



A P E G S

*Association of Professional Engineers
& Geoscientists of Saskatchewan*

COMPETENCY ASSESSMENT GUIDE

FOR APPLICANTS, VALIDATORS AND ASSESSORS

Version 18.1 – March 26, 2021

Adapted from Engineers & Geoscientists BC's *Competency Assessment Guide*

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1 INTRODUCTION

This Guide is intended to assist users of the **Competency Assessment System** of the Association of Professional Engineers & Geoscientists of Saskatchewan (APEGS) for the evaluation of engineering or geoscience work experience. It aims to assist professional engineering (P.Eng.) or professional geoscience (P.Geo.) applicants in completing their competency submission, as well as to guide Validators and Assessors in verifying, validating and evaluating these submissions. The contents are intended to enhance your understanding of engineering or geoscience competencies and how they should be met and presented in a **Competency Self-Assessment**.

The P.Eng. and P.Geo. designations are a professional licence, allowing you to practice engineering or geoscience on projects or properties located in the province or territory where the designation was granted. Only engineers or geoscientists licensed with APEGS, or those practising under the direct supervision of a P.Eng., P.Geo., Engineering Licensee or Geoscience Licensee licensed with APEGS, have a legal right to practice engineering or geoscience on projects or properties located in Saskatchewan. The competency assessment system is intended to preserve the quality, responsibility, professionalism, and reputation of the P.Eng., P.Geo, Engineering Licensee and Geoscience Licensee designations. The **Competency Framework**, Indicators / Workplace Examples, and **Competency Self-Assessment** form were designed in order to ensure that professional registration requirements uphold and protect the public interest while maintaining an equitable, transparent, consistent and efficient registration process. The **Competency Framework** comprises the required proficiencies to enter the engineering or geoscience profession and provides clear guidance on the path to registration for applicants, Validators, Assessors, and employers alike.

Competency assessment is conducted in order to determine whether or not applicants have progressed to a professional level of competency in their field during their engineering or geoscience work experience. To achieve registration as a professional engineer (P.Eng.) or professional geoscientist (P.Geo.), applicants must also meet a set of requirements including acceptable academic qualifications. The full list of requirements can be found on the APEGS website under Apply, Professional Member: <http://www.apegs.ca/Portal/Pages/Professional-Member>.

1.1 APPLICABILITY, COMING INTO FORCE AND TRANSITION

This Guide applies to professional engineer applicants (engineers-in-training), professional geoscientist applicants (geoscientists-in-training) as well as international graduates who have applied for engineer-in-training or geoscientist-in-training and have been given the opportunity to submit work experience in lieu of writing confirmatory exams (see section 8 – Academic Review Cases for details).

For Engineering:

Competency-based assessment (CBA) came into effect on January 1, 2019 for engineering applicants in Saskatchewan. Transition from the former, paper-based experience reporting system to CBA is as follows:

- a. CBA shall be used by:

1. engineers-in-training registered with APEGS on or after January 1, 2019; and
 2. engineers-in-training registered before January 1, 2019 who have not submitted any experience reports in the former paper-based system by January 1, 2019.
- b. All engineers-in-training registered before January 1, 2019 who have submitted one or more experience reports in the former paper-based system by January 1, 2019 have the choice to continue in the former system or switch to CBA. These engineers-in-training are encouraged and invited to switch to CBA.

For Geoscience:

Competency-based assessment (CBA) comes into effect on January 1, 2021 for geoscience applicants in Saskatchewan. Transition from the former, paper-based experience reporting system to CBA is as follows:

- a. CBA shall be used by:
 1. geoscientists-in-training registered with APEGS on or after January 1, 2021; and
 2. geoscientists-in-training registered before January 1, 2021 who have not submitted any experience reports in the former paper-based system by January 1, 2021.
- b. All geoscientists-in-training registered before January 1, 2021 who have submitted one or more experience reports in the former paper-based system by January 1, 2021 have the choice to continue in the former system or switch to CBA. These geoscientists-in-training are encouraged and invited to switch to CBA.

See also section 9 – Members-in-Training Transferring from Other Associations.

2 COMPETENCY ASSESSMENT – OVERVIEW

2.1 ELEMENTS AND DEFINITIONS

Competency

Competency can be defined as the ability to perform the tasks and roles of an occupational category to standards expected and recognized by employers and the community at large. The **Competency Framework** outlines the competencies related to work experience in an engineering or geoscience environment that are essential for professional engineers or professional geoscientists in all disciplines to ensure effective practice and public safety. Competency is a measure of ability, and thus examples drawn from actual work experience are required to demonstrate it.

In assessing the competence of an applicant for professional engineering or professional geoscience licensure, it must be clear that they have not only performed well in the circumstances they have encountered to date, but they have demonstrated the capacity to handle situations likely to be encountered in the future. Thus, a competency-based assessment system requires applicants to demonstrate the ability to apply their engineering or geoscience knowledge reliably and safely across different circumstances; to recognize their professional limitations; and to be prepared when necessary

to either a) extend and develop their expertise or; b) call for assistance from other sources.

Providing detailed examples as part of a **Competency Self-Assessment** allows APEG's Assessors to have a clear picture of an applicant's knowledge and experience in all areas essential to safe and effective engineering or geoscience practice.

Competency Categories - Engineering

The **Competency Framework** for engineering consists of seven **Competency Categories**, which are groupings of competencies or skills:

1. Technical competence
2. Communication
3. Project and financial management
4. Team effectiveness
5. Professional accountability
6. Social, economic, environmental and sustainability
7. Personal continuing professional development (CPD)

The seven categories represent the essential areas in which professional engineers of all disciplines must demonstrate competence in order to ensure effective practice and public safety. Each **Competency Category** contains a list of the **Competencies** required in that area. Applicants must meet the required average level of competence in each **Competency Category** in order to meet the competency requirements.

Competency Categories - Geoscience

The **Competency Framework** for geoscience consists of four **Competency Categories**, which are groupings of competencies or skills:

1. Professional Competencies - Professionalism
2. Competencies in Scientific Method
3. Competencies in Area of Geoscience Practice
4. Complementary Competencies - Communication and Management

The four categories represent the essential areas in which professional geoscientists of all disciplines must demonstrate competence in order to ensure effective practice and public safety. Each **Competency Category** contains a list of the **Competencies** required in that area. Applicants must meet the required average level of competence in each **Competency Category** in order to meet the competency requirements.

Competencies

Competencies are defined as an identified skillset or knowledge base which the applicant must have attained to achieve professional registration. They are behavioural-type descriptions of what an applicant must demonstrate they have done in practice to meet the required level of expertise in each **Competency Category**.

Level of Competence

Achievement of each category is measured through a **Competency Rating Scale** that outlines six different levels of competence (0 to 5). Each category has a required minimum overall average level of competence which is set at either level two (engineering only) or level three, and the average of an applicant's **Competency** ratings within each category must meet or exceed the required minimum level. Applicants must also achieve a minimum rating of level one (a training level) in each **Competency** (except for the Canadian environment competencies for engineering, refer to section 3.5.5.1 – Canadian Environment Competencies – Engineering). See sections 2.2 and 2.4 of this Guide for a more detailed description of the **Competency Rating Scales** and tables outlining the levels for engineering (Table 1) and geoscience (Table 2).

Indicators / Workplace Examples

The term 'Indicators' is used in the engineering online system and 'Workplace Examples' is used in the geoscience online system. Indicators / Workplace Examples are samples of activities, actions, skills or behaviours that an applicant could use to demonstrate the existence and achievement of a competency. The list of Indicators / Workplace Examples for each **Competency** is provided to help applicants understand what types of experience could be used to meet each requirement, or what specific knowledge base, experience or skill they must develop before achieving professional registration. **Indicators / Workplace Examples are for guidance and are not absolute requirements.** They help you interpret what you need to describe for your area of practice.

Indicators - Engineering

There is one generic indicator list that covers all the **Competency Categories** for all engineering disciplines. There are also discipline-specific indicator lists for the Technical Competence category (Category 1) for several engineering disciplines, including:

- Structural.
- Civil: Municipal/Infrastructure.
- Electrical: Power and Industrial.
- Materials, Metallurgical and Mineral Processing.
- Building Enclosure.
- Software.

