

**Guide for the
Engagement of a
Consulting Professional
Engineer**

**Adopted by the Association of Professional
Engineers and Geoscientists of the Province of Manitoba
And the Association of Consulting Engineering Companies - Manitoba**

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**GUIDE FOR THE ENGAGEMENT
OF A CONSULTING PROFESSIONAL ENGINEER**

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Section 1 Foreword

This Guide is prepared for the benefit of clients who propose to procure Consulting Engineering services, and for Consulting Engineers proposing to provide an engineering service to a client. It is intended to serve as an aid for use in selecting a Consulting Engineer, for defining the Consulting Engineering services being contracted for and in selecting the basis of fair remuneration for those services.

The Association of Professional Engineers and Geoscientists of the Province of Manitoba (APEGM), is established under the authority of the provincial statute, *The Engineering and Geoscientific Professions Act* (the Act) to govern and regulate the practices of professional engineering and professional geoscience in Manitoba in the public interest. It is responsible for the registration of Professional Engineers and Professional Geoscientists through the verification of appropriate educational and experience qualifications; for ensuring compliance with the Act with regard to non-registered persons and corporations undertaking professional engineering or holding themselves out to be Professional Engineers or Professional Geoscientists; and for the investigation of complaints and disciplining of members and corporations in breach of the Act, Bylaws or Code of Ethics, or whose conduct is found to have constituted unskilled practice of professional engineering or professional geoscience or professional misconduct. The membership of APEGM encompasses a wide range of professional engineers and geoscientists working in government, industry and the consulting industry.

The Association of Consulting Engineering Companies - Manitoba (ACEC-MB) is a business organization, members of which are Consulting Engineering companies managed primarily by professional engineers. The mandate of ACEC-MB is to lead the Consulting Engineering profession of Manitoba by enhancing its professional stature, profitability and commitment to

sustaining the alliance of private and public enterprise in the Province.

The Consulting Engineer - for the purposes of this Guide - is understood to mean a member, or licensee, of the Association with appropriate experience in a field of engineering, who depends substantially on the supplying of Professional Engineering services to the public and private sectors, working at arms length, for his/her livelihood. A Consulting Engineer practising in the Province of Manitoba must be registered or licensed to practise engineering in accordance with the Act. A Consulting Engineering firm must also hold a Certificate of Authorization issued by APEGM, a condition of which is the holding of professional liability insurance. The Consulting Engineer is personally accountable for the administration of his or her business practices. References to the level of fees for professional services are included in the document only as a guide for potential Clients. As noted, APEGM's main activity with respect to the practice of engineering, which frequently pertains to the Consulting Engineer, is in the administration of the Act, and the Act is intended to ensure the provision of "competent" engineering services provided compliance with the *Code of Ethics for the Practice of Professional Engineering and Professional Geoscience*.

The Consulting Engineering community recognizes that there are several methods used for the selection of a Consulting Engineer. The section of this Guide entitled "Procedure for the Selection of a Consulting Engineer" (Section 2), suggests methods where experience has shown results in a mutually satisfactory arrangement. This Best Practice promotes the principles of Qualifications Based Selection (QBS) rather than price-based selection as the best method for selecting professional engineers and other consultants.

Section 2 Procedure for the Selection of a Consulting Engineer

2.1 “Best Practices for Selecting a Professional Consultant”

The best practice for procuring engineering services entitled “Best Practice for Selecting a Professional Consultant” has been developed by *The National Guide to Sustainable Municipal Infrastructure (InfraGuide)*. This Best Practice was developed by a consortium, of public sector experts and promotes the principles of Qualifications-Based Selection (QBS) rather than price-based selection as the best method for selecting professional engineers and other consultants.

The InfraGuide “Best Practice” is a model founded on finding ways to add the greatest value to the client. It encourages selection of engineering consultants who are best qualified to successfully deliver a particular project on behalf of the client and to provide the client with the best value over the asset’s lifetime.

The InfraGuide “Best Practice” differs from other systems in that it places the emphasis on finding the engineering consultant that best understands the client’s needs and objectives. This is achieved through a jointly developed scope of services. The “Best Practice” affords the client the opportunity to use the expertise of the consultant in the development of the scope. Once the scope of service is agreed upon, the consultant is requested to submit a fee and schedule proposal that correlates with the project scope. The client and the consultant can then negotiate an agreement whereby the fees and schedule corresponds to the commitment of necessary staff and other resources to achieve the project and provides the client with the best possible return on investment.

