

2.3 Management of the Project

# 2.3.11 Contract Administration — Field Functions

2.3.11

Canadian  
Handbook of  
Practice  
for Architects

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# Contract Administration — Field Functions

## Introduction

The field functions of contract administration are done concurrently and in coordination with a variety of office tasks. Refer to Chapter 2.3.10, *Construction Administration — Office Functions*, for a description of the office work that supports field functions.

The terms used to describe the functions performed by an architect during the construction — or contract administration — phase of a project, on site or out of the office, are:

- field review;
- general review;
- site review;
- site observations.

The terms “*supervision*” and “*inspection*” refer to completely different levels of service **not** normally provided by an architect.

- “Supervision” implies the overseeing of the construction work, including the activities undertaken by workers on site, which is the responsibility of the contractor, not the architect.
- “Inspection” means a “close examination” (of construction); once again, this level of service is beyond the architect’s responsibilities.

The architect’s duty during field review is to carry out sufficient periodic site visits at appropriate intervals during the various stages of construction to determine if the work is in general conformity with the contract documents. In addition, the architect reports on the progress of the work and observations made on site.

## Purpose of Field Review

The architect’s field review work has the following three purposes:

- to monitor the contractor’s performance in maintaining both the construction schedule and the standards or quality of construction;
- to provide guidance to the contractor by interpreting the contract documents and issuing necessary Supplemental Instructions;
- to fulfil performance standards of general review as required by the client-architect agreement, Authorities Having Jurisdiction, and provincial or territorial associations of architects.

Site visits must be more than a brief stop at the construction site to speak with contractors, walk around, and take a few notes to forward to the client. Site visits are essential to the project’s success; the architect must, therefore, assign a qualified senior or experienced staff member who is properly trained to perform field reviews. It may be useful to prepare a manual with proper procedures for field personnel.

All field functions should follow these principles:

- carefully describe, to the client, the architect’s duties and role during the construction phase and adhere to these responsibilities;
- keep the client well-informed of the progress of the work, in part by sending copies of field review reports to the client and all appropriate parties;
- ensure that consultants review their portion of the work and submit field review reports;
- avoid the words “*inspect*” or “*supervise*” in all documentation;
- keep proper documentation including reports, logs, photographs, and videotapes;

- promote good communications with the contractor and building officials.

### Role of the Architect

The architect's role in a project changes from designer to contract administrator once the construction of a project is underway. Refer to the Schedules of Architect's Services which accompany the *Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six*, for a list of the architect's responsibilities during the construction phase of a project. The architect is both a representative of the client and an interpreter of the contract documents. Normally, the architect is present on site to:

- conduct a general or field review;
- attend site meetings;
- interpret contract documents or resolve problems;
- observe testing or other procedures;
- review and accept samples, mock-ups, etc.;
- meet with consultants, contractors or the client regarding the progress of the construction;
- determine the percentage of the work completed (information which is used to prepare certificates).

In most agreements, the architect is not required to make exhaustive inspections or continuous on-site review; nor is the architect responsible for the construction methods or procedures or for construction safety. However, the architect should understand workplace safety and practise "due diligence" on the construction site.

### Role of Others During Construction

The architect communicates with many others who may visit the site during the construction phase of a project, including:

- the client or designated representative;
- the consultants or design team;
- the contractor, sub-contractors, and suppliers;
- Authorities Having Jurisdiction;
- inspection and testing firms;
- other institutions, such as lending institutions and insurance agents.

#### *Client*

The client's role varies depending on the

client's expertise and interest in the construction phase of a project. Some clients will assign a representative dedicated to this phase or hire a clerk of the works to monitor and account for construction activities. On the other hand, some clients rely exclusively on the architect as their representative. The client or designated representative usually attends regular job-site meetings.

#### *Consultants*

The field functions of consultants are critical to the success of a project. Typically, the architect is responsible for notifying and coordinating consultants as well as ensuring their attendance on site at the appropriate times. Consultants usually review the portion of the work which they have designed or for which they are responsible. They also determine, whether their portion of the work is in general conformity with the contract documents. In addition, consultants assist the architect in preparing certificates by attesting to how much of their portion of the work has been completed. Consultants may also be involved with other inspection and testing procedures.

#### *Contractor*

The role of the contractor is described in a construction contract, such as CCDC 2, and in the project specifications. Generally speaking, the contractor is responsible for the construction schedule, the quality of construction, and the construction methods and procedures. The contractor is also responsible for supervising the crew and coordinating sub-contractors. Typically, if a project is of a certain minimum value, most contractors will assign one individual to manage the project. This person — known as the site superintendent — is usually assigned to only one project at a time, frequently setting up an office temporarily in a construction trailer or part of a building which is under renovation. The contractor usually contacts the architect at varying stages of the project to schedule reviews.

### Construction Safety

The constructor (usually the general contractor) is solely responsible for construction safety at the workplace and for:

- complying with the rules, regulations, and practices required by the applicable occupational health and safety legislation;

- initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the work.

Neither the owner nor the architect is responsible for safety at the construction site, unless the owner has awarded separate contracts or is using the owner's own forces for parts of the project. Some provinces have legislation which defines the owner as the *constructor* in these situations. The architect should review all applicable provincial and territorial occupational health and safety legislation to determine the architect's responsibilities in the workplace.

If an unsafe or life-threatening situation is observed, the architect is obliged to report immediately to the contractor, and to record the observation. Architects do not have a contractual obligation to report safety issues on a site; however, architects have a responsibility in tort – as does every individual – to do so. If an issue is noticed and not reported, an architect may assume responsibility for, or be liable for, contributory negligence for those unsafe practices observed. Nevertheless, when developing the scope of the architect's services in discussions with the client, avoid inadvertently assuming responsibility for site safety, especially when offering full-time, resident or expanded field services. The architect should make it clear to the owner and the contractor that the architect is **not** responsible for:

- the means, methods, sequence, procedures, techniques or scheduling of construction activities;
- job-site safety;
- electrical and mechanical services

## Conducting a Field Review

### Procedures

The architect should establish credibility on the job site from the start of the project. This is accomplished through a detailed knowledge and understanding of the project and the contract documents. The architect must conduct reviews systematically. Upon completion of a field review, the architect should prepare written reports for the owner and the contractor and, when required, for building officials. Site observations should be consistent, responding to the stage, progress, and quality of the work.

Some architects bring reduced-size sets of drawings to the site. These are very useful for comparing observed work with the contract documents. Other required or important tools to bring on site are:

- hard hat and safety boots;
- camera (preferably with a time and date record);
- voice recorder and/or note pad;
- safety glasses;
- safety vest;
- tape measure.

Depending on the project it may be useful to provide a variety of other tools.

Upon arrival at the site, the architect should either:

- talk to the site superintendent or leave a note for the superintendent; or
- contact the contractor's other site personnel.

A site visit can include:

- a quick overview, to get a general impression of the progress of the work relative to the schedule and to the last site visit;
- a tour with the contractor and/or owner to understand their problems and concerns;
- a tour with the general contractor and a single sub-contractor to concentrate on key trades in progress at the time.

The architect should not leave the site without speaking with the site superintendent or the contractor. Observations should be reported to the contractor's superintendent at the conclusion of the visit in order to indicate to the superintendent any problems which have been noted.

