

GUIDELINE

# **Guideline for the Selection of Engineering Services**

1998

**Mission Statement:**

*To govern the engineering profession while enhancing engineering practice and enhancing engineering culture*

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## 1. INTRODUCTION

This guideline should be read in conjunction with the common Foreword and Glossary for PEO guidelines. Its purpose is to assist a user of professional engineering services—the client—to choose the appropriate engineering consultant for a project. It does not apply to design/build projects.

Usually, engineering consultants recognize that a project's cost is of paramount importance to their clients. Clients should note that engineering fees amount to a relatively small percentage of the total project cost—especially when project life-cycle costs are taken into account.

Selecting appropriately qualified engineers usually results in good engineering designs and can significantly reduce a project's life-cycle costs. Rather than merely meeting minimum standards, the services of appropriately qualified engineering consultants can enhance a project's value to clients through rigorous consideration of alternatives, analyses of long-term operating and maintenance costs, and innovative design. It is therefore in the client's best interests to use a qualification-based selection method, which demonstrates the competence of the engineering consultant in the performance of the required engineering services.

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## 2. CLIENTS' RESPONSIBILITIES

To provide the services appropriate to a particular project, engineering consultants require a complete and clear set of terms of reference. Clients' responsibilities include preparing terms of reference and a preliminary cost estimate. Before selecting an engineering consultant for a project, clients should complete the following checklist.

### 2.1 Defining the Scope of the Project

Clients should describe the nature and extent of the project as clearly and precisely as possible, including defining the objective(s) to be met and outlining relevant background information. They should also state their expectations about how objectives will be accomplished and the anticipated involvement of their staff, the engineering consultant and other relevant parties. The following criteria may help to define the terms of reference for engineering services.

- u Objective(s)—What should the project accomplish?
- u Background—What factors led up to the project?
- u Scope—What will be included in, or excluded from, the project?
- u Approach—How will the objective(s) be met?
- u Resources—Who will be responsible for what?
- u Deliverables—What tangible results are expected?
- u Timing—When will the project start/finish?

### 2.2 Structuring the Project

Clients may either retain comprehensive engineering services from a project's start to finish, or develop a work plan for contracting out specific phases of the project to various parties. They should determine which alternative is appropriate in their situation.

### 2.3 Preparing a Preliminary Cost Estimate

A preliminary cost estimate will be only as accurate as the defined scope of a project or problem. In cases where very limited preliminary engineering has been undertaken, this estimate will likely reflect the cost of engineering services contemplated in the scope of the project. In cases where more extensive preliminary engineering has been completed and the scope of the project has been well defined,

this estimate will likely reflect the total project cost. For more information on the cost of engineering services, see the PEO guideline *Schedule of Fees for Engineering Services*.

## **2.4 Choosing a Selection Method**

Clients may procure engineering services through either the direct appointment process (see Section 4.1) or the selection process (see Section 4.2) outlined in this guideline. They should determine which process is appropriate in their situation.

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# **3. SERVICES TO BE PROVIDED BY ENGINEERING CONSULTANTS**

It is important that engineering consultants list all categories of work they are likely to be asked to perform within a contract, as well as those considered to be outside the scope of the contract.

Items that require particular attention when drafting a contract, especially for design and construction projects, include:

- u preparation of tender documents for sequential bidding;
- u changes to drawings to suit contract changes arising from events outside the engineer's control; and
- u preparation of itemized lists of construction materials, including reinforcing schedules.

When preparing a list of engineering services for contracts, consultants should also consider the degree to which they will be required to obtain approvals from regulatory authorities having jurisdiction. The following seven divisions of services may be a helpful resource in preparing a comprehensive list.

## **3.1 Consultative, Advisory, Investigative and Predesign Services**

These services may include, but are not limited to:

- u expert testimony;
- u appraisals and valuations;
- u investigations and studies;
- u rate structure and tariff studies;
- u inspections, explorations, surveys, testing or other services concerning the collection, analysis, evaluation and interpretation of data leading to specialized conclusions and recommendations;
- u feasibility studies on proposed projects, including studies of clients' needs, analyses of conditions or methods of operation, development of alternative concepts, economic analyses, environmental studies and site location studies;
- u development of preliminary design reports, including outline specifications, preliminary cost estimates, etc.; and
- u schematic design and design development for building projects.

## **3.2 Project Management Services**

Project management involves mobilizing a design and construction team to plan, control and implement all of a project's activities from conception to completion of construction. It also involves meeting client requirements related to the project's function, quality, schedule and budget.

Project management services include, but are not limited to:

- u selecting consultants;
- u conceptual studies and economic feasibility;

- u planning, scheduling, monitoring and controlling;
- u estimating, budgeting and cash control;
- u engineering and design;
- u arranging financing;
- u procurement;
- u risk management;
- u construction management;
- u commissioning; and
- u quality assurance.

