Capital Works Management Framework
Guidance Note

Design Development Process

GN 2.1

Design Development Process

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Contents

Foreword

Background

Design is the process by which information about a Client's needs is translated into three dimensional physical solutions: such as buildings, roads, bridges, and so on. Design activities take place at all stages in the creation of a facility.

The Capital Works Management Framework (CWMF) is a structure within which design is allowed to evolve to the point where it is capable of being translated into a physical structure. The development of the CWMF was the response to the Government decision in May 2004 to reform construction procurement in the public sector. The strategic objectives of that decision are:

- Greater cost certainty at contract award;
- Value for money; and
- More efficient delivery of projects.

These objectives can be delivered provided there is adequate pre-contract design, coupled with the use of the new public works contracts developed under the CWMF.

Terminology in this guidance note

The **Sponsoring Agency** becomes the **Contracting Authority** for a project once it becomes a party to any contract relating to the project. And from the time the Works Contract is signed, the Sponsoring Agency is referred to as the **Employer**. The term **Client** is used throughout this guidance note as a generic term to cover the Sponsoring Agency / Contracting Authority / Employer.

Scope of this guidance note

This guidance note is intended primarily for the assistance of Sanctioning Authorities and Sponsoring Agencies embarking on public sector building and civil engineering projects.

Building and civil engineering projects

Generally, the information presented in this guidance note applies to both building and civil engineering projects. Where necessary, specific reference is made to building or civil engineering activities. Throughout this guidance note, these separate activities are denoted by a coloured backgrounds as illustrated below:

Text with a blue background relates to **building** projects.	Text with a yellow background relates to **civil engineering** projects.

Traditional and design-and-build projects

This guidance note deals with the role of design in both traditional (Employer-designed) projects and in design-and-build (Contractor-designed) projects. In the case of the latter, however, much or all of the design is carried out by the Contractor; so for that reason, this guidance note is less specific about design once it transfers to contractors on design-and-build projects.

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Scope of this guidance note, (continued)

Cost Planning and Cost Control

This guidance note does not refer in detail to cost control activities relating to design. For details of these, please refer to the guidance note, *Planning and Control of Capital Costs* (GN 2.2).

Applying the process

This document presents the design process in a linear manner for ease of understanding for the traditional, Employer-designed project. The document also covers design-and-build projects up to the point where design risk is transferred from the Employer to the Contractor. While the process is expressed in linear terms, it may be necessary in some instances for one or more of the design activities to be carried out at different stages of the project or in parallel with each other. This might arise in the case of very complex projects where some initial design work may have been required at Appraisal stage.

Design work at Appraisal Stage (in the form of design studies) may be needed to help reach a decision as to whether to grant Approval-in-Principle. If it is granted, the design studies carried out should feed into the Planning Initial stage. Early design work should be reviewed in the context of the Definitive Project Brief to see if the facts and assumptions made at Appraisal stage continue to hold true. If they do, the process is moved on to the appointment of design consultants, if appropriate.

It is not unusual on small/medium or uncomplicated projects to run different design activities in parallel with each other, particularly where such activities can be rolled into one.

Note: Depending on the project, certain design stages can be streamlined or omitted provided the principle of cost control is not compromised. Such waivers must be agreed in advance with the Sanctioning Authority.

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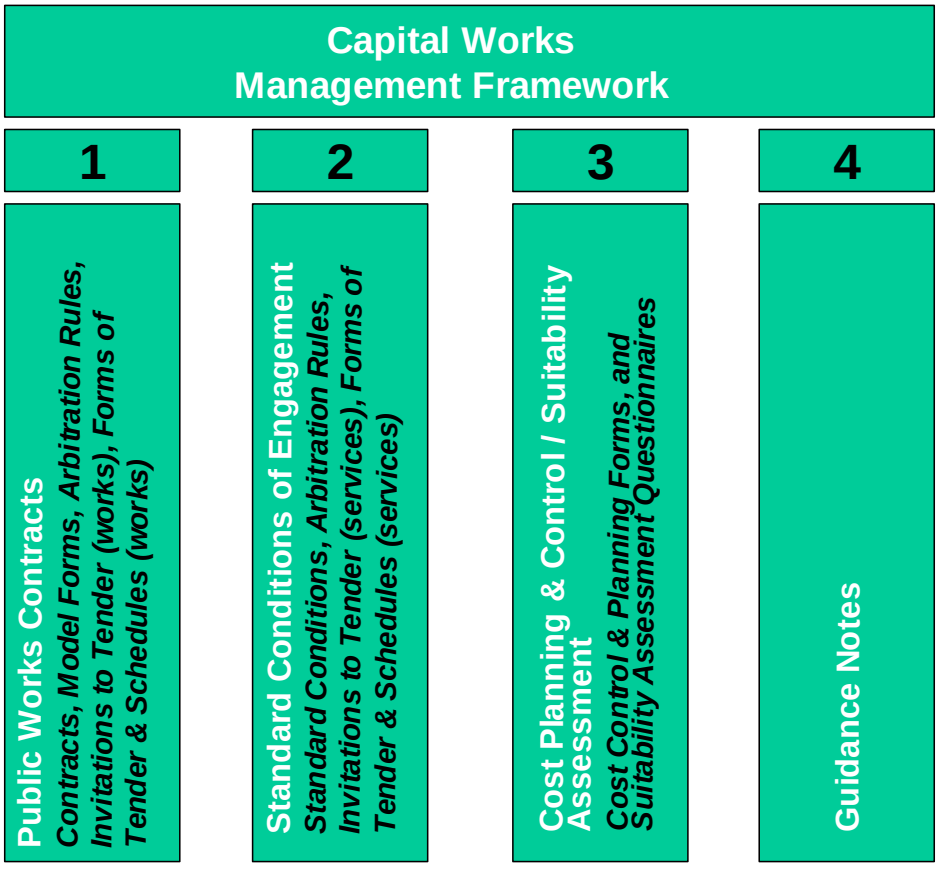
What is the Capital Works Framework

The Capital Works Management Framework (CWMF) is a structure that has been developed to deliver the Government's objectives in relation to public sector construction procurement reform. It consists of a suite of best practice guidance, standard contracts and generic template documents that form four pillars that support the Framework; the pillars are:

1. A suite of standard forms of construction contracts and associated model forms, dispute resolution rules, model invitations to tender, forms of tender and schedules;
2. The standard conditions of engagement for consultants, dispute resolution rules, model invitations to tender, forms of tender and schedules;
3. Standard templates to record cost planning and control information; and for suitability assessment; and
4. Extensive guidance notes covering the various activities in a project delivery process.



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What is the Capital Works Framework (continued)

The content of the four pillars is outlined below. The constituent documents are coded according to the following scheme:

Code	Description	Code	Description
PW-CF	*Public Works Contract Form*	*COE*	*Standard Conditions of Engagement*
MF	*Model Form*	*GN*	*Guidance Note*
AR	*Arbitration Rules*	*CO*	*Cost Planning / Control Form*
ITTS	*Invitation To Tender, Services*	*ITTW*	*Invitation To Tender, Works*
QC	*Questionnaire: Suitability Assessment for Service Provider*	*QW*	*Questionnaire: Suitability Assessment for Works Contractor*
FTS	*Form of Tender and Schedule*	*GL*	*Glossary*
WE	*Data on Weather Events*		

CWMF Pillar 1

Public Works Contracts

Contracts, Model Forms, Arbitration Rules, Invitations to Tender (works), and Forms of Tender & Schedules (works)

Contracts	
PW-CF1	*Public Works Contract for Building Works designed by the Employer*
PW-CF2	*Public Works Contract for Building Works designed by the Contractor*
PW-CF3	*Public Works Contract for Civil Engineering Works designed by the Employer*
PW-CF4	*Public Works Contract for Civil Engineering Works designed by the Contractor*
PW-CF5	*Public Works Contract for Minor Building and Civil Engineering works designed by the Employer*
PW-CF6	*Public Works Short Form of Contract*
PW-CF7	*Public Works Investigation Contract*
PW-CF8	*Public Works Short Form of Investigation Contract*
PW-CF9	*Public Works Framework Agreement*
Weather Event	
WE 1.0	*Met Éireann's calculations of Weather Events*

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CWMF Pillar 1
(continued)

Model Forms	
MF 1.0	*Model Forms (compendium of all model forms)*
MF 1.1	*Bid Bond*
MF 1.2	*Letter to Apparently Unsuccessful Tenderer*
MF 1.3	*Letter of Intent*
MF 1.4	*Letter of Acceptance*
MF 1.5	*Letter to Tenderers Notifying Award*
MF 1.6	*Performance Bond*
MF 1.7	*Parent Company Guarantee*
MF 1.8	*Novation and Guarantee Agreement*
MF 1.9	*Novation Agreement*
MF 1.10	*Appointment of Project Supervisor*
MF 1.11	*Professional Indemnity Insurance Certificate*
MF 1.12	*Collateral Warranty*
MF 1.13	*Rates of Pay and Conditions of Employment Certificate*
MF 1.14	*Bond – Unfixed Works Items*
MF 1.15	*Retention Bond*
MF 1.16	*Appointment of Conciliator*
MF 1.17	*Bond – Conciliator's Recommendation*
Arbitration Rules	
AR 1.0	*Arbitration Rules*
Invitations to Tender (works)	
ITTW 1	*Invitation to Tender for Works, Restricted Procedure*
ITTW 2	*Invitation to Tender for Works, Open Procedure*
ITTW 3	*Invitation to Tender, Investigation Contract under an Open Procedure*
Forms of Tender and Schedules	
FTS 1	*Form of Tender and Schedule: Public Works Contract for Building Works designed by the Employer*
FTS 2	*Form of Tender and Schedule: Public Works Contract for Building Works designed by the Contractor*
FTS 3	*Form of Tender and Schedule: Public Works Contract for Civil Engineering Works designed by the Employer*
FTS 4	*Form of Tender and Schedule: Public Works Contract for Civil Engineering Works designed by the Contractor*
FTS 5	*Form of Tender and Schedule: Public Works Contract for Minor Building and Civil Engineering Works designed by the Employer*
FTS 6	*Form of Tender and Schedule: Public Works Short Form of Contract*
FTS 7	*Form of Tender and Schedule: Public Works Investigation Contract*
FTS 8	*Form of Tender and Schedule: Public Works Short Form of Investigation Contract*

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CWMF Pillar 2 ***Standard Conditions***

Standard Conditions of Engagement, Arbitration Rules, Invitations to Tender (services), and Forms of Tender & Schedules (services).

Standard Conditions	
COE 1	*Standard Conditions of Engagement for Consultancy Services (Technical)*
COE 2	*Standard Conditions of Engagement for Archaeology Services*
Arbitration Rules	
AR 1.0	*Arbitration Rules*
Invitations to Tender (services)	
ITTS 1	*Invitation to Tender for Services, Restricted Procedure*
ITTS 2	*Invitation to Tender for Services, Open Procedure*
Forms of Tender & Schedule (services)	
FTS 9	*Form of Tender and Schedule, Consultancy Services (Technical)*
FTS 10	*Form of Tender and Schedule, Archaeology Services*

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CWMF Pillar 3 ***Cost Planning & Control/ Suitability Assessment***

Cost Control & Planning Forms; and Suitability Assessment Forms for works and services.

Cost Planning & Control Forms	
CO 1	*How to Use the Costing Document (Building Works) Template*
CO 1.1	*Costing Document (Building Works)*
CO 2	*How to Use the Costing Document (Civil Engineering Works) Template*
CO 2.1	*Costing Document (Civil Engineering Works, Roads)*
CO 2.2	*Costing Document (Civil Engineering Works, Water Sector)*
CO 2.3	*Costing Document (Civil Engineering Works, Marine)*
Suitability Questionnaires (works)	
QW 1	*Questionnaire: Suitability Assessment for Works Contractor, Restricted Procedure*
QW 2	*Questionnaire: Suitability Assessment for Works Contractor, Open Procedure*
QW 3	*Questionnaire: Suitability Assessment for Works Specialist for specialist area*
Suitability Questionnaires (services)	
QC 1	*Questionnaire: Suitability Assessment for Service Provider, Restricted Procedure*
QC 2	*Questionnaire: Suitability Assessment for Service Provider, Open Procedure*
QC 3	*Questionnaire: Suitability Assessment for Service Provider, Independent PSDP*
QC 4	*Questionnaire: Suitability Assessment for Service Provider, Independent PSCS*

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CWMF Pillar 4 ***Guidance Notes***

Guidance Notes	
GN 1.0	*Introduction to the Capital Works Management Framework*
GN 1.1	*Project Management*
GN 1.2	*Project Definition and Development of the Definitive Project Brief*
GN 1.3	*Budget Development*
GN 1.4	*Procurement and Contract Strategy for Public Works Contracts*
GN 1.5	*Public Works Contracts*
GN 1.6	*Procurement Strategy for Consultancy Services (Technical)*
GN 1.6.1	*Assessment of Construction Service Providers, Restricted Procedure*
GN 1.6.2	*Assessment of Construction Service Providers, Open Procedure*
GN 1.7	*Standard Conditions of Engagement, Guidance Note and Sample Schedules*
GN 2.1	***Design Development Process*** [1]
GN 2.2	*Planning and Control of Capital Costs*
GN 2.3	*Procurement of Works Contractors*
GN 2.3.1	*Assessment of Works Contractors, Restricted Procedure*
GN 2.3.2	*Assessment of Works Contractors, Open Procedure*
GN 2.4	*Tender Process*
GN 3.1	*Implementation Process*
GN 4.1	*Project Review*
Glossary	
GL 1.0	*Glossary*

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[1] The current guidance note.

Strategic Objectives of the CWMF

The strategic objectives of the Government's Capital Works Management Framework are to ensure:

- Greater cost certainty at contract award stage;
- Better value for money at all stages during project delivery, particularly at hand-over stage; and
- More efficient end-user delivery.

Provided there is a comprehensive definition of client's requirements in terms of output specifications, and (in the case of traditional contracts) adequate pre-tender detailed design input, the new public works contracts will enable the key objectives outlined above be achieved. The degree to which output specifications and the pre-tender detailed design input is developed is determined by the following guiding principles which underpin the new contracts:

- To ensure as far as practicable that the accepted tender prices and the final outturn costs are the same; and
- To allocate risk so that there is optimal transfer of risk to the Contractor.

The public sector client is called 'the Employer' in the new public works contracts. The achievement of optimal risk transfer is dependent on the Employer providing the following detailed information in the tender documentation:

- In design-and-build (Contractor-design) projects: detailed output specifications
- In traditional (Employer-design) projects: comprehensive input designs and specifications in the tender documentation;

In responding to an invitation to tender, prospective contractors can then assess the impact of the risks being transferred and build the costs of such risk into their tender price.

