team should be consulted before committing to any commercial project work and to help develop the contract management plan.

5.5 Risk Management Plan

The risk management plan details how risk will be managed throughout the project life cycle. High-level processes and techniques are set out in section 6.9 and a Quick Reference Guide and standard, pro forma is available. Other formats may be used but at a minimum the plan should address:

- i. how risk is going to be managed on the project including:
 - How risks will be assessed (e.g. scoring methodology);
 - How differently scored risks will be treated and prioritised;
 - How often the risk management plan including control measures, will be reviewed, and by whom;
 - When and how risks will be escalated.
- ii. A record of risks identified including for each risk:
 - The nature of the risk;
 - Measures of the likelihood, impact and overall risk;
 - The mitigating action taken and responsibility;
 - The residual risk and estimate of financial exposure.

Risk management at project level mostly focuses on risks that will affect the project's objectives, but it is also important for the project manager to understand the overall risk exposure of the project, so that this can be reported to the Project Sponsor and other stakeholders.

The Risk Management Plan must be maintained during the life of the project to take into account new risks and changes to the existing risks. SHE risks should be covered explicitly within a project safety plan.

5.6 Stakeholder Communication Plan

As with the Risk Management Plan, the Stakeholder Plan is a live document that should be updated as the project progresses. The plan should identify each stakeholder and record:

- Their interest in the project
- Their motivation, expectations and influence
- Proposed actions to address their needs
- Progress against these actions

Typical stakeholders will include individuals and groups performing the work: individuals and groups affected by the work; project owners and customers; and statutory and regulatory bodies.

The potential of each stakeholder to affect the project outputs or benefits (e.g. low/medium/high) should be analysed and used to develop a communication plan. Stakeholder management can evolve and become more complex as a project progresses from conception to operation, so must be reviewed throughout the project life cycle.

5.7 Project Change Request

Formal Project Change Requests are essential once the initial PMP is agreed to prevent scope creep and to formally approve any descope, change to timescales, or change to budget.

The document must include:

- A clear description of the change (referencing additional detailed documents if necessary)
- The impact of the change on the specification of the deliverables, the cost, and the timescales
- A record of approval by the Project Manager and Project Sponsor

5.8 Project Progress Report

The intention is that the pro forma Project Report provided becomes widely accepted within STFC, for example by the STFC Project Review Committee and by STFC Project Boards, to minimise the need for submitting the same progress information in different formats.

If the minutes of meetings or different forms are used to report progress then the following should be covered:

- Project successes, opportunities, failures and threats
- Progress against milestones or plan
- Spend against plan
- Current outturn forecast against budget
- Active risks or issues
- Changes to specification

5.9 Close Out Report

The report from the Close Out Review should include:

- The status of the project: the completeness of the deliverables, any variations against the specification, any requirement for ongoing support
- Further actions required including the date of the Post Implementation Review
- The final milestone summary
- The final financial summary
- Initial comments on the performance of the project

5.10 Post Implementation Review (PIR)

The report from the Post Implementation Review references the Close Out Report and includes:

- The status of the project: the performance of the deliverables and any ongoing support
- Progress against the actions from the Close Out Report
- Benefits realisation
- Feedback and lessons learned

A very important aspect is an objective review of the project and the performance of the organisation. A lot is learned during the lifetime of a project; effort must be made to pass that learning onto other projects and Project Managers.

5.11 Documentation Control

Government directives require us to have processes in place to ensure the confidentiality, integrity, and availability of all our data. This applies to all project data: design and management data, and both computer files and hardcopy.

The documentation associated with the project, for example plans and design data, requires formal control. There should be processes for version control, distribution, backing up, archiving and disposal. It is likely that a Department will have such processes in place and these should be followed. Alternatively the control processes should be set out in the PMP Quality Plan.

Further information on [STFC Information Security Policy](#) can be found on the STFC Intranet (STFC staff only).

6 Processes and Techniques

6.1 Project Approval

The STFC project initiation and approval process comprises two key steps and decision points. The concept phase establishes the need for the project and its feasibility. If supported, the project continues to the definition phase where feasibility is fully evaluated and the case for support, and plans necessary to implement the project, developed. If supported at the end of this stage the project proceeds to the implementation phase.

A new project is subject to formal STFC executive approval procedures at the appropriate delegated level of financial authority. The Executive Director, or for larger or critical projects the STFC Executive Board, is normally responsible for authorising new projects. Guidance is provided as part of the [STFC Delegation Framework](#).

Before STFC commits to participate in a major collaboration or international project, or undertake an externally funded project (including EU-funded projects) expert advice should be sought on governance, financial and legal issues. The [STFC Legal and Commercial](#) team will advise on drawing up the appropriate types of documents needed, from Memoranda of Understanding (MoUs) to more formal Collaboration Agreements. The STFC's Finance Directorate will provide advice and guidance on financial policy, including costing of projects, contracts and related issues (e.g. VAT) and the Directorate/Department Finance representative should be consulted at an early stage.

The procedures and documentation to be followed differ depending on the nature of the project and the sponsoring directorate/department, but the key steps and decision points are the same.

6.2 Project Approval – STFC funded

A flow diagram for the approval of an STFC funded project is available in Appendix A.

