



ESTIMATING

An introduction to the
core principles



Volume 1

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Our Why

Build on Knowledge sets out to develop and provide educational resources to enhance the learning experience of students studying topics in the Built Environment and assist in developing a '**practical understanding**' from '**theoretical knowledge**'

Knowledge is not something that we as people create, it is the result of exposure to other people and situations which create our life experiences. Therefore, knowledge is more something that we temporarily hold rather than own.

It is usually passed on to us by others and therefore we have no individual ownership of it, but a duty to share and pass on to others.

When we obtain knowledge, we are provided with either a theoretical representation of a subject, or someone's practical understanding based on their experience. Whether we set out to or not, the knowledge that we hold develops through our own experiences which makes it ever evolving.



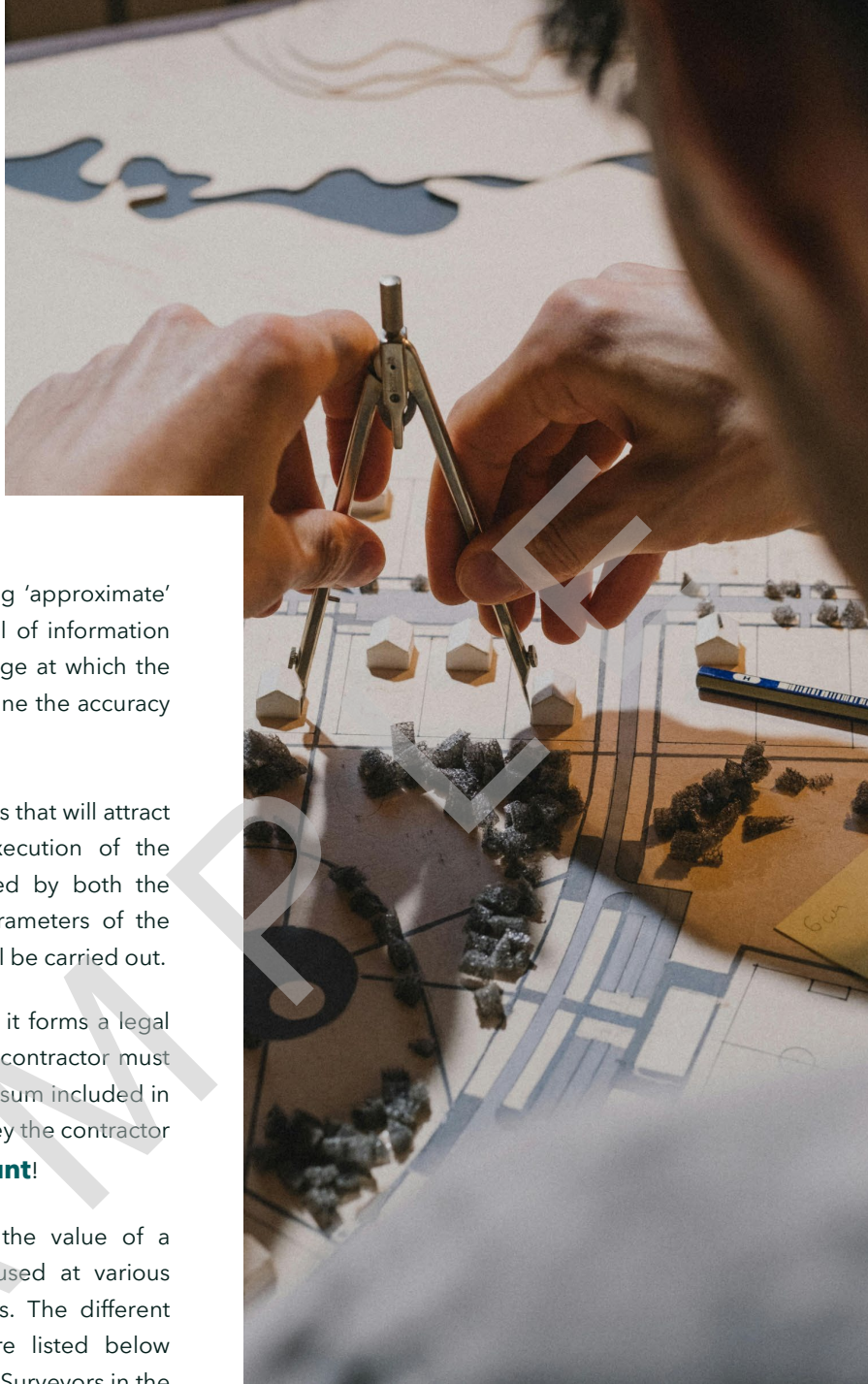
Knowledge; (noun); facts, information and skills acquired through experience or education; the theoretical or practical understanding of a subject.