The architect should endeavour to promote good communication and a close working relationship at all times with the contractor. However, if it is not possible to resolve on-site problems, the architect should ensure that the deficiencies are recorded in a field review report. Refer to "Checklist: General Items for Field Review" at the end of this chapter and to the many published checklists for:

- items to review during site visits;
- construction administration services.

### Frequency and Timing of Site Visits

The architect should schedule site visits at intervals appropriate to the construction. The frequency and timing is left to the judgement of the architect. Visits should be conducted at different times of the day and on different days of the week. This prevents familiarity with the architect’s routine and the scheduling of some construction when it might not be readily observed. In addition, it may be necessary to make strategically timed site visits to deter the contractor from becoming complacent about any contractual obligations.

Before processing progress claim applications, the architect must also visit the site and make detailed observations to determine:

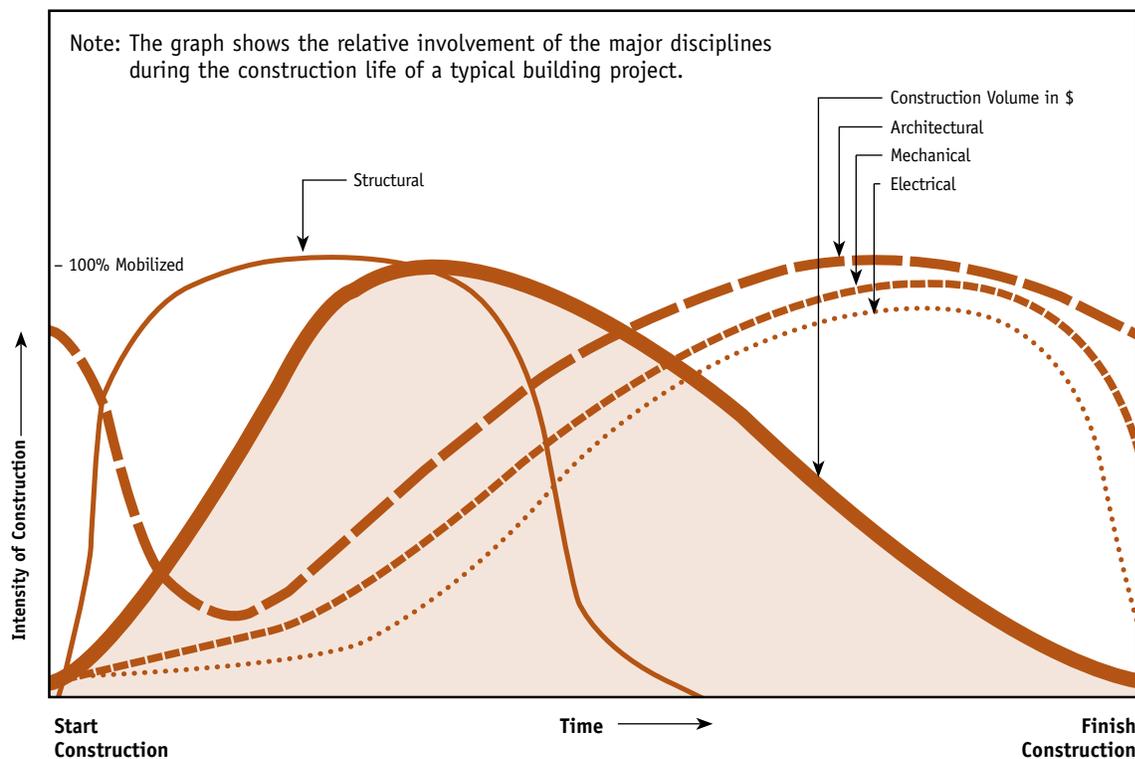
- the percentage of work completed;
- the amount of materials stored on site (or on the “extended site”).

Usually, more visits are required at the start-up and close-out of construction as noted in Illustration 1. Structural engineering review is more intense at the early stages of a project, whereas mechanical and electrical consultants are more involved near the completion of construction.

The following are general guidelines on **when** to conduct field reviews:

- at project start-up and/or excavation;
- at the start of major sub-contractors’ work on elements forming the enclosure of the building, such as:
  - forming and framing;
  - structural steel;
  - masonry;
  - waterproofing;
  - cladding;
  - window systems;

**Illustration 1: Graph Showing Typical Duration and Intensity of Work on Site — By Discipline**



- roofing;
- at the start of finishing trades, such as:
  - floor finishes;
  - cabinetwork;
  - wall finishes;
  - painting;
- when significant new materials and equipment are delivered to the site.

Because many types of work (masonry, for instance) cannot be corrected readily without replacement, timely field review is needed to preclude rejection of work which has been underway for several weeks.

Additional field reviews should be considered immediately before and during concrete placement to review:

- key dimensions;
- placement of reinforcing steel and inserts;
- presence of any debris, rust, water, etc., within formwork;
- placement of electrical and mechanical services;
- concrete placement.

When the work of one trade is covered up by another trade, it is too late for observation; therefore, field reviews must be done before the following work is covered up:

- insulation;
- fireproofing/firestopping;
- vapour barriers;
- blocking and furring;
- electrical and mechanical services.

Scheduling reviews **before** work is covered up allows for deficiencies to be corrected prior to permitting the completion of the remainder of the installation.

The architect usually conducts a field review after any serious or unexpected change in the weather — which can have an adverse effect on work in progress — to determine whether any damage has been done to existing work, such as:

- undermining or weakening of footings or foundations by heavy rain;
- freezing of concrete or mortar due to sudden drops in temperature;
- frost penetration of sub-soil;
- damage to roofing membranes and unbraced

- walls by strong winds;
- improper curing or drying out of materials from prolonged heat.

Finally, the architect may:

- carry out a detailed review before the owner takes early occupancy of any area, prior to completion of the entire project;
- prepare a deficiency list for the contractor and the owner before partial occupancy takes place.

### Field Locations

The architect may be required to make and record observations in three possible locations:

- the construction site;
- the “extended” site;
- the plant or location of off-site fabrication.

#### *The Construction Site*

The construction site — the location identified in the contract documents where the building is situated — is called “Place of the Work” in CCDC documents. This is where most of the construction activities take place and where the architect will conduct most of the field reviews, unless the building is prefabricated off-site.

#### *Extended Site*

An extended site refers to a location where products may be stored away from the construction site. The value of major items delivered to an off-site location may be considered eligible for payment, subject to the terms of the contract or once the following conditions have been met:

- after authorization or approval (usually for products which are costly or custom-made);
- after the contractor has made provision for:
  - secure storage (for example, a bonded warehouse);
  - insurance;
  - bonding;
- after the architect has made visits to observe the items at their storage location.

#### *Plant or Off-site Locations*

Review of work which is fabricated or assembled in a plant may also be necessary. The architect or consultants observe work in the plant to:

- examine the manufacturing facilities and capabilities of the sub-contractors before

- a contract is awarded;
- check or confirm progress of items, such as:
  - items whose schedule for delivery is critical to the progress of the project;
  - items which come to the construction site pre-assembled and could not be properly reviewed after delivery;
- resolve problems noted by inspection and testing companies, such as:
  - truss welding details;
  - prefabricated wall panel details;
- resolve manufacturing problems concerning details which prove to be impractical, such as:
  - the size of metal breaks;
  - prefabricated wall panels;
- witness tests undertaken in the plant, such as:
  - tests for curtain wall mock-ups;
  - tests on specialized prefabricated roof structures;
  - tests of air diffusers;
- review mock-ups, such as:
  - elevator cabs;
  - special ceiling systems;
- determine the source of problems occurring in the field which can be traced to plant manufacture or fabrication, such as:
  - welding deficiencies;
  - efflorescence.

