BRITISH COLUMBIA | Ministry of Transportation and Infrastructure

**Technical Circular T-01/23**
Date: October 10, 2023

To: All Directors, Integrated Transportation and Infrastructure Services
All Directors, Highways and Regional Services
All Directors, Policy, Programs and Partnerships
All Directors, Finance and Risk Management
All Members, Association of Consulting Engineering Companies, British Columbia (BC)

## Re: Professional Assurance Guidelines

## Purpose:

These guidelines have been prepared to define the roles and responsibilities of the various Professionals with respect to engineering design, from planning through construction phases, including design coordination and delivery on Ministry projects.

These guidelines:

- Apply to all projects designed for the BC Ministry of Transportation and Infrastructure.
- Provide an overview of the responsibilities and interrelationships between the parties.
- Do not supersede the contractual responsibilities of the parties.
- Apply to Design-Build, Alternate Delivery and Third Party Delivered Projects as per Appendix 2.
- May be used for works delivered by third parties, such as developers, utilities, and municipalities.
- Apply to proprietary designs that are incorporated into projects.
- Apply in conjunction with the BC Professional Governance Act, the BC Engineers and Geoscientists Regulation, the Bylaws of Engineers and Geoscientists BC, and the guidelines, standards, practice advisories and policies of EGBC.
- Supplement the requirements of the BC Building Code on projects where the BC Building Code applies.
- Apply unless variances to these guidelines have been reviewed and accepted by the Chief Engineer.

## Abbreviations & Definitions:

- **Assurance Forms** = The following H-forms are to be executed in accordance with this Technical Circular:
  - H1251 – Commitment for and Assurance of Coordination by Coordinating Professional Engineer
  - H1252 – Assurance of Professional Design
  - H1253 – Assurance of Professional Design Post Construction
  - H1254 – Commitment for and Assurance of Field Reviews
- **Authenticate(d)** = Appropriate Professional seal, signature, and date requirements as per EGBC Guide to the Standard for the Authentication of Documents.
- **Coordinating Professional Engineer (CPE)** = the Professional engineer responsible for coordinating the work of the Professionals of Record and Field Reviewers including the planning, design, Field Reviews, and Record Drawings.
- **Design(s)** = the compendium of drawings, plans, specifications, and other like material produced by the designers to calculate, determine, and define the items of work to be constructed.
- **EGBC** = Engineers and Geoscientists BC, the business name of the Association of the Professional Engineers and Geoscientists of the Province of British Columbia.
- **Field Reviewer (FR)** = the Professional responsible for the Field Reviews during construction, manufacturing, fabrication, implementation, testing, or commissioning of work.
- **Field Reviews** = reviews of the construction conducted by Professionals, or by subordinates acting under the Professional's direct supervision, at the construction site and/or other fabrication, manufacture, or implementation locations, where applicable.
- **Ministry** = the BC Ministry of Transportation and Infrastructure.
- **Ministry Design Lead (MDL)** = the Ministry Engineering Services representative for the project that coordinates Ministry engineering requirements.
- **Ministry Representative (MR)** = the representative of the Ministry designated in a construction contract.

- **Professional** = an individual who is a practicing professional registrant as defined in Engineers and Geoscientists BC's Bylaws.
- **Project Manager (PM)** = the representative of the Ministry responsible and accountable for managing the progress and performance of the project delivery to the agreed scope, schedule, and budget.
- **Professional of Record (POR)** = the Professional responsible for a specific portion of the project Design. Engineer of Record is included within this term.
- **Record Drawings** = final Authenticated drawing set reflecting the material Design changes made during construction that were brought to the attention of the POR.

Note: Abbreviations and Definitions above are applicable to all Assurance Forms associated to this Technical Circular.

## Roles and Responsibilities

### 1. Coordinating Professional Engineer (CPE)

The Ministry requires the CPE to be a Professional engineer. Most projects involve multiple engineering disciplines, and the role of the CPE is to be the single-point engineer for the coordination and assessment of interrelationships between engineering disciplines and communicating issues regarding coordination to the MDL and PM.