### **3.3 Detailed Design Services**

Detailed design services are based on previously established project requirements. They comprise the preparation of engineering designs, drawings, specifications and contract documents. Examples of these services include, but are not limited to:

- u preparing drawings, resolving detailed problems, selecting equipment and developing specifications;
- u coordinating engineers and/or other design service groups;
- u preparing detailed calculations, design drawings, specifications and contract documents;
- u preparing, or collaborating with others responsible for preparing, estimates of the cost of the work; and
- u providing assistance and advice to the client, related to tender call, evaluation and award immediately preceding construction.

### **3.4 Contract Administration and General Review During Construction**

These services comprise administering the construction contract and providing engineering review during the construction period, following the award of the contract. Distinct and separate from the services provided by resident field personnel, they should not to be considered as a substitute for resident engineering services.

They may include, but are not limited to:

- u providing advice on the interpretation of contract documents to the contractor or client, and issuing supplementary details and instructions as required;
- u reviewing shop drawings for general compliance with design requirements and contract documents;
- u reviewing contractor's progress claims, including the validity of additions or deletions;
- u issuing progress certificates and change orders for the client's acceptance;
- u making periodic site visits to assess progress generally and conformity of the work with the contract documents;
- u reporting to the client on the progress of construction;
- u arranging for, and attending, regular site meetings;
- u carrying out final review at the conclusion of the construction contract;
- u issuing a substantial performance and/or completion certificate; and
- u ensuring that the contractor keeps as-built records.

These services do not include directing the contractor's personnel in methods, scheduling, procedures, sequence of work, or equipment selection, except as may be specifically prescribed in the construction contract.

### **3.5 Resident Services During Construction**

Services during construction are considered to be "resident" when all office facilities required by staff at the site are provided by the client at no cost to the engineer, and when the staff assigned by the engineer are on site for a continuous work period of at least six weeks. Resident services may include, but are not limited to:

- u providing reference surveys to the contractor, but not surveys of legal property boundaries, and, where necessary, checking the contractor's surveys;
- u determining that the contractor's work satisfies the intent of the design and conforms with the plans and specifications;
- u arranging for, and/or carrying out, all prescribed field testing and inspection of materials and equipment;
- u investigating, reporting and advising on unusual circumstances that may arise during construction;
- u carrying out final inspection at the conclusion of the construction contract, as part of the client's acceptance program;
- u maintaining sufficient data to outline current progress of the work; and
- u certifying the contractor's request for payments regarding progress, quantities of work completed, materials delivered to the site, change orders, etc.

Resident services do not include directing the contractor's personnel in methods, scheduling, procedures, sequence of work, or equipment selection, except as may be specifically prescribed in the contract documents.

### **3.6 Additional Services**

Additional services will vary according to the client's needs and should be described in the scope of work. These may include, but are not limited to:

- u commissioning and start-up assistance;
- u preparing maintenance and operating manuals;
- u determining deficiencies during the warranty period;
- u preparing the final acceptance document at the end of the warranty period;
- u assisting with facility management and/or operations after the commissioning and start-up; and
- u providing as-built drawings.

### **3.7 Construction Management Services**

These may include, but are not limited to:

- u contract strategy, administration and expediting;
- u construction logistics, planning, scheduling and personnel forecasts;
- u field office management and temporary facilities provision;
- u materials receiving and warehousing;
- u progress monitoring, trending and reporting;
- u cost performance monitoring, trending and claims processing; and
- u labour relations and safety maintenance.

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## 4. QUALIFICATION-BASED SELECTION SYSTEM

The qualification-based selection system provides the best value-for-money in professional engineering services. It involves the selection of an engineering consultant using the following qualitative criteria:

- u technical competence;
- u experience on similar projects;
- u proven performance;
- u availability of dedicated personnel for the duration of the project;
- u ability to perform within time constraints;
- u location and/or local knowledge, where this is of importance to the project;
- u professional independence and integrity; and
- u managerial ability.

### 4.1 Direct Appointment

Some clients may wish to approach an engineering consultant directly for a proposal. It is advisable to use this method of selection only if:

- u the client has been well served by the engineering consultant in the past;
- u the client is well acquainted with the engineering consultant's resources;
- u maintaining continuity on a project is a factor;
- u the client has an equitable and open roster rotation system; or
- u the engineering consultant has been recommended and/or has demonstrated unique qualifications to the client.

Before proceeding, however, the client should ascertain whether the engineering consultant:

- u is interested;
- u has the necessary expertise;
- u has qualified staff available; and
- u is willing to supply other relevant information as may be requested.