### Reporting

The architect should write a report after every visit spent observing work in the field. The field review report may include the following information:

- name and position of the person conducting the field review;
- date, time, and duration of the visit;
- weather conditions, including any extreme conditions;
- names of those present or name of the site superintendent and the general contractor;
- percentage of work completed by trade;
- work progress compared to the contractor's schedule;
- work now underway or being accomplished;
- work scheduled to be completed before next visit;
- questions raised by the contractor or the owner;
- determinations made by the architect;
- outstanding issues requiring action;

- the list of people receiving copies of the report;
- status of deficiencies or outstanding issues from previous report;
- the report number for filing purposes.

Refer also to Chapter 2.4, *Sample Forms for the Management of the Project*, for a sample form for a field review report.

The architect should refer to one of the several available checklists for the review of building construction. Many checklists are organized by trade in the MasterFormat™ system. Architects can take the checklist to the job site and use it to assist in recording observations and writing field review reports.

Refer also to the RAIC Field Review / General Review Distance Learning Course, *Guidelines for Conducting and Documenting Construction Site Visits*, which includes 16 checklists.

### Mock-ups

Mock-ups are usually full-scale, partial constructions of a certain system or building component. The contractor or sub-trade prepares a mock-up, when specified, to:

- demonstrate a full understanding of the drawings and specifications;
- uncover any problems;
- represent the quality of construction expected by the architect.

The architect should establish a schedule for construction of mock-ups and procedures for their review of at a pre-construction meeting.

## Site Meetings

### Pre-construction Meeting

The tone, format, and efficiency of all subsequent meetings is often set at the pre-construction meeting. The architect should be well prepared for this first meeting.

Before work commences on the site, the architect usually makes a detailed review of the site with the contractor, and documents the condition of the existing site (existing structures, sidewalks, etc.) in order to:

- establish the state of existing facilities

- before work starts;
- provide a basis for settling any disputes arising from damages which may occur during construction.

Refer to “Checklist: Suggested Agenda for the Pre-construction Meeting,” located at the end of the chapter, for issues to be discussed and resolved at this important first meeting.

### Regular Site Meetings

One of the architect’s responsibilities during construction is to participate in job-site meetings. The architect should be familiar with the progress of the job prior to any regularly scheduled job meeting. Regularly scheduled site meetings are essential to:

- communicate the client’s expectations to the construction team;
- ensure good communication between all parties;
- exchange and transmit technical information such as shop drawings;
- provide a structured opportunity for field review;
- resolve problems and discuss all relevant design and construction issues;
- assist in making judgements and determinations;
- review schedules and progress claims.

Site meetings provide an excellent opportunity for the architect to establish an on-site presence. Minutes of the site meetings should always be recorded. They should indicate what actions are required and who is responsible for the action. Minutes should be distributed within 48 hours of the meeting. Either the architect or the general contractor prepares the minutes, depending on the architect’s choice and the general requirements of the specifications.

### Field Review Services of Consultants

The architect is usually the prime or “managing and coordinating” consultant, and is responsible for coordinating the field functions of the engineering and other consultants. It is important to call upon the services of the consultants at the appropriate stage of construction. All consultants should be required to submit field review reports in a format similar

to that used by the architect, and the architect will distribute the reports as required. In addition, the architect relies on the consultants to determine the value or percentage of work completed by each respective discipline in order to prepare Certificates for Payment.

### Engineers and other Consultants

The field review by engineers is critical to a successful building. The architect will normally:

- be familiar with the engineering work;
- note significant issues during site visits;
- bring those issues to the attention of the respective disciplines.

The role of consultants in the contract administration phase of the project follows the role of the architect. The engineers and other consultants should:

- review and provide the field functions as required at times appropriate to the stage of construction;
- provide written field review reports each time they visit the site.

Some aspects of review by engineering consultants differ from that of the architect. For example, some engineering disciplines — especially mechanical and electrical — provide information in a more diagrammatic manner than is presented in typical architectural drawings. Therefore, the trade or sub-contractor can use more discretion in the installation and operation of various equipment and systems. This diagrammatic information requires more interpretation on the part of both the engineer and the sub-contractor.

### Testing Agencies and Inspection Services

Independent inspection provided by specialist inspection and testing firms is required on most construction projects. The following summarizes the relationship of these specialists with the architect:

- inspection and testing is usually recommended by the architect or the engineers;
- these specialists do not supersede the architect’s authority;
- these services are ancillary to the architect’s basic construction administration services;

- the architect must ensure that he/she is only assisting in the process and does not assume a contractual obligation;
- inspection and testing firms undertake tests and issue timely reports, but they do not interpret the results of these tests or issue instructions to the contractor;
- interpretations are made by the contractor in the first instance and finally by the architect and the engineering consultants.

Inspection and testing firms are frequently selected by methods typically used for selecting other professionals, that is, by soliciting proposals. The cost of these services is generally paid for by the owner who contracts:

- directly with the inspection agency; or
- indirectly through the general contractor.

Inspection and testing services are frequently paid through cash allowances provided for in the construction contract. Sometimes, inspection and testing services are included as a sub-contract. For example, air balancing is frequently a sub-contract of the mechanical contractor. Also, manufacturers' representatives — such as certain roofing membrane manufacturers — commonly inspect the installation of their products by the trades to ensure compliance with their standards.

The following are typical examples of inspection and testing required:

#### **Division 03 — Concrete**

- test for air entrainment
- slump test
- load testing on cylinders
- core drilling and testing
- inspection of placement of steel reinforcement
- X-ray of existing concrete slabs

#### **Division 04 — Masonry**

- mortar test and chemical composition
- testing of masonry units for compressive strength, absorption, etc.

#### **Division 05 — Metals**

- inspection of welds, fabrications, etc.
- field inspection
- inspection of load-bearing metal stud framing

#### **Division 06 — Wood, Plastics and Composites**

- special lumber grading

#### **Division 07 — Thermal and Moisture Protection**

- building envelope
- inspection of fireproofing and firestopping
- roofing inspections (installation and cut tests)

#### **Division 09 — Finishes**

- flooring and painting inspections

#### **Division 14 — Conveying Equipment**

- elevator testing and certification

#### **Division 21 — Fire Suppression**

- testing and certification of sprinkler systems

#### **Division 23 — Heating, Ventilation and Air Conditioning**

- air balancing

#### **Division 25 — Integrated Automation**

- testing of controls

#### **Division 26 — Electrical**

- testing of emergency lighting and emergency power supply

#### **Division 27 — Communications**

- testing of communications systems

#### **Division 28 — Electronic Safety and Security**

- verification of fire alarm system

#### **Division 31 — Earthwork**

- additional geotechnical reports
- soil-bearing capacity
- approval of backfilling materials
- compaction of soils or fill
- load tests on, and inspections of, piles and caissons
- inspection of underpinning and shoring
- inspection of soil stabilization

Testing of complete systems, such as the building envelope, interior air quality, or integrated electrical and communications systems, may also be required.