1.1. The CPE shall:

- 1.1.1. Be assigned and submit an Authenticated H1251 Assurance Form, Part 1 – Commitment for Coordination at the commencement of project design.
- 1.1.2. Coordinate the work of the PORs for the preparation of the Design, including the tender and contract documents.
- 1.1.3. Ensure that there is a POR to Authenticate all aspects of the Design including any Designs for permanent works prepared by the construction contractor and design-build contractor.
- 1.1.4. Become the POR for those aspects of the Design where there is no other POR and shall ensure they have the qualifications required for that POR role.
- 1.1.5. Submit an Authenticated H1251 Assurance Form, Part 2 Assurance of Coordination of Design at the completion of the design project.
- 1.1.6. Ensure Field Reviews for the Designs of each POR are arranged and carried out, and that appropriate documentation is submitted to the PM and MDL in a timely manner.
- 1.1.7. Become the FR for those aspects of the Field Review where there is no other FR and shall ensure that they have the qualifications required for that FR role.
- 1.1.8. Ensure Record Drawings are produced, annotated with the appropriate sign-off wording, Authenticated by the PORs, and that the originals are submitted to the PM and MDL in a timely manner as a part of project close-out.
- 1.1.9. Ensure all Assurance Forms have been Authenticated and received from the respective PORs and FRs, and submitted to the MDL and PM.
- 1.1.10. Not act as PM or enforce contract terms between the Ministry and other parties.
- 1.1.11. Not have the responsibility to undertake checking and independent reviews of project Design and project design criteria unless specifically assigned to do so.
- 1.1.12. Not be a Professional Licensee (P.L.Eng. or P.L.Geo.).
- 1.1.13. Submit an Authenticated H1251 Assurance Form, Part 3 Assurance of Coordination of Field Review and Record Drawings, in a timely manner as a part of project close-out.

1.2. The CPE may:

- 1.2.1. Be a POR for one or more portions of the Design.
- 1.2.2. Be retained by the Ministry independent of any specific portion of the Design.
- 1.2.3. Rely upon the Ministry to require conformance with these guidelines by other parties.
- 1.2.4. Be a checker or independent reviewer when specifically assigned to do so.
- 1.2.5. Be a Professional geoscientist, Professional engineer, or Professional Licensee (P.L.Eng. or P.L.Geo.), where there is only one POR and that POR shall perform the role of the CPE.

### 2. Field Reviewer (FR)

The FR is responsible for assuring that the works constructed substantially comply in all material respects with the professional engineering concepts or intent reflected in the Design prepared for such work. The FR role is distinct from any day-to-day inspections and quality assurance by the MR and from any design services during construction.

2.1. The FR shall:

- 2.1.1. Be a Professional
- 2.1.2. Be assigned by the Ministry prior to the commencement of construction.
- 2.1.3. Submit an Authenticated H1254 Assurance Form, Part 1 – Commitment for Field Review, prior to the commencement of construction.
- 2.1.4. Perform Field Reviews in accordance with Appendix 1 – Field Review Guidelines.
- 2.1.5. Perform site visits.
- 2.1.6. Review the reports of any inspection and testing performed by others as provided by the Ministry.
- 2.1.7. Confirm that Field Reviews are undertaken incorporating all relevant Design changes.

2.1.8. Liaise with the MDL and PORs, as required, for interpretation of the Design.
2.1.9. Record any changes encountered, observations made, and deficiencies found during Field Reviews.
2.1.10. Provide the CPE, POR, MDL, and the MR with a written report of any changes encountered, observations made, and highlighting deficiencies, as soon as practical.
2.1.11. Only sign the Record Drawings for which they are the POR.
2.1.12. Not be responsible for the Design unless they are also the POR.
2.1.13. Submit an Authenticated H1254 Assurance Form, Part 2 – Assurance of Field Review, at the completion of construction to the CPE.

2.2. The FR may:
2.2.1. Be the POR, or another Professional retained by the POR or by the Ministry.
2.2.2. Delegate Field Reviews to an individual under their direct supervision in accordance with EGBC's Guide to the Standard for Direct Supervision and Guide to the Standard for Documented Field Reviews During Implementation or Construction.

## 3. Professional of Record (POR)

All engineering and geoscience Design will have one or more discipline specific PORs. Any work performed by other registered professionals (e.g. RP Biologist, RP Forester) is not explicitly covered under this document, but should be captured by the POR who incorporates the recommendations into a Design. The POR is not responsible for the quality of construction.

3.1. The POR shall:
3.1.1. Be responsible for their final Design including any changes made during construction.
3.1.2. Incorporate climate change considerations as per Ministry policy.
3.1.3. Authenticate the Design for their respective discipline and submit it to the MDL.
3.1.4. Obtain acceptance of their proposed Design from the MDL.
3.1.5. Submit an Authenticated H1252 Assurance Form at the completion of Design to the CPE.
3.1.6. Address any changes during construction with the following process:
3.1.6.1. Determine whether the changes substantially comply with the project design intent.
3.1.6.2. Where the changes substantially comply, notify the MDL and CPE that changes are acceptable.
3.1.6.3. Where the changes do not substantially comply, provide details of Design revisions to the MDL and CPE.
3.1.7. Authenticate and submit the Record Drawings to the CPE.
3.1.8. Annotate the Record Drawings "This drawing complies with H1253 – Assurance of Professional Design – Post Construction" and also include the declaration as described in 6.1.2.
3.1.9. Submit an Authenticated H1253 Assurance Form at the completion of construction to the CPE.