Even if your work experience was in one of the above areas, it is your choice as to whether or not you refer to the discipline-specific indicators when completing your entries or if you use the generic indicator list. The indicator lists are found in Appendices E-2 to E-8.

Workplace Examples - Geoscience

There is one generic Workplace Example list that covers all the **Competency Categories** for all geoscience disciplines.

Competency Assessment System

The system operates through an efficient, easy-to-use online system. Through the **Competency Assessment System**, engineers-in-training, geoscientists-in-training and member-in-training applicants

(i.e., academic review cases) can save their work experience information, monitor their progress towards meeting the competency requirements, and submit this information for online validation and assessment.

2.2 COMPETENCY RATING SCALE

The **Competency Rating Scale** is used to determine whether an applicant has achieved the required level of competence to gain registration as a professional engineer or professional geoscientist. An applicant must attain the minimum defined average level of competence in all **Competency Categories**, with no rating lower than level one for any **Competencies** (except for the Canadian environment competencies for engineering, refer to section 3.5.5.1 – Canadian Environment Competencies – Engineering).

See Table 1 (engineering) and Table 2 (geoscience) for a brief outline of the **Competency Rating Scales**. The rating scale descriptions in the tables below are abridged and are for demonstration purposes only. The wording varies in the online CBA system depending on the competency. Refer to the actual, detailed table available within the online system when selecting your ratings.

TABLE 1 – COMPETENCY RATING SCALE – ENGINEERING - Abridged (2 pages)

Competence Level	Short Description: Category 1	Short Description: Categories 2-6	Short Description: Category 7	Direct Supervision Required	Responsibility & Risk	Complexity of applicant's work	Supervision & Development of Others* *Category 1 only
0	Little or no exposure to the competency	Little or no exposure to the competency	No CPD completed and/or planned; no gap analysis	N/A	N/A	N/A	N/A
1	Training Level: A general appreciation and awareness of the competency is required	Training Level: A general appreciation and awareness of the competency is required	Minimal amount of CPD completed and/or planned; CPD completed may not address professional competence; an incomplete gap analysis	Significant	Minimal	Minimal	None
2	Requires knowledge and understanding of objectives; uses standard engineering methods and techniques in solving problems	At a level of limited experience; carries out activities of limited scope and complexity; requires knowledge and understanding of objectives	A marginal amount of CPD completed and planned; a marginal/insufficient gap analysis	Considerable	Some	Some	Limited
3	Carries out assignments of moderate scope and complexity; is typically seen to be prepared to assume professional engineering responsibilities	Approaching a professional level; carries out activities of moderate complexity	Adequate amount of CPD completed and/or planned; an adequate gap analysis	Some	Considerable	Moderate	Some

Competence Level	Short Description: Category 1	Short Description: Categories 2-6	Short Description: Category 7	Direct Supervision Required	Responsibility & Risk	Complexity of applicant's work	Supervision & Development of Others* *Category 1 only
4	Carries out responsible and varied assignments requiring general familiarity with a broad field of engineering and knowledge	Working at a professional level; carries out responsible and varied activities	A good amount of CPD completed and/or planned; a strong gap analysis	Minimal	Significant	Considerable	Some
5	Uses mature engineering knowledge; independent accomplishment, and coordination of difficult and responsible assignments	At a mature professional level; independent coordination of difficult and responsible activities	Provides and demonstrates leadership in Continuing Professional Development (CPD) activities; a superior gap analysis	Autonomous	Total	Significant	Some

TABLE 2 – COMPETENCY RATING SCALE – GEOSCIENCE

Competence Level	The applicant’s provided example demonstrates:
0	No exposure to the competency
1	A general awareness of the competency and its significance in practice
2	Application of the competency, or components of the competency, with considerable supervision, in situations of low complexity and low risk
3 (entry to practice)	Application of all components of the competency with limited supervision, in situations of moderate complexity and moderate risk. This may include situations in which the applicant supervises others in application of aspects of the competency, while maintaining accountability for their work
4	Application of the competency with minimal supervision, in situations of considerable complexity and moderate risk. This may include situations in which the applicant supervises others in application of aspects of the competency, while maintaining accountability for their work
5	Application of the competency without supervision, in situations of significant complexity and high risk. This may include situations in which the applicant supervises others in application of aspects of the competency, while maintaining accountability for their work

2.3 COMPETENCY CATEGORIES

To help cross-reference the **Competency Categories** with the **Competence Levels** shown in the next section, the **Competency Categories** are repeated here:

Engineering:

1. Technical competence
2. Communication
3. Project and financial management
4. Team effectiveness
5. Professional accountability
6. Social, economic, environmental and sustainability
7. Personal continuing professional development (CPD)

Geoscience:

1. Professional Competencies - Professionalism
2. Competencies in Scientific Method
3. Competencies in Area of Geoscience Practice
4. Complementary Competencies - Communication and Management

2.4 COMPETENCE LEVELS

2.4.1 Competence Levels - Engineering

Following is an overview of each **Competence Level** for engineering, divided by **Competency Category**.

Competence Level 0

An engineer at **Competence Level** zero:

Categories 1-6:

- Has little or no exposure to the competency.

Category 7:

- Has completed no Continuing Professional Development (CPD).
- Has not completed a gap analysis to determine areas of weakness.
- Has demonstrated no plan for future professional development.

Competence Level 1

An engineer at **Competence Level** one:

Category 1:

- Receives training in the various phases of office, plant, field, or laboratory engineering as on-the-job assignments.
- Assigned tasks include: preparation of simple plans, designs, plots, calculations, costs, and bills of material in accordance with established codes, standards, drawings, or other specifications.

- May carry out routine technical surveys or inspections and prepare reports.
- Has no supervisory role.

Categories 2-6:

- Receives training in on-the-job assignments.
- Is at an early/beginner level.
- Carries out activities of low complexity.
- Has no supervisory role.
- Is at a basic level in this area; competency needs substantial development.

Category 7:

- Has completed a minimal amount of CPD activities.
- Gap analysis is incomplete; incomplete assessment of areas of weakness.
- Has developed an inadequate or no professional development plan; many gaps in knowledge are not sufficiently addressed.

Competence Level 2

An engineer at **Competence Level** two:

Category 1:

- Receives assignments of limited scope and complexity, usually minor phases of broader assignments.
- Uses standard engineering methods and techniques in solving problems.
- Assists more senior engineers in carrying out technical tasks requiring accuracy in calculations, completeness of data, and adherence to prescribed testing, analysis, design or combination of methods.
- May assign and check work of one to five technicians or others.
- Is normally regarded as a continuation of an engineer's training and development.

Categories 2-6:

- Carries out activities of limited scope and complexity, usually minor phases of broader assignments.
- Usually relies on predetermined standards and techniques in solving problems.
- Assists more senior engineers in carrying out tasks.
- Is normally regarded as a continuation of an engineer's training and development.
- Has marginal skills in this competency; some training is required to bring skills up to a professional level.

Category 7:

- Has completed some professional development activities on a sporadic basis.
- Has a marginal gap analysis; insufficient assessment of areas of weakness.
- Has developed a marginal professional development plan; not all key gaps in knowledge are addressed.

Competence Level 3

An engineer at **Competence Level** three:

Category 1:

- Receives assignments of moderate scope and complexity, including stand-alone phases of major projects.
- Usually solves problems by using combinations of standard procedures, modifications of standard procedures, or methods developed in previous assignments.
- May assign and check work of one to five technicians and technologists.
- Is typically seen to be ready to assume professional engineering responsibilities.

Categories 2-6:

- Carries out activities of moderate scope and complexity.
- Provides significant assistance to more senior engineers in carrying out tasks.
- Usually solves problems by using combinations of standard procedures, modifications of standard procedures, or methods developed in previous assignments.
- Possesses adequate skills in this competency.
- Is typically seen to be ready to assume professional engineering responsibilities.

Category 7:

- Has completed a sufficient amount of CPD activities.
- Has an adequate gap analysis; areas of weakness are adequately assessed.
- Has developed an adequate professional development plan; gaps in knowledge are addressed.