## Continuous On-site Representation

For certain large and complex projects, or some fast-track projects, continuous on-site representation is required. If provided by the architect, it is considered an additional service requiring negotiation of a fee over and above the basic fee. Alternatively, the client may choose to directly hire a clerk of the works. Usually, the responsibilities of a clerk of the works are limited and do not include contract document interpretation. The clerk of the works records construction activities and quantities, often for unit price contracts.

A continuous, on-site architectural representative may undertake some of the following duties:

- coordinating all communications;
- interpreting contract documents;
- assisting in the preparation of Change Orders and certificates;

- arranging for inspection and testing;
- preparing record drawings;
- attending site meetings;
- providing continuous field review and maintaining a daily log which contains:
  - weather conditions;
  - major material and equipment deliveries;
  - daily construction activities, percentage of completion of work, and work force;
  - records of work stoppages and reasons for them;
  - occurrence of inspection and testing and their results;
  - special visitors;
  - unusual conditions or significant developments on site.

The architect's role as a continuous, on-site representative should be carefully and clearly defined, and an appropriate fee negotiated with the client.

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## Definition

**General Review:** Visits to the place of work at intervals appropriate to the stage of the construction that the architect considers necessary to become familiar with the progress and quality of the work and to determine that the work is in general conformity with the contract documents.

## References

Mahoney, William D. Editor. *Construction Inspection Manual*. Los Angeles, CA: Building News Inc., 1998.

Stitt, Fred A. *Construction Administration and Inspection Checklist: A Complete Guide For Exterior And Interior Projects*. New York, NY., Van Nostrand Reinhold Company.

The Royal Architectural Institute of Canada

*Canadian Standard Form of Contract Between Client and Architect: RAIC Document Six.*

Field Review / General Review Distance Learning Course, *Guidelines for Conducting and Documenting Construction Site Visits*, 2003.

## Appendix A — Tips for Site Observations – General

The architect undertaking field review should refer to one of the many published checklists for assistance in conducting site visits. The following is a partial list of very general matters to review on construction sites. Refer also to Appendix B – Professional Standards for Field Review / General Review.

### Architectural Items

- A1 Aesthetics** includes the location and appearance of exposed mechanical and electrical components, particularly in areas exposed to view which should be finalized during roughing-in.
- A2 Cleaning** of trapped areas must be undertaken continually. The architect reviews and checks that accumulated dirt and dust is not allowed to build up and be covered up by the work of later trades. This includes dirt and food products left inside chase walls, above ceiling areas, and in interstitial spaces which could eventually find its way into areas occupied by the public. This also includes cleaning of areas such as cavity wall spaces which could affect the performance of weep holes.
- A3 Code Requirements** include stairs, exiting, life support systems, and anything which involves public health and life safety.
- A4 Datums and Tolerances** involve points used to determine floor levels with respect to outside grades or adjacent structures. Also required to maintain setbacks from other buildings or property lines and plumbness of vertical elements such as elevator shafts.
- A5 Deflections** require that appropriate allowances be made during and after construction for the deflections that will occur in beams, floors, and slabs as they are loaded. Beams and lintels above masonry and deflection of steel decking under roof parapets are typical examples.
- A6 Drainage** includes the provision of adequate slopes to drain water in floor slabs, pits and vaults, paving areas, and below slab weeping tiles. Inadequate slopes and drainage are a major cause of claims and litigation.
- A7 Expansion and Control Joints** must align with related joints in the building structure and at areas of expected movement. Joints should be consistent in all planes of the building envelope and interior, must not be constrained by construction, and must be allowed to expand and contract freely. The damage to the building fabric and visual impact of improperly designed joints are among the most significant problems with construction.
- A8 Fireproofing** of building structures requires checking the thickness and densities of materials. There must be sufficient room to apply spray on fireproofing, and it must not interfere with mechanical and electrical systems. Patching of damaged fireproofing must be undertaken so as to not impair the tested ratings of the system, and testing and inspection should be done by recognized testing companies.
- A9 Fire Protection** must maintain the required fire separations mandated by building codes. Provision must be made where fire separations are penetrated by other building systems such as mechanical and electrical systems as well as vertical services such as elevators and stairs. The materials used must meet current standards. Confirm that the materials have the required fire ratings, that they are installed by approved methods and in all required locations.

- A10 Hardware** on building projects is subject to substitutions and changes of hardware, changes of use or occupancy, and requested changes from Authorities Having Jurisdiction. The architect requests the hardware supplier to check and accept the methods of installation and confirm that the requirements of the occupants and Authorities Having Jurisdiction are met.
- A11 Humidity and Water Infiltration** trapped in wall and roof systems during the construction phase can lead to problems with rot and damage. The architect checks for excessive moisture in insulation materials, windows, and roofing systems. Excess humidity during the installation of many building materials will also lead to long-term problems. Gypsum board or acoustic ceiling panels will swell or sag when subjected to moisture levels exceeding permitted levels.
- A12 Mechanical and Electrical Equipment** such as elevators, escalators, fans, pumps, and operable doors, etc., require break-in periods. To avoid excessive breakdowns and callbacks by the contractor, these break-in periods should be done before the owner accepts the building. Access panels and other items require coordination with architectural finishes.
- A13 Operating space** is required to allow maintenance operations to be undertaken when the building is turned over to the owner. This includes space to allow staff easy access to filters, fans, valves, air handling equipment, and life safety items. The architect checks that equipment is installed so that maintenance and replacement is simplified and also so that space is available to move equipment in and out. This includes doors, access panels, and corridors.
- A14 Public Safety** requires that proper hoarding, overhead protection and scaffolding, and barriers be provided. The architect should be aware that the contractor is responsible for controlling the site and its safety. If the architect sees a potential problem, the architect should report this immediately to the project site superintendent; however, the architect does **not** make any recommendations as to how the safety problems should be solved.
- A15 Wall and Floor Thicknesses** should be confirmed on site to ensure that they are sufficient to conceal the services which are to be installed inside them. Typical services include ductwork, plumbing and waste stacks, washroom equipment, etc. The architect makes observations to ensure that any required fire resistance ratings are maintained where services are installed in walls or in furred-out walls. Services which are installed in concrete floors should also be reviewed so that sufficient cover remains to ensure that the fire rating is maintained or the structural requirements are not impaired.
- A16 Water** in new construction poses particular problems because systems installed on wet or damp substrates can have long-term problems. When materials such as bituminous membranes are installed on wet concrete or damp masonry, the adhesion may fail. The contractor should be made aware of the importance of protecting all sensitive materials and the strict adherence to manufacturers' requirements for moisture content.

## Appendix B - Professional Standards for Field Review / General Review

### Introduction

#### *Terminology*

The terms “Field Review” and “General Review” are used interchangeably in various parts of Canada; they have the same meaning and force in law and form an essential component of the architect’s services during the construction phase of a project. For convenience, this service will be referred to in this document as **field review**.

#### *Purpose*

The purpose of this Appendix is to summarize:

- the professional standards which the architect must maintain when performing field review services;
- the scope of professional services required during field review;
- the determination of the appropriate fee related to the agreed field review services;
- recommended reporting formats.

### Professional Standards

Successful contract administration means that the architect must effectively integrate the administration of the services provided in the office with field reviews carried out on the site. Regardless of which project delivery method is used, all architects must always follow best practices during field review because these services form a significant part of architectural services to the client.