What is Estimating?

"the use of intellectual ability and comprehension to determine or appraise a particular value"

Estimating comes from the word estimate, deriving from the Latin word aestimat, which means 'determined' or 'appraised'. The noun of this Latin word was originally translated to mean 'intellectual ability' or 'comprehension' which later developed to 'valuing' or 'a valuation'.

The adjacent statement summarises the principles of estimating and what the role of an estimator is, to comprehensively establish what the value is of a particular construction project. We aim to explore this definition in detail and explain how it is implemented through the various elements that form the estimating process.



The estimate is usually classed as being 'approximate' and this is due to the nature and level of information that is available. Depending on the stage at which the estimate is being prepared will determine the accuracy and robustness.

The estimate should include all elements that will attract a cost during any aspect of the execution of the contract. The contract, which is signed by both the client and contractor sets out the parameters of the work and the way in which the works will be carried out.

Once a contract is agreed and signed, it forms a legal bond between parties, after which the contractor must execute the terms as per the stipulated sum included in the contract. This is the amount of money the contractor will be paid so **accuracy is paramount!**

There are different names given to the value of a construction project, and these are used at various stages of the pre-construction process. The different terms that you may come across are listed below (defined by Royal Institute of Chartered Surveyors in the New Rules of Measurement or NRM);

Order of Cost Estimate

Cost Plan

Cost Estimate

Tendered Cost

Contract Sum

Overall Project Cost



[CLICK THE LINK TO FIND OUT MORE ABOUT THESE AND NRM](#)

Regardless of the stage, the overall goal remains the same; **"to determine the most accurate assessment of cost at a given time, in line with the information available"**.

Due to cost being reviewed at different stages of a project, the accuracy will vary from stage to stage due to information available. During the early **'feasibility stage'** of a project, the estimator would carry out an **'order of cost estimate'** which is used to give the client an Indication of budget.

In some instances, the client may have to gain approval for funding or sign off from internal stakeholders for the project budget. This could involve setting aside capital or perhaps even applying for finance/loans.

In any case, gaining or securing funding for a scheme can be a lengthy process so it is important that the budgets set are as accurate as practicable **(not always easy)**.





Whether a cost plan is being prepared during the early stages or a full estimate is being put together for the contract sum, the basic principles of estimating remain the same. It is the estimator's responsibility to ensure that any cost that will be incurred as part of the contract execution must be included within the overall cost. This is the sum of money the client agrees to pay the contractor to fulfil their contractual obligations. As well as the physical works, this would also include items such as design fees and surveys, management costs, investigative works, cost of risks, overheads, insurances, inflation etc. all of which are assessed using different methods.

The RICS New Rules of Measurement (NRM), sets out a concise breakdown of costs and is adopted by most within the industry as the standard format for cost presentation. Cost plans are also presented in the same way and follow similar headings which allows easy comparisons at various stages.

