

Estimate Classes: An Explanation

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Introduction

For many years a system of classifying estimates using the terms "Class A, B C or D" has been loosely applied by a number of organizations. Somewhat of a mystery to some, and surrounded in myth for others, it is worth while taking a step back and considering the probable origins and the appropriate use of these terms.

As far as I can tell these classifications are drawn from definitions prepared by the Treasury Board (TB) of the Canadian federal government in the early 1970s. Designed for TB approval processes they were for application to all forms of procurement and not necessarily construction. Consequently they were generic in their description and several attempts, some ill advised, have been made to improve them since they were published. It will be worth noting that TB abandoned these designations several years ago, but they continue in use within Public Works and Government Services and elsewhere.

The following text provides primary definitions of the various estimate classification followed by an amplified explanation of the specific attributes displayed by each of the four estimate classifications. Application notes and references are also included.

Primary Estimate Definitions

The following are based on the original TB definitions but have been modified slightly to suit application to construction cost planning and cost control through design.

Class A Estimate

Based on complete working drawings and specifications, and prepared prior to calling competitive tenders, this estimate should be sufficient to allow a detailed reconciliation/negotiation with any contractors proffered tender.

Class B Estimate (Substantive)

Based on design/preliminary drawings and outline specifications for the project, which include the designs of all major systems and subsystems, as well as the results of all site/installation investigations, this estimate should provide for the establishment of realistic cost objectives and be sufficient to obtain effective project approval.

Class C Estimate (Indicative)

Based on a full description of the preferred option, construction/design experience, and market conditions, this estimate should be sufficient for making the correct investment decision, and obtaining preliminary project approval.

Class D Estimate

Based upon a statement of requirements, and an outline of potential solutions, this estimate is strictly an indication (rough order of magnitude) of the final project cost, and should be sufficient to provide an indication of cost and allow for ranking all the options being considered.

Treasury Board Estimate Classifications (Current)

The following definitions are the current terms and have been transcribed without modification. The two classifications relate specifically to the two main approvals provided by Treasury Board i.e. Preliminary Project Approval and Effective Project Approval. While the latter officially sets a 'budget' in TB's terms don't be fooled! They are quite capable of controlling and restricting expenditures to that sought as a preliminary project approval.

Indicative Estimate

This is a low quality, order of magnitude estimate that is not sufficiently accurate to warrant Treasury Board approval as a *Cost Objective*. It replaces the classes of estimates formerly referred to as Class C or D.

Substantive Estimate

This estimate is one of sufficiently high quality and reliability so as to warrant Treasury Board approval as a *Cost Objective* for the project phase under consideration. It is based on detailed systems and component design and taking into account all project objectives and deliverables.

While these definitions refer to a cost objective I have been unable to locate a TB definition and append the following as my interpretation.

Cost Objective

A planned, and approved, cost limit (or ceiling) within which the project's scope is to be delivered. The authorized expenditure for the current phase.

It might also be worth noting that the new TB definitions state that a 'D' estimate is good enough to be described as 'indicative'. This is unfortunate. I have noted a distinct 'dumbing down' of estimates within PWGSC lately, with insufficient consideration being given to the content of estimates prepared in support of preliminary project approvals. Consequently major problems arise when, as noted above, TB holds completion of the project to that preliminary figure.

Estimate Attributes

Each estimate classification displays a quite distinct set of attributes. These attributes, both primary and secondary, are identified in the following text and are also summarised within *Table 1. Cost Estimate Classification Summary – Estimate Attributes* that follows. In my view the primary attribute rules. Many of you may have encountered the lazy client who requests an estimate be classified higher than extant information permits. Content is everything. An estimate can be no better than the information that goes into it.

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(A) Class A Cost Estimate

(1) Primary Attribute

- (a) Work Definition
 - (i) Complete working drawings and specifications just prior to calling for tenders.
 - (ii) Definition of project typically in the order of 95% to 100% complete.