By jointly developing the scope of services, the client can assess the cost-benefit implications of all aspect of the project and finalize the scope based on the client’s

specific needs and on best return on investment. It also opens the

door to consider technological and managerial innovation and creative risk sharing opportunities.

Furthermore, a fee and schedule proposal that responds to a jointly developed scope will be a much more realistic representation of the work to be undertaken and will be an appropriate level of funding to ensure the client’s best interests are met. This provides more cost certainty with fewer “surprises” during design and construction.

Jointly developing the scope also fosters a “team” by which the consultant acts as an agent of the client dedicated to a successful project that achieves the client’s needs.

There is a difference between the InfraGuide “Best Practice” for Selecting a Professional Consultant and the “Two Envelope System” where all of the fee envelopes are opened and the price component is considered to determine the final selection. The two-envelope system does not meet the principles of the InfraGuide “Best Practice.”

A copy of the “Best Practice for Selecting a Professional Consultant” can be obtained at www.fcm.ca/infraguide

Section 3 Categories of Service

Consulting Professional Engineering services are available for a wide range of Client requirements.

The purpose of this section of the Guide is to enable the Client and Consulting Engineer to identify the scope of service to be provided and to establish the appropriate method(s) for determining remuneration.

Please Note:

When *Remuneration Method 2 – Percentage of Cost of Construction* is used, the services indicated “•” are Basic Services for Categories III through IV and should be included as part of the percent fee as outlined in Appendix B. Services indicated “+” are considered Additional Services and if requested the recommended percentage value should be increased accordingly.

Category I - Advisory Services

This Category includes services not necessarily associated with engineering design. Examples are:

- + Environmental assessments
- + Preparation or review of engineering program
- + Expert testimony
- + Appraisals, valuations, studies, reports
- + Feasibility analysis
- + Accident investigations
- + Conceptual design
- + Preliminary specification notes
- + Cost of work estimate
- + Litigation/Claims/ Insurance assistance
- + Detailed analysis of owning and operating costs
- + Support for special grants and loans
- + Translation and interpretation
- + Project management scheduling assistance
- + Assistance in preparing purchase enquiries
- + Value engineering

The payment for Advisory Services is normally under the Method 1 -Time Basis. (See Section 4)

Category II - Pre-Design Services

These services apply to assignments which are required prior to commencement of final engineering services for a project. Some examples of work which fall within this Category are:

Building Sector

- + Scope of project
- + Statement of probable cost
- + Review of design concepts
- + Preliminary design, sketches, schematics and specification notes.
- + Review of alternative design approaches
- + Assessment of major design solutions
- + Preparation of Preliminary engineering and construction schedules.

Infrastructure & Transportation Sector

- + Scope of project
- + Statement of probable cost
- + Preliminary design reports, alternative conceptual proposals, sketches, schematics, specification notes

Both Sectors

- + Detailed Scheduling
- + Documents for financing
- + Investigative surveys, geotechnical
- + Permits and licences
- + Revision of existing designs
- + Life cycle costing
- + Detailed cost estimates

The nature of the work under Category II is largely investigative and subject to variation. Payment under the Method 1 -Time Basis is suggested.

Category III - Design Services

These services are undertaken after the scope of the project and engineering services

have been fully defined, and when the Client authorizes the start of final design. Design Services include the following major items:

- Detailed design
- Working drawings
- Specifications and tender documents
- Statement of probable cost
- Prepare tender call documents
- Reviewing tenders submitted and advising
- + Detailed cost estimate
- + Reinforcing bar schedules
- + Fabrication Drawings
- + Reviewing tenders submitted and advising.
- + Prequalifications of contractors
- + Co-ordinating other Consulting Engineer's documents
- + Fast-track construction or sequential tendering
- + Bills, Materials, detailed cost estimates
- + Tender Advertisement
- + Alternative conceptual proposals

Payment for Design Services should be made under the most appropriate of the Payment Scales.

Contract Administration Services

It is strongly recommended, in the interests of both Client and Consulting Engineer that the Consulting Engineer retained for Design Services be retained for Category IV or V. The Consulting Engineer has the best knowledge of the critical aspects and the intended implementation of his/her design and the continuity of his/her services adds value to the project.