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Structure of this document

This document is divided into four chapters as follows:

Capital Works Management Framework

Main Project Processes

Project Stages

Capital Appraisal

Standard Conditions of Engagement

Project Stages		Project Management	Design Activities (Building)	Design Activities (Civil Eng.)	Cost Control Activities	Risk and Value Management	Documents for Approval
Appraisal							
Approval in Principle							
Stage 1 ***Planning Initial***	**Stage (i)** ***Feasibility Study / Preliminary Report***	**Manage outputs: Project Definition (through 16 N° overall parameters)** **Manage technical experts' appointment (if required)**	Conduct Feasibility Studies Develop *Definitive Project Brief* Appoint technical experts (if required) Appoint PSDP (if required)	Conduct Preliminary Report Conduct design studies Develop *Definitive Project Brief* Appoint technical experts (if required) Appoint PSDP (if required)	Conduct cost assessment of Feasibility Studies / Preliminary Report (capital and maintenance costs)	**VM:** Confirm strategic functional performance Review Feasibility Studies / Preliminary Report options Identify VM strategies Develop functional performance model **RM:** Identify and assess risk relating to the *Project Execution Plan* Develop high-level *Risk Management Plan*	*Project Management Structure* *Preliminary Project Brief* *Preliminary Output Specification* *Feasibility Study and Cost Plan* *Design Brief* *Final Output Specification* *Definitive Project Brief* *Project Execution Plan* *Risk Management Plan*
	Stage (ii) ***Design***	***Project Review 1: Confirm approval for design expenditure*** (Report to Sanctioning Authority and await approval prior to proceeding)					
		Manage procurement strategy **Manage design consultant appointment** **Manage assessment of output requirements**	Appoint Design Team / Design Team Leader Assess output requirements	Appoint Design Team / Lead Consultant Develop design standards Assess output requirements	Check / assess budget	**VM:** Consider VM in relation to procurement strategy **RM:** Identify risk in relation to procurement Agree risk allocation	*Definitive Procurement Strategy* *Contract Type Proposal* *Project Team Selection Report*
Stage 2 ***Planning Developed***		***Project Review 2: Confirm requirements; review procurement strategy*** (C ertify compliance to Sanctioning Authority; and proceed after agreed period provided no queries / hold from Sanctioning Authority)					
		Manage Outline Design process	Develop *Outline Sketch Scheme* Appoint PSDP (if not appointed earlier)	Develop Preliminary Planning Appoint PSDP (if not appointed earlier)	Develop *Outline Cost Plan*	VM: Consider VM in relation to Outline Sketch Scheme / Preliminary Planning RM: Consider RM in relation to Outline Sketch Scheme	*Outline Sketch Scheme (Building)* *Preliminary Planning drawings (C. Eng.)* *Outline Cost Plan*
		Project Review 3: Assess project design and Outline Cost Plan (Certify compliance to Sanctioning Authority; and proceed after agreed period provided no queries / hold from Sanctioning Authority)					
		Manage Developed Design process **Manage procurement process**	Develop *Developed Sketch Scheme* Prepare submission for statutory approval	Continue Preliminary Planning Prepare submission for statutory approval	Develop *Developed Cost Plan* Develop *Whole Life Cost Appraisal*	**VM:** Carry out value engineering Assess buildability of the design Consider VM in relation to *Detailed Sketch Scheme* **RM:** Identify residual risks Consider RM in relation to *Detailed Sketch Scheme* Suitability assessment of contractors	*Developed Sketch Scheme* *Developed Cost Plan* *Statutory Approval Submission*
		Project Review 4: Assess project prior to statutory approval (Report to Sanctioning Authority and await approval prior to proceeding)					
		Manage statutory submission process	Submit for statutory approval Review statutory approval outcome	Submit for statutory approval Review statutory approval outcome	Review *Developed Cost Plan*	**VM:** Review any planning conditions for value management impact. **RM:** Review any planning conditions for risk impact.	*Developed Cost Plan (reviewed)*
		Project Review 5: Assess outcome from statutory approval (Certify compliance to Sanctioning Authority; and proceed after agreed period provided no queries / hold from Sanctioning Authority)					
	Stage (iii) ***Tender***	**Manage the Detailed Design Process**	Develop Detailed Design (not design-and-build) Prepare tender documents	Develop Detailed Planning (Design) (not design-and-build) Prepare tender documents	Conduct *Detailed and Pre-Tender Cost Checks* and *Whole Life Cost Update* in advance of preparing tender documents	**VM:** Review suitability assessment of contractors for VM potential **RM:** Review suitability assessment of contractors for risk impact	*Tender Documentation* *Detailed Pre-tender Cost Check* *Whole Life Cost Update* *Contractor List Selection*
		Project Review 6: Approve detailed design solution; review pre-tender cost check; review risk (Report to Sanctioning Authority and await approval prior to proceeding)					
		Manage the Tender Process	Issue tender documents Assess tender returns Recommend successful tenderer	Issue tender documents Assess tender returns Recommend successful tenderer	Develop *Tender Cost Analysis* Develop *Tender Report*	**VM:** Assess tender returns for VM potential **RM:** Assess tender returns for risk impact	*Tender Assessment Criteria* *Tender Analysis And Report* *Contractor Recommendation*
		Project Review 7: Review tender returns in advance of awarding the contract (Report to Sanctioning Authority and await approval prior to proceeding)					
Stage 3 ***Implementation***	**Stages (iv)** ***Construction &*** **(v)** ***Handover***	**Manage the implementation / construction process** **Manage change control** **Manage contract**	Develop Detailed Design (Design and Build) Implement design	Develop Detailed Planning (Design and Build) Implement design	Manage change control for costs Prepare final account	**VM:** Carry out value engineering (for design and build projects only) **RM:** Manage residual risk Manage construction risk	Various contract management reports
Stage 4 ***Review***		**Manage the Project Review**	Conduct design review	Conduct design review	Develop *Analysis of Outturn Cost*	**VM:** Evaluate value achieved **RM:** Evaluate the risk management and risk mitigation process Consider operational risk reviews	*Project Outturn Review*

1: The Design Process: Concepts and Considerations

1.1 Overview

Introduction

Design is a creative activity by which client's needs and objectives are collected, interpreted and expressed in three-dimensional physical solutions.

For building projects, design should be used not only as a tool to achieve user requirements and fitness for purpose but also to achieve aesthetically pleasing solutions for society as a whole.

In the case of civil engineering projects apart from functionality and value for money in achieving the client's objectives, consideration must be given in particular situations to the visual impact that certain civil engineering projects will have on the landscape. Separate to this, the overriding criteria that should be applied to design are functionality and value for money.

Defining exact requirements for a project may take time; however it is important that adequate time and resources are allocated at this stage as it is at this point where key decisions taken can incur the greatest costs. Furthermore, a fitting design solution can be achieved more easily when a project is well defined and a clear and suitable brief is established. In order to attain an optimum design solution, the design process generally involves a number of iterations.

Contents

This section covers five topics as follows:

1.2 Design and Procurement Strategy

Who is responsible for design?

The choice of procurement strategy is a key determinant as to who should be responsible for design:

Employer	An *employer-designed (or 'traditional')* project is one where the Contractor is responsible for providing the construction services required to deliver a facility designed by (or on behalf of) the Client.
Contractor	A *contractor-designed* (or *'design-and-build'*) project is one where a contractor is responsible (subject to the terms of contract) for the design, management and delivery of the project, on time and within budget, taking into account whole-life costs and fitness for purpose in accordance with a pre-defined output specification provided by the Client.

Sponsoring Agency / Contracting Authority / Employer / Client

The Sponsoring Agency becomes the Contracting Authority for a project once it becomes a party to any contract (e.g. party to a consultant's contract) relating to the project. And from the time the Works Contract is signed, the Sponsoring Agency is referred to as the Employer. The term Client is used throughout this guidance note as a generic term to cover the Sponsoring Agency / Contracting Authority / Employer.

Employer design (traditional)

While the employer-designed approach can allow contractors to carry responsibility for designing parts of the project (i.e. those parts that are designed by specialist subcontractors or for temporary structures required during construction), the main body of work is designed by the client (or by others on behalf of the client), who retains overall responsibility for the design-and-buildability of the project.

In the case of traditional procurement, the client initiates the design process and the design is carried out on behalf of the client by the Design Team. The design team may be internal or external to the client organisation, depending on the in-house resources and technical knowledge available. Typically the design team is led by the architect (building projects) or the engineer (civil engineering projects). This type of procurement can allow the contractor to carry responsibility for designing part of the project – where this arises it should be explicitly defined in the contract as specialist work or as a specific type of temporary works.

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Contractor design (design-and-build)

If a client decides to pursue the design-and-build route, a precise definition of requirements and a comprehensive output specification should be developed so that the quality, design and performance of the completed facility are not compromised. The client's output specification must be provided in the tender documents.

With this type of procurement, contractors offer the client an integrated project team, which includes designers and construction personnel. For such projects clients have less input in the design process, being involved only at the initial or preliminary design stages, in the output specification and in the tender process. They may need to produce a feasibility study, outline sketches, specimen designs or output specifications, and to obtain Compulsory Purchase Orders, and they may also decide to obtain certain statutory approvals.

Most (if not all) of the design responsibility, however, is transferred to the contractor. The early involvement and commitment of the construction contractor in the design process improves buildability and ensures that risk in the execution of the design and any conflict that might arise between the designer and the contractor is a matter for those parties and does not involve the Client.

Clients should retain their own technical advisers (for design services) throughout the delivery process to protect their interests and to ensure that the construction quality meets Clients' specified design standards.

1.3 Design and Project Stages

Stages in capital works management

The four major stages in the life cycle of a public works project are set out in the Department of Finance's *Guidelines for the Appraisal and Management of Capital Expenditure Proposals in the Public Sector* (February 2005). The four stages are:

	Stage	What happens
Capital Works Management	**1. Appraisal**	The needs are identified, the broad parameters of a solution are agreed, and a Approval-in-Principle is granted.
	2. Planning	The needs are quantified and assumptions verified, the desired outputs are specified, and the solution is designed.
	3. Implementation	The solution is constructed.
	4. Project review	An assessment is carried out of how successfully the delivered solution addresses the needs.

The design process is a large part of the Planning Stage, and the various design activities are illustrated in Figure 1.

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1.3 Design and Project Stages, Continued

Project activities and reviews

Figure 1 illustrates the generic structure of project activities and reviews in the CWMF. It shows the sequence of major stages through which the project development passes, together with the main activities that the Sponsoring Agency or its personnel and/or consultants engage in during each stage and the project reviews that take place at key development points in the project.

Design is developed during the Planning Initial and Planning Developed stages

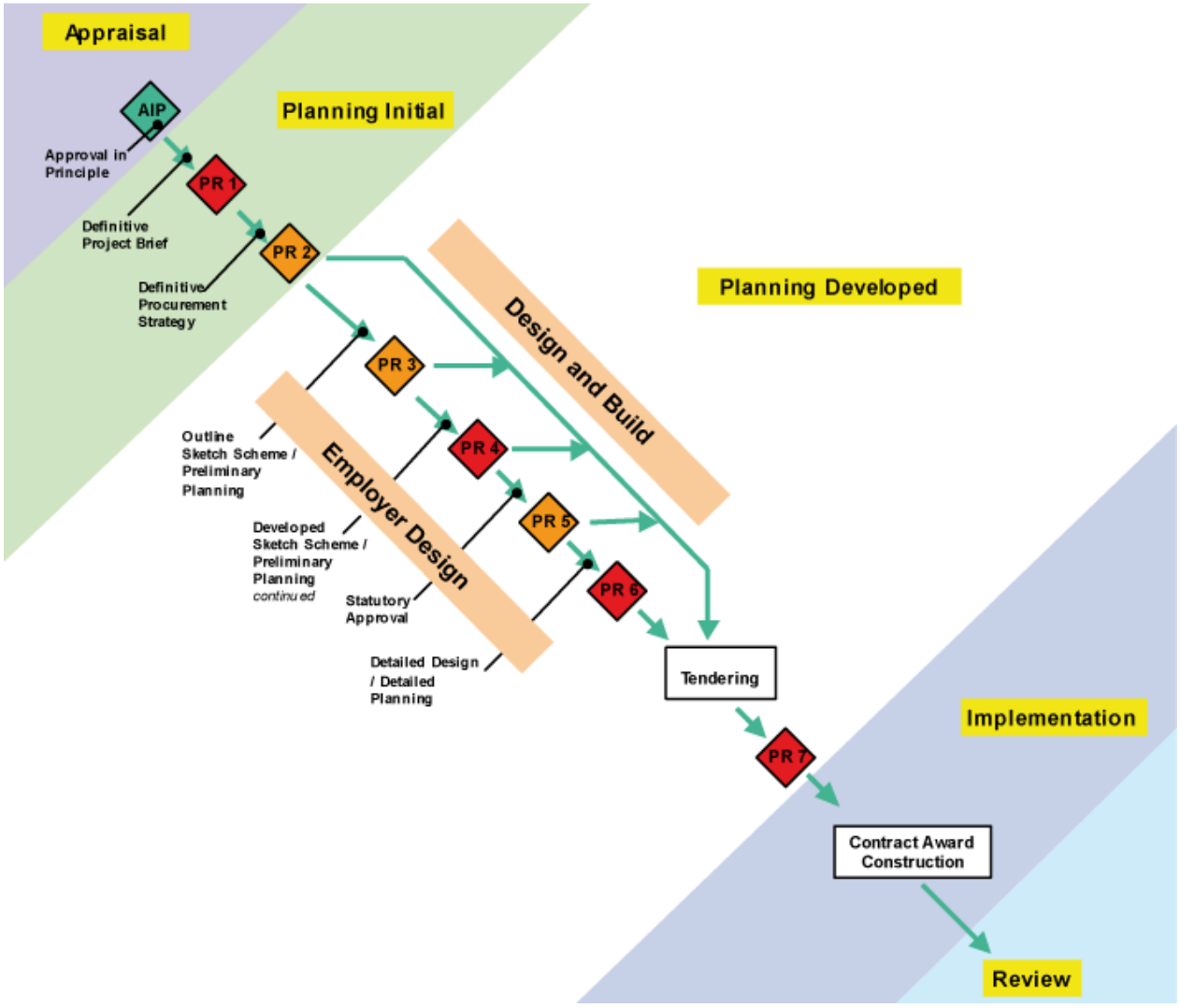

Figure 1: Project Activities and Reviews

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Design and the Appraisal stage

For the majority of projects design input is not necessary during the Appraisal stage. However, there may occasionally be situations when design input is required during this stage – for example, in complex or very large projects where the detailed appraisal requires schematic design to be undertaken to help in the decision-making process.

The Sponsoring Agency should decide what schematic design information is required during this stage (if any) and assess the in-house capacity to undertake it.

Responsibility for design at Planning stages

During the Planning Initial and Planning Developed stages, the role of design is to interpret the Client's output specifications, functional requirements and constraints and to translate them into prescriptive information in sufficient detail that can be communicated to a contractor, who can then construct a particular facility. All of these requirements are gathered together into the Definitive Project Brief, which represents all of the detailed accumulated knowledge about a project in output terms.

The Definitive Project Brief is, therefore, the primary input into the design process. It is developed early in the Planning Initial stage and represents the first major design milestone in a project life cycle. The design process proper (as described in this guidance note) begins once the Definitive Project Brief is signed off and Project Review 1 confirms that the project is in line with the Approval-in-Principle.

Procurement strategy

Once the Definitive Project Brief progresses past Project Review 1, the next step is for the Client to decide on what procurement strategy they are going to adopt and what contract type to use. *See Procurement Strategy for Public Works Contracts* (GN 1.4). This is a key decision which will determine where responsibility for design will rest for the remainder of project development and delivery.

- For design-and-build projects, the Client's design work may be concluded at any point after Project Review 2; once this happens, responsibility for design passes over to the Contractor who emerges as the successful tenderer from the tender process.
- For traditional, employer-designed projects, design can extend right up to the preparation of the tender documentation. It should not extend beyond this point, however, as such a situation would indicate that the complete design was not in place before contract award, and this would be contrary to a basic requirement when using the new Public Works Contracts.

For more information on the development of the Definitive Project Brief, see *Project Definition and Development of the Definitive Project Brief* (GN 1.2); and on the tender process, see *Tender Process* (GN 2.4).

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Responsibility for design at Planning stages (continued)

General principles for choosing a design-and-build strategy

Although there are no thresholds to guide when a design-and-build strategy is appropriate, there are general principles which should be observed in relation to when, specifically, design should be outsourced to contractors:

Projects that require unique or once-off designs should be of *sufficient value* to ensure that tender prices obtained for design-and-build solutions represent value for money.