Competence Level 4

An engineer at **Competence Level** four:

Category 1:

- Carries out responsible and varied assignments requiring general familiarity with a broad field of engineering and knowledge of associated effects of the work upon other fields.
- Solves problems by using a combination of standard procedures and devising new approaches.
- Deals with assigned problems by devising new approaches, applying existing criteria in new ways, and drawing conclusions from comparative situations.
- Participates in planning to achieve prescribed objectives.
- May give technical guidance to one or two junior engineers or technologists, and technicians assigned to work on a common project.
- Is typically seen to be working at a fully qualified professional engineering level.

Categories 2-6:

- Carries out responsible and varied activities requiring general familiarity with the area of competency.

- Deals with assigned problems by devising new approaches, applying existing criteria in new ways, and drawing conclusions from comparative situations.
- Participates in planning to achieve prescribed objectives.
- May provide guidance to one or two junior engineers or technologists, and technicians assigned to work on a common project.
- Possesses strong skills in this competency; above average ability is apparent.
- Is typically seen to be working at a fully qualified professional engineering level.

Category 7:

- Has completed a good amount of CPD activities.
- Has a strong gap analysis; areas of weakness are correctly assessed.
- Has developed a strong professional development plan; gaps in knowledge are well addressed.

Competence Level 5

An engineer at **Competence Level** five:

Category 1:

- Applies mature engineering knowledge in planning and conducting projects having scope for independent accomplishment, and coordination of difficult and responsible assignments.
- Deals with assigned problems in a mature, creative and experienced manner by modifying established guides, devising new approaches, applying existing criteria in new ways, and drawing conclusions from comparative situations.
- Participates in short and long-range planning.
- Makes independent decisions for devising practical and economical solutions to problems.
- Assigns and outlines work; advises on and outlines more difficult problems and methods of approach.

Categories 2-6:

- Carries out activities of advanced scope and complexity.
- Independently coordinates difficult and responsible assignments and activities.
- Deals with problems or issues in a mature, creative and experienced manner by modifying established guides, devising new approaches, applying existing criteria in new ways, and/or drawing conclusions from comparative situations.
- Participates in short and long-range planning.
- Makes independent decisions for devising practical and economical solutions to problems or issues.
- Possesses superior skills in this competency; provides mentorship or supervision for others.

Category 7:

- Provides and demonstrates leadership in CPD activities.
- Has excellent gap analysis; areas of weakness are very well assessed.
- Has developed a superior professional development plan to address all gaps in knowledge and maintain currency in field of practice.

- Develops professional development plans with others and may instruct courses as appropriate.

2.4.2 Competence Levels - Geoscience

For each work experience competency, professional geoscientist applicants document work experience that they believe demonstrates a level of competence relative to the task described.

The perceived level of competence for each competency is rated on a scale of 0 through 5, where 3 represents the level expected for entry-to-practice¹. Ratings will be based upon the level of competence definitions shown in Table 2 – Competency Rating Scale - Geoscience. Repeated and reliable performance is expected for ratings of level 3 or higher.

The Assessor's rating will be based upon the Assessor's review of the workplace experience that the applicant provides, and will take into account, but not be dependent upon, the ratings of the applicant and the validator.

Approach to Levels of Competence

Level of competence is a function of three variables:

- Level of complexity of the task expressed in the competency.
- Level of supervision provided in the applicant's performance of the task.
- Level of risk based upon the outcome of the task expressed.

As the level of competence increases, the level of supervision decreases and the level of complexity and risk increase. The level of risk is determined by how significant the decisions are likely to be based on the work undertaken. For example, is there likely to be significant financial risk to public investors based on the result of a resource estimate.

2.5 ROLES & RESPONSIBILITIES

The following is an overview of the roles and responsibilities of each participant in the competency assessment system.

APPLICANT

- Provides work experience details through the **Competency Assessment System**, including work experience chronology and specific examples to address each **Competency**.
- Provides self-assessed **Competence Level** for each **Competency** according to the **Competency Rating Scale**.
- Provides contact information for a minimum of four individuals to act as Validators to verify and provide feedback on their competency assessment. For those Validators who were not given specific competencies to validate, they provide an overall assessment. For example, if the applicant provided examples from only one supervisor, that supervisor validates all the examples and the other three Validators provide general comments and answer the general reference questions included in the **Competency Assessment System**. Applicants cannot act as their own validator.

¹ The rating scale goes beyond that required for entry to practice, to include higher levels of achievement, with the intent to recognize that PGeo candidates may be experienced geoscientists who possess such higher-level abilities.

- Provides further information as requested.

VALIDATORS (supervisor/employer/colleague/client – ideally P.Eng. or P.Geo. supervisor)

- Confirms the work experience information of which they have personal knowledge.
- Provides **Competence Level** ratings for **Competencies** to which they are assigned by applicants (if applicable).
- Provides overall feedback on the applicant’s readiness for professional registration.
- Applicants cannot act as their own validator.
- See section 3.5.1 – Selecting Validators for further information.

ASSESSORS (Qualified APEGS volunteers in the applicant’s area of practice)

- Reviews applicant’s submission as well as Validators’ feedback.
- Provides ratings for each **Competency**.
- Makes a recommendation on applicant’s readiness for professional registration.

3 DOCUMENTATION AND INSTRUCTIONS

3.1 SUBMISSION COMPONENTS

There are two main components that applicants must complete as part of their competency assessment, which are both submitted through the **Competency Assessment System**:

1. A brief, chronological **Employment History**. This provides a short form overview of an applicant’s experience.
2. A **Competency Self-Assessment** using examples drawn from work experience to demonstrate achievement of each **Competency**.

Note that competency submissions are not* assessed until you are registered with APEGS as an engineer-in-training or geoscientist-in-training (*with one exception – Academic Review cases where the applicant is given the opportunity to submit work experience to waive confirmatory exams. You will receive written notification from APEGS if this applies to you. For details, see Section 8 – Academic Review Cases).

3.2 BEFORE YOU APPLY – INITIAL STEPS

- Ensure that your résumé/curriculum vitae (CV) is up to date to include key job roles, projects and achievements over the period of work experience you are claiming (a minimum of four years). This saves you time in completing the Employment History and selecting projects to use as examples in the **Competency Self-Assessment**. Note that a project does not need to be completed in order to use it as a competency example.
- Ensure you maintain a record of all of your CPD goals and activities.

- Familiarize yourself with the **Competency Framework** and its Indicators / Workplace Examples (including any discipline specific indicators available for your area of practice for engineering). They are included in the **Competency Self-Assessment** section of the online system for reference and are also in the appendices of this Guide.
- For key learning activities, take the time to reflect briefly on the key learning that you gained including how it may have impacted your practice and contributed to demonstrating competence within any of the **Competency Categories**.
- There is an optional tutorial in the online system for engineering applicants in the drop-down menu after you have logged in. A tutorial for geoscientists is coming in the future.

3.3 EMPLOYMENT HISTORY

Compiling an Employment History

All applicants must complete an **Employment History** summary through the **Competency Assessment System**. The Employment History section creates a chronological, short-form overview of an applicant's experience, including brief additional detail regarding responsibilities in each position. The summary can be edited at any time before an applicant submits their final **Competency Self-Assessment**.

Remember to:

- Briefly explain any gaps or overlaps in time periods.
- Demonstrate evidence of progression of experience and responsibility throughout your career.

Format and Information

The format of entries in the Employment History section is as follows:

Experience Type *	Work Experience
Employer *	
City *	
Province/State *	Select State/Province
Country *	Select Country
Start Date *	Select month Select year
End Date	Select month Select year
Job Title *	
Primary Area of Practice *	Select Primary Area of Practice
Supervisor *	
Overview of Major Responsibilities and Projects *	☰ ☰

For each item, you select “add employment history” and enter the relevant information. You are asked to classify each item as “work experience”, “other/non-engineering”, “other/non-geoscience” or “thesis.” Note that only a thesis-based Master’s (M.Sc. in some countries) is eligible to count toward the four years of experience required, not a course-based Master’s (M.Eng. in some countries).