NRM Cost Headings

Section 0	Facilitating Works
Section 1	Substructures
Section 2	Superstructures
Section 3	Finishes
Section 4	Fittings, Furnishings, Equipment
Section 5	Services
Section 6	Prefabricated Buildings/Units
Section 7	Work to Existing Building
Section 8	External Works
Section 9	Main Contractor Preliminaries
Section 10	Main Contractor Overhead/Profit
Section 11	Project/Design Team Fees
Section 12	Other Development Costs
Section 13	Risk (Client Contingencies)

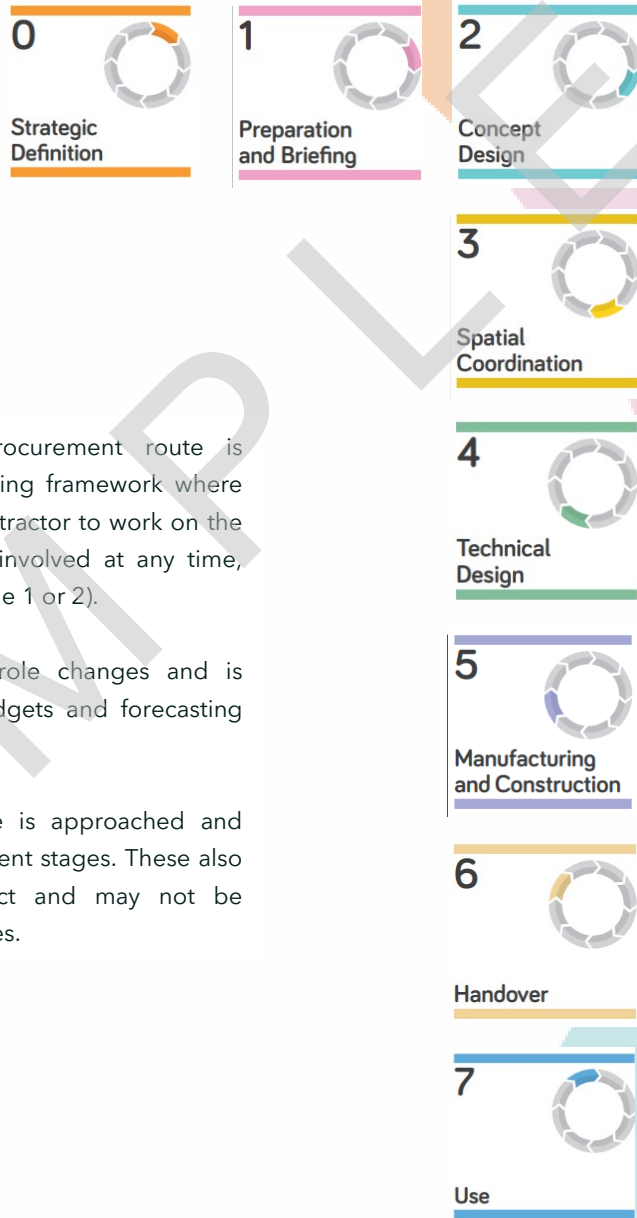
Estimating through the Pre-Construction Stages

Construction projects are generally developed in line with the Royal Institute of British Architects (RIBA) Plan of Work design stages. As the design information is developed in line with the customer’s brief, the estimator is required to update the estimate to reflect the value of the scheme through each stage. There is a correlation between design and estimating, which requires a high level of interaction and teamwork between consultants, as well as the design and estimating leads.



We are focusing on the preconstruction period which spans from stage 0-4. Stages 5-7 cover the construction period, starting on site through to completion and building use. The estimator has key responsibilities during each stage of the pre-construction process. If the project is being procured traditionally through a single or 2 stage tender, then this is usually from Stage 3 or 4 as this is where the client has developed the scheme’s design to a level that can be priced and reviewed by the contractor. In this case, the estimator’s role is to price the scheme based on tender information.





However, if an alternative procurement route is implemented, such as a partnering framework where the client nominates a single contractor to work on the scheme, the estimator may be involved at any time, usually earlier in the process (Stage 1 or 2).

At this point, the estimator's role changes and is required to offer advice on budgets and forecasting during the project's infancy.

The way in which the estimate is approached and produced varies across the different stages. These also change from project to project and may not be applicable to all tendered schemes.