The project proponent(s) identifies a new idea or concept and works to develop an outline proposal or Business Case. The STFC Project Sponsor reviews and evaluates the outline Business Case with advice from the relevant strategic advisory body, e.g. Science Board. If subsequently approved a Full Proposal or Business Case is invited. The full Business Case should set out the costs and benefits of the project (a full Investment Appraisal may be required in specific cases).

For collaborative projects, this process will normally be initiated by the lead organisation, e.g. a university or STFC Department, and the Business Case developed jointly with the collaboration.

Proposals for funding under the STFC's Science Programme must be submitted to Programmes Directorate (PD). The PD project initiation and approval process, and the documentation required, are described in the [Project Peer Review Panel \(PPRP\) web-pages](#), which can be found on the STFC website. The relevant PD programme manager should be contacted in the first instance for further guidance and advice.

Proposals made as part of other STFC funded programmes are normally submitted to the sponsoring Department or Directorate. In some areas (e.g. RAL Space) local project appraisal processes have been established and should be followed but in all cases these must include the same key steps and decision points as set out in Appendix C.

If initial R&D work is required a bid is prepared, and reviewed and evaluated by the Sponsor and Peer Review Body, e.g. PPRP. Funds may be applied for through the [Project Research and Development \(PRD\) Scheme](#) to further develop the concept. If approved, the R&D is undertaken and

the report and outcomes are reviewed. If subsequently approved a Full Proposal is then invited. Within STFC, the Centre for Instrumentation (Cfi), which undertakes core technology development for STFC's Facilities and Programmes, also provides short term, responsive funds to enable technologies to be developed.

An outline Business case (or Statement of Interest) can normally be submitted to STFC at any time, but sometimes may be requested in response to a formal call for proposals as an Outline Proposal through the Grants Je-S system.

The Full Proposal, comprising the Business (and scientific) Case and Project Management Plan is reviewed and evaluated by the Sponsor and relevant Peer Review Body. Following peer review, project funding and plans are revised to take account of any recommended changes (e.g. to scope or specification), the project approved and the award announced.

6.3 Project Approval – Externally funded

A flow diagram for the approval of externally funded projects is available in Appendix B.

Before going ahead a formal [bid approval process](#) must be completed and which requires sign off by both the relevant financial authority and the STFC Legal and Commercial team.

A robust approval process is needed for all externally funded work to ensure that bids are acceptable to STFC in terms of strategic fit, technical feasibility, resource availability, cost, price and liabilities. It also ensures that decisions are taken at an appropriate level in the organisation depending on the financial commitment, complexity and risk involved following consultation with the relevant professional staff (e.g. financial, legal and commercial). Note that the project cost is not necessarily the same as the price. The first point of contact for guidance is the [Business Operations Group representative](#) for your division/department.

The initiation of new projects normally happens at Department level. For low risk, smaller projects (typically <£100k) Division Head approval is sufficient for the opportunity to go ahead. Departments may choose to set a lower limit. All opportunities over £100k require a separate Business Case document and approval must be sought in line with STFC's Delegation Framework.

Where opportunities are over £1M per year (or >£5M total value) or with a high reputational risk to STFC, the Business Case should be submitted by the relevant Director to the Executive Board for final sign off, advised by the Finance Director.

Departments determine the bid review process and contractual arrangements in consultation with STFC Finance contacts. Typically reviews are held for all high risk projects or those over £100k, they are attended by Finance Staff, the Project Manager, Division Head, and Department Head or Deputy. Final sign off has to be in line with STFC's Delegated Financial Authority matrix.

The Business Case should include an outline project management plan summarising how the project will be managed. For externally funded projects this should incorporate a contract management plan setting out the procedures to ensure that the provider complies with the terms and conditions of the contract, that performance is effectively managed, that communications are managed, and that issues are appropriately escalated. Input and advice should be sought from the appropriate contract experts (e.g. legal/commercial services).

If the funding won differs by more than 10% or £1M from the original bid, or there are other changes of equivalent value, then the Business Case must be updated and resubmitted through the original approval route.

6.4 Project Organisation

An essential requirement in all projects is the appointment of a Project Manager and Project Team. In many projects it is adequate to define the Project Manager and the key team members. Accountability and upwards reporting for the Project Manager is to the Project Sponsor and Customer.

In more complex projects a formal organisational structure is required to show the relationships between the management team, for example between the Project Manager, Sub-Project Managers, Project Board and Sponsor. Refer to the section on Project Roles and Responsibilities. For large international collaborative projects, the governance, management and oversight framework must be defined to establish the boundaries of responsibility and accountability between the partners.

6.4.1 Work Breakdown Structure

A Work Breakdown Structure (WBS) can be used to sub-divide the project into pieces of work, or Work Packages, that can be assigned to the project team and managed effectively. The WBS represents a hierarchical view of the project where the term Task is used at the lowest level of detail. This is equivalent to the Product Breakdown Structure (PBS) in PRINCE2.