For building projects, Client and Consulting Engineer should establish in advance responsibilities for the review of construction and for compliance with the legislated requirements for certification.

For situations where, by agreement, the Consulting Engineer is not engaged for providing the Categories IV and V services, these services should be made the responsibility of another suitably qualified Engineer.

Category IV - Contract Administration: Non-Resident Services

These services are provided by the Consulting Engineer following completion of sufficient Design Services to permit commencement of construction. The services under Category IV are typically those provided from the Consulting Engineer's design office to include the following:

- Assisting in preparation of contract
- Review of shop drawings
- Progress Review
- Quality assurance
- Change order costing.
- Document interpretation
- Payment recommendation
- Substantial performance review
- Advising Client and Contractor of continuing or newly observed defects of deficiencies.
- Year end warranty review.
- + System start-up and documentation
- + Post-warranty period follow-up
- + Fast-track construction and sequential tendering
- + Maintenance manuals and drawings
- + Certification and testing of systems
- + Commissioning/training
- + Attendance, when requested, at job-site meetings
- + Environmental monitoring
- + Record drawing
- + Test monitoring

Payment for Contract Administration: Non-Resident Services should be made under the most appropriate of the Payment Scales.

Category V - Contract Administration: Resident Services

This Category covers contract administration and engineering site review at the site, where the Consulting Engineer acts as agent for the Client. Services available under this Category include:

- + Review site review to determine that work is carried out in general conformity with drawings and specifications

- + Field testing of materials and equipment by field staff or testing specialist
- + Investigation and reporting of unusual conditions which may arise during construction
- + Final testing and commissioning of work prior to certification
- + Co-ordination of the preparation of records of as-built changes to allow subsequent modification of drawings as may be arranged with the Client (Category VI)
- + Attendance at job-site meetings
- + Advising the Client of any unusual construction circumstances, the Contractor's adherence to the construction schedule and their potential impact on costs
- + Recommendation of progress payments to the Contractor
- + Construction contract administration as it pertains to City and Municipal occupancy certificates, interim or substantial completion certificates, final completion certificates, certificates of total performance, warranty site reviews and/or final acceptance certificates.

Payment for Contract Administration: Resident Services is normally made under the Method 1 –Time Basis.

Category VI - Additional and Special Services

There are additional and special services available from the Consulting Engineer which are not usually included in Categories I to V. It is recognized that, under some circumstances, such additional and special services may be provided for in the agreement between the Client and Consulting Engineer as work common to Category I, II, III, IV, or V assignments. The following is a representative list of additional and special services which are not normally included in the other Categories but may be required for the project:

- + Preparation of commissioning procedures and operating manuals
- + Assistance in plant start-up and training of operating personnel
- + Procurement and expediting of materials and equipment
- + Site review and quality control services in vendors' shops
- + Engineering services for remedial or renovation construction work
- + Preparation of bonding company status reports if requested by the Client
- + Analysis and evaluation of contract claims including assistance in arbitration proceedings
- + Services of any specialist Consulting Engineer required for the work

Because of the special nature of the work under this Category, it is suggested that payment be made under Method 1 -Time Basis.

- + Special investigative surveys, other than profiles and cross-sections required for design purposes and quantities, such as:
 - legal surveys
 - regional topographic surveys, whether by ground or photogrammetric means
 - surveys of existing conduits by television or camera
 - surveys to locate uncharted underground utilities
 - field surveys to establish limits of property required for rights-of-way
 - surveys to relocate other utilities
- + Revision of completed or substantially completed design documents and the preparation of additional plans, specifications and design
- + Review of change orders and/or contract documents as a result of changes initiated or required by the Client
- + Preparation of mechanical piping spool drawings
- + Preparation of reinforcing bar schedules and material lists
- + Revisions to original drawings to prepare "Record Drawings".
- + Co-ordination of work by other Consulting Engineers engaged directly by the Client.
- + Co-ordination of utilities such as electrical, telephone, water, gas.
- + Computer services for design, scheduling and project cost control

Section 4 Basis for Remuneration

4.0 General

Professional engineering fees should be based on the value of services received by the Client and not simply the Consulting Engineer's cost of providing services. The fees listed are appropriate compensation for the professional work required to meet the necessary standards of engineering care and quality, and to sustain the profession through skills training and research and development. Since these fees are a matter of contract between the Consulting Engineer and the Client, both parties are free to develop arrangements suited to specific situations within the parameters presented in this document, bearing in mind the need for appropriate and adequate compensation as outlined in APEGM's Code of Ethics.