Stage 0 Strategic Definition

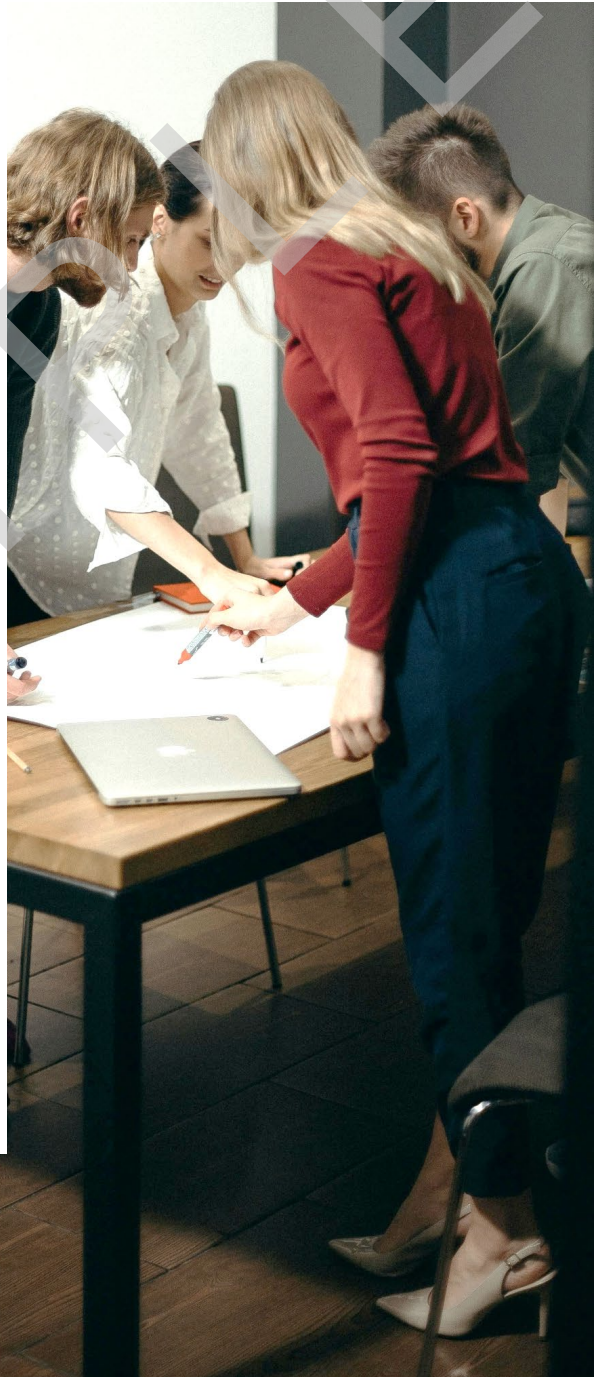
This stage is used to set the scene for the project and define the strategic aims/outputs that the client wants to achieve. The overall strategy and business case will be formulated and signed off by relevant stakeholders. This is usually an internal process and would not normally involve many third parties. The main contractor would generally not be involved at this stage, and the client's team, project manager, cost consultant, design team etc. would usually be brought together upon sign off of the strategic brief and business case once agreed.

Stage 1 Preparation & Brief

Stage 1 brings about the development of the project itself. A team would be formed, and contracts setup between the client and the relevant consultants as required. The role of the main contractor, and more specifically the estimator may vary between different procurement methods; they may or may not be involved at this stage.

This is identified in the RIBA Plan of Works under the procurement, programme and planning task bars. It is acknowledged that these 2 aspects of work will be delivered and planned differently depending on the procurement route chosen as the main contractor will have input on the programme and costings from an earlier stage if the scheme is procured directly through a framework.

A contract, usually referred to as a Pre-Construction Services Agreement (PCSA), is signed and agreed between the client and contractor. This will set out the key roles and responsibilities between parties and the deliverables during this preconstruction period. There will usually be costs associated with these activities which the estimator would include within the estimates and will form part of the PCSA contract to ensure that the contractor is paid for the work that they do. At this point neither the client nor contractor are legally bound to complete any further works beyond the extent of the PCSA.