The detail of the WBS depends on the complexity of the project. In general tasks should be sufficiently detailed to enable:

- Accurate estimation of effort and cost
- Control of risk
- Clear accountability

6.5 Scheduling and resourcing

A wide range of scheduling techniques is available and it is for the Project Manager to choose those that are appropriate for the size and complexity of the project. Brief guidance is given here but this Framework is not prescriptive on the techniques to be used. Project Managers should refer to the literature (see Section 1.2) for detailed information.

A **Milestone Plan** is the minimum requirement for any project. It lists key events in the project with dates. Milestones are, in the main, concerned with the project schedule and mark the completion of significant events such as decision points (e.g. moving from one phase of the project to the next) or deliverables (such as completion of preliminary design, placing of contracts, equipment installation etc.). Milestones should be defined in sufficient detail so that it is clear when they have been met, and be sufficiently frequent to enable effective monitoring of the project.

Most projects will use a **Gantt Chart** or **Network Diagram** for more detailed planning. They can be used to illustrate simple time dependency or full resourcing and costing.

Project Managers should be pragmatic in their use of staff resource planning – for much of the work that we undertake it is not realistic to turn staff on and off projects on a day by day basis or to split their effort over a number of tasks. For projects constrained by staff resources consideration can be given to use of overtime, sub-contracting or hiring additional resource.

Other resources such as equipment, consumables, accommodation and travel should also be considered – and if appropriate can be built into the planning process in the same way as staff.

A useful technique is **rolling wave planning** where projects are planned in detail in the early stages, and at a higher level for the remaining stages. This can be helpful where the project definition is

uncertain, for example in some R&D or software projects or where the implementation phase of the project is too large to be planned in detail at the outset.

There is no requirement to use particular **planning software**. Microsoft Project is widely used and would be the default for many Project Managers but other factors may drive the choice, for example customer requirements, compatibility with related projects, or suitability for particular project types.

6.6 Financial Planning

Analysis of the resourcing, recurrent and capital expenditure leads to the development of a Cost Plan, a plot of budgeted expenditure against time. Where a Work Breakdown Structure is being used costs will be broken down in the same way.

The [STFC Policy on Costing Projects](#) and [STFC Costing Guides](#) provide guidelines for estimating staff costs and overheads. The STFC Finance policy for costing projects requires all projects to be approved on the basis of the full cost to STFC over their entire life - from conception to completion. Costs must be presented in full, regardless of whether any customer agreement allows for their full recovery and any shortfall or excess in funding should be disclosed – reasons for any shortfall should be provided including the source of funding for the difference. Costs must be clearly defined and spending realistically planned, including in-kind contributions.

Directorate/Department Finance representatives are the initial contacts for advice on all aspects of costing and pricing, and for contractual and procurement matters, and should be consulted early on in the planning process. For Programmes Directorate funded projects, you should seek the advice of the relevant PD programme manager in the first instance.

The following items need to be considered appropriately in any costing:

- Direct Payroll Costs
- Overtime and Allowances
- Overhead charges as set out in the STFC Costing Models
- Sub Contract work
- Capital purchases
- Recurrent costs
- Use of facilities
- Recovering Feasibility Phase costs
- Insurance: Notional and Project specific
- Cost of Capital
- Depreciation

Costs must be clearly defined and spend planned, including in-kind contributions. Costs of activities may also be covered through overheads (e.g. indirect or estates costs) and so the project will not need to include these as direct costs. The STFC Staff Costing Guide provides guidance on the types of activities covered as part of its overheads policy.

Other project specific costs may also include VAT, shipping, contingency and a margin. Where the project spans more than one financial year inflation will also need to be taken into account.

6.7 Estimating time and costs

Both time and cost estimates should:

- Be based upon experience
- Be developed Top Down initially, but Bottom Up when the WBS has been fully defined
- Include an agreed amount of contingency as a direct result of risk analysis
- Not include 'hidden' contingency
- Use the experience documented in previous project Post Implementation Reviews

Contingency allowance, covering both cost and schedule, should be considered for all projects. This allowance has two parts, the Working Margin and the Contingency Reserve.

Working Margin

The Working Margin is used to cope with the uncertainties that occur in all projects (sometimes called “known unknowns”) such as increased cost of materials, complexity of design and manufacture of components. It can be calculated in a number of ways and should take account of the project risks and their mitigation.

If estimates are based on the ‘most likely’ cost or timescales then the distribution of outcomes will usually be skewed, with costs and timescales more likely to be over than under budget. There should be a reasonable chance (i.e. greater than 75%) that the project can be completed within the budget of the base cost plus the working margin.

The working margin is normally held by the Project Manager and its use formally reported to the Oversight Committee or Project Board. It is normally included in the project’s cost and schedule baseline.

Contingency Reserve

The Contingency Reserve is for the unknown and unexpected things that can occur within a project and which could not reasonably be predicted (sometimes called “unknown unknowns”). For example, an international project may be subject to fluctuating exchange rates. It should be calculated on the basis of an understanding of the risks of the project and there should be a high expectation that the project can be completed without the use of contingency.

By its nature it is difficult to estimate the Contingency Reserve and it is best held at a top level in the organisation, accessed by the Project Manager through the Project Board and Project Sponsor. At the start of the project the Project Manager should determine the source of Contingency Reserve for the project and the process for accessing the reserve.