- Projects of *low value* are suitable for design-and-build solutions where they involve repeat contractors' designs with only a small amount of bespoke design work particular to the project, and where the tender prices obtained for design-and-build solutions represent value for money – for example, this might be the case for system buildings and prefabricated systems. Design-and-build solutions are suitable for specialists' works *of any size* (for example, curtain walling, mechanical and electrical systems, windows and so on), provided the tender prices obtained represent value for money.

Contractors' responsibility for the design of specialist works is the same as it is for their own design work.

Responsibility for design in design-and-build contracts

Where the Client has chosen a Contractor-designed (design-and-build) procurement strategy, the successful Contractor takes over responsibility for design at contract award.

The Client's design input may cease at any stage after Project Review 2. All of the design-related documentation produced up to that point should be included with the tender documentation as part of the specification of the Works Requirements. Usually, this includes the Definitive Project Brief and all of the documents that have contributed to it, including the Feasibility Study / Preliminary Report, Output Specifications, Functional Requirements, and so on. It also includes any prescriptive drawings and specifications that have been developed in detail sufficient for statutory approval purposes.

Under clause 1.7 of the contract, the Contractor must be satisfied on entering the contract of the adequacy of the Works Requirements, which are listed in Part 1B of the Schedule.

The Contractor's ultimate responsibility for design comes under Clause 8.1(4) of the Public Works Contract Designed by the Contractor which states:

> *'... the Contractor shall ensure all of the following; that the completed Works are fit for their intended purposes as stated in or to be inferred from the Works Requirement.'*

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Responsibility for design in design-and-build contracts (continued)

Where the Contractor's design is not satisfactory

In a situation where the Contractor's design is not satisfactory, the Client should, in the first instance, indicate this by reference to the generic specifications in the Works Requirements, and only call in the 'fit for their intended purposes' clause later. Relying on the general provision of 'fit for their intended purposes' will lead to disputes and arguments which may not be the appropriate solution in a particular situation.

Background Information (design-and-build)

The Client (Employer), however, accepts no responsibility for background information supplied to the Contractor – this includes all types of information relevant to the project that is not contract information. The Miscellaneous section of Clause 1.10.1 of the Public Works Contract Contractor Design states:

> *'The Employer does not warrant the correctness, completeness or suitability of any information provided to the Contractor on, before or after the Contract Date, and shall have no liability in connection with such information, except as expressly stated in the Contract.'*

Note: Contractors' responsibility for the design of specialist works is the same as it is for their own design work.

Note: Contractors' responsibility for specialists' design work remains the same irrespective of which procurement strategy is taken.

Responsibility for design in traditional contracts

Where the Client has chosen a traditional procurement strategy, the Client retains responsibility for design, and needs to take the following actions:

- Appoint a Design Team;
- Have the output requirements and budget checked by the appointed Design Team;
- Establish design standards for civil engineering projects (these may already have been established, at the time of the Definitive Project Brief; and if so it should be confirmed that they still hold true);
- Produce Outline Sketch Scheme / Preliminary Planning (design);
- Develop Developed Sketch Scheme / Preliminary Planning (design);
- Obtain statutory approvals;
- Develop Detailed Design / Detailed Planning (design);
- Produce tender documentation;
- Invite tenders;
- Assess tenders, and
- Award the contract.

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Responsibility for design in traditional contracts (continued)

The Client (Employer) is responsible for all of the design on a project procured using one of the Employer Design public works contracts, except for the specific works identified in Clause 8.1(4) for which the Contractor carries the responsible. Clause 8.1(4) states:

> *'The Contractor shall ensure all of the following; that all Works Items selected or designed by the Contractor [including by any Specialist] are fit for their intended purpose in the works.'*

This high standard must be observed for such works. The responsibility for the rest of the design work in an Employer Design project is shared between the Employer and the Employer's appointed Design Consultant and is therefore not to the same high standard as that for Works Items.

Clauses 2.1, 2;.2 and 2.3 of the Standard Conditions of Engagement set out the level of design responsibility that the Design Consultant has for his designs.

> *'The Consultant shall perform the Services identified in Schedule B at its [his, her] own expense [except where the Contract states otherwise], with the skill, care, diligence, efficiency and professional conduct reasonably to be expected from a consultant with the qualifications and experience for the Services.'*

The Client (Employer) carries all risk that falls between the Consultant's design responsibility *('...with the skill, care, diligence, efficiency and professional conduct reasonably to be expected...'*) and the standard *'...fit for their intended purpose in the works'*.

Design and the Implementation stage

As part of the Implementation stage, the design solution (as agreed and approved in the Planning stages) is built. The way design information is interpreted and implemented is very important.

- For traditional projects best practice would dictate that there should be minimal or no design input during the Implementation stage; and
- For design-and-build projects, some design activities may take place during the Implementation stage – if these are planned or required by the contractor.

For further information see *Implementation Process* (GN 3.1).

Design and the Project Review stage

During the Project Review stage, a design assessment is carried out to check if the client's needs have been met by the design solution and budget (as expressed at the outset of the project) . For further information on design during Project Review stage, see *Project Review* (GN 4.1).

1.4 General Design Considerations

Project definition

Project definition is the single most important exercise in the design process. It consists of a set of activities that have as their final purpose the development of a Definitive Project Brief that can enable a responsive and efficient design process, with a minimum number of iterations. When clear project objectives are set, a mechanism for cost control can also be established. The importance of the role of the project definition cannot be emphasised enough and clients should make sufficient effort and allocate enough time and resources in developing the Definitive Project Brief.

For further information on how to achieve a project brief, see *Project Definition and Development of the Definitive Project Brief* (GN 1.2).

Client experience

The experience of the people working on building or civil engineering projects is critical to the design process. This is particularly relevant in ensuring that the client's Output Specifications and Functional Requirements are finalised before design commences. It is important therefore that the people charged with delivering projects have relevant experience. The availability of suitable in-house expertise and/or resources will determine whether it is necessary to outsource the project management and design services.

Cost planning and control

Cost and design are closely linked and it is important to ensure that projects are delivered within their approved budgets and that the design represents value for money. Projects should be designed taking account of both capital and operational costs – whole-life costing is an integral part of the design process, and whole-life costs of key components of a facility should be considered during the design process. To ensure value for money, a balance should be struck between initial capital costs and expected replacement costs over the life of the facility.

For further information on cost control see *Budget Development* (GN 1.3) and *Planning and Control of Capital Costs* (GN 2.2).

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1.4 General Design Considerations, Continued

Project size and complexity

The size and complexity of projects determine the extent and intricacies of the design. Large, complex and bespoke projects usually require a longer and more elaborate design process. Small, simple projects or those of a repetitive nature tend to have shorter and simpler design processes. Each project needs to be assessed from the outset in terms of scale and complexity so that the design process is tailored accordingly.

A client may run a design competition to arrive at the most suitable design. Such competitions must be held in accordance with EU procurement rules where these apply.

For more information on procurement in relation to design contests see *Procurement Strategy for Consultancy Services (Technical)* (GN 1.6).

Sustainability and environmental impact

Designers will be required to create sustainable designs to international standards and to optimise the whole-life costs of facilities. The environmental impact of the materials and processes used in the construction of projects should be taken into account.

More information on sustainable design is available from Sustainable Energy Ireland (SEI), which was set up by the Government in 2002 as Ireland's national energy agency. SEI's mission is to promote and assist the development of sustainable energy – see www.sei.ie.

Universal access

Designers should take into account the principles of *universal access* and *design for all* in order to ensure that the facilities to access and exit, and the benefits of use apply equally to all people regardless of their age, size or ability.

Designs should endeavour to be in line with international best practice and should take into account the conditions set out in the Disability Act 2005. Further information is available from the National Disability Authority (NDA) – see www.nda.ie.

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1.4 General Design Considerations, Continued

The design management role

Design management is an important activity in the design process as it involves the coordination, analysis and testing of the design, as well as the management of the different stakeholders involved.

It needs to be carried out by a person with relevant skills and experience, usually the Design Team Leader. Traditionally this role is fulfilled by architects (for building projects) or engineers (for civil engineering projects) either internal or external to the client organisation. More recently, however, this role has evolved and design management may now be undertaken by other specialists or project managers, particularly for technically complex projects where a high level of integration is required.

It is important at the outset to clearly set out the responsibilities of everyone in the Design Team – see *Project Management* (GN 1.1).

Ensuring optimal value for money

Different design solutions must be assessed to ensure optimal design and value for money. At a strategic level project options will be decided during the project definition process. For building projects, this can be done at Feasibility Study; for civil engineering projects, it can be done at the Preliminary Report or Design Studies, or when Design Standards are established, or even earlier.

Once the strategic decision on the best option is taken, design analysis at the next level of detail should continue and be carried out through the design process. This exercise should not generate design change unless it achieves better value for money. The option selected at the strategic level should continue to be questioned to ensure that it holds true to the end of the design process.

1.5 Design – Roles and Responsibilities

Overview

The roles and responsibilities of the Sponsoring Agency, the Design Team and the Contractor in relation to design are outlined below.

See *Planning and Control of Capital Costs* (GN 2.2) for details of roles and responsibilities in relation to cost control during the design process.

The Sponsoring Agency

The Sponsoring Agency must demonstrate clear leadership in relation to project delivery. This should start with the formulation of a clear Definitive Project Brief and the appointment of a suitable and competent Design Team. The Sponsoring Agency's responsibilities in the design process are:

- To appoint a Project Coordinator who has responsibility to monitor and approve the various activities within the design process. For this, the Project Coordinator should establish clear reporting procedures, the format for presenting information, and the approved mechanism for each design stage. The Project Coordinator should ensure that all project information is effectively and correctly communicated between the design team, the Sponsoring Agency and stakeholders so that it is fully understood.
- To appoint in writing a competent Project Supervisor for the Design Process (PSDP) for every project – this is required under the Safety, Health and Welfare at Work (Construction) Regulations. The PSDP can be an internal or external appointment to the Sponsoring Agency organisation. The role should be carried out by a competent person with relevant skills and knowledge of health & safety which can be applied to the design as it develops.
- To approve design proposals at each design stage and for seeking approval from the Sanctioning Authorities at specific points in the process.

Design Team

On traditional, Employer-designed projects, the Design Team is responsible for developing and delivering the design solution. The nature, size and complexity of projects determine the size and make-up of the Design Team, and selecting the team is crucial for obtaining the correct level of service and design quality. The need for specialist knowledge should be assessed at each stage so that relevant skills can be called upon at the right time in the design process and design can be coordinated efficiently.

On design-and-build projects, the Design Team acts in the capacity of technical advisers (for design services) throughout the delivery process. This is to protect the Client's interests and to ensure that the construction quality meets the Client's specified design standards.

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1.5 Design – Roles and Responsibilities, Continued

Contractor

On design-and-build projects, the Contractor provides an integrated project team that includes designers and construction personnel. For such projects, contractors take responsibility for the design and are in charge of producing design solutions that respond to the Client's requirements as set out in the detailed output performance specifications which should reflect all key material in the Definitive Project Brief.

The Contractor's design activities in a design-and-build project should follow the same procedures as those of an Employer in a traditional Employer-designed project but may be in a less structured way.

1.6 Design and Safety, Health and Welfare

Legal obligation

Clients need to ensure that they comply with the Safety, Health and Welfare at Work (Construction) Regulations, 2006. Under these regulations, clients have the following responsibilities in relation to design:

- Appoint in writing a competent Project Supervisor for the Design Process (PSDP);
- Appoint in writing, a competent Project Supervisor for the Construction Stage (PSCS) before construction begins;
- Be satisfied that each designer (traditional) and contractor (design-and-build) has adequate training, knowledge, experience and resources for the work to be performed;
- Cooperate with the PSDP and supply any necessary information – for example, an existing Safety File);
- Retain and make available any existing Safety File for the complete structure;
- Provide a copy of the safety and health plan prepared by the PSDP to every person tendering for the role of PSCS;
- Notify the Health & Safety Authority of the appointment of the PSDP on the approved form AF 1 available at www.hsa.ie – this is required where construction is likely to take more than 500 person days or 30 working days; and
- Allow a reasonable amount of time for project completion.

Duties of the PSDP

The PSDP has a duty to coordinate the designers in relation to the safety, health and welfare implications throughout the project. To carry out this duty, the PSDP must:

- Identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project;
- Where possible, eliminate the hazards or reduce the risks;
- Communicate necessary control measures, design assumptions or remaining risks to the PSCS so that they can be dealt with in the safety and health plan;
- Ensure that the work of designers is coordinated to ensure safety,
- Organise cooperation between designers;
- Prepare a written safety and health plan for any project where construction will take more than 500 person days or 30 working days or there is a particular risk and deliver it to the Sponsoring Authority prior to tender;
- Prepare a Safety File for the complete structure and give it to the Sponsoring Agency;
- Notify the Health & Safety Authority and the Sponsoring Agency of non-compliance with any written directions issued.

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1.6 Design and Safety, Health and Welfare, Continued

Duties of the PSDP (continued)

In light of these responsibilities, the PSDP may issue directions to designers, contractors or others. When unforeseen circumstances arise during execution of the project, which result in a design change with safety, health and welfare implications, these need to be addressed by the PSDP.

Employer-designed (traditional)

Clients have a responsibility to appoint a Project Supervisor for the Design Process (PSDP) who should then ensure that the design complies with all health and safety requirements and that a safety file is compiled during the construction process.

Design-and-build

Clients have a responsibility to appoint a PSDP who should ensure any initial design work (i.e. the work done by the client's designers) complies with all health and safety requirements.

The PSDP should during the main contract tendering period, appoint a Health & Safety Coordinator for each tenderer – as proposed by the tenderer and approved by the PSDP. In each case, the Health & Safety Coordinator's role is to assist the PSDP with the tenderer's designs during that period.

Once tenders have been submitted, the PSDP reviews the Health & Safety Coordinators' reports which may also involve interviewing the Coordinators in relation to health and safety issues associated with a particular design.

The PSDP's and the Coordinators' involvement continues until the main Contractor is awarded the contract, at which point all Health & Safety Coordinators' appointments cease (as does the Client's PSDP appointment). At this point, the successful Contractor may also be appointed as PSDP, or an independent PSDP may be appointed.

Safety File

On completion of the project, the Safety File is handed over by the Client to the owner of the facility and retained by them in perpetuity. In the case of design-and-build projects, the Safety File is first handed over from the Contractor to the Client. The Safety File should be made available for inspection by any person who may need information from it, in circumstances such as:

- For the purpose of compliance with any duties imposed under the relevant statutory provisions; or
- for updating – when new construction work is being carried out on the structure to which the Safety File relates.

For further information

To obtain more details on Health & Safety duties, roles and responsibilities see the Safety, Health and Welfare at Work (Construction) Regulations, 2006 (available at http://www.entemp.ie/publications/sis/2006/si504.pdf).

2: Design Management and Coordination

2.1 Overview

Why design management and coordination are important

To ensure that optimal design, value for money and buildability are achieved, due care and attention need to be given to the proper management and coordination of all design activities throughout the design process. In particular, the interaction between the different design disciplines requires a well-coordinated teamwork structure. Design management encompasses all of the coordination, analysis and design testing activities that a project requires. For effective design management and coordination it is necessary to appoint a manager with appropriate management skills to ensure the design process operates efficiently. Such a person is usually the design team leader.

To ensure its effectiveness, the Project Coordinator should draw up a programme which includes the main areas of activity (i.e. Planning, Implementation and Review) up to project occupation. In relation to the design development activity (part of the Planning Stage) the Design Team Leader should, as soon as the other principal consultants are appointed, draw up details of design responsibilities and milestones for each consultant and illustrate them on a project programme which should be part of the Project Execution Plan.

Coordinating different types of project

On small projects, design coordination can be very informal with meetings between different disciplines taking place as and when required. These meetings should be used to deal with specific design issues that cannot be addressed by telephone or email.

On medium-sized projects the informal approach should be augmented with regular formal design team meetings. These design team meetings allow issues to be discussed between all team members and a coordinated approach to be adopted.