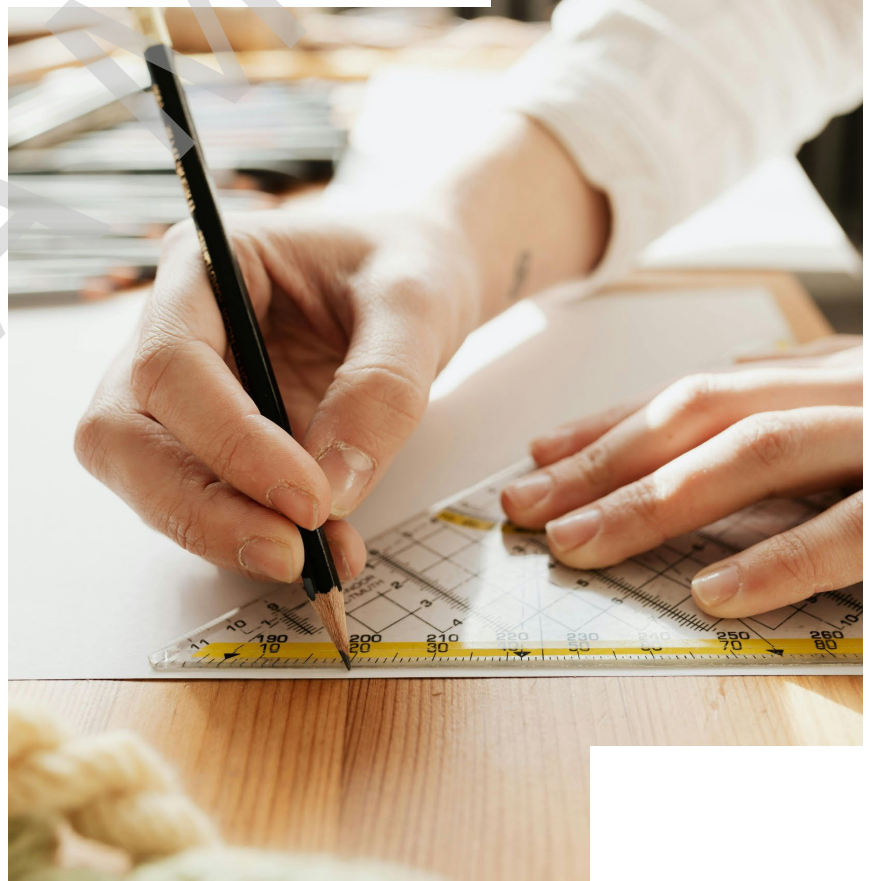


A project budget will be developed and a cost for the scheme will be determined. This budget cost will most likely be the amount of money the client will look to seek funding for. This may be in the form of internal expenditure or external finance so the budget should be as accurate as possible, as there may not be an opportunity to get additional funding later in the process.

The estimator uses benchmarking costs and historical data from previous schemes to aid in the setting of the budget, as well as their own experience, judgement and intuition. Usually these would be in the form of **costs per square metre (£/m²)**, which is data that has been accumulated from previously delivered schemes. This data is calculated by dividing the cost values of a project by the Gross Internal Floor Area (GIFA) to determine a rate that can then be applied to the GIFA on another scheme.

The GIFA is the entire internal floor area up to the internal face of the external wall and is measured over the footprint of internal walls, staircases etc.

Other factors such as inflation, location, project constraints/abnormals, building type, procurement method and any project specific requirements would need to be incorporated at this point. Cost Planning and budgeting is a separate topic in itself so at this stage we will not discuss this in any further detail.



Stage 2 Concept Design

After the overall brief and requirements have been set the next stage allows conceptual designs to be undertaken and starts to put some context to the scheme. Option appraisals would usually be undertaken and reviewed by the project team.

The estimator maybe required to produce some additional cost plans, which take the form of £/m² analysis as previously described, or there might be some further detail that can be used to complete measurements and price the options in slightly more detail.

The estimator will then be required to assess these options based on the budget set at stage 1 to ensure that the scheme and design is being developed within the financial parameters set. Any options that are over budget would usually be disregarded or refined to bring them within the allowable costs. The estimator would attend the design review meetings and input with cost advice and solutions.

A feasibility report and/or options appraisal analysis would be produced and issued to the client for their review and sign off. Structural and building services designers will also be involved at this stage as well as the architect, to begin developing other aspects of the design. At the end of stage 2 there will usually be a preferred concept option that is decided upon to develop through the next stage.