Contingency will only be released on the approval of STFC Project Sponsor after considering advice from the Project Board and exploring the possibilities of de-scoping the project. The Contingency Reserve held by STFC is based on its understanding of the current risks to its Programme and is not the sum of all the project contingencies. The use of Contingency Reserve requires a change to the project baseline.

Proper consideration of the Working Margin and Contingency Reserve is essential; otherwise projects will frequently run over time or over budget. An important principle is: if the estimates for a project are sound and include reasonable contingency, then an allocation of funding or time below the estimate must be balanced by a reduction in the scope of the project.

6.8 Planning Procurement

Many projects involve a significant procurement activity. In these cases SBS Procurement should be consulted as early as possible and be involved in discussions with suppliers. For large contracts, tendering, or the legislative requirement to go to European tender, can introduce significant delays and the process should be started as soon as possible.

Procurement plans should make best use of the internal and external technical expertise, and appropriate negotiation procedures, according to the technical demands. The responsibilities of all suppliers must be contractually fixed based on detailed specifications and drawings.

Directorate/Department Finance representatives should be consulted if items are being exported and VAT is being recovered.

6.9 Risk Management

Effective Risk Management is an essential component of sound Project Management. Risk Management looks ahead and considers what could go wrong (i.e. in terms of both threats and/or missed opportunities), and then puts in place strategies to eliminate or mitigate the risks. The risk management arrangements followed are consistent with the [STFC's corporate Risk Management Strategy](#).

Risk management is an activity that is ongoing throughout the life of a project and the Risk Management Plan (see section 5.4) must be regularly reviewed.

The process for managing risk is:

- Identify potential risks using techniques such as group discussions, risk workshops, checklists, and interviews
- Analyse the risks to determine which are the most serious by assessing the probability of the risk occurring and assessing the impact should the risk occur
- Devise action plans to mitigate risks (updating the baseline plan where necessary) by either avoiding the risk, transferring the risk, reducing the probability and/or the impact of the risk, or accepting the risk
- Implement the action plans to control foreseen risks
- Regularly review the risks to reassess and reprioritize as well as to identify any new risks that have emerged.

Projects are, by their very nature, risky enterprises and may well give rise to potential hazards. Some form of risk management is essential on even the smallest of projects.

Projects at high risk overall (typically those of value over £1M per year/£5M in total or of high reputational risk to STFC) are recorded on the STFC Project Register and regularly reviewed at the STFC Project Review Committee (see section 3.6). 'Red' projects, those with a high residual risk, may be escalated to the Corporate Risk Register as 'Black' where the impact is broad or high.

A Quick Reference Guide to Risk Management is also now available on the STFC Project Management intranet site highlighting key aspects and areas of best practice.

Consideration of [Safety, Health and Environmental \(SHE\) risks](#) follow a similar process and should be considered by the Project Manager alongside risks.

6.10 Project Monitoring and Reporting

The PMP defines the methods to be used for progress reporting and control in the Implementation phase up to Handover and Close Out. The plan includes frequency and attendance for progress meetings, the acceptance process for key deliverables and milestones, and the frequency and content of progress reports.

Projects which are considered to be business critical to STFC are required to provide monthly Project Reports to the STFC Project Review Committee.

6.10.1 Key Performance Indicators

A project may be delivered on-time and to budget but not satisfy its objectives. Key Performance Indicators (KPIs) enable the monitoring of other facets of the project to address this.

KPIs are quantifiable measurements of the performance of the project and should be defined by the Project Sponsor in collaboration with the Project Board/Oversight Committee, and in consultation with the Project Manager, at the start of the project. Defining appropriate indicators for a specific project can be a challenging task. Depending on the project they fall into one of the following

categories: financial performance; customers & markets; operational performance and organisational/staff.

KPIs should be identified as early as possible in the project life-cycle, but can be expected to evolve during the life of the project especially if Rolling Wave Planning is adopted. KPIs should be SMART (i.e. Specific Measurable, Attainable, Relevant, Time-bound) and are distinct from milestones.

Examples may include:

- Project Team and management procedures in place
- Preliminary/Final Design Review passed
- All long-lead time items ordered.

6.10.2 Earned Value Analysis

Earned Value Analysis (EVA) is a powerful project performance measurement technique which is particularly useful in monitoring larger and more complex projects. It compares the value of the work done with the planned cost for that work and the cost of the work that was planned to be done. To be effective it is important that this is agreed and planned from the outset.

EVA produces two indices, the Cost Performance Index (CPI) and the Schedule Performance Index (SPI).

The CPI is the budgeted cost of the work done to date divided by the actual cost of the work done. A value of less than 1 indicates that the project may run over budget.

The SPI is the budgeted cost of the work done divided by the budgeted cost of the work planned to have been done by that date. A value of less than 1 indicates that the project may run late.

These indices can be used to plot cost and schedule trends to date, and to compare the performance of projects on a 'like for like' basis, even though those projects may be of different sizes.

The CPI and SPI can then be used to forecast Estimated Cost at Completion (EAC) and Estimated Time to Completion (ETC), based on performance to date.