In the “Overview of Major Responsibilities and Projects” section, provide a brief outline of the major projects on which you worked in each position, including a description of your role and the project scope. Point form is permitted.

Four years* of experience requirement

*Academic Review Cases require five years of experience. See section 8 – Academic Review Cases of this Guide, if this applies to you.

It is through the Employment History screen that we determine whether or not you have the four years of experience required for professional registration.

3.4 TYPES OF ELIGIBLE EXPERIENCE

Eligible experience is counted as follows:

Post-bachelor’s experience – Acceptable full-time engineering or geoscience experience is counted based on the number of months of experience. If experience was less than full-time then you must indicate the percentage in the Overview box. You do not need to subtract normal vacation and statutory holidays. However lay-offs and leaves of absence are not counted toward the four years.

The time counted cannot exceed calendar time so if you worked more than 40 hours per week you cannot count that as additional time worked.

Pre-graduation experience – One year maximum can be counted. Experience has to be from after half of the bachelor level university program of study was completed and supervised by (or close professional oversight by) a professional engineer, professional geoscientist, engineering licensee (if the experience was within their scope of practice) or geoscience licensee (if the experience was within their scope of practice) registered anywhere in Canada or the USA. See also “technologist experience” below.

Close professional oversight - Contact the APEGS office to discuss situations where your direct supervisor was not a professional engineer, professional geoscientist or equivalent but you worked closely with a professional engineer, professional geoscientist, engineering licensee or geoscience licensee, as it might be eligible to count toward the four years required. If you use pre-grad experience in one of your competency examples, it had to have close professional oversight in order to be assessed (i.e., the Validator needs to be a professional engineer, professional geoscientist or equivalent). The professional who provided close professional oversight can be used as the Validator upon approval of APEGS.

Completed thesis-based Master’s degree in engineering or geoscience (M.Sc. in some countries) – One year maximum can be counted. Attach the one-page thesis abstract and list of publications (if applicable) in the online system. A maximum of three years of experience is counted for international experience and graduate studies combined; i.e. Canadian graduate studies do not count as Canadian experience for the purposes of the Canadian Environment Competencies (engineering) or the equivalent-to-Canadian experience (geoscience). A course-based Master’s (M.Eng. in some countries) is not eligible to be counted for experience.

Completed PhD in engineering or geoscience – Two years maximum can be counted if the PhD program was entered directly after a bachelor program. Only one year can be counted when a Master’s was completed; i.e. the maximum allowable experience counted for all graduate studies is two years. Attach the one-page thesis abstract and list of publications in the online system. Note - a maximum of three years of experience is counted for international experience and graduate studies combined; i.e. Canadian graduate studies do not count as Canadian experience for the purposes of the Canadian Environment Competencies (engineering) or the equivalent-to-Canadian experience (geoscience).

Engineering or Geoscience work while doing graduates studies – Any engineering, geoscience or Teaching Assistant / Research Assistant work not related to your graduate degree work is eligible to be counted. Engineering or geoscience experience gained with an employer outside the university setting is also eligible. The number of months experience counted cannot exceed the actual calendar time. This experience is entered as separate employment periods from your graduate degree even though the time periods might overlap.

International experience –International experience needs to be validated in the same way as Canadian experience. Note that Canadian environment experience is also required, see section 3.5.5.

Teaching of engineering or geoscience – Examples from this type of experience are eligible for submission. You include the applicable content of what you taught in order to demonstrate the competency. Engineering courses taught must have engineering science and/or engineering design content as defined by the Canadian Engineering Accreditation Board in order to be eligible. For a particular competency example, include the name of the course you taught as well as details on the applicable part of the course that fulfills the competency and how that content is applied in a real-world situation (the outcome).

Technologist experience prior to completing bachelor degree - One year maximum can be counted in exceptional cases where an applicant has, at a minimum, a technologist level education prior to going back to university to obtain a bachelor level degree in engineering or geoscience. This experience needs to have been supervised by a professional engineer, professional geoscientist, engineering licensee (if the experience was within their scope of practice) or geoscience licensee (if the experience was within their scope of practice) in order to be considered. The 12-month maximum is reduced by the number of months of pre-grad experience counted for a maximum total of 12 months for any experience gained prior to completing the university level education in engineering or geoscience that was the basis of registration for engineer-in-training or geoscientist-in-training.

Recent experience – Applicants must have some recent work experience at the time of application for professional registration. Recent is defined as having been obtained in the last two years prior to application. For example, the end date on your most recent experience listed in the Employment History table must be no more than two years old at the time of professional member application.

3.5 COMPETENCY SELF-ASSESSMENT

3.5.1 Selecting Validators

Through the [Competency Assessment System](#), applicants provide the names and email addresses of Validators. Validators verify and provide feedback on the engineering or geoscience experience.

Considerations when selecting Validators:

- A **minimum of four* Validators** are required.
*exception – see section 8 – Academic Review Cases require a minimum of two Validators.
- The Validator for each example is the person who supervised you for the work you have chosen to use for that competency example, whether or not they were a professional engineer, professional geoscientist (or equivalent), keeping in mind the minimum number of professional engineer / professional geoscientist Validators required as outlined below. If there are any issues with using the director supervisor as Validator, see further instructions in this section.
- Validators are typically the P.Eng. or P.Geo. supervisors but may also be colleagues, clients or consultants with first-hand knowledge of your work experience. The supervisor is the person whom you report to or who signs off on your work.

- A minimum of two* must be professional engineers, professional geoscientists (or equivalent).
*exception – see section 8 – Academic Review Cases.

A professional engineer can validate geoscience experience and a professional geoscientist can validate engineering experience if the experience falls within the field of the practice of the professional (there is some overlap in the practice of professional engineering and the practice of professional geoscience).

- Combined, the Validators' first-hand knowledge should cover as much of your experience as possible but a minimum of four* years must be covered.
*exception - five years for Academic Review Cases, see section 8.
- Each competency requires one Validator. A Validator can verify multiple competencies.
- There may also be some Validators who are not given specific competencies to verify but provide input in the overall feedback section only. The overall feedback section includes questions on the applicant's readiness for licensure.
- Validators nominated by the applicant to verify specific competency examples must have direct personal knowledge of the engineering or geoscience work performed. This person is the supervisor except in exceptional circumstances where prior approval is obtained from APEGS. At least one Validator must be a direct supervisor and share the same discipline or scope of practice as the applicant.
- No additional reference forms are required to be submitted for the professional member application for users of the **Competency Assessment System** unless the applicant provides additional names on their professional member application that were not included in the **Competency Assessment System**. All supervisor feedback is provided through the system's online validation process.
- Validators professional engineer, professional geoscientist (or equivalent) – this means a P.Eng., P.Geo., Engineering Licensee or Geoscience Licensee (or comparable registration category) registered in another Canadian Association equivalent to APEGS. Also, professionals registered with organizations where APEGS has a professional level Mutual Recognition Agreement (MRA) are considered Canadian-equivalent Validators. The current list of MRAs is on the APEGS website under Apply, 'International Mobility – engineers' and 'International Mobility – geoscientists'.
- Applicants cannot act as their own validator.
- Applicants who impersonate a validator will go to the Registrar's Advisory Committee and/or the Investigation Committee for character review or misconduct investigation as applicable. The application of anyone found to be in contravention of the Good Character Guideline will be denied and members found in contravention of the Code of Ethics are subject to discipline.

As you complete your **Competency Self-Assessment**, you assign each example to a Validator with first-hand knowledge of the work described and following the considerations above for selecting Validators. This Validator is asked to provide a **Competence Level** rating for the example and has the option of

providing a comment. All Validators are also asked to provide overall feedback on your experience and readiness for professional registration. **There is no requirement to assign all of your Validators to a specific Competency; Validators not assigned to any Competencies are asked to provide overall feedback.** For example, co-op work term supervisors who do not need to validate any examples may be included as Validators to provide overall feedback, which allows them to comment on and confirm your experience during the co-op period.

Note that a project does not need to be complete in order to use it as a competency example.