On large projects, design team meetings are the main method by which design coordination is achieved, and the client should be represented at such meetings.

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2.1 Overview, Continued

Contents

This chapter covers the following topics:

2.2 Client and Statutory Approvals

Client approvals

Design is a staged process during which a number of approvals / sign-offs are required from the client. Approvals are usually given as part of the formal project review structures. In each case, there must be enough information for the client to give informed approval. The timing and sequencing of client approvals may differ from project to project, depending on how the design process is carried out.

- The Definitive Project Brief (including approval of each activity within the project definition, in particular the Design Brief and the Final Output Specification) is approved by the Sanctioning Authority as the outcome of Project Review 1;
- The Project Execution Plan (including, particularly, its design-specific elements) is developed by the Project Coordinator and is signed off by the Sponsoring Agency, also as part of Project Review 1;
- The Appointment of the Design Team is made by the Sponsoring Agency after notification to the Sanctioning Authority. Each member of the Design Team is appointed under a separate contract as part of Project Review 2.
- The Outline Sketch Scheme, the Developed Sketch Scheme and Detailed Designs (building projects) and Preliminary Planning (design) and Detailed Planning [design] (civil engineering projects) are approved by the Sponsoring Agency as the outcomes of Project Review 3, 4 and 5; and
- The tender documentation is approved by the Sponsoring Agency as part of the outcome of Project Review 6.

Consents including statutory approvals

Various regulations and laws apply to the design of projects, both building and civil engineering, and to their owners and users. Projects should be designed so that approvals from all relevant Statutory Authorities can be obtained.

For building and civil engineering projects all statutory consents that the Client has decided to obtain should be in place prior to the start of works on site. See Appendix B2 of *Public Works Contracts* (GN 1.5) for a checklist (non-exhaustive) of consents and licenses that may be required.

Responsibilities for obtaining all required consents should be determined at the outset of each project, with those that the Client decides to obtain being pursued at the appropriate time in the process so as to avoid delay to the programme.

2.3 Ensuring Design Quality

Why design quality is important

Design quality is a critical success factor for projects and requires a balance to be struck between functionality, impact, build quality and value for money. Clients have responsibility for commissioning buildings of good design quality at an affordable and reasonable cost. Good quality buildings have a big impact on public behaviour, on society as a whole and on perceptions of public space and infrastructure.

Certain civil engineering projects can have a profound impact on the quality of the built environment and full consideration should be given to the aesthetic and environmental qualities of such projects. Projects should be seen as challenging opportunities to present well-designed infrastructure that can have considerable aesthetic as well as functional merit.

General design quality considerations

Design quality can be uniquely defined for each facility in any project type. There are however some general considerations that apply to most projects:

- Efficient use of space;
- Positive environmental impact;
- Secure and safe facilities;
- Energy efficient buildings;
- Universal accessibility; and
- Future-proof design.

Buildability

Buildability represents the extent that the design of a facility takes account of available construction systems and techniques that ease construction activity and have a positive impact on cost. Buildability is an important factor in the design process and should be discussed from the early stages of projects. The use of modern methods of construction and innovation should be considered where their use is appropriate and their adoption cost-effective. Therefore, the early involvement and commitment of the construction contractor in the design process should improve buildability.

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Benefits of good design

Apart from its aesthetic appeal, good design will also consist of a number of other qualities such as:

- Contributing to a construction process that is efficient and safe, and that creates a built environment that is non-threatening;
- Making a positive addition to the project's location, environment and community by creating an attractive and healthy environment for users;
- Achieving universal accessibility targets;
- Adding value and reducing whole life costs by producing facilities that are easy and cost effective to manage, clean and maintain;
- Creating a flexible, durable, sustainable and ecologically sound environment for the community;
- Minimising pollution, waste of materials and use of energy both in construction and in use.

Steps to achieve quality design

There are a number of steps that a client can take to achieve design quality in a project; these include the following:

Review designs regularly to ensure that they satisfy the needs expressed in the Definitive Project Brief.

5. Insist on the submission of design information that can be readily understood.
6. Check designs regularly to ensure that the requirements of the Definitive Project Brief are met in the following areas:
   - Schedules of areas, room data sheets, specifications and whole-life-value-for-money (for building projects); and
   - Capacity, level of service and whole-life value-for-money (for civil engineering projects).
7. Check that the designs are consistent with the intended business objectives of the facility
8. Sign off on design should occur only when all elements of the design are agreed.

2.4 Design Deliverables

In general

Design deliverables will change as projects progress through the design process. However, the basic design deliverables will always be the drawings, schedules, specifications, other documents and details required to construct and deliver a project that meets the approved Design Brief within the approved budget.

Clients (through their Project Coordinator and design consultants) should ensure that they understand all elements of the design, and should always seek clarification as questions arise.

Building design deliverables

Designers on building projects use two- or three-dimensional drawings to illustrate their designs, using different scales depending on the stage of the project. At outline sketch scheme, large-scale drawings are produced but as designs are developed, increasingly detailed drawings are produced. Three-dimensional models (electronic or physical) are often used to illustrate designs. These are very important in helping clients visualise the end-product, and should be requested as appropriate on projects.

Civil engineering design deliverables

Designers on civil engineering projects use large scale mapping in the early design stages to allow for location analyses, constraints studies, location of Natural Heritage Areas (NHAs), Special Areas of Conservation (SACs), areas of archaeological interest and so on. As the project progresses and location/route analyses are completed, more detailed mapping and drawings are produced.

2.5 Stakeholders and Design

Why is stakeholder management required?

Stakeholders play an important role in the design process as they help determine the design requirements for projects. This is particularly relevant in the context of public consultation in respect of infrastructure projects. Achieving consensus and 'buy in' from stakeholders is a critical success factor and this can be achieved through effective communication.

Consultation process

Stakeholders should be identified and engaged as early as possible in the project and they should be involved in the consultation process when the Definitive Project Brief is formulated. This can be achieved using both formal and informal channels of communication. The consultation process should be finalised before work progresses to design and implementation.

Aims of consultation

The aims of the consultation process are to:

- Engage stakeholders in a two-way dialogue;
- Keep such interested parties regularly and fully informed of developments;
- Focus stakeholders' attention on the project;
- Record and consider stakeholders' views on the project;
- Understand and explain the project's implications for each stakeholder;
- Manage stakeholders' outlook on the project and set realistic expectations;
- Develop community satisfaction with the project; in order to save time and aid progress through the statutory approval process

Means of consultation

Consultation with stakeholders can be both formal and informal through:

- Group meetings;
- Face-to-face discussions;
- Telephone information lines;
- Public information office at location;
- Questionnaires and interviews;
- Printed information (leaflets, newsletters, posters);
- Web based information (intranet or internet sites);
- Media (newspapers, television, radio); and
- Road shows.

3: Planning Initial – Building and Civil Engineering Projects

3.1 Overview

Introduction

This chapter deals with design activities that take place during the Planning Initial stage of a project. During this stage the Sponsoring Agency must define the project requirements in detail, and the main outcomes are the Definitive Project Brief and a decision on which procurement strategy to take.

For more detailed information relating to the Planning Initial stage, see the following:

- *Project Definition and Development of Definitive Project Brief* (GN 1.2), which covers the process by which clients determine the project requirements.
- *Procurement Strategy for Public Works Contracts* (GN 1.4), which deals with how clients determine which procurement strategy to follow and the contract type to use.

Project reviews

There are two project reviews in the Planning Initial stage for both building and civil engineering projects.

- Project Review 1 is a mandatory red light review that occurs at the end of the Project Definition stage when approval for design expenditure is needed.
- Project Review 2 is an amber light review, which occurs after the procurement strategy is agreed and the Design Team has been selected.

See also *Project Management* (GN 1.1) for further information on the role of each of the project reviews.

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This section covers the following topics:

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Contents (continued)

3.2 Design Activities at the Planning Initial Stage

Introduction

The design activities that take place during the Planning Initial stage are focused on the following outputs, which are carried out by the Sponsoring Agency (with assistance from service providers where appropriate):

- Development of the Feasibility Study or Preliminary Report;
- Development of the Design Brief and Design Studies and Standards (where appropriate) which form part of the Definitive Project Brief; and
- Development of the Definitive Project Brief.

Depending on the nature of the project, the Feasibility Study / Preliminary Report, Design Brief / Design Studies and Standards and the Definitive Project Brief may be accompanied by a range of supporting reports, tests and studies that underpin the outcomes of those activities.

The determination of Design Standards and the development of Design Studies are usually design activities that apply to civil engineering projects.

As the Planning Initial stage progresses, information relating to the project is further developed and refined through research, analysis, tests and, if appropriate, additional design studies. It is critical that sufficient information is gathered to allow a full constraints analysis to be performed so that detailed design options are not developed with inherent flaws which might be costly to rectify or progress through later design or statutory process stages.

Each of the design outputs is described in turn below.

Note: In parallel with the design process, budgetary, contractual and other activities – for example, sale and acquisition of land, acquisition of temporary accommodation) also take place during the Planning Initial stage.

Feasibility Study / Preliminary Report

Where required, the Feasibility Study (or Preliminary Report) considers key quantitative aspects of the project in sufficient detail to inform a final and reasoned decision on whether or not to proceed. In the case of building projects it is not unusual for design input to be required in the form of various footprints of a facility or block plan options to identify the preferred option . Such design information is not intended to constitute formal design proposals at this stage – it consists merely of illustrative drawings or sketches to allow decisions to be made.

As part of a Feasibility Study for a building project, an examination of site options should be carried out to establish which is the best location to site the facility from the perspective of land use, cost and planning considerations.

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3.2 Design Activities at the Planning Initial Stage, Continued

Feasibility Study / Preliminary Report (continued)

In civil engineering projects, design input is more likely to be required – for example, for developing and assessing options before recommending a preferred option and/or location.

Note: Site investigation work may also be carried out at this stage (where access is possible) to ascertain what the ground conditions might be in the area where the investigation work is conducted so that costs in relation to underground design can be realistically ascertained.

Design Studies

Design Studies for civil engineering projects are carried out to help determine the basic layout, route selection, location, environmental constraints, and other data relating to known functional requirements needed to identify the preferred option. In order to assess the location of a project, site and route options need to be examined as part of the Preliminary Report.

The assessment of a location may include preliminary design studies dealing with basic layout, points of discharge, assimilative capacity, site coverage (footprint and facility) and block plan options to determine best land use, and to deal with planning considerations and overall cost implications. The use of mapping and Geographic Information Systems (GIS) can be particularly useful in this stage of a project so as to gather and analyse large amounts of spatial information economically and quickly. If design work is required at this stage, clients must appoint a competent and adequately resourced PSDP – this must be done in writing, and before design work starts, .

Design Brief

The Design Brief is the full and completed statement of the Sponsoring Agency's functional and operational requirements for a project. It defines all design requirements for a project including performance standards and quality thresholds. It is the foundation on which design will be developed and is the benchmark for measuring future design development. It also includes a detailed outline of the preferred option, supported with design studies where appropriate, and with reasons for the choice.

For more information on the Design Brief, see *Project Definition and the Definitive Project Brief* GN 1.2).

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Definitive Project Brief

The Definitive Project Brief is a complete statement of the client's budget, functional and operational requirements for a project. It includes the Feasibility Study / Preliminary Report, Design Studies that establish Design Standards (where appropriate) and the Design Brief. It also includes all other outputs from studies and reports that are required to enable future inputs from designers to be developed.

Design concepts may need to be elaborated on from earlier outline or generic design studies with, for example:

- Indicative block plans and massing diagrams; and specification of net spatial area with clearly defined functional spaces (building); and
- Details of overall output / treatment capacity and level of service required from the proposed scheme and an indicative cross section (civil engineering).

Prior to the completion of the Definitive Project Brief, the Sponsoring Agency should review its contents and, where designs have been included, these too should be considered. In the event of a conflict arising between the assumptions on which the Approval-in-Principle was granted and the design as it is presented in the Definitive Project Brief, work on the project should be suspended, and the project referred back to the Appraisal Stage for re-assessment.

The Definitive Project Brief should also include some indication of realistic cost limits.

Design Standards

Design Standards for a civil engineering project are specified and established when the Definitive Project Brief is complete. These standards identify various constraints to location with design options set out and compared in a matrix in order to identify the preferred option to be developed through the preliminary and detailed design stages.

Constraints Analysis

It is critical that sufficient information is gathered to allow a full constraints analysis to be performed so that design options are not developed with inherent flaws which may be costly to rectify or progress through later design or statutory process stages. The deliverable at the end of the project definition stage will be the identification of a robust feasible design option which can be further developed and progressed through the statutory and design processes.

3.3 Project Reviews 1 and 2 and Sequence of Events on Building Projects

Building projects: Project Review 1 and after

Project Review 1 is a mandatory red light review that takes place at the completion of the Definitive Project Brief when a commitment to commence design and construction activities is sought from the Sanctioning Authority. The Review involves a comprehensive examination of all the outputs in the Definitive Project Brief.

The Definitive Project Brief consists of outputs from three of the most important key activities in the Project Brief – Feasibility Study, Design Brief and Final Output Specification. Also as part of these activities is an approved budget for the project as well a register of known Constraints.

The Sanctioning Authority's approval is required for Project Review 1 before the project can proceed.

See also *Planning and Control of Capital Costs* (GN 2.2) for further information on costs.

The following activities take place on building projects after the Project Definition Stage.

Step	Activity
1	**Project Review 1** The Sponsoring Agency conducts Project Review 1 to confirm that the project is in line with the Approval-in-Principle.
2	**Appointment of Design Team / Design Team Leader** The Sponsoring Agency appoints the Design Team, the Design Team Leader and other team members, or confirms continuation of the appointment of consultants engaged at the Feasibility Study stage. **Note:** Consultants appointed earlier and whose commissions include the provision to continue their involvement (at the discretion of the Sponsoring Agency) beyond the Definitive Project Brief should have those commissions ratified at this stage.
3	**Appointment of Project Supervisor for the Design Process (PSDP)** The Sponsoring Agency appoints a PSDP (if one has not already been appointed at Feasibility Study stage).
4	**Assessment of Feasibility Report, Design Brief, Output Requirements, Constraints, Budget** On appointment, the Design Team confirms the adequacy, accuracy and completeness of the Definitive Project Brief.

Continued on next page

3.3 Project Reviews 1 and 2 and Sequence of Events on Building Projects, Continued

Building projects: Project Review 1 and after (continued)

Step	Activity
5	**Project Review 2** The Design Team conducts Project Review 2. The purpose of this review is for the Design Team to check that the requirements are adequate and to review the procurement strategy.
6	**Recommendation to Proceed** On the conclusion of Project Review 2, and providing the assessment (at step 4) confirms that the initial decisions and assumptions are correct, the Sponsoring Agency should certify compliance to the Sanctioning Authority, and after an agreed period of time (agreed beforehand with the Sanctioning Authority) instruct the Design Team leader to proceed with the project – provided the Sanctioning Authority, in the meantime, has no queried the project and does not issue an instruction to put the project on hold. **This is a necessary step before the commencement of the Planning Developed stage.** Any shortcomings (identified at step 4) must be satisfactorily resolved before the recommendation to proceed may be given. The Sanctioning Authority must be informed of progress in relation to any shortcomings identified. The project may not proceed to the next stage without a written instruction from the Sponsoring Agency to the Design Team Leader.

Continued on next page

3.3 Project Reviews 1 and 2 and Sequence of Events on Building Projects, Continued

Documents produced / approved by the Design Team before Project Review 2

On appointment the Design Team is given responsibility for the design and (usually) the management and administration of the construction process. The Design Team has the responsibility to:

- Check the Client's output documents (which are in place prior to the Design Team's appointment); and
- Produce other documents as necessary at the start of the design process.

Each of these sets of documents is described in turn.