6.11 Quality Planning and Reviews

A Quality Plan should be developed for all projects, either as part of the PMP or as a separate document. The Plan documents the processes used by a project team in quality assurance and quality control in the project.

Where the customer has specific quality requirements they will be documented here together with the arrangements for accommodating those requirements within a Department's Quality System.

The Quality Plan includes the processes for Documentation Control and Change Control, and the plans for Project and Technical Reviews.

6.12 Change Control

An effective, formal change control procedure is essential to successful Project Management. The procedure must ensure that the Project Manager, and the Customer or Project Sponsor, take into account the impact of the change on all aspects the project and then agree and sign off the change.

Situations in which a formal change is required include:

- Changes to the Technical Specification
- Changes in financing or delivery requirements
- Changes to the baseline plan to address lateness or overspend, or improved strategy/information
- Change of Project Manager

- Termination of the project

A change control procedure must contain the following key elements:

- A record of the request for a change
- Assessment of the impact of the change in terms of cost, time, specification, risk, resources and its effect on other changes
- Approval or rejection of the request
- Feedback to the person who made the request
- Distribution of the updated plans
- Implementation of the change

6.13 Reviews

Project milestones should include the project and technical reviews, and the Close Out and Post Implementation reviews. The dates should be included in the schedule and there should be an outline of the scope and attendance for each review, including the role of the Project Sponsor or Customer.

6.14 Safety, Health and Environmental (SHE) Management

As with other aspects of project planning, considering safety issues as they arise during project execution is expensive, but this can be avoided with careful planning up front.

A project safety plan should mirror that of the project plan, for specific tasks there will be SHE issues that may need to be considered, and together these form the basis of a safety plan based upon Risk Assessment. Guidance on Risk Assessment can be found in [STFC SHE code 6: Risk Assessment](#).

Projects may generate many hazards, and it may be necessary to prioritise risks and resource through the use of a quantitative risk assessment process described in the risk assessment code. The standards and controls expected for hazards typical of work in the STFC can be found in the [STFC SHE codes](#).

All SHE incidents arising during the course of projects should be reported through [SHE Enterprise](#), and investigated to minimise their potential for recurrence, see [STFC SHE code 5: Incident Reporting and Investigation](#).

Effective project communication processes provide the vehicle through which SHE issues can be raised, and be brought promptly to the project team's attention, for example following a SHE incident.

For large projects, particularly those involving construction, consideration should be given to the establishment of safety tours and inspections, alongside the implementation of [SHE code 13 Construction, Design and Management \(CDM\)](#).

Further help and guidance can be obtained from the [STFC SHE Group](#).

6.15 Impact Potential

As part of its mission, STFC is required to ensure that the impacts of the research it supports are effectively demonstrated and supported throughout the research lifecycle in order to add value, stimulate interest from wider stakeholders, including industry and the general public, and, where needed, actively highlight the need for continued investment in the research base. Activities to enhance the impacts of research should be planned as an integral part of a project from its inception (i.e. knowledge exchange, economic impact and public outreach).

The Research Councils describe impact as the demonstrable contribution that excellent research makes to society and the economy. Impacts from research can take many forms, and become manifest at different stages in the research lifecycle of a project and beyond. They can also be promoted in many different ways. The routes through which economic impact occur include the following:

- Fostering global economic performance, and specifically the economic competitiveness of the UK through, for example:
 - Providing highly skilled people – skills development, employment
 - Creating opportunities for and improving UK business
 - Attracting investment in the UK
 - Commercialisation
- Increasing the effectiveness of public services and policy
- Enhancing quality of life, health and creative output - societal and other impacts

The potential for Economic Impact and routes to exploitation should be considered in the Conception and Definition phases of the project, built into the planning of the project, and included in the PMP.

6.16 Diversity Assessment

Project Managers need to consider whether their project will impact on particular groups of staff. This is particularly applicable in the case of business change projects.

An Impact assessment template is available which should be used as a checklist for all projects. Where the impact is significant the template should be completed and returned to the Equality and Diversity Manager. [Further information](#) is available on the local web.

7 Forms

7.1 STFC standard templates

The following pro-forma are available on the [STFC intranet](#):

- Business Case
- Project Management Plan
- Risk Management Plan
- Stakeholder Plan
- Project Change Request
- Project Report
- Close Out Report
- Post Implementation Report