3.5.2 Issues contacting Validators / Validator causing delays

The applicant must do their utmost to contact their supervisor(s) to act as Validators. Contact APEGS's staff at experience-review@apegs.ca for assistance if there are issues with making contact or if you are experiencing a delay in the Validator completing their part. A person other than the direct supervisor may be used to validate examples only upon approval by APEGS. Remember that the Validators who are not verifying specific competency examples but are only completing the overall feedback section need not have been one of your supervisors.

3.5.3 Competency Examples

The **Competency Self-Assessment** section is divided into either seven (engineering) or four (geoscience) categories of the **Competency Framework**. Under each category heading – such as Technical Competence – the required **Competencies** are listed. One example must be provided for each **Competency** prior to final submission. Each **Competency** must be achieved at a minimum level of one on the **Competency Rating Scale**, while **achieving the required average level for each category as a whole** (except for the Canadian environment competencies for engineering, refer to section 3.5.5.1 – Canadian Environment Competencies – Engineering). For engineering, the minimum required average rating for each category is either 2 or 3 depending on the category. For geoscience, the minimum required average rating is 3 for all categories.

When filling in the **Competency Self-Assessment**, use both the competencies and their Indicators / Workplace Examples as guidelines to identify suitable and relevant projects and activities from your engineering or geoscience experience that best **demonstrate your achievement of each Competency**. **Be specific about your individual actions and contributions**. For each example, identify a self-assessed **Competence Level** that you believe you have demonstrated. The descriptions of each level of competence in sections 2.2 and 2.4 of this Guide help you determine which level on the **Competency Rating Scale** you should cite for each **Competency**. The descriptions are also provided in the applicable screens in the online system.

Examples are valid if:

- They are related to unique problems without obvious pre-determined solutions; and
- You had full or partial responsibility for delivering the outcome; and
- They typically took at least one month* to accomplish (*more on this in section 5.1 of this

Use “I” statements as opposed to “we”

Guide. The value of one month is for guidance and is not an absolute requirement).

- Note that a project does not need to be complete in order to use it as a competency example.

A partial image of the window for entering an engineering **Competency** examples is included below as a sample. The geoscience window is equivalent in layout:

Key Competency 1.1 Required Overall Level: 3

Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.

Indicators :

- Demonstrate knowledge of materials, operations, project and design constraints, e.g. cost, design, material, labour, time, budget, production.
- Demonstrate understanding of and coordination with other engineering and professional disciplines.

Indicator Type: Generic

Employer*: Select an employer

Validator*: Select a validator

Position*

Start Date*: Select month, 2013

End Date: Select month, 2014

Situation* ?

Save as Draft Save as Complete Cancel

3.5.3.1 Selecting, Drafting and Saving Examples

Under each **Competency**, you are asked to describe the example of your recent engineering or geoscience activities that best demonstrates your achievement of the competency. The examples you select should reflect activities or projects in which you had responsibility. Note that a project does not need to be completed in order to use it as a competency example. Detail is encouraged; be specific in describing how you have met the **Competency**. When selecting examples, pay close attention to the Indicators / Workplace Examples provided in the system; they are intended to assist you in identifying typical evidence to submit. **Different aspects of the same project can be used to demonstrate several of the competencies.**

For each **Competency** for engineering applicants, you may view different types of indicators from the “indicator type” drop-down list; the generic indicators are recommended for most situations, but discipline specific indicators are also available in several areas of practice for Category 1.

You do not need to demonstrate all Indicators / Workplace Examples listed. They provide a helpful guide as to what Assessors are looking for. Indicators / Workplace Examples are **samples to guide you in determining the type of engineering or geoscience work that satisfies each Competency**. Use any example from your own work experience which will demonstrate satisfaction of the Competency; it is not necessary to use one of the Indicators / Workplace Examples provided, although you may if appropriate for your work experience.

Warning: You cannot edit the content of your competencies or your Validator assignments after you have selected the button to submit your assessment for validation. Do all the necessary checks to ensure accuracy, like you would do in your professional practice, prior to submitting.

3.5.4 Competency Example Components

Each example includes the following information:

- **Employer and Position:** Your employer and position at the time of the work described in the example.
- **Validator:** The professional engineer, professional geoscientist (or equivalent) that has first-hand knowledge of the work you are asking them to validate. This is ideally the person who supervised the work but may also be a colleague or client with prior approval of APEGS.
- **Start Date and End Date (Month/Year):** The time period covered by your specific example for this competency.
- **Situation:** A brief overview of a specific situation or problem. The same situation can be used to cover multiple **Competencies**.
- **Action:** The actions that you took in response to the situation, including engineering or geoscience judgments made or solutions found. This section is typically the longest portion of the example and should include details about the specific actions that you took that demonstrate completion of the **Competency**. **Be specific about your individual work and contributions – use of the word “I” is required in order to show what work you did specifically.** Point form is permitted.
- **Outcome:** The impact that your actions, solutions or judgments generated.
- **Canadian Example:** Indicate whether this experience was gained in a Canadian environment (Yes or No). See section 3.5.5 for details on Canadian Environment Experience.
- **Self-Assessed Competence Level:** The level on the **Competency Rating Scale** that you believe you have demonstrated in the example.

3.5.5 Canadian Environment Experience

Canadian environment or “equivalent-to-Canadian” experience normally means anything from within Canada or the United States but it does not include Canadian graduate studies. If you have international experience with a company that used Canadian or North American standards, customs and/or codes (and

had similar climate if important to the competency in your discipline of practice), it might be considered as equivalent-to-Canadian and count toward the Canadian experience requirement. This would include validated experience supervised by a professional member of a recognizable Canadian or international licensing body. The applicant would have to be working, at least, to international standards and it could include working for a multinational corporation or a Canadian or U.S. corporation abroad.

3.5.5.1 Canadian Environment Competencies – Engineering

Effective January 1, 2020, engineering applicants are required to demonstrate the following eight competencies in a Canadian or equivalent-to-Canadian work environment*: 1.1, 1.6, 1.9, 2.1, 2.2, 2.3, 5.1, 6.2. Each of these competencies must be passed with a rating of the applicable Category average. For example, competencies 1.1, 1.6 and 1.9 must have a rating of 3 in order to pass.

*except Academic Review cases – refer to section 8.

This requirement affects international graduates as well as Canadian graduates who have only experience from outside Canada or the USA.

Any competencies submitted to Validators for validation on or after January 1, 2020 are required to meet the Canadian environment competency requirement. This includes competencies that require re-submission and were submitted for validation on or after January 1, 2020.

Prior to January 1, 2020 applicants were required to have at least 12 months of Canadian or equivalent-to-Canadian experience. As of January 1, 2020, the time-based requirement of 12 months is removed for engineering applicants. However, any engineering applicant who submitted a competency assessment for validation before January 1, 2020 has the choice to be assessed using either the previous standard** for Canadian or equivalent-to-Canadian environment or the eight Canadian Environment Competencies.

**The previous standard for Canadian or equivalent-to-Canadian environment was as follows:

- the applicant may or may not have provided any specific competency examples in a Canadian or equivalent-to-Canadian environment but needed at least 12 months of experience shown in the Employment History table as Canadian or “equivalent-to-Canadian”
- at least two of the four Validators were professional engineers or equivalent (unchanged, including professional geoscientist); and
- the feedback from Validators was acceptable to the Registrar (unchanged).

3.5.5.2 Canadian Environment Experience – Geoscience applicants

Geoscience applicants are required to have at least one year of experience in a Canadian or equivalent-to-Canadian environment. This is shown and tallied via the Employment History table. The applicant may or may not have provided any specific competency examples in a Canadian or equivalent-to-Canadian environment and that is acceptable. At least two of the four Validators required must be professional geoscientist or equivalent (including professional engineer) and the feedback from those Validators needs to be acceptable to the Registrar.

Note that Canadian environment competencies for geoscience will likely be identified in the future, similar to what has been done for engineering.