Payment for the various Categories of engineering services may be based on one or more of the following methods of calculation:

- Method 1 Time Basis
- Method 2 Percentage of Cost of Construction Basis
- Method 3 Fixed Fee or Lump Sum Basis

These Methods are explained in detail in the following pages, together with recommendations as to which method is most applicable to a particular Category of Service.

The application of the particular method will vary with the standing and specialized knowledge of the Consulting Engineer, as well as with the nature and extent of the work.

These methods do not include the cost of disbursements incurred as part of the project delivery. Disbursements are covered in Section 4.4.

4.1 Method 1 – Time Basis

The Time Basis method can be utilized for all Categories of Service.

4.1.2 General

In this arrangement, every hour charged by a Consulting Engineer's staff working on the project is billed at agreed hourly rates. All time expended on the assignment is billable, including travel time, time in the Consulting Engineer's office and time on the Client's premises or elsewhere. This billable time also applies to the production of technical and clerical services engaged in correspondence and documents such as reports and specifications.

4.1.3 Hourly Rates

a) Payroll Multiplier Method

The payroll multiplier is no longer an applicable method for calculating hourly rates as the use of the payroll multiplier method contravenes the Privacy Act.

b) Specified Hourly Rates

Time Basis rates may be set on the basis of specified hourly rates as shown in Appendix A. These rates are set on the basis of a stated hourly rate per employee or class of employee. Anticipated adjustments of such rates during the life of a project should be explicitly documented.

4.1.4 Special Expertise

Fees for senior personnel rendering specialized or expert service or testimony for which they are eminently qualified will generally be higher and reflect the service provided.

4.1.5 Salary Adjustments

Salary adjustments during the life of a project should be reflected in adjustments to hourly rates unless noted otherwise by agreement.

4.2 Method 2 – Percentage of Cost Construction Basis

- bridges and interchanges
- dams, hydraulic structures
- tunnels and mines
- water storage facilities
- waterfront improvements and terminal facilities
- offices and schools (without laboratories or research facilities)
- industrial plants of below-average complexity
- institutional residences
- arenas, grandstands, convention and exhibition buildings
- hangars, armories
- apartment buildings
- repair and maintenance garages
- parking buildings
- fire and police stations
- pumping stations
- water intakes and sewage outlets
- jails and correctional institutions

Complex II Fee:

The Complex II percentage fee scale is for those projects of above-average complexity involving more specialized technology, a higher degree of detailed engineering and the co-ordination of several technical disciplines. Representative projects include the following:

- industrial plants of above-average complexity, such as: refineries, chemical plants, food processing plants and breweries, metallurgical treatment processing plants
- communications centres, computer centres, TV and radio production centres
- theatres, hospitals, research buildings
- airport terminal facilities
- university and technical college buildings with laboratories and research facilities
- treatment plants for water, sewage and industrial waste
- incinerators and incineration systems
- power and heating plants, thermal and hydro generating stations
- swimming pools

Fees for full-time resident engineering are in addition to fees determined under Method 2. For full-time resident engineering, Method 1 -

Time Basis is recommended.

4.3 Method 3: Fixed Fee or Lump Sum Contract

A Fixed Fee or Lump Sum Contract is suitable if the scope and schedule of the project are sufficiently defined to allow the Consulting Engineer to estimate project costs. It is recommended that a detailed scope of services be defined by the Client and the Consulting Engineer, preferably at the proposal stage. This type of contract is frequently developed from Time Basis projections or specific services requirements for particular tasks. It is also often derived from the appropriate Percentage of Cost of Construction Fee method of the characteristic project.

4.4 Disbursements

The Consulting Engineer should be compensated for disbursements by one of the methods described below:

1. **At Cost Plus A Percentage:**
The percentage is intended to cover the handling and financing costs associated with these disbursements.

Suitable percentages range from 10% to 15% depending on the magnitude and quantity of disbursements.