7.2 Programmes Directorate Funded Projects

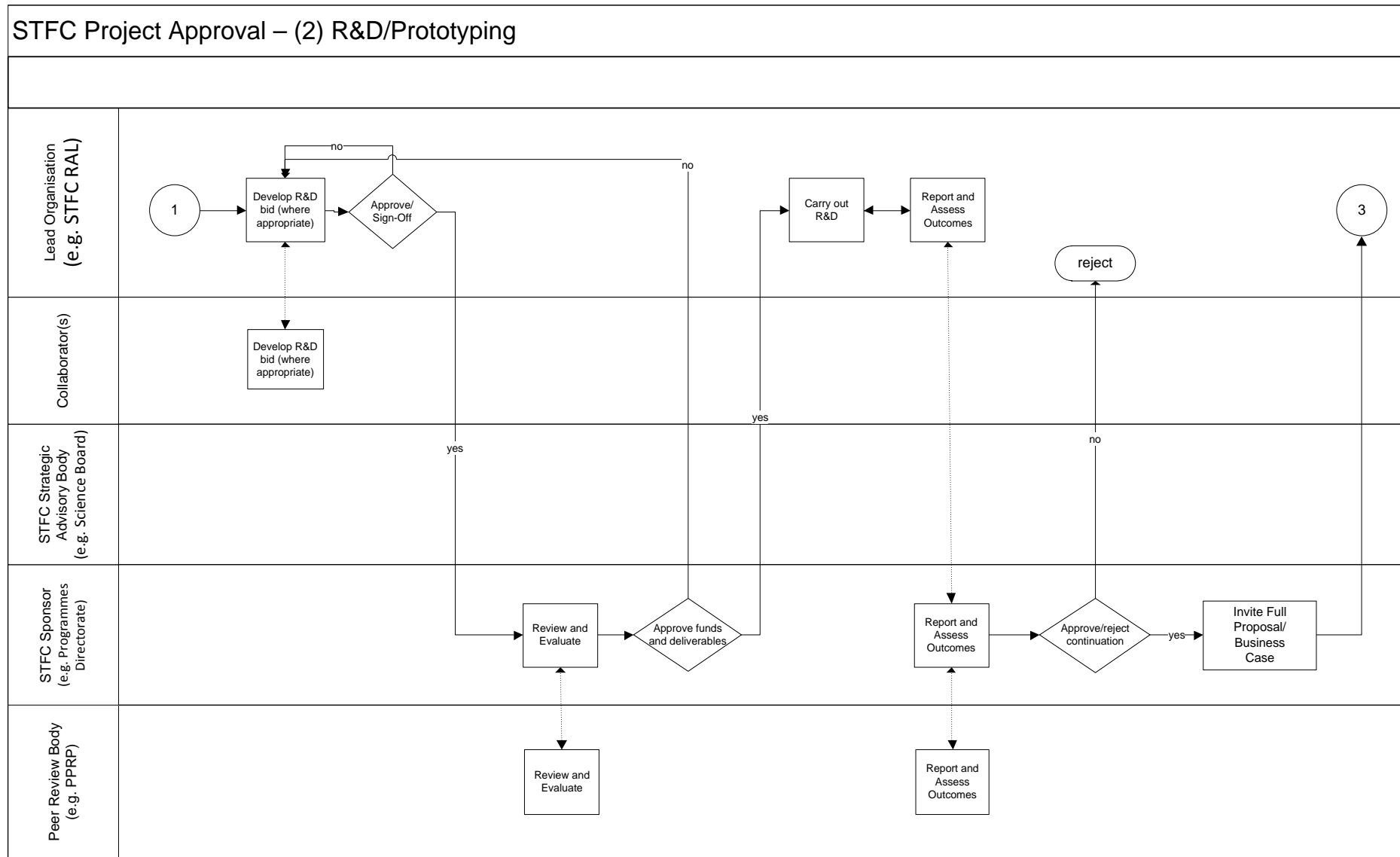
Standard pro-forma must be used when submitting project proposals to the STFC's Programmes Directorate (PD). While these are consistent with the generic STFC templates, there are some additional requirements. Please contact the relevant PD programme manager first for information and advice. Further information is also available on the [STFC's Projects Peer Review Panel \(PPRP\)](#) website.