The frequency, number and extent of field reviews required on a specific project is the prerogative and professional responsibility of the architect who should resist any attempt by the client to dictate the number of visits or to limit the amount of fee for field review services. Substantial settlements (payments resulting from a claim) have resulted when architects have limited their field review visits under pressure from their clients. The Courts have made it clear that there is an expectation for the architect to conduct a field review process that meets recognized professional standards, regardless of the fee or, in the alternative, to withdraw from the project.

The architect’s aim should be to keep ahead of events on the site and to assist the construction process in running smoothly (which is clearly to the advantage of the owner, the architect and the contractor), in order to achieve the desired end result without undesirable compromises. The architect must identify to the contractor all specific events about which advanced notification is required, particularly in relation to the scheduling of the portions of the work which will require:

- pre-construction meetings;
- special inspections or testing.

The architect must also monitor the work of consultants.

### Scope of Field Review Services

Services identified as “*supervision*” or “*inspection*” are not normally provided by an architect.

Field review, as defined in the client/architect contract, is intermittent, neither constant nor comprehensive:

- field review is based on a systematic, random sampling of the work;
- the architect is entitled to rely on the contractor’s consistency for the quality of the work.

The contractor, under contract with the client, has contracted to construct a building which is in general conformance with the contract documents. The ability of the architect to enforce this intent varies and depends on the type of project delivery method used:

- the greatest level of control is under a stipulated price contract (such as CCDC 2);
- the least control will likely occur when the client is an owner-builder, whose objectives may be restricted to quick completion at the lowest possible cost;
- the various forms of construction management and design-build contracts fall between these extremes.

The two broad categories of field review services are:

- **Matters required by the Building Code:**  
These services are a regulatory requirement and they must be performed. The usual practice is for these services to be provided by the project's architect, but others who are qualified to do so may be engaged by the client.
- **Contractual Matters or "good practice":**  
These are matters related to workmanship, appearance, accuracy, etc. and they go beyond the review required for code-related matters. These services should be set out in a schedule of the scope of services in the client/architect contract (**Canadian Standard Form of Contract for Architectural Services –Document Six 2002**).

Essential elements of field review for building code matters include:

- site visits;
- written reports;
- changes to the work;
- shop drawings;
- coordination of consultants.

Elements of field review for "good practice" matters are similar, except that:

- the architect will identify, as a matter of professional judgement, which shop drawings for non-Code items will require review by the architect;
- these elements should be predetermined and set out in the contracts - between the client and contractor, and between the client and architect (such as in the *Schedule of Architect's Services* in Document Six).

### **Fees for Professional Services for Field Review**

The following are procedures to determine the fee for field review services:

1. If engaged for field review, confirm whether the services will include non-Code matters (Building Code matters should always be part of the fee);
2. Establish a draft of appropriate services for the specific project;
3. Define the scope of services which address these;
4. Discuss the field review process and appropriate fee with the client;
5. Make adjustments as required;
6. Review with consultants.

Be aware of obligations required by the Building Code and by the relevant provincial Architects Act, such as preparing and submitting field review reports to the municipality having jurisdiction over the project. Remember that if contracted to certify payments to the contractor, the architect is then required to provide field review for both Building Code and non-Code matters. Field review, as well as payment and substantial performance certification, are included in the definition of contract administration in the standard client/architect contract.

If the municipality requires shop drawings of Code-related matters to be submitted for their records, advise the client that the cost of making these submissions is included in the fee for contract administration.

Evaluate the time required to provide field review services appropriate to the specific project, calculate the fee, and review it in detail with the client prior to signing the client/architect contract. The client/architect contract should record:

- the agreed-to scope of services;
- the related fees, and
- an amending provision to adjust the contract should circumstances differ from what was agreed.

Circumstances which were not anticipated originally may require renegotiation.

Many factors affect the ability of the architect to prescribe fully, at the time of preparing the client/architect contract, the number, frequency and extent of site visits, however, some of the following factors can be predicted with some degree of accuracy and should be considered in establishing the fee:

- size and complexity of project;
- type of construction contract and method of project delivery;
- experience of the client with construction matters;
- requirements for submission of Code-related shop drawings to the municipality having jurisdiction over the project.

These are known prior to the execution of the client/architect contract and should be identified in the contract and the related costs included in the fee.

Other factors cannot be predicted accurately, such as:

- varying weather conditions;
- quality of workmanship of trades;
- performance of general contractor and its personnel assigned to project;

Review the provisions made in the contract to allow for these uncertainties with the client and advise the client that the scope and fee may need to be re-visited if changes in the scope of services occur due to circumstances unforeseen at the time of execution of the contract.

### Procedures

1. Review and bring to the attention of the chief building official all changes that may affect Code compliance, including shop drawings for Code related matters that are at variance with the permit documents;
2. Review and comment on shop drawings and samples for Code compliance to determine general conformity with the design concept (the architect may also review shop drawings for non-Code matters);

It is prudent to consider the impact on Building Code requirements of each Proposed Change and to obtain approval from the chief building official before finalizing Change Orders.

The architect is usually engaged to coordinate field review activities of other consultants (whether or not engaged by the architect) which include, for their respective disciplines:

- site reviews;
- written reports;
- review and comment on the costs quoted for changes to the work;
- shop drawings and samples;

Refer also to “Checklist: Coordinating Consultants” (Chapter 1.2.3 - Consultants).

In some instances, the architect may be working under a prime consultant (another architect or a professional from another discipline) whose responsibilities will include coordination services for the project; in these circumstances the Code requires the architect to cooperate with the prime consultant providing coordination of other consultants.

### **Conclusion**

In the final analysis, whether or not the architect has exercised appropriate professional judgement in attending at the site, including when or how often these attendances should have occurred, will be determined by a panel of the architect's peers, in the case of complaints and discipline hearings, or by a judge or arbitrator, in a matter of a claim against the architect.

### **Definition**

*General Review/Field Review* means review during visits to the *Place of the Work* (and where applicable, at locations where building components are fabricated for use at the *Project* site) at intervals appropriate to the stage of the construction that the *Architect*, in his or her professional discretion, considers necessary to become familiar with the progress and quality of the *Work* and to determine that the *Work* is in general conformity with the construction documents.

(*Canadian Standard Form of Contract for Architectural Services –Document Six 2002– Definitions*)

### **References**

RAIC Professional Development Course, Distance Learning Kit, *Field Review/General Review* with CD-ROM which includes:

- *Guidelines for Conducting and Documenting Construction Site Visits*
- *Checklists*

OAA Practice Bulletins: A.10 series

# Checklist: Suggested Agenda for the Pre-construction Meeting

## 1. Introduction

- all attendees and who they represent.

## 2. Administrative Procedures

- schedule of meetings;
- who will record and distribute minutes;
- format of minutes;
- general communications;
- procedures for distribution and routing and for the review and/or approval of information, including:
  - correspondence;
  - shop drawings, including format, turn-around time, etc.;
  - samples, including mock-ups and schedule;
  - substitutions;
  - tests and inspections, including identifying companies and reporting circulation;
  - progress payments;
  - Change Orders, including procedure and forms.

## 3. Project Team Directory

(as per Form 1.5 of Chapter 2.4, *Sample Forms for the Management of the Project*)

## 4. Current Project Status

- receipt of:
  - building permit;
  - insurance and bonds;
  - certificates of good standing from Workers Compensation Board;
- identification of Authorities Having Jurisdiction;
- permits for gas, electrical services, other utilities, etc.