Documents in place prior to appointment of the Design Team

The following documents will normally have been produced by technical experts and advisers to the Client and will be in place before a Design Team is appointed. The extent to which they are in place, however, will vary from project to project. The Design Team should review these documents and report to the Client on their adequacy for ongoing design, and as a basis for further instructions from the Client.

The table below also indicates (as appropriate) where documents relate to parameters defined within the Project Definition process. See 1.5 **Project Parameters** in *Project Definition and Development of the Definitive Project Brief* (GN 1.2) for details of the project definition parameters.

Document	To be reviewed by
Schedule of Client Output Requirements The Schedule of Client Output Requirements and functional needs that establishes the scope of the project. Relates to parameters 3, 4 and 5 (Scope, Deliverables / desired outcomes and Performance) in the project definition process.	Architect / Engineer
Feasibility Study The approved Feasibility Report in the Definitive Project Brief. Following best practice, this should address all of the project parameters in the project definition process in some manner.	Architect / Engineer
Constraints The Technical Experts' report on any constraints (known at the time) that will apply in relation to design. Relates to parameter 16 (Constraints) in the project definition process.	Architect / Engineer

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3.3 Project Reviews 1 and 2 and Sequence of Events on Building Projects, Continued

Documents in place prior to appointment of the Design Team (continued)

Document	To be reviewed by
Project Budget The approved budget in the Definitive Project Brief. Relates to the capital costs portion of parameter 15, (Budget) in the project definition process.	Cost Adviser
Design Brief The approved Design Brief included in the Definitive Project Brief. Relates to parameter 13 (Design restrictions / requirements) in the project definition process.	Architect
Project Execution Plan The approved Project Execution Plan included in the Definitive Project Brief, that indicates the overall timeframe within which the project should be delivered. Relates to parameter 11 (Project Execution Plan) in the project definition process.	Architect / Engineer

Documents produced by the Design Team after their appointment

If any or all of the documents listed below are not in place before a Design Team is appointed they should be produced by the Design Team as one of their first tasks. If they are in place the Design Team should review them and report on their adequacy to the Client.

Document	To be reviewed / produced by
Project Programme This document sets out the timeframe for design, procurement and construction activities. This timeframe should be consistent with the overall timeframe as set out in the Project Execution Plan. It should also be consistent with the time periods for Stage Services set out in Schedule B and within the overall time period set out in Schedule A of the *Standard Conditions of Engagement for Consultancy Services (Technical).*	Architect

Continued on next page

3.3 Project Reviews 1 and 2 and Sequence of Events on Building Projects, Continued

Documents produced by the Design Team after their appointment (continued)

Document	To be reviewed / produced by
Site Suitability Report This document evaluates all available sites for development, identifying the advantages and constraints for each site and identifying the preferred option.	Architect / Engineer
Site Report (preferred option) This report should show a location map to 1:1000 scale and an accurate survey drawing of the site to at least 1:500 scale – the latter should show the position of existing buildings, boundaries, adjoining properties and public services. Rights of way should be identified on the 1:500 plan.	Architect / Engineer / Quantity Surveyor
Drawings of existing buildings on the site and other information in relation to those Any drawings in relation to existing buildings and other information relating to such buildings (such as a Safety File) should be identified	Sponsoring Agency
Site Investigation Report The information in this document should be based on borehole logs or trial holes that indicate the nature of the sub-soil.	Engineer
Existing Services Report This document should identify and comment on the availability, location and adequacy of water supply, electricity, gas, telephone, TV, broadband, surface water and sewage disposal.	Engineer
Report on discussions with Statutory Authority This document should include a record of any informal discussions that took place with the Statutory Authority or Fire Officer on the availability, location and adequacy of access, and other Statutory Authority requirements.	Architect

Continued on next page

3.3 Project Reviews 1 and 2 and Sequence of Events on Building Projects, Continued

Design-and-build: transferring risk to the Contractor

For design-and-build projects, the Sponsoring Agency may decide to cease design work after Project Review 2 and to transfer complete design and statutory approval risk from that point on to the successful design-and-build Contractor who will emerge from the tender process. For design-and-build projects, the Sponsoring Agency will require the Design Team it has appointed to remain in place to:

- Prepare tender documents (based on the Sponsoring Agency's output requirements, and pricing templates) for design-and-build tenderers;
- Evaluate tender designs and prices; and
- Monitor construction, administer the contract and settle the final account.

The Sponsoring Agency should have appointed an independent PSDP at the same time as the appointment of the Design Team. This independent PSDP should remain in place until the works contract is awarded to address Health & Safety design issues in the tender documents and in the tender submissions (with the assistance of the Health & Safety Coordinator appointed by the PSDP).

Note: Health & Safety legislation requires the Preliminary Health & Safety Plan to be produced by the PSDP and issued with the tender documents. In the case of design-and-build projects, the detail of the Health & Safety risks included in the Preliminary Plan will depend on the degree to which design is developed before the project is put out to tender. Where only output requirements and specimen drawings are issued, the Health & Safety risk details will be very general – perhaps commenting on Health & Safety issues such as access to the site, traffic adjacent to the site, working on a confined site, adjoining buildings, and so on.

3.4 Project Reviews 1 and 2 and Sequence of Events on Civil Engineering Projects

Civil engineering projects: Project Review 1 and after

Project Review 1 is a mandatory red light review that takes place at the completion of the Definitive Project Brief when a commitment to commence design and construction activities is sought from the Sanctioning Authority. The Review involves a comprehensive examination of all the outputs in the Definitive Project Brief.

The Definitive Project Brief consists of outputs from the most important key activities in the Project Brief – Preliminary Report / Design Brief and Final Output Specification. Also as part of these activities is an approved budget for the project as well a register of known Constraints.

The Sanctioning Authority's approval is required for Project Review 1 before the project can proceed.

See also *Planning and Control of Capital Costs* (GN 2.2) for further information on costs.

The following activities take place on civil engineering projects after the Project Definition Stage.

Step	Activity
1	**Project Review 1** The Sponsoring Agency conducts Project Review 1.
2	**Appointment of Design Team / Lead Consultant** The Sponsoring Agency appoints the Design Team, the Lead Consultant and other team members, or confirms appointments already made. **Note:** Consultants appointed earlier and whose commissions include the provision to continue their involvement (at the discretion of the Sponsoring Agency) beyond the Definitive Project Brief should have those commissions ratified at this stage.
3	**Appointment of Project Supervisor for the Design Process (PSDP)** The Sponsoring Agency appoints a PSDP (if one has not already been appointed at Preliminary Report stage).
4	**Statement of Design Standards** The Lead Consultant / Design Team develops a comprehensive statement of the design standards to be used in the project. Where design standards have already been developed (in parallel with the Definitive Project Brief), the Lead Consultant / Design Team reviews and approves or enhances them.

Continued on next page

3.4 Project Reviews 1 and 2 and Sequence of Events on Civil Engineering Projects, Continued

Civil engineering projects: Project Review 1 and after (continued)

Step	Activity
5	**Assessment of Output Requirements, Constraints, Budget** On appointment, the Design Team confirms the adequacy, accuracy and completeness of the Definitive Project Brief.
6	**Development and Comparison of Alternative Designs** The consultant (engineer) compares alternative designs, checks their feasibility and recommends the preferred solution to the Sponsoring Agency.
7	**Project Review 2** The Design Team conducts Project Review 2. The purpose of this review is to check that the requirements are adequate and to review the procurement strategy.
8	**Recommendation to proceed** On the conclusion of Project Review 2, and providing the assessment (at step 5) confirms the initial decisions and assumptions are correct, the Sponsoring Agency should certify compliance to the Sanctioning Authority, and after an agreed period of time (agreed beforehand with the Sanctioning Authority) instruct the Lead Consultant to proceed with the project – provided the Sanctioning Authority, in the meantime, has no queries and does not issue an instruction to put the project on hold. **This is a necessary step before the commencement of the Planning Developed stage.** Any shortcomings (identified at step 4) must be satisfactorily resolved before the recommendation to proceed may be given. The Sanctioning Authority must be informed of progress in relation to any shortcomings identified. The project may not proceed to the next stage without a written instruction from the Sponsoring Agency to the Lead Consultant.

Continued on next page

3.4 Project Reviews 1 and 2 and Sequence of Events on Civil Engineering Projects, Continued

Documents produced / approved by the Design Team before Project Review 2

On appointment the Design Team is given responsibility for the design and (usually) the construction process. The Design Team has the responsibility to:

- Check the Client's output documents (which are in place prior to the Design Team's appointment); and
- Produce other documents as necessary at the start of the design process.

Documents in place prior to appointment of the Design Team

The following documents will normally have been produced by technical experts and advisers to the Client and will be in place before a Design Team is appointed. This is a non-exhaustive list of documents typically required. The Design Team should review these documents and report to the Client on their adequacy for ongoing design, and as a basis for further instructions from the Client.

The table below also indicates (as appropriate) where documents relate to parameters defined within the Project Definition process. See **Project Parameters** in *Project Definition and Development of the Definitive Project Brief* (GN 1.2) for details of the project definition parameters.

Document	To be reviewed by
Inception Report This is a statement of the basis for the project and a review of any historical supporting documentation or reports.	Engineer
Schedule of Client Output Requirements The Schedule of Client Output Requirements and functional needs that establishes the scope of the project. Relates to parameters 3, 4 and 5 (Scope, Deliverables / desired outcomes and Performance) in the project definition process.	Engineer
Design Standards Report This report sets out the main parameters of the proposed scheme – for example, proposed waste water treatment standards (BOD_5: SS), Capacity (m^2/d), road cross section (Motorway, Single carriageway), junction treatment, design speed etc. It is critical that design standards be agreed in writing before the scheme design commences in order to avoid costly and time consuming rework.	Engineer

Continued on next page

3.4 Project Reviews 1 and 2 and Sequence of Events on Civil Engineering Projects, Continued

Documents in place prior to appointment of the Design Team (continued)

Document	To be reviewed by
Preliminary Report / Design Brief The approved Preliminary Report / Design Brief in the Definitive Project Brief. Following best practice, the Preliminary Report should address all of the project parameters in the project definition process in some manner. The Design Brief relates particularly to parameter 13 (Design restrictions / requirements) in the project definition process.	Engineer
Constraints The Technical Experts' report on any constraints (known at the time) that will apply in relation to design. During the review it may become apparent that a more detailed constraints report is required – see Constraints in the table relating to **Documents produced by the Design Team after their appointment** on page 54. Relates to parameter 16 (Constraints) in the project definition process.	Engineer
Project Budget The Design Team reviews and confirms the budget for all project costs. Relates to the capital costs portion of parameter 15, (Budget) in the project definition process.	Cost Adviser
Project Execution Plan The approved Project Execution Plan included in the Definitive Project Brief, that indicates the overall timeframe within which the project should be delivered. Relates to parameter 11 (Project Execution Plan) in the project definition process.	Engineer

Continued on next page

3.4 Project Reviews 1 and 2 and Sequence of Events on Civil Engineering Projects, Continued

Documents produced by the Design Team after their appointment

If any or all of the documents listed below are not in place before a Design Team is appointed they should be produced by the Design Team as one of their first tasks. If they are in place the Design Team should review them and report on their adequacy to the Client.

Document	To be reviewed / produced by
Project Programme This document sets out the timeframe for design, procurement and construction activities. This timeframe should be consistent with the overall timeframe as set out in the Project Execution Plan. It should also be consistent with the time periods for Stage Services set out in Schedule B and within the overall time period set out in Schedule A of the *Standard Conditions of Engagement for Consultancy Services (Technical).*	Engineer
Site Investigation Report The information in this document should be based on borehole logs or trial holes that indicate the nature of the sub-soil. It probably will not be possible (on a large site) to carry out a full investigation for the whole site at this stage.	Engineer
Preferred Route (Location) Report This report will include a statement of the purpose and need for the project, a description of the selected design, a discussion of the various alternative designs considered and a comparison of all of the options which explains the benefits of the preferred solution.	Engineer / Specialist Sub Consultant
Part 8 / EIS Screening & Scoping Report This identifies the statutory approvals that will have to be obtained for the scheme prior to progressing to procurement and construction.	Engineer
Constraints Where constraints require further review, it may be necessary to appoint specialist sub-consultants in areas such as archaeology and ecology to assist the Lead Consultant in the identification of potential constraints.	Engineer / Specialist Sub Consultant

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3.4 Project Reviews 1 and 2 and Sequence of Events on Civil Engineering Projects, Continued

Design-and-build: transferring risk to the Contractor after Project Review 2

For design-and-build projects, the Sponsoring Agency may decide to cease design work after Project Review 2 and to transfer complete design and statutory approval risk from that point on to the successful design-and-build Contractor who will emerge from the tender process. For design-and-build projects, the Sponsoring Agency will require the Design Team it has appointed to remain in place to:

- Prepare tender documents (based on the Sponsoring Agency's output requirements, and pricing templates) for design-and-build tenderers;
- Evaluate tender designs and prices; and
- Monitor construction, administer the contract and settle the final account.

The Sponsoring Agency should have appointed an independent PSDP at the same time as the appointment of the Design Team. This independent PSDP should remain in place until the works contract is awarded. This is so that Health & Safety design issues can be addressed in the tender documents and in the tender submissions.

Note: Health & Safety legislation requires the Preliminary Health & Safety Plan to be produced by the PSDP and issued with the tender documents. In the case of design-and-build projects, the detail of the Health & Safety risks included in the Preliminary Plan will depend on the degree to which design is developed before the project is put out to tender. Where only output requirements and specimen drawings are issued, the Health & Safety risk details will be very general – perhaps commenting on Health & Safety issues such as access to the site, traffic adjacent to the site, working on a confined site, adjoining buildings, and so on.

4: Planning Developed – Building and Civil Engineering Projects

4.1 Overview

Introduction

This section presents the design activities required at the Planning Developed stage of a project. On small projects not all these activities may be required, but they should still be considered, if only in a simplified way or as part of a checklist.

Contents

This section covers the following topics:

4.2 Design Activities at the Planning Developed Stage, Building and Civil Engineering

Design Stages

Within the Planning Developed stage, design is a step-by-step process during which design ideas are developed into drawings and specifications that can be used as a means of communicating the design of a project in the tender documentation, and ultimately, to construct the project.

The Planning Developed stage commences with a written instruction from the Sponsoring Agency to the Design Team leader / Lead Consultant, following an agreed period of time after satisfactory conclusion of Project Review 2.

The following tables summarise the stages of design activities for building and civil engineering projects that take place at the Planning Developed stage.

Building Projects		
Stage	**Description**	**Reviews**
A1	Outline Sketch Scheme	Project Review 3
A2	Developed Sketch Scheme, *including Statutory Approval*	Project Review 4 Project Review 5
A3	Detailed Design	Project Review 6

Civil Engineering Projects		
Stage	**Description**	**Reviews**
B1	Preliminary Planning (Design), *including Statutory Approval*	Project Review 3 Project Review 4 Project Review 5
B2	Detailed Planning (Design)	Project Review 6

The design activities detailed in this chapter are more associated with projects that use the traditional, Employer-designed method of procurement. In design-and-build projects, the Contractor takes responsibility for the processes through which design emerges. Depending on the complexity of the project, however, the Contracting Authority should decide the level of detail required of the Contractor at tender submission stage and state this in the tender documents.

The Contracting Authority may be involved in design up to the point of obtaining Planning Approval before the design is handed over to tendering contractors. On particular civil engineering projects, it may be necessary for the Client to be involved in certain approvals (Part 8 or EIS) and land acquisitions (CPO).

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Using service providers for design work

Depending on the type of project and the availability of skills within the Sponsoring Agency, the services of architects, engineers and other design specialists will usually be required (particularly on civil engineering projects); and if they cannot be recruited from in-house resources, they can be acquired externally.