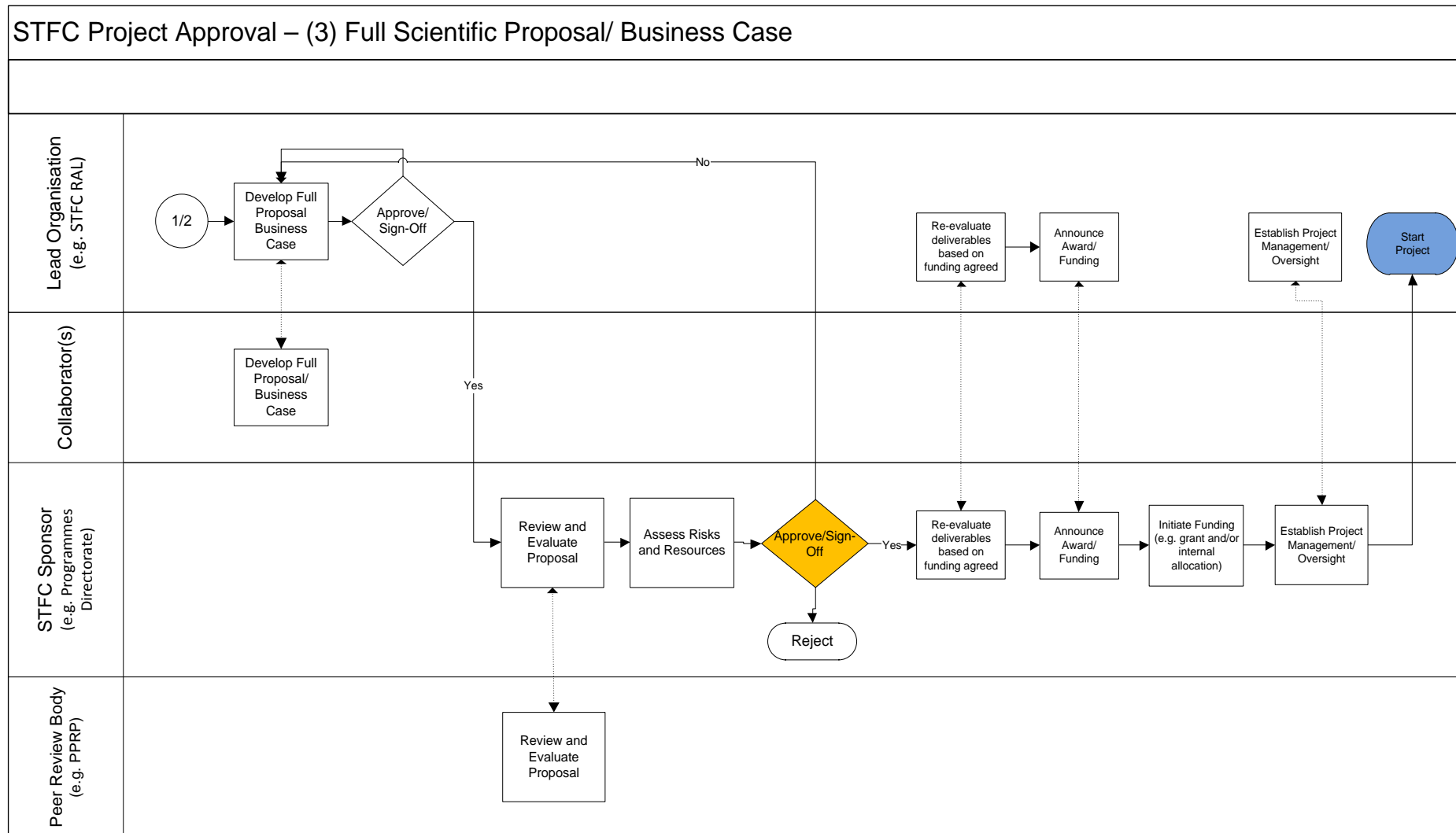
7.3 Externally Funded Projects

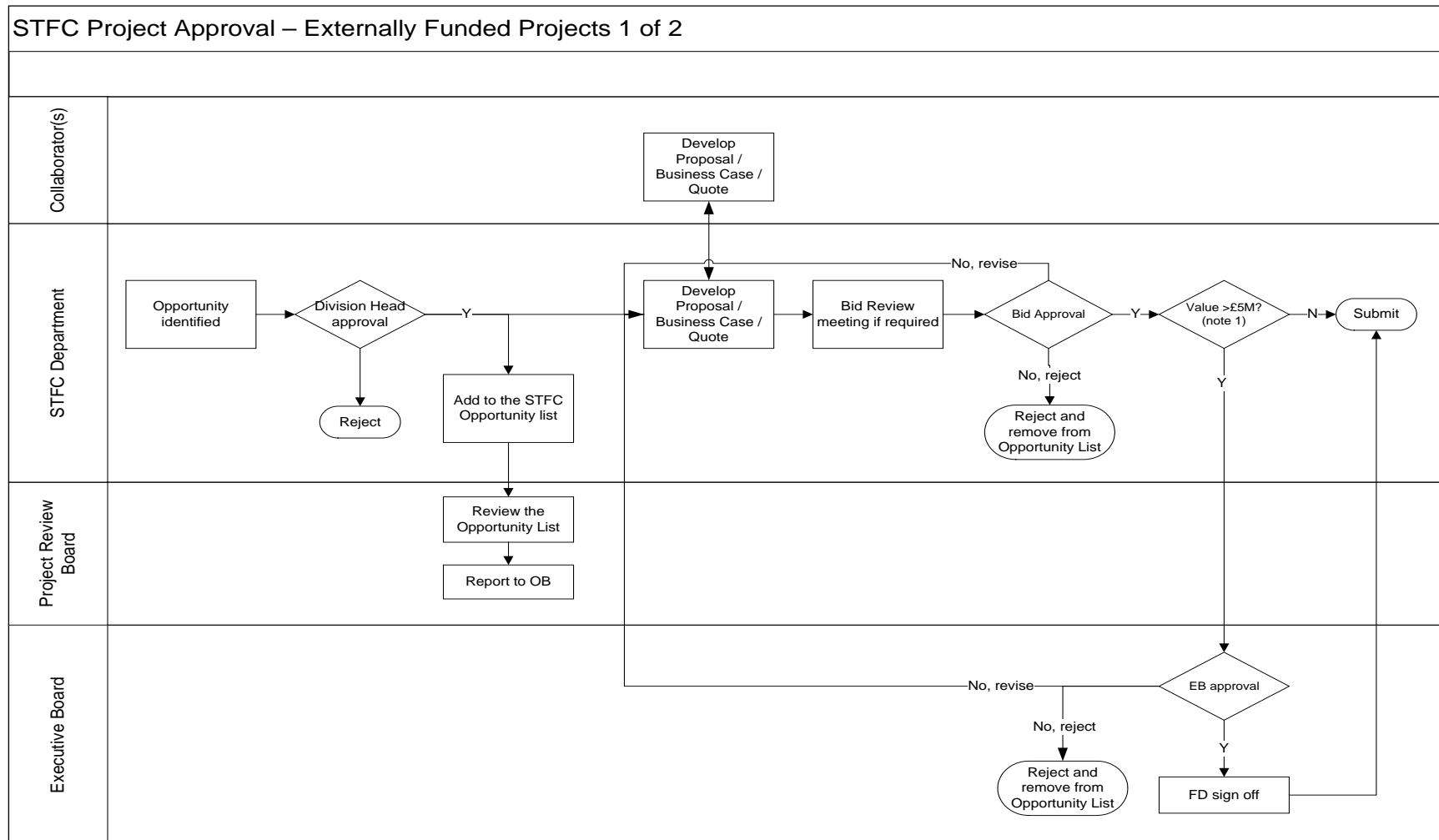
Contact your local retained Finance staff for the current Bid Forms for use in the approval of externally funded projects.