3.5.5.3 How to request “equivalent-to-Canadian”

If the experience in any example was obtained outside of Canada or the United States and you have indicated that it is a Canadian example, then you must include that information within the competency description so it can be validated. Additional information may be uploaded to the “Supporting Documents” screen in the online system but that information will not be validated so carries less weight, unless the information you upload has been physically signed by the validator. The information should include a detailed description of why you think the experience should be considered equivalent-to-Canadian. Include **specific** references to the standards, customs, codes and/or climates that were a part of your experience that are the same as in Canada (or North America if your discipline of practice uses international standards).

If you are unsure if the international experience could count as equivalent-to-Canadian, call the APEGS office and speak to the experience review staff.

3.5.6 Tips on Writing Examples

Depending on the **Competency**, it is recommended to include the significance of the project (e.g. an indication of project size such as dollar value and duration), your role in the project and the key issues and outcomes. Make the technical or managerial complexity of the project clear. Be specific about your role (use “I” statements) and level of responsibility.

Applicants are encouraged to exercise judgement over the level of detail provided with different examples. Less detail may be needed for substantial, obviously complex projects or activities than for smaller scale projects where the complexities may not be immediately apparent to the Assessors or where the work is in a non-traditional engineering or geoscience environment. The objective is to supply sufficient information to enable straightforward verification of your evidence by Assessors, and not to leave Assessors with substantive questions or information gaps that require further investigation before they can verify that the required **Competence Level** is met.

Assessors cannot rely on ‘implied evidence’ – they can only use evidence which clearly shows you are able to do the work required by the **Competency Framework**. For this reason it is important to identify specific examples that best demonstrate your competence. For example, in your **Competency Self-Assessment** it is not acceptable to state: “I am a Project Manager and must be able to communicate clearly to perform my job”. You must give specific examples of your communication requirements (e.g. chairing client meetings, managing contractors, reporting to senior management, etc).

When completing your **Competency Self-Assessment**, **always write in the first-person. Use “I” statements as opposed to “we”** - even if you were working as part of a group. **It is important to identify your personal contribution and those things for which you took responsibility.**

Remember:

- Your competencies are assessed as development towards becoming a professional engineer or professional geoscientist. Your examples should demonstrate experience in an engineering or geoscience environment or as part of an engineering or geoscience assignment.
- Be specific about your contributions when describing your experience. Avoid general terms such as “participated in” or “involved with”, and **state your exact duties**.
- Always write in the first person **using “I” statements** – even if you were working as part of a group.
- Wherever possible use point form when describing the actions you took to resolve the Situation described in your example.
- As an applicant, it is your responsibility to pick your best evidence for your submission. Do not wait to be asked!
- Assessors cannot rely on ‘implied evidence’ – you must use specific examples that best demonstrate your competence. For example, for **Competency Category 2** for engineering and **Competency Category 4** for geoscience, in which applicants must show that they communicate clearly with others as part of their activities:
 - ☒ Unacceptable description: “I am a Project Manager and must be able to communicate clearly to perform my job.”
 - ✓ Acceptable description: “As a Project Manager I chair client meetings, manage contractors and report to senior management. For example... <<include a specific time you did one of these>>”
- For examples of what could be good evidence to include in the **Competency Self-Assessment** you can refer to the Indicators / Workplace Examples.
- Different aspects of the same situation / project can be used to demonstrate multiple competencies, as applicable.
- A project does not need to be complete in order to use it as a competency example.

3.5.7 Confidential Information

Where project details are required to be kept confidential, indicate so with a statement to that effect in the appropriate box within the reporting system where the information is being provided by the applicant. Provide as much detail as you are permitted with the goal to provide sufficient evidence that you are able to practice competently as a professional engineer or professional geoscientist. This could be demonstrated by documentation that describes the nature of your work and its complexities without disclosing confidential details about solutions, business processes, client names or locations. You may use surrogate names such as “Project X” in “City/Town Q” then inform the Validator separately which project you are referring to by “Project X” and “City/Town Q”. Note that although all APEGS Assessors are bound by confidentiality, it is wise not to disclose proprietary or confidential information because Assessors may work in the same industry or sector as you.

4 VALIDATION OF A SUBMISSION

See section 3.5.1 – Selecting Validators for the requirements on choosing Validators.

4.1 VALIDATION PROCESS

The online validation process proceeds as follows:

1. When the applicant selects the button to submit for validation, the Validators cited by the applicant receive a link by email which includes login information to complete their validation through the online system. This e-mail is sent when an applicant submits an example through interim validation or a completed **Competency Self-Assessment**. It is recommended that the applicant contact the Validator(s) before or immediately after releasing the completed submission for validation to confirm they received their link. **Note:** If the Validation e-mail was not received by the Validator, check the spam filter. The domain name of the email is competencyassessment.ca.
Warning: You cannot edit the content of your competencies or your Validator assignments after you have selected the button to submit your assessment for validation. Do all the necessary checks to ensure accuracy, like you would do in your professional practice, prior to submitting.
2. Following the link, the Validator enters the **Competency Assessment System**.
3. The Validator first views the applicant's education and employment history. No input is required from the Validator in these sections, but they provide the Validator with the opportunity to review chronological summaries of the applicant's education and experience.
4. Validators then have an opportunity to decline to complete the process if they are not willing or not able to verify the applicant's experience. A reason must be provided if the validation is declined, and a comment box is provided. The reason, along with all Validator feedback, is confidential and is not visible to the applicant.
5. The Validator is asked to review the applicant's **Competency Self-Assessment** and provide feedback on any examples that the applicant has assigned to them. The selected Validator provides a rating on the **Competency Rating Scale** and is given the option to provide a comment. Descriptions of each level are available in sections 2.2 and 2.4 of this Guide. **Validator comments on the examples are encouraged** and help to provide valuable additional feedback and information to Assessors.
6. Finally, Validators are asked to provide overall feedback on the applicant's readiness for registration or licensure. The overall feedback section includes similar questions to the APEGS professional reference form so those people are not asked to complete a separate reference again when the member-in-training applies for professional registration in the future. Also note that if a Validator is not assigned to a specific competency example, they are asked to complete

the overall feedback section only.

If the Validator rates an applicant lower than the applicant rates themselves

If a Validator rates an applicant lower than the applicant self-rates, Assessors consider several things:

- If it is one competency and the category averages to an acceptable level, it is normally not considered to be a problem. Validators whose rating is below the applicant's will often comment on why, although it is not mandatory. Assessors tend to accept the Validator's rating, especially if it is below that of the applicant, as it normally is accompanied by a concern articulated by the Validator.
- Assessors look at the Validator's overall additional feedback at the end to see if the Validator considers the person ready for registration or licence.
- It may be that the applicant did an unacceptable job of writing the example but the experience may be acceptable. The applicant will be provided with the opportunity to rewrite and resubmit the competency in question.
- If there is a Validator comment that the applicant needs additional experience to satisfy a specific competency and the Assessors agree, the Assessors will comment and the applicant will normally be given the opportunity to re-submit the competency in question if it is necessary in order to pass either the competency or the category.
- Upon assessment of the re-submission, one of three things may happen: 1) the competency is accepted, or 2) the applicant will have to use another example from other work experience, or 3) the applicant will have to gain additional experience to satisfactorily complete a **Competency Category**.

Although the applicant is asked to show understanding of all of the competencies and to demonstrate an overall average minimum level achievement in each category, at the end of the day, Assessors are looking at other factors including the peer recommendations to determine if the applicant is ready for professional registration.

Disagreement with Validator's Evaluation

All members-in-training, professional members and licensees are obligated to adhere to the Code of Ethics of the Association with which they are registered. The Code of Ethics for APEGS is contained in section 20 of the Regulatory Bylaws which can be found on the APEGS website www.apegs.ca under About Us, Act and Bylaws.

Section 2(e) of the Code of Ethics states "members and licensees shall conduct themselves with fairness, courtesy and good faith towards clients, colleagues, employees and others; give credit where it is due and accept, as well as give, honest and fair professional criticism". If a Validator includes a negative comment in an experience report, it does not necessarily mean that the experience will not be approved. It is essential that future and current professionals are aware of areas they need to make improvement.

In the online system, Validator comments are not visible to the applicant, but Validators are urged to inform the applicant separately of any areas of concern, unless there are legal reasons preventing it. A member-in-training may not agree with the evaluation of a Validator. If that is the case, it should be discussed with the Validator and if necessary, an additional letter submitted to APEGS stating the concerns.