Best practice requires that the appointment of design specialists should be subject to two separate competitions, one for design studies (up to the Definitive Project Brief) and one for design services (after the project definition). In the event that a single competition is used – for example, civil engineering projects where Constraints and Route Selection Studies are required as well as detailed design and site supervision), this must include the following two options:

- An option to cancel the contract for that service at no cost to the Client (in accordance with Clause 14.9 of the Standard Conditions of Engagement) if the Client should decide not to proceed after the Definitive Project Brief is completed; or
- An option to change the terms of the contract for that service to allow for any changes in the nature of the project that come to light during project definition.

4.3 Summary of Project Reviews 3 to 6

Project Reviews

Four project reviews take place during the Planning Developed stage. These relate in particular to projects that use traditional Employer-designed procurement. For design-and-build projects the requirements for each of these project reviews will have to be addressed on a project by project basis depending on when the design risk is transferred to the Contractor and the extent of the Contractor's design work. Project Reviews are intended to review the project against the requirements set down in the Definitive Project Brief and any subsequent approved amendments to it.

See also *Planning and Control of Capital Costs* (GN 2.2) for further information on costs as they relate to each of the project reviews.

See also *Project Management* (GN 1.1) for further information on the role of each of the project reviews.

Design-and-build: transferring design risk to the Contractor after a Project Review

For design-and-build projects, the Sponsoring Agency may decide to cease design work at the conclusion of any one of the project reviews, up to and including Project Review 6, but should be earlier (unless it is exceptional), and to transfer the complete design and statutory approval risk (if appropriate) from that point on to the successful design-and-build Contractor who emerges from the tender process. For design-and-build projects, the Sponsoring Agency will require the Design Team that has been appointed to remain in place to:

- Prepare tender documents (based on the Sponsoring Agency's output requirements, and pricing templates) for Design and Build tenderers;
- Evaluate tender designs and prices; and
- Monitor construction, administer the contract and settle the final account.

The Sponsoring Agency will also be required to appoint an independent Project Supervisor for the Design Process (PSDP) to address Health & Safety design issues in the tender documents and in tender submissions (with the assistance of the Health and Safety Coordinators appointed by the PSDP).

Project Review 3

Project Review 3 takes place at the end of the Outline Sketch Scheme for building projects and at an appropriate point during the Preliminary Planning (Design) stage for civil engineering projects. The scope of this review is for the Design Team / Lead Consultant to assess if the project as designed (together with its associated Outline Cost Plan) is in line with the requirements of the Definitive Project Brief. If so, at the end of this review the Sanctioning Authority should be formally notified of compliance.

Continued on next page

4.3 Summary of Project Reviews 3 to 6, Continued

Project Review 3 (continued)

Proceeding to the next stage

The project should then, *after an agreed waiting period* (agreed beforehand with the Sanctioning Authority), proceed to the next stage, unless the Sanctioning Authority instructs the Sponsoring Agency otherwise. When notifying the Design team to proceed, the Sponsoring Agency should advise the Design Team of any approved changes in requirements or legislation.

The project may not proceed to the next stage without a written instruction from the Sponsoring Agency to the Design Team Leader / Lead Consultant.

Project Review 4

Project Review 4 takes place at the end of the Developed Sketch Scheme stage for building projects, prior to the submission of the building project for statutory approval (i.e. Planning Permission). In the case of civil engineering projects it takes place at the end of the Preliminary Planning stage just prior to submission for statutory approval.

The scope of this review, in the case of both building and civil engineering projects, is for the Design Team to assess if the project as designed and its associated Developed Cost Plan / Outline Cost Plan (revised) are still in line with the requirements of the Definitive Project Brief. If so, at the end of this review the Sanctioning Authority should be formally notified of compliance.

Proceeding to the next stage

The project should, *after an agreed waiting period* (agreed beforehand with the Sanctioning Authority) be submitted for statutory approval unless instructed otherwise. The Sponsoring Agency should advise the Design Team of any approved changes in requirements or legislation.

The project may not proceed to the next stage without a written instruction from the Sponsoring Agency to the Design Team Leader / Lead Consultant.

Combining Project Reviews 3 and 4 on Civil Engineering Projects

For a civil engineering project, Project Review 3 may take place at an appropriate point during Preliminary Planning as agreed with the Sponsoring Agency. Alternatively, the Sponsoring Agency may agree that Project Reviews 3 and 4 can be combined at the end of the Preliminary Planning stage.

Project Review 5

Project Review 5 takes place once statutory approval (for building projects) or statutory approval or comments / conditions (for civil engineering projects) from statutory authorities are received. If approval is received with no changes in design, the Sanctioning Authority should be formally notified of compliance and the project should, after an agreed waiting period (agreed beforehand with the Sanctioning Authority), proceed to the next stage unless instructed otherwise. If comments / conditions that require design amendments are received from statutory authorities, the Design Team should produce a report on the cost and design implications for the project.

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4.3 Summary of Project Reviews 3 to 6, Continued

Project Review 6

Project Review 6 takes place at the end of the Detailed Design / Detailed Planning stage prior to the issue of the Invitation to Tender. At this point the fully-detailed design needs to be assessed. This is a very important and critical review which should result in approval of the detailed design solution and the pre-tender cost check, and the agreed optimal transfer of risk. If at this point the project as planned is not in line with the Definitive Project Brief, the design proposal should be amended or the implementation of the project should be suspended and the project referred back to the Sanctioning Authority for a decision.

If the project meets the requirements set in the Definitive Project Brief the Sanctioning Authority should be formally notified of compliance. The project should not proceed until approval is given by the Sanctioning Authority. After receipt of approval and before seeking tenders, the Sponsoring Agency should ensure that the calculation of project cost is not more than one month old. Once this is confirmed, the tender process should commence by issuing the tender documents to those interested in bidding for the project.

4.4 Planning Developed Stage A1 (Building): Outline Sketch Scheme

Outline Sketch Scheme: design activities

The Outline Sketch Scheme approved at the end of the Planning Initial stage is developed to meet the requirements set out in the Definitive Project Brief (including the Design Brief and the Output Specifications).This stage also involves making initial contact with the planning authorities.

The Outline Sketch Scheme stage commences with a written instruction from the Sponsoring Agency to the Design Team Leader to proceed with the work in accordance with Schedule B of the Standard Conditions of Engagement. The written instruction is issued after a waiting period (agreed beforehand with the Sanctioning Authority) at the start of the Planning Development stage (after Project Review 2).

In relation to the Stage Services outlined in Schedule B of the Standard Conditions of Engagement, the Outline Sketch Scheme can be one of the following:

- The output from sub-stage (ii a), where further design work by the Client is foreseen; or
- The output from sub-stage (ii a), where further design work by the Client is *not* foreseen. This is the scenario that applies where the procurement strategy is to go for design-and-build at this point – that is, where the Client transfers design responsibility to the Contractor from this point on.

Note: for very small projects, the Client has the choice of dividing design into sub-stages or of treating design as a single *Whole Stage* – this choice is available in Schedule B of the Standard Conditions of Engagement.

The development of an Outline Sketch Scheme is usually used for both Employer-design and Contractor–design (design-and-build) projects. However, there may be circumstances where project information is not developed to this level at the time tenders are being sought – for example, design-and-build projects based on generic output specifications and functional requirements. In such cases the risk relating to statutory approvals would be transferred to the Contractor.

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4.4 Planning Developed Stage A1 (Building): Outline Sketch Scheme, Continued

Outline Sketch Scheme: design activities (continued)

Design activities during Outline Sketch Scheme

The design activities that take place during this stage (Outline Sketch Scheme) are summarised in the following table:

Step	Activity
1	**Produce the Outline Sketch Scheme** The Design Team, through a process of dialogue and consideration, produces the Outline Sketch Scheme.
2	**Conduct Project Review 3** The Design Team conducts Project Review 3 to assess if the project as designed (together with its associated Outline Cost Plan) is in line with the requirements of the Definitive Project Brief. For details of Project Review 3 see page 59.
3	**Preliminary Discussions with statutory authorities** The Sponsoring Agency or its Designers hold preliminary discussions with the statutory authorities. The purpose of these discussions is to establish the likelihood of the scheme obtaining approval, and to explore any variations in the design and other wider issues that might impact on the design and that need to be considered. These discussions may take place in parallel with Project Review 3.
4	**Outline Sketch Scheme Sign-Off** On the conclusion of Project Review 3, the Sponsoring Agency must sign off on the Outline Sketch Scheme before the project can proceed (after a waiting period agreed beforehand with the Sanctioning Authority) to the Developed Sketch Scheme stage.

Change in Scope

Once the Outline Sketch Scheme design commences, changes in the scope or objectives of the project should not be made unless absolutely necessary and only with the approval of the Sanctioning Authority or unless the proposed changes could reduce the overall cost of the project without changing the quality or size of the project.

If changes are to be made, the cost implications and the effects on the timing and delivery of the project should be fully appraised and documented before being presented by the Sponsoring Agency for acceptance by the Sanctioning Authority.

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4.4 Planning Developed Stage A1 (Building): Outline Sketch Scheme, Continued

Documents required for the Outline Sketch Scheme

The Outline Sketch Scheme requires a number of documents to be produced, which need to be approved by the Sponsoring Agency. The exact documents required differ from case to case, depending on the complexity and size of the project. The following table includes documents that might typically be required, with an indication in each case of who is responsible for developing them . This list can be abridged or expanded as required for a particular project.

Note: The scale of drawings may vary depending on the type and size of project. The Design Team should decide on the appropriate scale of drawings at the beginning of this project stage.

Document	Description
Architect's report	This report should include a general description of the overall design concept, an appraisal of the options considered, conclusions, and recommendations. The report should incorporate input from other members of the design team, and detail site features, flood plane analysis, sustainability, opportunities and constraints. It should also cover the implications of the proposed design solution in terms of quick and economical construction. Responsible: **Architect**
Civil / Structural Engineer's Report	This report should include initial comments on structural design, particularly in relation to the ease and economy of construction. The report should also include details of the design of the main drains, connection locations to Local Authority main systems, roads, paving, water mains, and so on associated with building projects. Responsible: **Civil / structural engineer**
Service Engineer's Report	This report should include comments on the proposed systems and thermal performance of the facility. It should also assess the effect of design features on the performance of service systems. The report should also address existing telephone and power lines traversing the site. Responsible: **Service engineer**

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4.4 Planning Developed Stage A1 (Building): Outline Sketch Scheme, Continued

Documents required for the Outline Sketch Scheme (continued)

Document	Description
Cost Adviser's Report	This report should include comments on the cost implications of the proposed design solution. The report should include the Outline Cost Plan within which the design will be developed in more detail. For further information in relation to this document see *Planning and Control of Capital Costs* (GN 2.2). Responsible: **Cost Adviser**
Design Programme	Developed by the Design Team Leader / Project Coordinator, the Design Programme should indicate time scales (in weeks) for each of the main stages of work. These periods should coincide with the time allocated for this work in the Project Execution Plan. Responsible: **Design Team Leader / Project Coordinator**
Location Plan (1:1000 scale)	This document should illustrate the relationship between the site and its surroundings. Responsible: **Architect**
Site Plan (1:500 scale)	The document should show buildings, boundaries, entrances, substations, plant areas, services, roads, paths, parking layout, play areas and other specific requirements generated by the type of building or imposed by statutory authorities. All site plans should indicate the north point and where appropriate the direction of prevailing wind. Responsible: **Architect**
Floor plans, roof plans, cross sections (1:200 scale)	The floor plans should show the spatial layout of the design, floor areas and the north point. Cross-sections should indicate the relationship between the building levels and site levels as well as the general structural solution and the design solution for natural lighting and ventilation. Responsible: **Architect**
General structural design drawings	These drawings should indicate the initial structural solution for the proposed design Responsible: **Structural Engineer**
General services design drawings	These drawings should indicate the initial services solution for the proposed design. Responsible: **Services Engineer**

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4.4 Planning Developed Stage A1 (Building): Outline Sketch Scheme, Continued

Documents required for the Outline Sketch Scheme (continued)

Document	Description
Schedule of Accommod-ation	This should include a breakdown of all areas proposed in the design as indicated on floor plans and should be reconciled with the schedule of accommodation in the Definitive Project Brief. Responsible: **Architect**
Preliminary Specification	This specification should include a description of the materials proposed and details of the method of construction. Responsible: **Architect**
Preliminary report of discussions with Statutory Authorities	The comments made by the statutory authorities with respect to the proposed design, including comments with regard to the fire and transport strategy and any wider issues raised should be presented If a project requires planning permission from a planning authority or An Board Pleanála, discussions should be held as early as possible so that any potentially difficult planning conditions are identified and accommodated. A decision to proceed to the next or subsequent stages should not be taken until there is a reasonable level of confidence that permission will be granted on conditions that are acceptable (if any). Similar considerations should apply to the requirements of various statutory codes operated by local authorities and other bodies, (i.e. Fire Safety Certificate, Air or Water Pollution Licence, Waste Permit, or Integrated Licence from the Environmental Protection Agency). Under a design-and-build contract, responsibility for obtaining planning permission will, if tendered prior to Outline Sketch Scheme, will be assigned to the successful contractor who should have carried out such preliminary discussions when preparing its tender. Responsible: **Architect (traditional)**

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4.4 Planning Developed Stage A1 (Building): Outline Sketch Scheme, Continued

Documents required for the Outline Sketch Scheme (continued)

Document	Description
Preliminary Safety and Health Plan	The Preliminary Safety and Health Plan is concerned with the arrangements in place for the management and co-ordination of health and safety matters on site. It should contain an overall description of the project, its proposed timescale, and appropriate information relating to other work on site. It must also specify any work related to the project that will involve particular risks. The plan prepared on a preliminary basis by the PSDP must be developed before the commencement of work by the Project Supervisor for the Construction Stage (PSCS) into a Safety and Health Plan for the Construction Stage. The detail and size of the plan will depend on the size and nature of the project. In the case of design-and-build projects, the Preliminary Safety and Health Plan is to be prepared by PSDP for each tenderer's design. Responsible: **PSDP**

4.5 Planning Developed Stage A2 (Building): Developed Sketch Scheme

Introduction to the Developed Sketch Scheme stage

Once Project Review 3 has been satisfactorily concluded and the Sponsoring Agency has signed off the Outline Sketch Scheme, the Developed Sketch Scheme stage commences with a written instruction from the Sponsoring Agency to the Design Team Leader to proceed with the work in accordance with Schedule B of the Standard Conditions of Engagement. The written instruction is issued after an agreed waiting period (agreed beforehand with the Sanctioning Authority) at the conclusion of Project Review 3.

In relation to the Stage Services outlined in Schedule B of the Standard Conditions of Engagement, the Developed Sketch Scheme can be one of the following:

- The output from Stage (ii b) where the Developed Sketch Scheme follows Stage (ii a), the Outline Sketch Scheme; or
- The output from sub-stage (ii b), where further design work by the Client is *not* foreseen. This is the scenario that applies where the procurement strategy is to go for design-and-build at this point – that is, where the Client transfers design responsibility to the Contractor from this point on.

During the Developed Sketch Scheme stage, the design solution is developed further in order to achieve greater certainty of design and cost. Where design-and-build procurement is being used, the development of the design may be left to the successful design-and-build Contractor who emerges from the tender process.

The design activities that take place during this stage (Developed Sketch Scheme) are summarised in the following table:

Step	Activity
1	**Produce a developed sketch scheme** The Design Team through dialogue and consideration produces a developed sketch scheme.
2	**Approval of all drawings and documents** The Sponsoring Agency approves all the drawings and documents related to the Developed Sketch Scheme stage.
3	**Conduct Project Review 4** The Design Team conducts Project Review 4 to assess if the project design and the Developed Cost Plan are aligned with the requirements of the Definitive Project Brief. For details of Project Review 4 see page 60.