8 Flow Diagrams

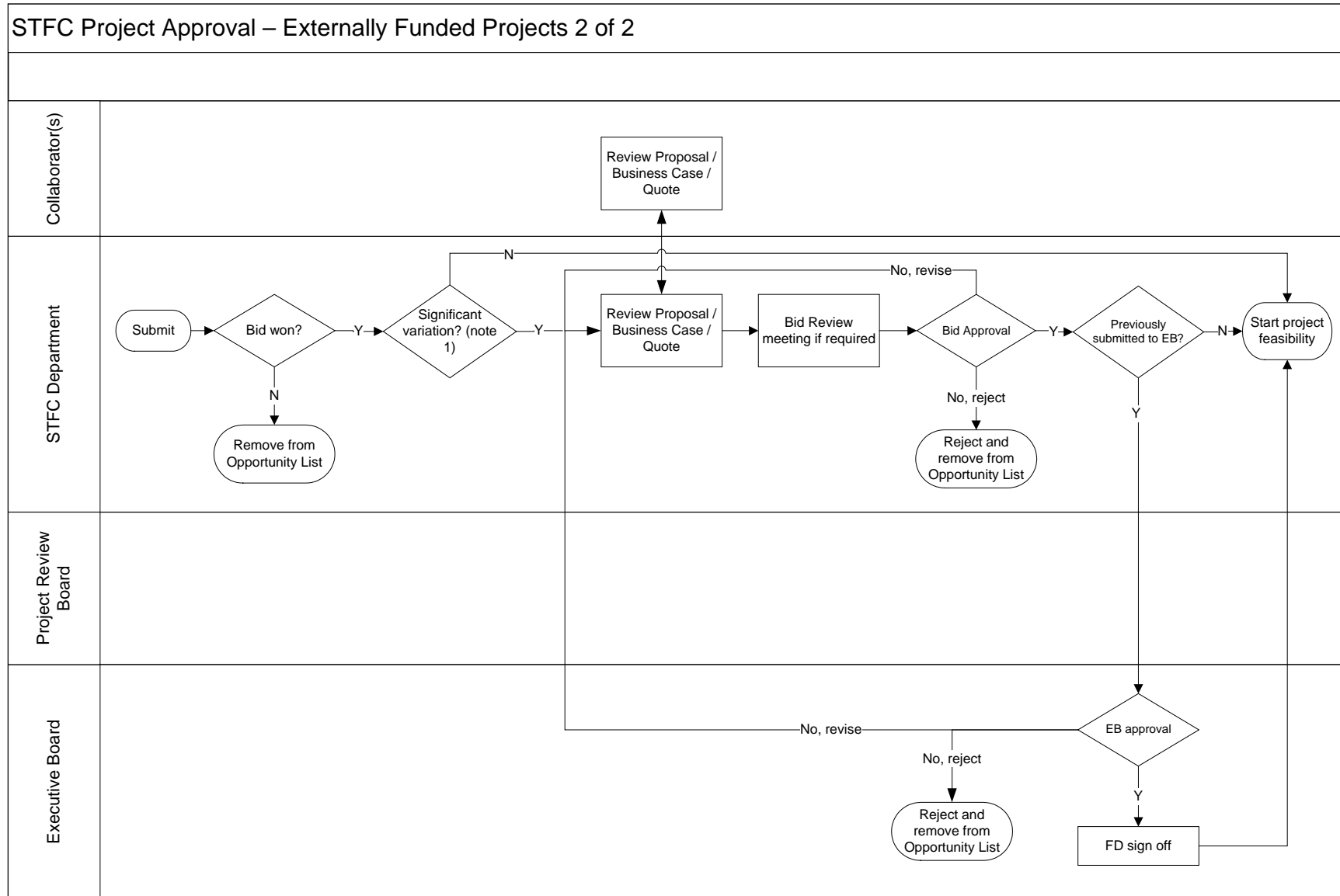
The detailed flow diagrams for the approval of STFC funded and externally funded projects are set out in the following appendices.







Note 1: Project value >£5M or high risk where the potential loss in operational effectiveness or damage to reputation is equivalent to £5M



Note 1: Funding won differs by more than 10% or £1M from the bid

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