2. **Hourly Rate or Percent of Fees**
Many disbursements, such as communication costs (phone, fax, courier, etc.), routine printing and plotting costs, routine software and computer costs (spreadsheets, word processing, etc.) and CAD equipment and software charges are expensive for the Consulting Engineer to track and expensive for Clients to review and verify. The billing of these disbursements can be addressed by invoicing them at an agreed percentage of the hourly fees.

Experience has shown that rate of approximately 8% of the hourly fees is appropriate.

Non-routine disbursements such as travel, accommodation, bulk printing, and specialized software are not included in this charge and would be billed separately at a cost plus percentage rate.

5.1 Form of Contracts

The size, complexity, duration and other aspects of the assignment govern the agreement between Client and Consulting Engineer. For simple projects with well-defined parameters and requirements, a simple agreement may suffice, sometimes appended with a mutually accepted set of standards, terms, and conditions. On the other hand, a large project may require detailed agreements. Such projects between these extremes may use one of the following standard contract agreements:

- ACEC 31, 'Prime Agreement between Client and Engineer'.
- ACEC 32-S, 'Agreement between Engineer and Subconsultant'.

The primary reason for such agreements is to indicate clearly and precisely to each party the conditions under which the assignment will proceed. The agreements are a means of avoiding misunderstandings of duties, rights and responsibilities.

5.2 Special Conditions, Disbursements And Taxes

5.2.1 Abandonment

If the project is abandoned or suspended and if tenders for the project have not been received, fees are as determined in Method 1 unless otherwise specified in the agreement. If tenders have been received, the fee may be based on either Method 1 or Method 2 applied to the lowest bona fide tender.

5.2.2 Delay

When a project is unexpectedly delayed, renegotiation of the fee may become necessary. When the completion of construction is delayed beyond the date in the construction contract and when the Consulting Engineer is retained on the basis of Methods 2 and 4, reimbursement for additional services is on the basis of Method 1.

Remuneration for Consulting Engineering services that adapt plans and specifications from one existing project to another similar or identical project at a different site for the same Client is subject to a royalty plus additional fees for whatever extra work is required and subject to approval being granted by the consulting Engineer in advance of the documents being utilized.

5.2.4 Alternative Designs

When the Consulting Engineer is required to complete designs on one or more alternative methods of construction or installation for the purpose of tendering, the fee is based on the tender price of the accepted alternative plus charges for extra work required as in Method 1.

5.2.5 Payment of Fees

Fees are generally established on the understanding that they will be paid within 30 days of invoicing. At that time the account is overdue and is subject to interest, and service may be withdrawn without liability by the Consulting Engineer for consequential delay or loss. The costs of litigation or collection services to obtain payment are to be paid by the Client. When the Consulting Engineer is engaged on a Time Basis, invoices should be presented monthly.

The Client's right to the use of the documents is contingent upon the payment of the engineer's fee.

When engaged on a Lump Sum or Percentage Fee basis, invoices should be presented monthly on a prorated basis, or as previously arranged in the Engineer/Client agreement.

5.2.6 Assurance of Professional Design and Field Review

To ensure a Consulting Engineer's design is constructed in accordance with the contract documents it is strongly recommended that

the Engineer be engaged by the Client to provide resident and non-resident services (Category IV and V).

for an acknowledgment of the advice to be signed by the Client.

If for some reason this is impractical, the issue of overall design responsibility needs to be addressed in the contract.

5.2.7 Ownership of Drawings and Intellectual Capital

Ownership of the intellectual capital related to all engineering drawings, specifications and other documentation typically rests with the Consulting Engineer. Ownership of the drawings is frequently confused with ownership of the intellectual capital. Ownership of the drawings is governed by the agreement, while intellectual capital is the ownership of the idea embodied in the drawings and the right to reproduce that idea (refer to agreement document ACEC 31. Drawings, specifications and other documents are instruments of service for the execution of the project.

5.2.8. Taxes

Any and all federal and provincial taxes, recoverable or not by the Client, are additional and are applicable to fees and disbursements.

5.2.9 Professional Liability Insurance

The Engineering and Geoscientific Professions Act of Manitoba requires that holder's of a Certificate of Authorization must have professional liability insurance. A Certificate of Authorization is required to provide engineering services to a party outside the Engineer's employer's firm.