Continued on next page

4.5 Planning Developed Stage A2 (Building): Developed Sketch Scheme, Continued

Introduction to the Developed Sketch Scheme stage (continued)

Step	Activity
4	**Preparation of proposals and application for submission to statutory authorities** The Design Team prepares proposals and applications for submission to the statutory authorities. For more information, see page 72.
5	**Conduct Project Review 5** The Design Team conducts Project Review 5 to assess the outcome of the statutory approval process. For details of Project Review 5 see page 60.
6	**Detailed Sketch Scheme Sign-Off** On the conclusion of Project Review 5, the Sponsoring Agency must sign off on the Detailed Sketch Scheme before the project can proceed (after a waiting period agreed beforehand with the Sanctioning Authority) to the Detailed Design stage.

Documents required for the Developed Sketch Scheme

The Developed Sketch Scheme consists of a number of documents, which need to be approved by the Sponsoring Agency. The exact documents required differ from case to case, depending on the size and complexity of the project. The following table includes documents that might typically be required, with indication of who is responsible for developing them.

This list can be abridged or expanded to suit the complexity and size of the project. The amount of drawn information needs to be provided for this stage should be agreed among Design Team members and confirmed by the Sponsoring Agency at the beginning of this stage.

Document	Description
Fully developed site plan (1:500 scale)	The site plan from the previous stage is developed to include the building, boiler-house and substations; with full site development including contours, finished levels, boundaries, entrances, roads, paths, parking, play areas, external yards, parking layout and drains. North point and where appropriate the direction of prevailing wind should also be indicated. Responsible: **Architect**

Continued on next page

4.5 Planning Developed Stage A2 (Building): Developed Sketch Scheme, Continued

Documents required for the Developed Sketch Scheme, (continued)

Document	Description
Floor plans and roof plan, cross-sections and elevations (1:100 scale)	Floor plans showing allocation of functional spaces, general areas, widths of corridors, circulation spaces etc. Responsible: **Architect**
Floor plans and selection of detailed room data sheets (1:50 scale)	The proposed materials, finishes, door and window locations etc should be shown on floor plans accompanied by room data sheets. Also the layout of furniture and/or equipment and other relevant features may be shown on the floor plans. Responsible: **Architect / Interior Designer**
Selection of detailed sections (1:50 scale)	This should include (through illustrations of selected portions of the building) the method of construction, natural lighting and ventilation, coordination of services, finishes etc. Responsible: **Architect**
Outline specification	Specify materials and methods of construction proposed, accompanied by a schedule of finishes etc. Responsible: **Architect**
3D Drawings	Demonstrate design concept in three dimensional drawings. Responsible: **Architect**
Civil / Structural design drawings and report	Drawings developed at a suitable scale to illustrate the civil / structural design, accompanied by the Civil / Structural Report (developed from the report at Outline Sketch Scheme stage). Responsible: **Structural Engineer**
Services design drawings (1:100 scale) and report	Drawings illustrating the services design, accompanied by the Services Report (developed from the report at the Outline Sketch Scheme stage). Responsible: **Services Engineer**

Continued on next page

4.5 Planning Developed Stage A2 (Building): Developed Sketch Scheme, Continued

Documents required for the Developed Sketch Scheme, (continued)

Document	Description
Energy strategy document	Details of the proposal for heating and lighting systems and a completed Energy Information Form – the energy strategy document should reflect modern building services. Responsible: **Services Engineer**
Cost Plan and Cost Adviser's report	Developed Cost Plan and a Cost Report to accompany the design information – for further information see *Planning and Control of Capital Costs* (GN 2.2). Responsible: **Costs Adviser**
Preliminary Safety and Health Plan	An update to the earlier Preliminary Safety and Health Plan (traditional) In the case of design-and-build projects, it is the PSDP's responsibility to keep the Preliminary Safety and Health Plans up to date. Responsible: **PSDP**

4.6 Building: Statutory Approval

Submission of application for planning permission and other statutory approval and consents

Once the Developed Sketch Scheme is signed off by the Sponsoring Agency, the Sponsoring Agency should proceed (after an interval, as agreed beforehand with the Sanctioning Authority) with the submission for planning permission. This does not apply if the Sponsoring Agency has already transferred the risk for statutory approval to the successful design-and-build Contractor who emerges from the tender process.

Various regulations and laws apply to the design of building projects, and to their owners and users. Projects should be designed so that approvals from all relevant statutory authorities can be obtained.

See Appendix B2 of *Public Works Contracts* (GN 1.5) for a checklist (non-exhaustive) of consents and licences that may be required.

At this stage, planning permission should be sought from a planning authority or from An Bord Pleánala as a decision to proceed to the next project stage is dependent on satisfactory permission being obtained. The Sponsoring Agency should instruct the Design Team in writing to submit the application for planning permission.

Receipt of planning permission and other statutory requirements

When planning permission is obtained the implications of any conditions attaching to the planning permission should be fully assessed by the Design Team, with the Sponsoring Agency, going so far (if warranted), as considering whether the project should be abandoned if the conditions are too onerous. Similar considerations should apply to the requirements of various statutory codes operated by local authorities and other bodies – for example, for the Fire Safety Certificate.

Under a design-and-build contract, responsibility for obtaining planning permission may be assigned to the successful contractor.

4.7 Planning Developed Stage A3 (Building): Detailed Design

Introduction to Detailed Design stage

Once statutory approval has been obtained, and Project Review 5 has been satisfactorily concluded and provided there is no instruction from the Sanctioning Authority *not* to proceed, Detailed Design stage commences with a written instruction from the Sponsoring Agency to the Design Team Leader to proceed with the work in accordance with Schedule B of the Standard Conditions of Engagement. The written instruction is issued after an agreed waiting period (agreed beforehand with the Sanctioning Authority) at the conclusion of Project Review 5.

In relation to the Stage Services outlined in Schedule B of the Standard Conditions of Engagement, the Detailed Design is:

- The output from Sub-Stage (ii c) where the Detailed Design follows Sub-Stage (ii b), the Developed Sketch Scheme; or
- The output from a single *Whole Stage* that is not divided into sub-stages.

Detailed Design by the Client is appropriate only to projects that are following the traditional, Employer-design procurement strategy.

In the case of design-and-build projects, the level of design that tenderers are required to submit with their tenders is stated in the tender documents. Such design work is at the level of Outline Sketch Scheme or Developed Sketch Scheme. It is only at the evaluation stage that the tenderer of the preferred tender is asked to advance its design to Detailed Design stage

In the case of both traditional and design-and-build contracts the Detailed Design stage is very important for the success of the project and requires thorough re-evaluation of the building components, services and external works. All elements of design must be agreed at this stage so that changes do not occur during construction. In the case of traditional contracts the Detailed Design is based on the Developed Sketch Scheme and forms the basis of the tender documentation.

The design activities for traditional contracts that take place at this stage in a building project are listed below.

Step	Activity
1	**Development of Detailed Design** The Design Team (including the Architect, Structural Engineer Services Engineer and any other relevant service providers) develop the detailed design (after statutory authority approvals have been obtained)
2	**Approval of drawings and documents** The Sponsoring Agency reviews all drawings and documents and approves them as appropriate.
3	**Checking of the pre-tender cost** The Sponsoring Agency and the Cost Adviser check the pre-tender cost of the project.

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4.7 Planning Developed Stage A3 (Building): Detailed Design, Continued

Introduction to Detailed Design stage (continued)

Step	Activity
4	**Conduct Project Review 6** The Design Team conducts Project Review 6, a red light review to approve the detailed design solution and to conduct a pre-tender cost check and risk review.

Documents for Detailed Design (Building)

The Detailed Design needs to be supported by a number of documents, which must be approved by the Sponsoring Agency. The exact documents required differ from case to case, depending on the size and complexity of the project.

The following list includes documents that might typically be required for a traditional contract, with an indication of who is responsible for developing them – all or some of these might be sought on a particular project for a design-and-build contract. This list can be abridged or expanded to suit the complexity and size of the project. The amount of drawn information required at this stage should be agreed among Design Team members.

Document	Description
Detailed site plan (1:500 scale)	The site plan should be fully developed including all details as indicated in the Developed Sketch Design and details of the landscape design where appropriate. Responsible: **Architect**
Detailed drainage plan (1:100 or 1:200 scale)	Detailed drawings should show foul and surface water drains, invert levels, location of soak pits and outfall of Local Authority systems. Responsible: **Architect, Civil Engineer**
Detailed floor plans and roof plan (1:50 scale)	Floor and roof plans together with sections and elevations at 1:50 scale to show the general arrangements of the project and the spatial relationship between different areas. Responsible: **Architect**
Furniture and equipment detail	Appropriate detailed drawings of furniture and equipment required for the project. Responsible: **Architect, Interior Designer**

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4.7 Planning Developed Stage A3 (Building): Detailed Design, Continued

Documents for Detailed Design (Building) (continued)

Document	Description
Detailed cross-sections (1:20 and 1:5 scale)	Detailed cross-sections through the external walls and selected portions of the building as required. Responsible: **Architect**
Specifications of materials	Details of all building components and their performance specification. A schedule of finishes should also be included in the specification. **Responsible: Architect, Structural Engineer, Services Engineer**
Structural specifications and detailed drawings	Detailed specifications defining the structural members of the building should be specified separately; detailed structural drawings including reinforcement drawings and bar bending schedules. Responsible: **Structural Engineer**
Detailed services drawings, schedules and specifications	Detailed design drawings and specifications for heating, hot and cold water, gas, electricity, communications, ventilation and external services. Responsible: **Services Engineer**
Detailed specialist design drawings	Detailed specialist drawings for specialist works (if required) in addition to structural and services drawings. Responsible: **Architect, Engineer, Specialist Contractor, Specialist Designer**
Fire Safety Certificate	Fire safety measures incorporated into the design and as required to obtain a Fire Safety Certificate Responsible: **Architect**
Cost Plan /Pricing Document	Details of cost holding categories, and how tenderers are to break down costs. Responsible: **Cost Adviser**
Preliminary Safety and Health Plan	Update of earlier Preliminary Safety and Health Plan Responsible: **PSDP**

4.8 Planning Developed Stage B1 (Civil Engineering): Preliminary Planning (Design)

Purpose of the Preliminary Planning (Design) Stage

The Preliminary Planning (Design) approved at the end of the Planning Initial stage, is developed to meet the requirements set out in the Definitive Project Brief (including the Design Brief and the Output Specification), and to a degree of detail which will allow the following goals to be met:

- Developed preliminary alignment and structural design, treatment and unit process specification;
- Definition of land acquisition requirements;
- Statutory approval acquisition (under Part 8/EIS/CPO regulations); and
- Developed preliminary cost plan.

This is a step-by-step iterative process that allows for design ideas to develop into drawings and specifications that can be used to construct the project. These steps are detailed in reference to the traditional method of procurement. It is important that environmental and cost considerations are assessed and implemented in parallel with the preliminary design of the project rather than be used as tools for post project justification.

At this stage preferred route proposals (road schemes) or location/treatment process options (waste / waste water treatment plants) are developed. These take into account the findings of the design standards, inception, constraints and route selection reports. The Preliminary Planning (Design) stage also involves progressing planning / statutory processes, for example, initial contacts with the planning authorities, Part 8 Planning, EIS or CPO approval, Effluent Discharge / Foreshore Licensing etc.

Change in scope

Once the Preliminary Planning (Design) stage commences, changes in the scope or objectives of the project should not be made unless absolutely necessary and only with the approval of the Sanctioning Authority or unless the proposed changes could reduce the overall cost of the project without changing the quality or size of the project. If changes are to be made, the cost implications and the effects on the timing and delivery of the project should be fully appraised and documented before being presented by the Sponsoring Agency for acceptance by the Sanctioning Authority.

Continued on next page

4.8 Planning Developed Stage B1 (Civil Engineering): Preliminary Planning (Design), Continued

Preliminary Planning (Design) activities

The Preliminary Planning (Design) stage commences with a written instruction from the Sponsoring Agency to the Lead Consultant to proceed with the work in accordance with Schedule B of the Standard Conditions of Engagement. The written instruction is issued after an agreed waiting period at the conclusion of the Planning Initial stage (after Project Review 2).

In relation to the Stage Services outlined in Schedule B of the Standard Conditions of Engagement, Preliminary Planning (Design) can be one of the following:

- The output from sub-stage (ii a), where further design work by the Client is foreseen; or
- The output from sub-stage (ii a), where further design work by the Client is *not* foreseen. This is the scenario that applies where the procurement strategy is to go for design-and-build at this point – that is, where the Client transfers design responsibility to the Contractor from this point on.

Note: for very small projects, the Client has the choice of dividing design into sub-stages or of treating design as a single *Whole Stage* – this choice is available in Schedule B of the Standard Conditions of Engagement.

During Preliminary Planning (Design), the design solution is developed in further detail in order to achieve greater certainty of design and cost.

The design activities that take place at this stage of a civil engineering project are as follows:

Step	Activity
1	**Commission extra site surveys** The Sponsoring Agency and the Design Team commission additional detailed topographical and site surveys as appropriate.
2	**Preparation of preliminary design drawings / documents** The Design Team develops preliminary design drawings and documents.
3	**Prepare EIS / Part 8 / CPO submissions** The Design Team prepares the Environmental Impact Statement, Part 8 Drawings and Public Notices and any Compulsory Purchase Order documentation.
4	**Conduct Project Review 3** The Design Team conducts Project Review 3 to assess if the project as designed (together with its associated Outline Cost Plan) is in line with the requirements of the Definitive Project Brief and design standards. For details of **Project Review 3,** see page 59.

Continued on next page

4.8 Planning Developed Stage B1 (Civil Engineering): Preliminary Planning (Design), Continued

Preliminary Planning (Design) activities (continued)

Step	Activity
5	**Preliminary Discussions with statutory authorities** The Sponsoring Agency or its Design Team holds preliminary discussions with the statutory authorities. The purpose of these discussions is to establish the likelihood of the scheme obtaining approval, and to explore any variations in the design and other wider issues that might impact on the design and need to be considered. These discussions may take place in parallel with Project Review 3.
6	**Conduct Project Review 4** The Design Team conducts Project Review 4 to assess if the project design and the Outline Cost Plan (revised) are aligned with the requirements of the Definitive Project Brief design standards. For details of **Project Review 4**, see page 60.
7	**Preparation of proposals and application for submission to statutory authorities** The Design Team prepares proposals and applications for submission to the statutory authorities. For more information, see page 83.
8	**Conduct Project Review 5** The Design Team conducts Project Review 5 to assess the outcome of the statutory approval process. For details of **Project Review 5** see page 60.
9	**Preliminary Planning (Design) Sign-Off** On the conclusion of Project Review 5, the Sponsoring Agency must sign off on the Preliminary Planning (Design) before the project can proceed (after a waiting period agreed beforehand with the Sanctioning Authority) to the Detailed Planning (Design) stage.

Note: Project Reviews 3 and 4 may be combined into a single review in the case of civil engineering projects.

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4.8 Planning Developed Stage B1 (Civil Engineering): Preliminary Planning (Design), Continued

Documents for Preliminary Planning (Design)

Preliminary planning requires a number of documents to be produced, which need to be approved by the Sponsoring Agency. The exact documents required differ from case to case, depending on the complexity and size of the project The following is a non-exhaustive list of documents typically required with indication of who is responsible for developing them. The following list can be abridged or expanded to suit a project's complexity.

Scale of Drawings

The scale of drawings may vary depending on the type and size of project (for example, 20 kilometres of road versus a single site waste water treatment plant) and the Design Team should decide on the appropriate scale of drawings at the beginning of this project stage consistent with the statutory authority's approval requirements. Guidance on appropriate drawing scales is available and some are prescribed in statutory documents for example, Part 8 drawings, CPO Maps, and so on.