## 5. Job Site Documents

- permit set;
- codes and standards;
- geotechnical report.

## 6. Review of Information from Contractor, including:

- construction schedule;
- schedule of values for progress draws;
- cash flow projections.

## 7. Site Issues

- parking;
- loading and storage;
- garbage, construction waste, and recycling requirements;
- hoarding and fencing;
- tree protection;
- project identification and signage;
- snow removal;
- operational constraints (use of existing washrooms, maintenance of existing services, etc.);
- hazardous materials (handling and disposal).

## 8. Construction Services and Utilities, including:

- water;
- heat;
- light;
- power;
- toilets;
- construction office;
- communications systems.

## 9. Requirements for Pre-construction Surveys

- recording existing conditions;
- setting out of foundations, establishing property boundaries.

## Checklist: General Items for Field Review

### 1. Permits and Inspections

- determine whether the contractor has arranged for all permits and inspections required for compliance with local, provincial, and federal regulations, including:
  - building permits;
  - environmental permits, if applicable;
  - safety and labour department permits.

### 2. Code Requirements

- observe whether construction is proceeding in accordance with the requirements of applicable codes:
  - the contractor is responsible for compliance with all regulations for construction methods;
  - the architect is responsible for design.

### 3. Shop Drawings and Samples

- confirm that the contractor has reviewed copies of all applicable shop drawings on site and they are being used for construction;
- confirm that approved samples are kept on site for reference and comparison with the completed work.

### 4. Mock-ups

- before the work commences, have the contractor prepare on-site mock-ups and retain them for reference for:
  - the work of certain trades;
  - significant repetitive elements;
- mock-ups allow tradespeople to see what impact and interface is required between trades before work begins on, for example:
  - masonry walls;
  - through-wall flashings;
  - window installations;
  - roofing and flashings.

### 5. Materials and Equipment

- review materials and equipment immediately after delivery to the site for conformance to the contract documents by the architect or the consultant;
- advise the contractor to store materials so that they can be readily observed.

### 6. Fabrication

- a visit to the plant for certain critical work and items with a long lead time may be warranted.

### 7. Workmanship

- remind the contractor of the required quality of workmanship:
  - from the start of the project;
  - through the contractor so that all trades are aware of the standards;
- make frequent spot checks so that the standards established initially are maintained.

### 8. Handling and Storage

- note the methods of delivery, handling, and storage of materials and equipment;
- observe whether these meet applicable standards and no damage to the project or materials will result.

### 9. Protection

- observe:
  - insulation exposed to sunlight;
  - masonry exposed to rain or snow or wind;
  - millwork and carpentry exposed to the elements;
  - structure overloaded by pallets of materials concentrated close together.

**10. Erection and Installation**

- the contractor is solely responsible for construction methods:
  - the architect risks incurring liability by offering suggestions;
- during the installation and erection of work, the architect checks the procedures being used by reviewing:
  - specifications;
  - notations on shop drawings;
  - agreed-to instructions and correspondence;
- the architect reports any concerns about erection procedures for structural work to the structural engineer immediately.

**11. Relation to Prior Work**

- review the work of trades already completed;
- establish with the contractor whether corrective work is necessary before the work of the next trade contractor begins;
- request the contractor to obtain acceptance of the previous work by the next trade contractor, for example, acceptance of:
  - steel decking before installation of roofing;
  - concrete floors before installation of finish flooring;
  - gypsum board substrates before painting.

**12. Cooperation Between Trades**

- review with the contractor the need for coordinating the work between trades;
- observe whether the trades are cooperating and that one is not disregarding the requirements of another;
- make proper interference drawings available, especially drawings for the mechanical and electrical trades showing:
  - ductwork;
  - sprinklers;
  - lighting fixture layouts.

**13. Clean-up and Safety**

- check that the site is being maintained in a clean and safe condition;

- an untidy site indicates potential problems:
  - fire hazards;
  - accidents;
  - lowered productivity;
  - Authorities Having Jurisdiction may close the work down if serious problems are not rectified;
  - the owner may develop a negative image of both the contractor and the architect, even though the architect has no control over how the work is being performed;
- if unsafe working conditions or practices are evident, notify the contractor's superintendent immediately and record the notification and circumstances;
- if action is not forthcoming, report immediately to the proper authorities.

**14. Inspection and Testing**

- establish that arrangements with the inspection and testing companies have been made and verify that:
  - representatives of those companies are or have been on site when required;
  - necessary test or control procedures are being made;
  - detailed reports are being prepared and issued.

(Refer to "Testing Agencies and Inspection Services" earlier in this chapter.)

**15. Contract Document Review**

- check the work against:
  - original contract documents;
  - addenda;
  - Change Orders;
  - Supplemental Instructions.

**16. As-Built Drawings**

- remind the contractor to update the drawings regularly as the work progresses.

**17. Site Visits with the Owner**

- make visits with the owner as the work of various trades is completed;
- make a site visit or series of visits with the owner's representative before the work is accepted.

## Checklist: Final Field Review

Review Items	Observations	NBC Reference
STRUCTURE	<input type="checkbox"/> complete <input type="checkbox"/> window cleaning anchorage systems <input type="checkbox"/> final review conducted by P. Eng	
HVAC	<input type="checkbox"/> complete & operational <input type="checkbox"/> fire dampers at all fire separations <input type="checkbox"/> venting of commercial cooking equipment <input type="checkbox"/> smoke control verification in high buildings <input type="checkbox"/> final review conducted by P. Eng	3.1.8.7.-3.1.8.9. 6.2.2.6. 3.2.6.10.
PLUMBING	<input type="checkbox"/> complete, tested & operational <input type="checkbox"/> backflow prevention devices installed & tested <input type="checkbox"/> final review conducted by P. Eng	7.1.2.1.
ELECTRICAL	<input type="checkbox"/> supply, lighting & heating complete & operational <input type="checkbox"/> emergency lighting <input type="checkbox"/> emergency power <input type="checkbox"/> final review conducted by P. Eng	3.2.7.3. 3.2.7.4.
BUILDING ENVELOPE	<input type="checkbox"/> environmental separation <input type="checkbox"/> thermal resistance <input type="checkbox"/> precipitation protection <input type="checkbox"/> grading for surface water	5.1.4.2. 5.3.1.1. 5.6.1.1. 5.7.1.1.
FIRE ROUTES	<input type="checkbox"/> open & accessible <input type="checkbox"/> minimum 6m width <input type="checkbox"/> capable of supporting response vehicles	3.2.5.5.-3.2.5.6.
FIRE ALARM & SUPPRESSION	<input type="checkbox"/> fire alarm system tested & verification report <input type="checkbox"/> firefighting water supply & hydrant location <input type="checkbox"/> standpipe system, fire hose cabinets & extinguishers <input type="checkbox"/> sprinkler/extinguishing system tested & operational <input type="checkbox"/> fire department siamese pumper connections <input type="checkbox"/> firefighters' elevator	3.2.4. 3.2.5.7. 3.2.5.8.-3.2.5.12. 3.2.5.13. 3.2.5.16. 3.2.6.1., 3.2.6.5.
GUARDS	<input type="checkbox"/> balconies <input type="checkbox"/> stairs & landings & where drop exceeds 600mm <input type="checkbox"/> windows & transparent doors <input type="checkbox"/> height, openings & climbability <input type="checkbox"/> load capacity <input type="checkbox"/> retaining walls	3.4.6.5. 3.3.1.18. 3.4.6.5. 4.1.10.1.