Should negative comments be included in an experience submission, the Experience Review Committee identifies the area of concern (competence or conduct) and attempts to identify personality conflicts to eliminate them from the assessment where they exist. If necessary, further information from the member-in-training, supervisors, mentors, Validators, co-workers and other references is gathered for the committee's consideration.

5 ASSESSMENT

Each competency submission is reviewed by two or more Assessors in the applicant's field. The online assessment process proceeds as follows:

1. Two or more Assessors are assigned by APEGS staff, notified by email once the submission is ready for review, and log in to the **Competency Assessment System**. Each Assessor performs their review independently.
2. Each Assessor reads the applicant's education and employment history. No input is required from the Assessor in these sections, but they provide the Assessor with the opportunity to review chronological summaries of the applicant's education and experience.
3. Each Assessor then reviews the applicant's **Competency Self-Assessment** and determines for each **Competency** whether the example(s) provided represent sufficient evidence that the required **Competency** has been satisfied. While reviewing each example, Assessors note the **Competence Level** claimed by the applicant and Validator for each **Competency**. Based on the breadth, depth and quality of the example provided they determine the **Competence Level** demonstrated for each **Competency**. Descriptions of each level are available in sections 2.2 and 2.4 of this Guide. Assessors also have the option of providing a comment for each **Competency**; these comments are confidential to the assessment process and are not viewable to the applicant or Validators. However, if a re-submission is required, the applicant will be provided with details of the issues.
4. The system calculates the average **Competence Level** achieved for each category according to each Assessor.
5. In the "Supporting Documents" section, Assessors may review any supporting documents uploaded by the applicant. The inclusion of supporting documents is optional, however applicants who want to count a thesis-based Master's or PhD in the four years of experience requirement must upload the one-page thesis abstract. The Supporting Documents section is also where Assessors may find supplemental information to the request from the applicant to consider international experience as equivalent-to-Canadian (see section 3.5.5 – Canadian

Environment Experience). However, the applicant should include the information for an equivalent-to-Canadian request within the competency description so it can be validated.

6. In the “Validator Overall Feedback” section, Assessors review the feedback of the Validators.
7. Each Assessor is asked to confirm their final recommendation on whether the applicant has met the competencies at the required level for professional registration (entry to practice).

5.1 RATING AN EXAMPLE

Assessors rate each example in an applicant’s **Competency Self-Assessment** for each **Competency** according to the **Competency Rating Scale**. An Assessor’s role is to examine the examples provided for each **Competency** and determine the **Competence Level** demonstrated; applicants must have met the required average **Competence Level** for each category to be approved.

Example Review Process – Category 1 for Engineering / Category 3 for Geoscience

An evaluation of **Competency Category 1** for engineering (Technical Competence) and **Competency Category 3** for geoscience (Geoscience Practice), serves as an example of the review process.

The Assessor reads and assesses the examples for each **Competency**, keeping in mind the following:

- Examples must be related to unique problems without obvious pre-determined solutions. Original thinking is used in the analysis and/or synthesis of problems.
- The applicant must have had full or partial responsibility for delivering the outcome.
- Examples typically have taken at least one month to accomplish.
 - Note - the length of time it takes to perform a task is not indicative of complexity. A complex example can take a short amount of time and a simple example can take an extended period of time. The typical minimum of one month is for guidance and is not an absolute. For instance, for working well in a team, a significant difference of opinion could be resolved within a week and be an excellent example. The quality of the example is more important than the time it takes to complete it.
- Examples must be **clear and specific** and demonstrate the applicant’s competence in a particular area. Assessors cannot rely on implied evidence.

Based on the evidence provided in the examples, the Assessor assigns the applicant a rating on the **Competency Rating Scale** for each **Competency** in the category. The applicant’s self-assessed rating as well as the Validator’s feedback are available for reference, as well as the detailed descriptions of each **Competence Level** included in sections 2.2 and 2.4 of this Guide.

The online system calculates the average that the applicant has achieved for each **Competency Category** based on the ratings assigned by the Assessors. If the average rating is equal to or higher than the required minimum overall **Competence Level** for the category, then the applicant has satisfied the requirement. If the category average rating is below the minimum required, the applicant has failed to satisfy the

requirements for that category.

A successful submission requires that an applicant attains, at a minimum, the required average level of competence in all **Competency Categories**, with no rating lower than level one for any **Competency** (except for the Canadian environment competencies for engineering, refer to section 3.5.5.1 – Canadian Environment Competencies – Engineering).

- Assessors may look to the **Competency Rating Scale** and Indicators / Workplace Examples for guidance in determining whether an applicant has met the required standard for each **Competency**.

When Assessors Do Not Agree or When Any Competencies Do Not Pass

Further assessment is completed if the Assessors do not agree that a specific competency is passed. Depending on the situation, the submission may go before the entire Experience Review Committee to make a determination.

This process applies to the first submission as well as any re-submissions.

5.2 RESULTS AND THEIR COMMUNICATION

Within approximately three months of submission you should receive feedback as to whether or not the experience is acceptable. Your results are entered into your online profile (APEGs Central) in the Applications area and you will receive an email notification to go into APEGs Central to check. You will also receive your results via email. If you have not heard from the APEGs office within three months of all Validators having completed their part, contact APEGs experience review staff to check on the status at experience-review@apegs.ca.

If staff at APEGs or the Experience Review Committee identifies concerns with a submission or the work experience itself, one or more of the following may occur:

1. The member-in-training may be contacted by email or phone and asked to provide missing or further information.
2. The member-in-training may be contacted by email, with copies sent to the Validator outlining the concerns and action required, if any.
3. The member-in-training and/or Validator may be asked to attend a meeting and/or interview with APEGs representatives.

The possible outcomes of experience review are as follows:

- Approval.
- Coaching letter which states that experience is approved but there are improvements required for the final submission (for Academic Review cases).
- Tabled until the next committee meeting for one of the following reasons (results will come out of the following meeting):

- Assessment by additional Assessor(s).
- Assessment by a discipline specific specialist.
- Assessor unable to complete an assessment due to conflict of interest or unforeseen circumstances.
- Request to re-submit the insufficient competencies because they did not contain the information necessary in order for the Assessors to make a decision. The applicant is provided with specific feedback on what the issues are.
- Denial of experience for professional registration. Specific reasons for the denial are provided as well as the path forward.

The opportunity for appeal exists if the result is re-submit or denial.

5.3 RE-SUBMISSION OF INSUFFICIENT COMPETENCIES

In cases where one or more competencies are assessed as insufficient, the applicant is informed with specific comments and is given an opportunity to re-submit. The specific competencies are made available in the **Competency Assessment System** for the applicant to re-enter information. Once completed, those competencies are released for the Validator(s) and Assessors to review again using the same process as before.

Interviewing to Assess Competency

In cases where further clarification or detail is required after re-submission(s) are exhausted, applicants may be asked to attend an interview. Interviews are conducted in rare situations where an impediment is identified in adequately explaining the experience in writing. These interviews provide applicants with an opportunity to present in person a summary of their experience, to further expand on their project work, and/or to better explain how they apply engineering theory in their work. The interview helps to determine whether an applicant has satisfied all of the experience requirements and has demonstrated a progression of experience and responsibility to an entry to practice professional level. **Competency Categories** or **Competencies** in which an applicant is rated below the required **Competence Level** may be areas of focus for the interview.

5.4 APPEALS

There are three levels of appeal explained in detail below:

- a) to the Experience Review Committee;
- b) to Council;
- c) to the Court of Queen's Bench.

The Experience Review Committee's decision on satisfactory experience is a recommendation to the Registrar, who is an APEGS staff person appointed by Council. If the experience is not approved because of a negative assessment by the Experience Review Committee, the member-in-training is given the opportunity to re-submit one or more times to the Experience Review Committee. Note that further assessment is part of the standard process for all cases where re-submission is flagged by the original Assessors, as outlined in section 5.1 of this Guide.