Site Investigation

Part of the Site Investigation work may have been done already during the Planning Initial stage. If not, it is done now to ascertain what the ground conditions are so that realistic costs for underground design can be allocated to key components of a project at the development of the Outline Cost Plan.

Investigation work may require to be carried out in different phases as total access might not have been possible earlier. If additional work is necessary, it should be carried out during this stage before any further design work done.

Document	Description
Site Investigation Tender for extra investigation work	It is important that an appropriate level of testing is carried out in order to provide the designer with all of the information necessary to safely design and specify the scheme and to complete an accurate Bill of Quantities / Pricing Document. It will be necessary to appoint an appropriate specialist with the required plant to do this work. The Public Works Investigation Contract should be used for this purpose. The requirements for a site investigation will need to be specified in tender documents and a competition held so that a suitable specialist can be found to do the work. The standard Form of Tender and the standard Invitation To Tender documents should be used for this purpose. Following the appointment of the site investigation contractor it is critical that an experienced geotechnical engineer supervise the fieldwork. Responsible: **Engineer**

Continued on next page

4.8 Planning Developed Stage B1 (Civil Engineering): Preliminary Planning (Design), Continued

Documents for Preliminary Planning (Design) (continued)

Document	Description
Topographical Survey Tender	Accurate topographical information is critical for a designer to design and specify a scheme safely and for an accurate pricing document to be completed. In order to obtain this information an expert in topographical surveys should be employed. The Standard Conditions of Engagement should be used for this service requirement. The requirements for a topographical survey will need to be specified in tender documents and a competition held so that a suitable specialist can be found to do the work. The survey should be carried out to the required tolerance levels and should be to ordnance datum and Irish National Grid coordinates. (The latter is only relevant to major road projects). Responsible: **Engineer**
Site Investigation Factual Report	This report is the product of the data that the site investigation contractor (appointed under the tender competition referred to above) obtained from excavations carried out on the site. The report should be prepared following the completion of all fieldwork and laboratory testing. It should give a full description of all the relevant information in respect of the location of trial pits, boreholes and slit trenches carried out in the field and a full description of the results of all laboratory testing. Responsible: **Engineer**
Part 8 Drawings and Public Notices	Part 8 Drawings / Public Notices should be prepared as necessary and as described in the relevant statutory instrument. Appropriate back-up materials such as pamphlets or handouts should also be prepared to present the scheme in such a way that it can be easily understood by lay people. Responsible: **Engineer**

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4.8 Planning Developed Stage B1 (Civil Engineering): Preliminary Planning (Design), Continued

Documents for Preliminary Planning (Design) (continued)

Document	Description
Environmental Impact Statement	The Environmental Impact Study should be prepared as specified in the relevant statutory instruments, laid out as specified and properly scoped. The EIS should inform the design process rather than being used as a tool to rationalise a design that has already been determined. It is likely that a number of specialist subconsultants will be required to complete the EIS. However it is important that a single editor takes responsibility for the EIS to ensure that it is a coherent document. Responsible: **Engineer / Specialist subconsultants**
Stage 1 Road Safety Audit (Road Projects)	The Stage 1 Road Safety Audit should be prepared by an experienced independent expert (not the Engineer) approved by the National Roads Authority. Following the receipt of the audit, a Designer's Response should be prepared and both documents should be submitted to the Sponsoring Agency for approval. Responsible: **Independent Audit Expert**
Compulsory Purchase Order (CPO) / Deposit and Land Transfer Mapping and Schedules	CPO / Wayleave Mapping and Schedules should be prepared in consultation with the Sponsoring Agency's Legal Agent. It is critical that the full footprint of the design including all drainage outfalls, junction sight triangles and local road tie-ins be included in the CPO. A CPO Report should also be prepared for submission to An Bord Pleanála in support of the scheme. Responsible: **Engineer / Sponsoring Agency's Legal Agent**
Licences	Effluent Discharge, Foreshore, or Abstraction Licence applications should be made at the earliest possible date so that progress on the project is not impeded. Responsible: **Engineer**

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4.8 Planning Developed Stage B1 (Civil Engineering): Preliminary Planning (Design), Continued

Documents for Preliminary Planning (Design) (continued)

Document	Description
Preliminary Design Report including Cost Plan	The Preliminary Design Report should describe the project fully. It should incorporate a Cost Plan presenting a cost-benefit analysis of the scheme, and should be submitted to the Sponsoring Agency for approval. For further information refer to *Planning and Control of Capital Costs* (GN 2.2). Responsible: **Engineer**
Design Programme	At this stage, the Design Programme should build on the design programme prepared for the Planning Initial stage. It should indicate time scales (in weeks) for each of the main stages of work up to Substantial Completion of the project. This programme should complement the time periods in the Project Coordinator's programme for the entire project. Responsible: **Engineer**
Preliminary Health and Safety Plan	Update of earlier Preliminary Safety and Health Plan. In the case of design-and-build projects the Preliminary Safety and Health Plan is to be prepared by the PSDP. Responsible: **PSDP**

4.9 Civil Engineering: Statutory Approval

Submission of application for statutory approval and other statutory consents	Once the Preliminary Planning is signed off by the Sponsoring Agency, the Sponsoring Agency should confirm to the Sanctioning Authority that Preliminary Planning is complete and should seek authorisation to proceed to the next stage. When authorisation has been given by the Sanctioning Authority the Sponsoring Agency should proceed with obtaining statutory approval and other statutory approvals and consents. This is not required where the Sponsoring Agency has decided to transfer statutory approval risk to the successful design-and-build Contractor who emerges from the tender process. The Part 8 Drawings / Public Notice, the Environmental Impact Statement and the Compulsory Purchase Order / Wayleave Mapping and Schedules Report prepared in the Preliminary Planning (Design) stage in accordance with the relevant statutory instrument should be submitted to the appropriate Statutory Authorities. There are various other regulations and laws that apply to the design of civil engineering projects so any design work should be done with the view that approvals can be obtained from all relevant statutory authorities. See Appendix B2 of *Public Works Contracts* (GN 1.5) for a checklist (non-exhaustive) of consents and licenses that may be required. At this stage, statutory approval / planning permission should be sought from a planning authority or from An Bord Pleánala as a decision to proceed to the next project stage is dependent on satisfactory permission being obtained. The Sponsoring Agency should instruct its Design Team in writing to submit the application for planning permission.
Receipt of statutory approval	When statutory approval is obtained the implications of any conditions attaching to that approval should be fully assessed by the Engineer, with the Sponsoring Agency going so far, if warranted, as to consider whether the project should be abandoned if the conditions are too onerous. Similar considerations should apply to the requirements of various statutory codes operated by local authorities and other bodies – for example, Air or Water Pollution Licence, Waste Permit, or Integrated Licence from the Environmental Protection Agency. Under a design-and-build contract, responsibility for obtaining statutory approval may be assigned to the successful contractor.

4.10 Planning Developed Stage B2 (Civil Engineering): Detailed Planning (Design)

Purpose

The preferred design solution is developed further in the Detailed Planning (Design) stage. Like the Preliminary Planning (Design) stage, this is a step-by-step process that allows for design ideas to develop and be converted into detailed drawings, specifications and schedules that can be used for implementation. These steps are particular to the traditional, employer-designed method of procurement. Where greater detail is added to existing design information, this enables the scheme to be fully and comprehensively designed, audited and specified, so that the facility can be efficiently constructed without interruption due to changes or delay in design information being provided.

The detailed design process takes account of the findings of previous reports and of any independent audits or statutory process conditions that may have arisen during the Preliminary Planning. This may include changes on foot of the Part 8 planning process or conditions imposed by An Bord Pleanála following oral hearings. In addition, the process takes account of any conditions imposed on the granting of Effluent Discharge, Abstraction or Foreshore licenses. It is essential that the detailed design be fully reconciled against decisions of the any relevant statutory or audit process in order to ensure the progress of the project without risk of future disruption.

Activities for Detailed Design

Once statutory approval has been obtained, and Project Review 5 has been satisfactorily concluded and provided there is no instruction from the Sponsoring Agency *not* to proceed, the Detailed Planning (Design) stage commences with a written instruction from the Sponsoring Agency to the Lead Consultant to proceed with the work in accordance with Schedule B of the Standard Conditions of Engagement. The written instruction is issued after a waiting period (agreed beforehand with the Sanctioning Authority) at the conclusion of Project Review 5.

In relation to the Stage Services outlined in Schedule B of the Standard Conditions of Engagement, the Detailed Planning (Design) is:

- The output from Sub-Stage (ii b) where Detailed Planning (Design) follows Sub-Stage (ii a), Preliminary Planning; or
- The output from a single *Whole Stage* that is not divided into sub-stages.

Detailed Planning (Design) by the Client is appropriate only to projects that are following the traditional, Employer-design procurement strategy.

This stage is very important for the success of the project and requires thorough re-evaluation of all components of the proposed works. All elements of design must be agreed at this stage so that changes do not occur during construction.

The documents produced at this stage form the basis of the tender documentation.

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4.10 Planning Developed Stage B2 (Civil Engineering): Detailed Planning (Design), Continued

Activities for Detailed Design (continued)

The design activities that take place at this stage of a civil engineering project are as follows:

Step	Activity
1	**Production of detailed drawings and documents** The Design Team produces detailed drawings and documents that further develop the design solution.
2	**Preparation of a Detailed Design Report** The Design Team prepares a Detailed Design Report.
3	**Preparation of Detailed Cost Plan** The Design Team prepares a Detailed Cost Plan, the Environmental Impact Statement, Part 8 Drawings and Public Notices and any Compulsory Purchase Order documentation.
4	**Discussions with Statutory Authorities** The Design Team continue discussions with the statutory authorities.
5	**Conduct Project Review 6** The Design Team conducts Project Review 6 to approve the detailed design solution and to conduct a pre-tender cost check and risk review. For details of **Project Review 6**, see on page 61. This is a red light review and is the most critical design-related review.

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4.10 Planning Developed Stage B2 (Civil Engineering): Detailed Planning (Design), Continued

Documents for Planning Developed (Design)

The Planning Developed (Design) stage requires a number of documents to be produced, which need to be approved by the Sponsoring Agency. The exact documents required differ from case to case, depending on the complexity and size of the project.

The table below contains a non-exhaustive list of the documents typically required for road works for a traditional contract – all or some of these might be sought on a particular design-and-build project. For other specialist engineering sector projects, such as marine works, different documents specific to that sector would be required. This list can be abridged or expanded to suit a project's complexity. The scale of drawings may vary depending on the type and size of project, and the Design Team should take a decision on the appropriate scale for drawings at the beginning of this project stage.

Documents to tender standard

The drawings, specifications, schedules and Bills of Quantities / Pricing Document developed at this stage should be to such a standard that they comprehensively and accurately define the scope of the project and are in such detail that a Contractor can proceed to construct the works efficiently without concern of being interrupted by excessive changes or by lack of design information.

Document	Description
Detailed Design Drawings (Roadworks)	The Detailed Design should be prepared to represent the proposed scheme fully with all drawings clearly laid out and annotated, including: ▪ Site location — ▪ Layout ▪ Plan and profile (Long Section) — ▪ Detailed structures Drawings ▪ Drainage — ▪ Services ▪ Discharge locations — ▪ Junction details ▪ Accommodation works details — ▪ Signage and delineation ▪ Lighting — ▪ Elevations ▪ All reinforced concrete details — ▪ All mechanical and electrical drawings Responsible: **Engineer**

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4.10 Planning Developed Stage B2 (Civil Engineering): Detailed Planning (Design), Continued

Documents for Planning Developed (Design) (continued)

Document	Description
Stage II Road Safety Audit (Roadworks)	This audit should be carried out by an independent experienced engineer approved by the National Roads Authority. On receipt of the audit a Designer's Response should be prepared and both documents should be submitted to the Sponsoring Agency for approval. Responsible: **Independent Auditor**
Detailed Design Report	This report should describe the project fully and should be submitted to the Sponsoring Agency for approval. It should incorporate the Detailed Price Cost, a Full Life Cost Review and Cost–Benefit Analysis. For further information please refer to *Guidance Note on Planning and Control of Capital Costs* (GN 2.2). Responsible: **Engineer**
Design and Construction Programme	This programme should build on the programme prepared earlier, It should indicate appropriate time scales (in weeks) for each of the main stages of work up to Substantial Completion of the project. This programme should complement the time periods specified in the Project Coordinator's programme for the entire project. Responsible: **Engineer**
Specification for Works	For road projects the NRA Specification for Roadworks is the default specification. For other projects (such as water services, marine projects etc.) there will be bespoke specifications. Responsible: **Engineer**
Preliminary Health & Safety Plan	Update of earlier Preliminary Safety and Health Plan. This document should be part of the tender documents for the project. Responsible: **PSDP**
Pricing Document	This document should quantify the works in sufficient detail and accuracy to allow the scheme be priced by Contractors. It must be in accordance with the Method of Measurement approved by the Department of Finance Responsible: **Cost Adviser**

5. Design at Tender Stage

5.1 Building and Civil Engineering

Introduction

This section outlines design activities required during the tendering process. Once all tender documentation is produced, checked and approved, invitations to tender are issued. Tenders should, as appropriate, be invited in accordance with national or EU procurement rules. See *Tender Process* (GN 2.4) for details of the tendering process.

Purpose

The purpose of tendering is to follow a competitive process to obtain a cost-effective solution for the implementation of the project design. The design activities at this stage relate mainly to design clarifications of tender documentation, the appointment of Health and Safety Coordinators and the assessment of proposed design schemes for design-and-build projects. There are no significant differences in the procedures for building and civil engineering projects at this stage.

Roles and responsibilities

The Sponsoring Agency is responsible for the assessment and award of the contract based on the *most economically advantageous tender* criteria. Prior to issuing the invitations to tender, the Sponsoring Agency should decide the criteria for the selection of the successful tender.

Designers and other specialists are responsible for answering any queries raised by tenderers.

Tender documentation

The tender documentation consists of all of the information produced at the Detailed Design / Detailed Planning stage plus *the Pricing Document and other contract documentation*, as produced by the Project Manager / Sponsoring Agency.

Tender documentation should include all the information about the project to enable prospective contractors to price the project as correctly as possible. All information including the Detailed Design / Detailed Planning must be checked for accuracy and consistency before the invitation to tender is issued.

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Project Review 7

Project Review 7 takes place at the end of the tendering process and its main aim is to review the tender returns before the contract is awarded.

If at this point the tender returns do not justify approval for the next stage of the project, the proposal should be amended or the project should be stopped altogether and referred back to the Sanctioning Authority for a decision. Amendments may involve design changes if the cost of the building is higher than expected or if contractors identify any flaws within the design. If this is the case, consideration will have to be given to abandoning the procurement procedure that was used (in a transparent way) and commencing a new procedure. If the view at this stage is that the project should be abandoned and if substantial amounts have already been spent on planning etc, the situation should be analysed to determine why the project got to this stage and had to be abandoned.

If the tender returns provide the basis for undertaking the planned project the Sanctioning Authority should be formally notified of compliance. The project should not proceed until approval is given by the Sanctioning Authority after which approval should be given by the Sponsoring Agency to the Design Team to proceed to the Implementation stage of the project.

Tender return assessment

The review carried out at Project Review 7 forms the basis of tender analysis. The following activities take place at this project review:

- Checking if the tender returns provide the basis for undertaking the planned project.
- Tender analysis and report – this may involve design queries and clarifications;
- Selection of contractor (for design-and-build projects, the contractors' ability to deliver a suitable design solution should have been assessed at suitability assessment stage of the project); and
- Assessment of risk for tender returns and contractor selection (for design-and-build projects the quality of the built facility needs to be considered).

Although a large part of the tender return assessment relates to the cost of the project (for example, review of outline rates), there may be situations where design solutions need to be considered as well, including design solutions for temporary works on traditional civil engineering projects.

For design-and-build projects an assessment of the detailed design solution proposed by the contractor will be required.