Stage 3 Developed Design

Stage 3 brings about further design development and co-ordination between architectural, structural and services. During this stage surveys would usually be undertaken to gather further information regarding the site on which the project is going to be executed.

These surveys generally include ground investigation, noise and air quality assessments, soil testing, ecology surveys, traffic and transport assessments etc. The outcomes of these surveys will aid and input into the overall design of the scheme.

The estimator will also review these surveys to ensure that any site-specific requirements are picked up within the cost plan. The surveys also allow for some areas of risk that are unknown to become known to the project team so that these can be mitigated through the design.

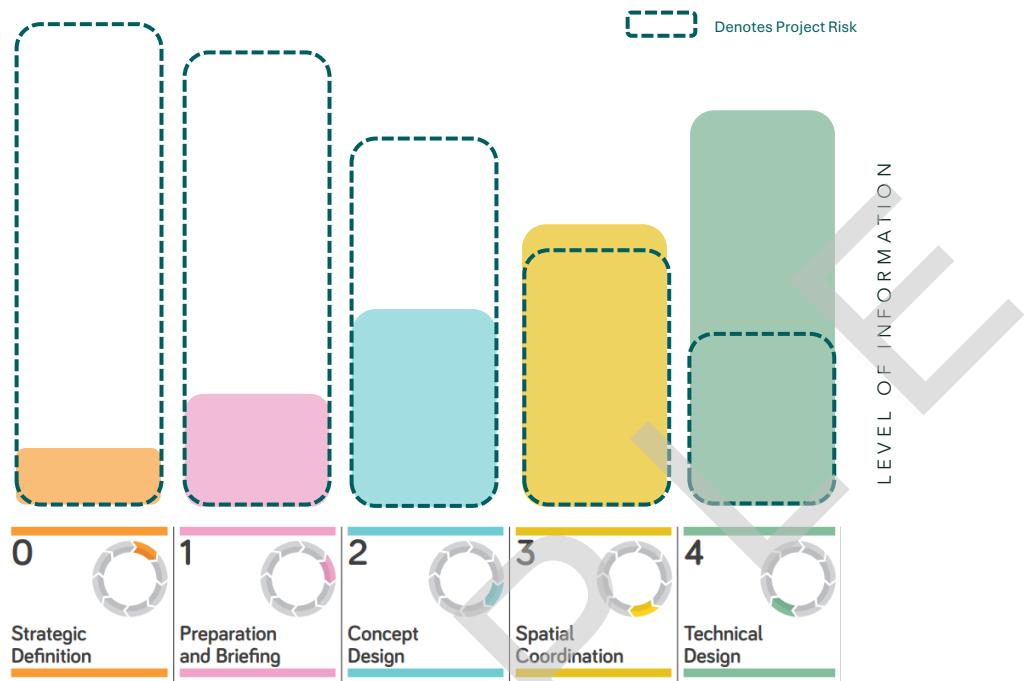


Stage 4 Technical Design

This is the tender stage and is where the design is developed to a point at which it can be robustly priced by the estimator. The estimator implements the full tender process at this stage which is the process that is covered in detail in following publications.

“the project team should collectively be **reducing risk** to the project and **adding value** for the client throughout the process”

During this preconstruction process we would expect the level of information to increase as the design develops and site specific surveys are carried out. This increase in information and knowledge of the project would allow the project to increase the certainty of the cost estimate and reduce the risk associated with the scheme.



The above is a visual representation of typically what is expected in regard to risk and the amount of information that is available on schemes during this preconstruction phase across the RIBA Stages. This will not be the case on all projects as the risk profile and development of design varies project to project. Generally as the detail/information increases, the level of risk decreases and the cost certainty would be greater.

Upcoming Projects

We hope Volume 1 of 'Estimating; An Introduction to the Core Principles' has been useful. This is just the start! We are currently working on additional estimating publications as well as other exciting products for you.

Build on Knowledge services and products coming soon...



Further Learning Publications



Online Learning Resources



Interactive Group Workshops

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