It is required that the Consulting Engineer carry professional liability insurance. Should the Client require the Consulting Engineer to carry additional coverage, this is at the Client's cost as a disbursement. Alternatively, the Client may carry a single project professional liability policy.

Under APEGM Bylaws, professional engineers are required to notify the Client, in writing, whether or not professional liability insurance is held and are to include provision

Section 6 Definitions

Cost of Work

- a) "Cost of Work" means the total cost to the Client of the project, including all materials, equipment, labour, bonding, insurance and contractors' or managers' overhead and profit necessary to complete the work for which the Consulting Engineer prepares designs, drawings or specifications, or for which the Consulting Engineer is responsible.
- b) Whenever the Client furnishes new or used material, equipment, labour or any other service which is incorporated in the work, the fair market value of such material or equipment as though it were purchased new, and the current price of such labour or other service when the work was executed, shall be used to compute the cost of the work.
- c) In computing the cost of the work, no deductions shall be made on account of any penalties or damages claimed by the Client from any contractor, or on account of any other sum withheld from any contractor.
- d) The cost of the work shall include all applicable Federal and Provincial Government surcharges, such as duty and sales tax.

Time Expended

All time expended on the assignment, whether in the Consulting Engineer's office, at the Client's premises, or elsewhere, shall be chargeable, including clerical staff engaged in the preparation of documents such as reports and specifications.

Disbursements

Typical disbursements include:

- a) Living and travelling expenses of all employees when away from the home office on business connected with the project;
- b) identifiable communication expenses, such as long distance communication

charges, cost of site telephone, facsimile transmission, postage and courier charges;

- c) identifiable reproduction costs, such as photocopying, plotting, printing, photography and other processing except as otherwise provided;
- d) identifiable costs related to the use of computers and associated equipment (chargeable costs for such equipment owned by the Consulting Engineer should be negotiated with the Client, taking into account commercial rates for similar equipment);
- e) resident services; with the consent of the Client, the cost of providing field office facilities, vehicles, expenses arising out of special risks, travelling, living and moving expenses;
- f) fees paid to any special Consulting Engineers, testing or site review agencies, for services which may be recommended by the Consulting Engineer and agreed to by the Client (legal fees, land surveys, soils investigations, foundation site review, materials testing, quantity surveyors, roof site review, government inspectors' fees, etc.);
- g) such further and other levies of direct or indirect tax which may be assessed from time to time by a government authority having jurisdiction;
- h) other justifiable expenditures.

Contract Administration: Non-resident Services

Contract Administration: Non-Resident Services are services which are provided by the Consulting Engineer and are consistent with the Consulting Engineer's professional responsibilities through the application of resources and knowledge which are available in the Consulting Engineer's Office.

Contract Administration: Resident

Services

Contract Administration: Resident Services are services which are provided, consistent with the Consulting Engineer's professional responsibility, through assigned office and resident staff and/or periodic site reviews by the Design Engineer or associates. Such services shall mean applying such review and sampling procedures at the project site as required and as contractually agreed to enable the Consulting Engineer to ascertain whether the work is being carried out in general conformity with the drawings and specifications. It should be noted that because the extent of these services cannot be defined precisely, Method 1 is considered to be the appropriate fee scale.

Appendix A

FEE GUIDELINE – HOURLY RATES * Effective January 1, 2016

STAFF CLASSIFICATION

PROFESSIONAL SERVICES

E1	A	\$125.00
E2	B	\$140.00
E3	C	\$170.00
E4	D	\$195.00
E5	E	\$220.00
E6	F	\$255.00
	F+	\$300.00 +

A	Engineer-in-Training
B	Assistant Project Engineer
C	Project Engineer
D	Supervisory Engineer / Specialist Engineer
E	Management Engineer / Advanced Specialist Engineer
F (F+)	Senior Management Engineer / Senior Specialist Engineer

TECHNICAL SERVICES

T1	\$85.00 – \$110.00
T2	\$110.00 - \$140.00
T3	\$150.00 - \$195.00

T1	Technician
T2	Intermediate Technologist
T3	Senior Technologist

* Above rates do not include disbursement or taxes.

GUIDE TO THE ENGAGEMENT OF A PROFESSIONAL CONSULTING ENGINEER
APPENDIX B: Percentage Engineering Fee vs. Cost of Work
BASIC: (Not Additional Services)