3.2. The POR may:
3.2.1. Be the FR, CPE, and/or MDL.
3.2.2. Rely upon assurances by the FR.
3.2.3. Be released from Field Review obligations when instructed in writing by the Ministry as per the guidelines in Section 3.7.2 of EGBC Guide to the Standard for Documented Field Reviews During Implementation or Construction.
3.2.4. Revise or replace, with the Ministry's acceptance, the assignments listed in Schedule A – Summary of Professional Assurance Assignments.

## 4. Ministry Design Lead (MDL)

The Ministry requires a MDL to be assigned on every project where this technical circular is applicable. This role ensures coordination of all internal Ministry engineering requirements and engineering decisions throughout the project.

4.1. The MDL shall:
4.1.1. Be internal Ministry personnel from Engineering Services.
4.1.2. Consult the POR for all proposed changes to the Design during construction.
4.1.3. Verify and accept all Authenticated tender packages.
4.1.4. Obtain all internal Ministry approvals and sign offs as needed.

4.2. The MDL may:
- 4.2.1. Be the CPE and/or a POR when these roles are assigned to internal Ministry personnel.
- 4.2.2. Be a Professional.

## 5. Ministry Representative (MR)

The MR role and responsibilities defined below are in relation to this Technical Circular.

5.1. The MR shall:
- 5.1.1. Be responsible for the day-to-day quality assurance of the construction contractor's work and coordination of any changes to the construction contract.
- 5.1.2. Communicate any required, proposed and desired Design changes during construction to the MDL and POR for their assessment of whether such changes require the approval of a Professional.
- 5.1.3. Communicate changes that are encountered on site impacting the Design to the MDL and POR.
- 5.1.4. Implement Design changes only as accepted by both the MDL and POR.
- 5.1.5. Track, record and report all Design changes on a set of red-line markup drawings for the production of Record Drawings.
- 5.1.6. Annotate the red-line mark ups: "These drawings accurately record all significant Design changes known to me, having exercised due diligence in monitoring the construction of the work", followed by the MR's name and title.
- 5.1.7. Submit the red-line markup drawings to the MDL and POR.

## 6. Record Drawings

6.1. Shall be in accordance with:
- 6.1.1. Clause 3.1 of this Technical Circular.
- 6.1.2. Section 3.2.3.8.9 - Declaration from Version 4.0 of the EGBC Guide to the Standard for the Authentication of Documents. The example declaration wording provided by EGBC shall be used.
- 6.1.3. Ministry Technical Circular T-07/09 – Record Drawings.

## Contacts:


Kevin Baskin, P.Eng.
Advisory Bridge Engineer
Kevin.Baskin@gov.bc.ca
778-974-5295

Mark DiDonato, P.Eng.
Highway Design Engineer
Mark.DiDonato@gov.bc.ca
778-362-4498

Michael George, P.Eng.
Senior Geotechnical Engineer
Michael.George@gov.bc.ca
778-362-4509

Faisal Siddiqui, P.Eng.
Construction Engineer
Faisal.Siddiqui@gov.bc.ca
250-320-8233




Ian Pilkington, P.Eng.
Chief Engineer

## Useful Links & Reference Documents

Reference Documents:

- EGBC Quality Management Guides
- EGBC Guide to the Standard for the Authentication of Documents Version 4.0 (June 15, 2023)
- EGBC Guide to the Standard for Direct Supervision Version 3.0 (June 15, 2023)
- EGBC Guide to the Standard for Documented Field Review during Implementation or Construction Version 3.0 (June 15, 2023)
- Guide to the Letters of Assurance in the BC Building Code 2018 and Vancouver Building By-Law 2019

Links to Assurance Forms (H-Forms):

- H1251 – Commitment for and Assurance of Coordination by Coordinating Professional Engineer:
- http://gww.th.gov.bc.ca/forms/getForm.aspx?formId=1108

- H1252 – Assurance of Professional Design
- http://gww.th.gov.bc.ca/forms/getForm.aspx?formId=1107

- H1253 – Assurance of Professional Design Post Construction
- http://gww.th.gov.bc.ca/forms/getForm.aspx?formId=1106

- H1254 – Commitment for and Assurance of Field Reviews
- http://gww.th.gov.bc.ca/forms/getForm.aspx?formId=1105

## APPENDIX 1: Field Review Guidelines:

The frequency of Field Reviews will be established on a project-by-project basis based on the size and complexity of the project.