✗ NOT APPLICABLE

✓ IN COMPLIANCE

● NOT IN COMPLIANCE

✱ SEE COMMENTS

Review Items	Observations	NBC Reference
FIRE SEPARATIONS & FIRE RESISTANCE	<input type="checkbox"/> firewall integrity	3.1.10.
	<input type="checkbox"/> conformance of specified assemblies	
	<input type="checkbox"/> verification of spray fireproofing	
	<input type="checkbox"/> exits	3.4.4.1.
	<input type="checkbox"/> floors	
	<input type="checkbox"/> mezzanines & interconnected floor spaces	3.2.8.1., 3.2.8.2.
	<input type="checkbox"/> loadbearing columns supporting rated assemblies	3.1.7.5.
	<input type="checkbox"/> roofs	
	<input type="checkbox"/> spatial separation for exterior walls	3.2.3.
	<input type="checkbox"/> public corridors	3.3.1.4.
	<input type="checkbox"/> between occupancies	3.1.3.1.
	<input type="checkbox"/> between suites	3.3.1.1.
	<input type="checkbox"/> garbage, mechanical service, janitor rooms	3.6.2.
	<input type="checkbox"/> shafts	3.6.3.
	<input type="checkbox"/> labeled door, frame & other closures	3.1.8.
	<input type="checkbox"/> firestopping	3.1.9.1., 3.1.11.
<input type="checkbox"/> combustible piping penetrations	3.1.9.4.	
<input type="checkbox"/> hazardous substances – Fire Code compliance	3.3.1.2.	
EXITS	<input type="checkbox"/> separation integrity	3.4.4.4.
	<input type="checkbox"/> door swing direction	3.3.1.10., 3.4.6.11.
	<input type="checkbox"/> door hardware, latching, & self closing devices	3.1.8.11., 3.1.8.13.
	<input type="checkbox"/> panic hardware, hold open & electromagnetic release	3.4.6.15.
	<input type="checkbox"/> handrails, continuous one side	3.4.6.4.
	<input type="checkbox"/> uniform rise & run	3.4.6.7.
	<input type="checkbox"/> exit signs	3.4.5.
	<input type="checkbox"/> lighting	3.2.7.1.
	<input type="checkbox"/> unobstructed safe egress at grade	
BARRIER-FREE ACCESS	<input type="checkbox"/> exterior walk & ramp to parking	3.8.3.2., 3.8.3.4.
	<input type="checkbox"/> entrance threshold	3.8.3.3.
	<input type="checkbox"/> door operator	3.8.3.3.
	<input type="checkbox"/> washroom clearances & fixturing	3.8.3.8.-3.8.3.12.
	<input type="checkbox"/> handrail extensions	3.4.6.4.
	<input type="checkbox"/> signage for parking, entrance, washrooms	3.8.3.1.
	<input type="checkbox"/> corridor obstructions affecting visually impaired	3.3.1.9.(3)
UNFINISHED BUILDING OCCUPANCY	<input type="checkbox"/> compliance within occupied areas	
	<input type="checkbox"/> housekeeping	
	<input type="checkbox"/> authority to occupy permit obtained	
AS-BUILT CONFORMITY	<input type="checkbox"/> consistency with approved documents	2.6.2.1.
	<input type="checkbox"/> authorization for changes obtained	
COMMENTS		

× NOT APPLICABLE

✓ IN COMPLIANCE

● NOT IN COMPLIANCE

\* SEE COMMENTS

# Checklist: Architect's Role in Soils and Materials Testing

## Notes

Soils and materials testing agencies are generally arranged by the architect on behalf of the client. Their fees are paid by the client, either directly, or indirectly through allowances included in the contract price. *For convenience, these are referred to as 'agencies' in this document.*

Manufacturers' representatives commonly inspect the installation of their products to ensure compliance with their standards and there is no additional cost to the client for these services. The architect is normally responsible for the coordination of these agencies. The basic services and principles for coordination should be affirmed/clarified by the architect as early as possible.

Comments, clarifications or recommendations are in *italics*  
Use of a forward slash (/) signifies *and* or *or*

Refer also to "Checklist for the Management of the Architectural Project" in Chapter 2.3.1 *Management of the Project*, Chapter 2.3.4 *Pre-design* and Chapter 2.3.11 *Contract Administration - Field Functions*

## Pre-agreement

### 1. Defining expectations:

- ❑ Before beginning negotiations with potential agencies prepare clear definition of expected performance for each specialty, including:
  - a) extent of participation by agency during design/documentation stages: *(this is more relevant to some specialties than others such as design consultation from a roofing inspector)*
  - b) knowledge of/commitment to current practice in specialties such as sustainable design or embodied energy
  - c) contract administration procedures:
    - i) site attendance:
      - on demand:
        - expected notification
        - normal/emergency response time
      - regularly scheduled *for work continuing over extended time period*
      - off-site locations *fabricating/manufacturing plants*
    - ii) reporting, including :
      - frequency of reports *(some agencies may accumulate reports and submit them monthly, unless instructed otherwise)*
      - measuring quantities *additional excavation/backfilling*
      - procedures when emergencies occur
    - iii) site instructions, including policy for prior authorization/approval
    - iv) review of change quotations *as requested*
- ❑ review past performance of previously engaged agencies. Review unsolicited offers of service from agencies not previously engaged
- ❑ Seek confidential recommendations on unfamiliar agencies from colleagues/clients *(Some clients may have ongoing service contracts with specific agencies and will instruct architect accordingly. Concern for due diligence may indicate that seeking independent recommendations on the client's selected agency is advisable. In this case, the client's approval should be obtained in advance, and all information obtained reported*

to the client. Confidentiality of comments received must be respected, therefore the architect is obliged to obtain original source's permission to report his comments, or maintain confidentiality of source, if so requested)

- ❑ Prepare short list of agencies selected (formerly engaged/new) to interview
- ❑ Develop score sheet for use during first interviews for consistent recording/rating of agencies' responses

## 2. Interviews

(separate preliminary discussions with each of selected agencies to confirm that agency understands/accepts architect's performance expectations)

- ❑ Encourage agency to describe their procedures in dealing with architects
- ❑ Confirm adequate professional liability insurance
- ❑ Make notes on score sheet

## 3. Following Interviews

- ❑ Review score sheets for each agency
- ❑ Eliminate unsuitable agencies
- ❑ Prepare formal Request for Proposals (RFP) letter for selected list of agencies
- ❑ Different letters will be required for each specialty, but each should include:

a) statement of expectations, confirming topics presented during interview (specific performance requirements should be stated in detail in initial RFP letter)

b) description of project, giving as much information as possible:

- project name/client/location
- site
- target date for completion

c) proposed schedule as relevant to required testing/inspection:

- pre-design/documentation
- construction

d) fee basis:

- lump sum
- percentage
- unit rates

e) request to confirm/provide:

- acceptance of performance expectations
- ability to meet timetable
- proof of professional liability insurance

## 4. Appointment of Agencies

- ❑ Review proposals and verify acceptance of performance expectations/adequate professional liability insurance
- ❑ Analyse any additional conditions agree or reject
- ❑ Select best proposal for each specialty (may not be the cheapest if expected performance is superior)
  - Recommend to client to engage selected agencies for pre-design testing work
  - Instruct contractor to engage selected agencies for work during construction phase
- ❑ Notify successful agencies
  - Arrange for client to sign formal agreements for pre-design testing work
- ❑ Advise unsuccessful agencies (this maintains good relations: you may want to consider engaging them in future)