(2) Secondary Attributes

- (a) Intended Purpose
 - (i) Confirmation of project compliance with the budget (Effective Project Approval) prior to calling tenders.
 - (ii) Provide the basis/background necessary for detailed negotiation, and cost reconciliation, with any bidder and/or contractor.
 - (iii) A final “run through” of the tender documents checking for errors, inconsistencies and omissions.
- (b) Level of Precision
 - (i) High
- (c) Appropriate Preparation Methodology
 - (i) Measured and priced, fully detailed quantities, obtained from the completed working drawings and specifications.
 - (ii) This estimate will contain only those cash allowances that are called for in the construction documents.
 - (iii) The extensive detail contained within this estimate will equal the detail within any contractors bid estimate.
- (d) Typical Level of Effort
 - (i) High (Extensive and time consuming).

(B) Class B Cost Estimate

(1) Primary Attribute

- (a) Work Definition
 - (i) Completed design documents including drawings and outline specifications at the end of the Design Development stage and just prior to commencement of working drawings.
 - (ii) Definition of project typically in the order of 20% to 35% complete

(2) Secondary Attributes

- (a) Intended Purpose
 - (i) Confirming validity of Preliminary Project Approval, and
 - (ii) Seeking Effective Project Approval, and
 - (iii) Typically setting the Project Budget
- (b) Level of Precision
 - (i) Medium
- (c) Appropriate Preparation Methodology
 - (i) Majority of estimate prepared from measured and priced quantities obtained from the completed design drawings and outline specifications

- (ii) A minor proportion of the estimate may be in the form of allowances
- (d) Typical Level of Effort
 - (i) Medium.

(C) Class C Cost Estimate

(1) Primary Attributes

- (a) Work Definition
 - (i) A completed project plan, clearly defining the intent and extent of the planned work
 - (ii) Definition of project typically in the order of 5% to 15% complete

(2) Secondary Attributes

- (a) Intended Purpose
 - (i) Establish and/or confirm cost of the recommended option, selected from the various options studied, and the associated investment decision, and
 - (ii) Seek approval from Regional and/or Headquarters Investment Management Board, and
 - (iii) Seek Preliminary Project Approval from Treasury Board
- (b) Level of Precision
 - (i) Low
- (c) Appropriate Preparation Methodology
 - (i) Prepared from measured and priced quantities, where possible, and priced parameter quantities, all obtained from the project information that is available.
 - (ii) A significant proportion of the estimate may be in the form of allowances
- (d) Typical Level of Effort
 - (i) Low

Primarily an extension of the work undertaken in preparing the Class D estimate this estimate is a hard “second look” at the preferred option.

(D) Class D Cost Estimate

(1) Primary Attribute

- (a) Work Definition
 - (i) A description of the intended solutions with such supporting documentation as is available.
 - (ii) Definition of project typically in the order of 1% to 5%

(2) Secondary Attributes

- (a) Intended Purpose
 - (i) To aid in the screening of various procurement options proposed prior to recommending a preferred procurement solution, and
 - (ii) To provide an “Order of Magnitude” cost only
- (b) Level of Precision
 - (i) Lowest
- (c) Appropriate Preparation Methodology
 - (i) Various and simple methods of estimate preparation may be employed in preparing this class of estimate.
 - (ii) A significant proportion of these estimates may be in the form of assumptions and allowances.
 - (iii) Where additional information is available it is appropriate to use it in the estimate
- (d) Typical Level of Effort
 - (i) Lowest

A minimal level of detail, and often significant assumption, combined with an acceptance of the low order of inherent precision assure that these estimates are typically prepared with a minimal amount of effort. Unique projects where existing and comparable cost data is unavailable will require an additional effort, primarily to generate (model) valid and supportable estimates.

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Table 1 – Cost Estimate Classification Summary – Estimate Attributes

| Estimate Classification | Primary Attribute | Secondary Attributes | | | |
|-------------------------|---------------------------------------|---|--|--------------------|--------------------|
| | Project Definition | Intended Purpose | Methodology | Level of Precision | Preparation Effort |
| Class A | High (completed working documents) | Compliance with effective project approval (budget) | Measured, priced, full detail quantities | High | High |
| Class B (Substantive) | Medium (completed design development) | Seeking effective project approval | Mainly measured, priced, detail quantities | Medium | Medium |
| Class C (Indicative) | Low (project plan) | Seeking preliminary project approval | Measured, priced, parameter quantities, where possible | Low | Low |
| Class D | Lowest (described solutions) | Screening of various alternative solutions | Various | Lowest | Lowest |

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**Estimate Attributes –
Application Notes**

Primary Attribute

Work Definition

The level of work definition is the primary determinant of an estimate's outcome, and it is the completeness of that information that determines the classification of the estimate. No estimate can be better than the information upon which it is based, nor can it make up for deficiencies in that information. Reasonable efforts should be made to ensure that the estimate does, in fact, make use of the full information set available, else the estimate must be classified at a lower level consistent with the actual level of information used.