If the engineering consultant is interested and meets the criteria described above, the client may ask the engineering consultant to submit a proposal. Alternatively, the client and the engineering consultant may:

- u discuss the project in depth;
- u prepare Terms of Reference for the project jointly;
- u agree on the fee compensation and method of payment;
- u develop a tentative project schedule; and
- u establish an engineering fee budget.

## 4.2 Selection Procedure

If clients believe it is in their best interest to select an engineering consultant through a formal procedure, they should complete the following steps in sequential order.

Steps	Client Action	Consultant Actions
1.	Define project and scope of services required	
2.	Prepare long list of qualified consultants	
3.	Request letters of interest (optional)*	Respond
4.	Prepare short list of two to four consultants	
5.	Request detailed proposals	Respond
6.	Interview candidate consultants (optional)**	attend interview
7.	Select preferred consultant	
8.	Meet with preferred consultant	Attend meeting
9.	Execute agreement	Execute agreement
10.	Notify unsuccessful consultants	

*Note: \*Step 3 is optional and used primarily in preparing the short list.*

*\*\*Step 6 is also optional and limited to complex or unique projects.*

### 4.2.1 Preparing a List of Qualified Engineering Firms (Long List)

Except in unusual circumstances, the long list ranges from five to 10 engineering firms. In selecting firms for the long list, clients may wish to consider the following criteria:

- u personal knowledge and/or experience of the client's staff;
- u recommendations from other people or organizations who may have completed similar engineering projects;
- u requests from consultants asking to be considered; and
- u lists of qualified engineering firms from such appropriate associations as Consulting Engineers of Ontario or Professional Engineers Ontario.

### 4.2.2 Requesting Letters of Interest

A letter of interest (three to four pages of text), is normally not required for projects that are routine or of low complexity. Clients should request letters of interest from qualified engineering consultants only if sufficient information to prepare the short list of candidates is unavailable from other sources (see Sections 4.2.1 and 4.2.3).

Clients generally intend letters of interest to be simple and inexpensive for engineering firms to prepare. However, in their attempts to be short listed, engineering firms tend to put effort and expense into preparing elaborate submissions aimed at marketing their services effectively. It would therefore be prudent for clients to include the following paragraph in their written requests for letters of interest:

“This is not a request for proposal. Elaborate submissions are not expected or desired. (Two, Three, Four) interested firms will be selected for (interviews, detailed proposals) and further evaluation.”

When preparing letters of interest, consultants should include brief descriptions of:

- u the firm's ability and experience on similar projects, including references the client may contact about past performance;
- u key personnel available, including resumes; and
- u the proposed organization of the project, if it is complex and/or involves study teams or consortiums.

#### 4.2.3 Identifying Candidate Consultants (Short List)

From the long list, clients reduce the number of qualified engineering firms to a reasonable number (two to four) of candidate consultants for detailed evaluation. Clients can usually accomplish this by using:

- u their own performance evaluation record on engineering consultants;
- u the knowledge and experience of their staff;
- u references from others who have carried out similar projects;
- u references from government agencies familiar with the consultant's capabilities and areas of expertise; and
- u advice on how to select candidate consultants from engineering consultants with whom they already have business relationships, if applicable.

#### 4.2.4 Preparing Requests for Proposal (RFP)

Unless "Letters of Interest" have been solicited, this is the first point of consultant involvement in the selection process. The RFP should contain a definition of the project, scope of services required and the terms of reference (see Section 2.1). It should also ask the consultant to address the:

- u staff or study team proposed for assignment to the project;
- u resumes of key personnel;
- u previous experience on similar assignments, with dates;
- u project methodology, if applicable;
- u schedule or time frame; and
- u method of payment and basis for remuneration, e.g. fixed lump-sum fee; fee calculated on a time-plus-expenses basis; fee calculated on a percentage-of-cost basis, or combination thereof.

#### 4.2.5 Two-Envelope System

In the two-envelope system, clients ask candidate consultants to submit proposals in two, sealed envelopes. One envelope contains the technical proposal—exclusive of the engineering fee. The other contains the proposed engineering fee for the services.

Upon receipt of this information, clients use the qualification-based selection system to evaluate the technical proposals and to establish their order of merit. During the evaluation period, envelopes containing proposed engineering fees remain sealed.

Once a selection has been made, the client reviews the selected consultant's proposed engineering fee. In cases where two proposals are considered comparable, clients may wish to review the proposed engineering fees for both, before making a final selection. All envelopes containing proposed engineering fees submitted by unsuccessful firms are returned unopened to the respective firms.

#### 4.2.6 Two-Stage System

In the two-stage system, clients ask candidate consultants to submit technical proposals without any reference to engineering fees. Clients then use the qualification-based selection system to evaluate the technical proposals and to establish their order of merit.