The number and frequency of reviews must be determined by the applicable FR, with estimates provided and agreed to in writing by the Ministry. The review is intended to ascertain whether the implementation or construction of work substantially complies in all material respects with professional engineering or professional geoscience concepts, or the intent reflected in the Design prepared for such work. In general, Field Reviews will include the following:

1. For all disciplines:
    a. Preconstruction meetings including: quality management coordination meetings and specific pre-work meetings within the scope of the FR's assignment (e.g. if retained as the FR for municipal works, a meeting held with the municipal works crew would be more appropriate than the pre-construction meeting).
    b. Approximately once per month for general work progress.
    c. Hold and Witness Points as defined in the construction contract and as applicable to the FR scope.
    d. Substantial Completion.
    e. Total Completion.

2. For Structural:
    a. Within the first 10% of the work: at the site (and fabrication facilities where applicable) for each class of structural work items.
    b. Pre-pour for major reinforced concrete elements.
    c. Once for each of the major structural element types.
    d. Elements considered critical to the Design.

3. For Hydrotechnical:
    a. At completion of toe/terminal end key excavations.
    b. Preparation of back slope/surfaces.
    c. Installation of filters.
    d. Complex field fit installation details.
    e. For review of scour protection, riprap and granular filter material.

4. For Civil:
    a. Within the first 10% of the work: on a sample of a class of work items (e.g. Utilities, culverts and drainage components, water mains, storm and sanitary sewers etc.).
    b. Review signing and pavement markings.
    c. Geometric Design elements (e.g. Cross sections, horizontal alignments and vertical profile etc.).

5. For Electrical:
    a. Prior to commissioning/energizing electrical systems.

6. For Geotechnical:
    a. Critical excavations, complex embankments, pile installation, shallow foundations, ground anchors, and high or under-pinned retaining walls.
    b. Foundation conditions, prior to commencement of embankment construction, prior to placing rebar in foundation elements, and prior to construction of retaining wall footings.
    c. For embankments, in addition to the foundation inspection, occasionally during embankment construction, with greater frequency for soft soils and preloads.
    d. For retaining walls, in addition to the foundation inspection, occasionally during wall erection, with greater frequency for underpinned walls.
    e. Rock slope stability assessments as needed, for scaling, bolting and other recommendations.

The Field Review frequency may be revised at the discretion of the FR and as agreed to in writing by the Ministry if significant deficiencies or changes are encountered during construction. The above frequencies are for a typical, MR administered, highway construction project and are in addition to the POR design services during construction. Any potential overlap between FR and POR services, during construction, should be addressed through the combination of both with limited duplication.

## APPENDIX 2: For Design-Build, Alternate Delivery and Third Party Delivered Projects:

Any works within the Ministry right-of-way that fall within the scope of "practice of professional engineering" or "practice of professional geoscience" under the Professional Governance Act and the Engineers and Geoscientists Regulation will be performed by a Professional, and shall comply with these guidelines, amended as the Ministry may so direct for the specific circumstances.

"**Lead"** when used below means:

a) the design-build Contractor retained by the Ministry; or
b) the municipality, developer, or other 3rd party responsible for delivery of the Project.

The Lead will be responsible to ensure that the guidelines below are followed:

1. Land development projects subject to Ministry review require identification of a CPE before any engineering work is carried out. If the Ministry agrees to allow engineering works to commence before a CPE is identified, the proponent shall identify a CPE before the site Design is completed and before any construction commences.
2. The Ministry will have a full right of reliance on any Assurance Forms issued by the Lead, CPE, POR, and FR.
3. At the discretion of each individual POR, the FR for that POR's work will be either:
    - The POR, or
    - Retained by the POR, or
    - A member of the Lead's team (including any engineers or contractors retained by them).

   The FR and inspection staff shall comply with the Design-related instructions of the POR.
4. The role of CPE and POR for design-build or third-party agreements shall be documented in quality management plans.
5. For design-build projects where the Ministry is a party to the contract, any deficiencies noted by the FR will be reported to the Ministry, as well as any parties named in accordance with the Lead's quality management plan.
6. The role of the MR regarding quality assurance (QA) of the construction work is different on "design-build" and "Third Party Delivered Projects" compared to the MR role on traditional ministry "design-bid-build" projects. The traditional QA duties of the MR will be undertaken by a member of the Lead's team on "design-build" and "Third Party" delivered projects.
7. Changes to the Design will be dealt with by the design-builder POR in accordance with the design-build contract or in accordance with the Lead's quality management requirements.
8. Field changes: The POR shall be responsible for instituting a quality management system that will ensure that any significant changes made during construction are identified and accepted by the POR and are reflected in the Record Drawings.
9. The POR sign-off on the Record Drawings shall be in accordance with Section 6 of this document.
10. The Ministry will be granted full access to all quality management records, from any party, related to the Design and construction of the project and may decline to accept the product if the records are insufficient, inaccurate, or misleading or if they demonstrate a product that does not comply with Ministry standards.
11. In some circumstances, larger design-build or P3 projects may have their own certificates. The form and content of such certificates must meet the intent of this Technical Circular.