While expressed within this text as project documents being a certain percentage such a determination can be subjective and difficult to assess.

Secondary Attributes

Intended Purpose

Each level (classification) of estimate is intended for a specific purpose within the approvals process. While higher level estimates can be used for lower level purposes the reverse is not the case.

Level of Precision

Described here in the relative terms, as Lowest, Low, Medium and High inherent levels of precision, the size of a project has a significant impact on any numerical measure of precision. Contrary to common belief Treasury Board has never attached a numerical level of precision to estimates, and with good reason. Such numerical measures when expressed as a percentage of project cost will vary inversely with project size.

Expressions of precision are also subjective. In addition to project size, consideration should also be given to the availability and/or quality of reference cost estimating data, the uniqueness and/or complexity of the project, and also the competency and skills of potential bidders.

In my view the term 'level of accuracy', while often used, is misleading. Accuracy is a function of both estimate precision and information variability. It also leads to the question "Measured against what?" which can provoke significant debate.

Past research into the results of competitive bids, received by PWGSC, has identified a major distinction between the behaviour of bid competitions for projects of less than \$1,000,000 and those above that mark. Two examples were chosen from that research as they are most typical of the size of projects undertaken by PWGSC.

Projects in the order of \$100,000

In this category the demonstrated range, about the mean bid, for 95% of all bids received, was $\pm 25\%$

Projects in the order of \$7,500,000.

In this category the demonstrated range, about the mean bid, for 95% of all bids received, was $\pm 4\%$

Application

Within the two major ranges (i.e. above and below \$1,000,000) projects of lesser value than the examples provided will exhibit a wider range of precision and vice-versa.

Remember these are the results of competitive bids based on complete drawings and specifications. If you should wish further detail on this research then examining the *Construction Economist* archives will show up a précis of a paper that I wrote and presented at the AACEI Annual General Meeting in Seattle in 1991.

Appropriate Preparation Methodology

Numerous estimate preparation methods are available, the choice of which depends primarily on the level of project definition available and to a far lesser extent on intended estimate purpose. Typically, for building construction projects, stochastic type estimates are relatively rare (except perhaps for some "order of magnitude" estimates). Deterministic, i.e. measured,

estimate types are the norm. Above all it is important to use an appropriate methodology that uses the all project information available, delivers an appropriate answer, and at a reasonable (affordable) level of effort.

Typical Level of Effort

The circumstances surrounding any project or estimate are extremely variable and as a result the necessary level of effort may also vary significantly for reasons other than project size.

NOTE: Regarding Class C Estimates – the description included relates to that estimate needed in support of a preliminary project approval submission i.e. a confirmation and second look at the Class D estimate. That second Class C estimate often prepared later, after project commencement and at completion of the formal project definition phase, will be a new estimate with additional information, and will entail a level of effort, approaching that required of a Class B estimate.

References

Treasury Board Manual

Chapter 2-1 Project Approval – 01-06-94

Appendix A – Requirements for Treasury Board Submissions Seeking Preliminary Project Approval; Appendix B – Requirements for Treasury Board Submissions Seeking Effective Project Approval; Appendix C – Requirements for Treasury Board Submissions Seeking Lease Project Approval; Appendix F – Project Brief; Appendix G – Use of Estimates in Treasury Board Submissions.

Chapter 2-2 Project Management – 01-06-94

Appendix D – Project Progress Reports and Databases for Project Management Guideline

Chapter 2-3 Management of Major Crown Projects (MCP) – 01-06-94

Appendix C – Submission of Requirements for MCP's

Glossary/Lexique – 01-06-94