The consultants with the top two proposals are asked to submit their proposed engineering fees for the assignment. Both consultants should be advised of any changes to the scope of engineering services at this time. The client selects the preferred consultant based on the fee proposals.

#### 4.2.7 RFP Processes

There are two processes used to request proposals from engineering consultants. Clients may wish to use the following matrix to determine which process is the most suitable for a project, based on the project's complexity and estimated cost.

ESTIMATED PROJECT COST	COMPLEXITY		
	HIGH	MEDIUM	LOW
Over \$1,000,000	RFP Process I	RFP Process I	RFP Process II
\$1,000,000 to \$500,000	RFP Process I	RFP Process I	RFP Process II
\$500,000 or less	RFP Process I	RFP Process II	RFP Process II

##### *RFP Process I*

Recommended for most engineering assignments, RFP Process I emphasizes competence and qualifications as the primary considerations in selecting consultants.

In this process, requests for proposals are normally sent to two to four engineering firms on the “short list”. For projects that are of high complexity or large in scope, clients should hold a joint briefing meeting with their candidate consultants. This meeting should serve to:

- u identify the client's staff associated with the project and their responsibilities;
- u review and explain the Terms of Reference;
- u outline and, in some cases, disseminate background material available to consultants for use in preparing proposals;
- u provide an opportunity for consultants to ask questions or seek clarifications;
- u segregate the various phases of the project; and
- u enable consultants to assess the compatibility of their staffs with the client's staff.

Such joint briefing meetings will save the client's staff time. They will also ensure that all consultants are provided with identical information at an early stage in the preparation of their proposals.

It is recommended that the two-stage system outlined in Section 4.2.6 be used in this process. If the selected consultant's proposed fee structure exceeds the client's budget, the client and the consultant may negotiate a new fee structure, based on revised terms of reference for engineering services. If the client and selected consultant are unable to reach such an agreement, the client can restart the negotiation process with the consultant who is the second choice, and so on, until a satisfactory agreement is reached.

##### *RFP Process II*

RFP Process II also emphasizes competence and qualifications as the primary considerations in selecting consultants. However, it also recognizes that for some clients, engineering fees may be a primary consideration for projects that are routine and/or low budget. This process therefore uses the two-envelope system outlined in Section 4.2.5.

In the process, requests for proposal are normally sent to at least one or more “qualified” engineering firms. When preparing RFPs, clients should ensure that the scope of the project and its terms of reference are well defined and very explicit.

#### 4.2.8 Interviewing Candidate Consultants

During the evaluation of the technical proposals, clients may interview one or two candidate consultants to clarify the points contained in their proposals. To ensure that all technical proposals are evaluated on the same basis, clients may wish to discuss topics not covered in a consultant's written submission.

#### 4.2.9 Selecting the Preferred Consultant

Under the qualification-based selection system, the selection of the preferred consultant is based on:

- u technical competence;
- u experience on similar projects;
- u dedicated personnel available for the duration of the project;
- u ability to perform within time constraints;
- u proven performance;
- u location and/or local knowledge, where this is of importance to the project;
- u professional independence and integrity; and
- u managerial ability.

#### 4.2.10 Meeting with the Preferred Consultant

Following the ranking of the candidate consultants, the client should meet with the preferred or top ranked consultant to:

- u discuss the project in depth;
- u update jointly the terms of reference, if required;
- u agree on the engineering fee structure;
- u develop an engineering fee budget; and
- u negotiate other salient points leading to an Engineering Agreement.

#### 4.2.11 Executing the Agreement with the Selected Consultant

Clients are responsible for preparing Engineering Agreements for execution. For more information, see the PEO guideline *Recommended Form of Agreement between Client and Engineer* and the companion guideline.

#### 4.2.12 Notifying Unsuccessful Consultants

Following the successful conclusion of the meeting with the selected consultant in Section 4.2.10, clients should notify all unsuccessful consultants in writing that they were not selected for the project. Written notification should include the name of the selected consultant.

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## 5. CONSULTANT PERFORMANCE EVALUATION

Although the concept of quality or value may be subjective, it can be made more tangible by defining and measuring agreed-upon elements.

Clients can establish a formal performance review and evaluation process, using value-based criteria or performance indicators on which they and the engineering consultant have agreed. Performance reviews and evaluations can be either ongoing during the project, or undertaken at project completion. Value-based criteria can include the consultant's:

- u adherence to budget and schedule;
- u communication skills, including information flow to clients on changes in the scope of the project;
- u ability to work with the client's staff;
- u cost estimating accuracy;
- u innovation;
- u presentation skills; and
- u suitability and quality of end products (e.g. reports, design, constructed works, etc.).

Clients should meet with consultants to review their observations on the consultants' performance. They should also maintain a record of performance evaluations for future reference in selecting consultants. Consultants should be given an opportunity to respond in writing to clients' concerns.



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