## Pre-design - Geotechnical Inspection and Testing (soils)

### 1. Define scope of work:

a) review requirements in consultation with:

- structural engineer
- testing agency

b) establish number/locations/depth of boreholes for:

- soil/rock sampling
- penetration tests
- moisture content
- groundwater observations

c) other tests as required

- probes if rock encountered at shallow depth
- test pits
- percolation tests

### 2. Define information required:

a) overburden (usually requiring removal from site, except for topsoil which may be salvageable for use in landscaped areas)

b) organic material: thickness/depth/layers

c) fill/other non-native material

- moisture content

- d) soil/rock type:
  - character/formation/origin
  - moisture content
  - bearing capacity
  - depth to bedrock
  - inclination of rock surface
- e) water table
- f) soil analysis
- g) unusual conditions, including:
  - flowing ground water
  - quicksand
  - loose rocks/boulders

### Report

- h) borehole location plan
- e) borehole logs
- j) soil analysis:
  - soil classifications
  - stratification
  - penetration values
  - moisture content
- k) recommendations for:
  - i) allowable bearing pressure
  - ii) foundations, including:
    - design
    - bearing level
    - necessity for skim slab to protect excavated surfaces prior to concrete pour *as required*
    - earth cover to protect footings from frost action *as required*
    - angle of repose for cut slopes
  - iii) floor slab construction:
    - compaction of exposed subgrade by *proofrolling, etc. as required*
    - compacted sub-base
  - iv) pavement construction:
    - compaction of exposed subgrade *as required*
    - compacted base/sub-base
  - v) excavation/handling of rock slabs *as required*
  - vi) groundwater control
  - vii) special requirements for unusual conditions such as deep foundations or engineered fill
- l) confirm project schedule/deadlines

## Commonly Specified Inspection and Testing Services during Construction

Charges for these services are usually paid from specified Inspection & Testing allowance or included in contract price of relevant sub-trade. Payment for retesting/reinspection of work found defective following initial inspection, or as otherwise made evident, is responsibility of contractor

- ☐ In all cases, agreed contract administration procedures must be followed for:
  - site attendance
  - reporting
  - lines of communication
  - site instructions
- ☐ Monitor each agency's performance and advise promptly if not satisfactory

### Additional Geotechnical Inspection and Testing Services

- ☐ Additional boreholes to augment those taken earlier *may be required as unusual/unexpected conditions become evident as excavation/site work proceeds*
- ☐ Tests of soil-bearing capacity
- ☐ Test pits *as required*
- ☐ Observation/measurement of:
  - additional excavation of unacceptable material
  - related additional backfilling *as specified*
  - boulders over specified size
  - *charges for the above measured quantities are usually at unit rates quoted at time of bidding*
  - topsoil salvaged for re-use

### Backfilling

- ☐ sieve analysis of proposed fill materials
- ☐ compaction tests including frequency and number of tests per specified area or at specified lift interval
  - undisturbed excavated surfaces prior to backfilling/placement of footings
  - backfilling under floor slabs/paving
  - backfilling against walls
  - backfilling at site areas following removal of unacceptable material

**Asphalt Paving**

- compaction tests:
  - sub-base
  - base
- inspection of asphalt placement:
  - mixture temperature
  - placing
  - rolling

**Special Foundations**

- caissons:
  - drilling
  - bearing surface
- piles, including:
  - driving of piles
  - load tests
- underpinning
- shoring

**Concrete**

- air entrainment
- slump
- cylinder tests, specified frequency for each test (at least once per prescribed quantity delivered/placed or each placement day)
- core drilling *as required*
- load tests *as required*
- reinforcement, including:
  - bar sizes
  - placement
  - tying
  - chairs/spacers

**Masonry**

- masonry materials *as required*:
  - absorption rate for clay brick
  - mortar
  - masonry ties

**Structural Steel**

- off-site fabrication:
  - mill test reports
  - materials/products as specified
  - conformance to reviewed shop drawings, including:
    - correct sizes
    - fabrication/erection tolerances
    - welding
- field assembly, including:
  - bolting
  - welding
  - plumbness/alignment/level
  - base plate grouting/removal of shims

**Steel Decking**

- mill test reports
- no damaged/deformed materials incorporated in work
- attachments, including:
  - welding
  - button punching
- reinforcing at openings
- edge closures, including:
  - flute closures
  - bent plate edge forms

**Metal Fabrications**

- handrails/guards, including:
  - fastenings
  - vertical/horizontal load capacity *as specified*

**Membrane Waterproofing**

- pre-construction conference
- condition of substrate
- installation, including:
  - daily or more frequent inspections throughout duration of work *as required*
  - substrate preparation
  - application

**Sprayed Plaster Fireproofing**

- conformance to product data/test reports, including:
  - bond to substrate
  - thicknesses for required ratings

**Roofing**

- daily or more frequent inspections throughout duration of work *as required*
- condition of substrate such as steel deck/concrete slab
- inorganic moisture-resistant rigid underlayment
- vapour retarder, including:
  - mopped in/adhesive fixed *as required*
  - placement of adhesive
  - sealed at:
    - all laps
    - terminations
    - perimeter air/vapour barrier(s)
- insulation, including:
  - mechanical fastening/mopped in *as required*
  - joints/ends staggered
  - fitted around drains/vents/curbs/abutting construction
- roofing membranes, including:
  - mopped/torched *as required*
  - membrane/bituminous flashings
  - granular surfacing *as required*
  - temporary water cut-offs
  - control joints

- roof pavers/roof protection course
- sheet metal flashing, including:
  - fabrication
  - joints
  - corners
  - underlay *as required*
  - backpainting *as required*
  - provision for expansion
  - caulking

### **Sealants**

- field quality control provided by manufacturer's representative *as specified*, including :
  - substrate preparation
  - application of packing and sealant

### **Finish Hardware**

- field quality control provided by manufacturer's representative *as specified*, including:
  - installation
  - operation/adjustments as required for items such as door closers, automatic door openers

### **Flooring**

- field quality control provided by manufacturer's representative *as specified* for:
  - resilient sheet flooring, including:
    - seam welding
    - integral cove bases
  - carpeting

### **Painting & Finishing**

(NOTE:several provinces now have quality assurance programs offered by their provincial Painting Contractors' Associations (PCA). Costs of the program are included in the contract price. These services are recommended for specification by architects, if available. Such programs include:

- Approved Product Lists for all Canadian paint manufacturers, listing Coating and Finishing Systems for all exterior and interior conditions
- Warranty/Guarantee, either:
  - PCA 2 year Guarantee for PCA members
  - Maintenance Bond for non-PCA painting contractors
  - Field Quality Control independent inspection service)
- Field quality control provided by independent inspection *as specified*:
  - condition of substrate, including:
    - clean/dry/free of imperfections
    - no adverse moisture content/alkalinity
  - preparation, including:
    - products from PCA Approved Products Lists *as specified*
    - priming/filling
    - ventilation
    - temperature
  - application, including:
    - coverage
    - touch-up
    - finished appearance

### **Special Finishes**

- field quality control provided by manufacturer's representative *as specified*
- dry film coating thicknesses *as specified*