Should the re-submission(s) to the Experience Review Committee not be successful and the applicant is in disagreement with the results, this effectively means one component of a professional member application is being denied and the applicant has the opportunity to appeal the decision of the Registrar directly to Council as per section 24 of *The Engineering and Geoscience Professions Act*. Section 19 of the *Regulatory Bylaws* requires that an appeal to Council must be launched within 30 days and the applicant must set out the grounds on which he or she alleges that the Registrar's decision is in error, together with any documentation necessary to support the allegation. The Bylaws also provide the right to make a verbal presentation to Council.

Should Council uphold a decision of the Registrar, then the applicant subsequently has the opportunity to appeal to the Court of Queen's Bench for membership or licence being refused as per section 25 of *The Engineering and Geoscience Professions Act*. The assessment of qualifications is the aspect of self-regulation that the Courts typically defer to the expertise of the profession (i.e., the Experience Review Committee). The Court's role in an appeal is to review the process followed to make sure the Association followed the established process correctly.

6 APPLICANT STAGES

6.1 WHEN TO START ENTERING YOUR COMPETENCIES

You can create an account for the **Competency Assessment System** when you are eligible to start using the system which is in one of these two circumstances:

1. You are approved as an member-in-training with APEGS, or;
2. You are an member-in-training applicant **and** you are an international graduate who has been given the opportunity to submit work experience in order to waive confirmatory exams (see section 8 – Academic Review Cases).

You access the system online here: <https://competencyassessment.ca/>

Once you have followed the instructions to set up an account, APEGS will be notified automatically to approve your account, and you will be notified by email when it is ready to begin entering your information.

6.2 TRACKING PROGRESS OF YOUR ASSESSMENT

Once you have submitted your **Competency Self-Assessment** through the **Competency Assessment System**, you are able to log back into the system at any time to track the progress of your Validators in verifying your submission. This information is available in the **Competency Self-Assessment** screen.

6.3 WHEN TO APPLY FOR PROFESSIONAL MEMBERSHIP

Once you are notified that your competency assessment is passed and you have also written the Professional Practice Exam (anticipating that you passed), you can apply for professional membership.

More information about this application is available on the APEGS website under Apply, Professional Member:

<http://www.apegs.ca/Portal/Pages/Professional-Member>

If your professional member application is locked in APEGS Central when you are ready to apply, contact experience-review@apegs.ca.

7 INTERIM ASSESSMENT

As of November 15, 2019 CBA applicants are no longer able to receive an official interim assessment. A replacement for interim submissions that will provide some informal feedback to applicants is currently under consideration.

8 ACADEMIC REVIEW CASES

This section applies to international graduates who obtained their bachelor's degree outside Canada and are not yet approved as a member-in-training. This section does not apply to you if you are already registered as a member-in-training.

If you are a member-in-training **applicant** who received your **bachelor's** degree outside of Canada and you have more than five years of engineering experience according to your **résumé**, the Academic Review Committee (ARC) may give you the opportunity to submit work experience in order to waive confirmatory exams. If you are given this opportunity, you are informed in writing and provided details on next steps. We refer to these applicants as an "ARC case" for the purposes of experience review.

Member-in-training **applicants** who do not have a bachelor's degree that is recognized by the APEGS Council and who are being assessed to determine if they have at a minimum a bachelor level education in engineering or geoscience by the ARC may be assigned three confirmatory exams. The confirmatory exams are technical exams used as a tool to assess whether or not the **level** of the education is at least the equivalent to Canadian bachelor level. The theory behind using experience assessment as an alternative to confirmatory exams is that the bachelor level education had to be in place in order for the person to perform engineering or geoscience work at the minimum standard expected of a Canadian professional engineer or professional geoscientist. If the applicant appears to have at least five years of engineering work experience (according to the **résumé** submitted with the member-in-training application) from anywhere in the world, they are given the opportunity by the ARC to have confirmatory exams waived by submitting **five** years of experience for the Experience Review Committee (ERC) to assess. The ERC is looking for evidence that the experience demonstrates that the applicant obtained a bachelor level education at a sufficient level in order to do the engineering or geoscience work described in the competency submission. The level of experience required for the purpose of waiving confirmatory exams is the same as the level required for professional registration. Keep in mind that these are member-in-training **applicants** so APEGS is still evaluating their **academics**.

If it can be determined from the experience submission that the applicant appears to have an education at a sufficient level in order to perform acceptable engineering or geoscience work at the minimum standard for professional registration then confirmatory exams are waived, and the ERC also grants experience credit toward professional registration. This is the same assessment that is done for all members-in-training who are submitting work experience for the purpose of professional registration. The number of months of experience credit granted depends upon whether or not Canadian environment experience is fulfilled as explained in Examples 1 and 2 below.

Engineering Academic Review cases - Canadian experience requirement

Scenario 1 – for engineer-in-training applicants: for applicants who submitted their competencies for validation prior to January 1, 2020 (as per section 3.5.5.1 of this Guide, these applicants have the choice to fulfill the time-based requirement of 12 months Canadian or equivalent-to-Canadian experience or to fulfill the eight Canadian Environment Competencies with no time-based requirement). If the experience is acceptable then confirmatory exams are waived and:

- If less than one year of the experience in the Employment History Table is Canadian or equivalent-to-Canadian, and the applicant chooses to fulfill the time-based requirement of 12 months Canadian or equivalent-to-Canadian then the applicable amount of experience credit is granted toward professional registration in order to reserve the appropriate number of months required to fulfill the one year of Canadian or equivalent-to-Canadian experience requirement. The results are communicated to the applicant in writing.
 - If this situation applies to you and your confirmatory exams were waived, once you obtain the required amount of Canadian or equivalent-to-Canadian work experience, you will update your Employment History Table with the Canadian or equivalent-to-Canadian employment (and the associated Validators). Contact the APEGS experience review staff to re-open what is necessary in the online system in order to update the Employment History Table and associated Validator(s)
- If at least 12 months of the experience in the Employment History table is Canadian or “equivalent-to-Canadian” then four years of experience is granted toward professional registration and experience review may be complete. The results are communicated to the applicant in writing.
- Note that equivalent-to-Canadian experience requests on international experience are not permitted at the member-in-training application stage. They are only permitted at the professional member application stage.

Scenario 2 – for engineer-in-training applicants: for applicants who submitted their competencies for validation on or after January 1, 2020 (as per section 3.5.5.1 of this Guide, these applicants have to fulfill the eight Canadian Environment Competencies, no time-based requirement for Canadian or equivalent-to-Canadian experience). If the experience is acceptable then confirmatory exams are waived and:

- If any of the three Category 1 Canadian environment competencies (1.1, 1.6, 1.9) are not in a Canadian or equivalent-to-Canadian environment then you can still proceed with entering your

international experience examples in order to waive confirmatory exams. However, after you are approved as an engineer-in-training, you will be required to re-submit those specific competencies once you feel you have examples to report in a Canadian or equivalent-to-Canadian environment. What is required for your situation will be communicated to you with your assessment result. Those competencies that need to be re-submitted in a Canadian or equivalent-to-Canadian environment will be re-assigned in the online system and you will be able to insert new examples along with the rest of the competencies required to become a professional engineer. The new examples are then run through the regular assessment process, similar to how a re-submission is processed.

- For the Category 1 Canadian environment competencies (1.1, 1.6, 1.9) in the online system, if your online CBA account was approved by staff on or after November 30, 2020, you will notice that there is a note that they are mandatory Canadian environment competencies. That notice is for professional member applicants only. You may ignore that if you are a member-in-training applicant (i.e., an ARC case). Click on the link to the document for additional guidance if the best examples you have took place outside of Canada.
- Note that equivalent-to-Canadian experience requests on international experience are not permitted at the member-in-training application stage. They are only permitted at the professional member application stage.

Geoscience Academic Review cases - Canadian experience requirement

For geoscientist-in-training applicants who are given the experience review option to waive confirmatory exams, if the experience is acceptable and the applicant has at least five years of geoscience experience in the Employment History Table then confirmatory exams are waived and:

- If less than one year of the experience in the Employment History Table is Canadian or equivalent-to-Canadian, then the applicable amount of experience credit is granted toward professional registration in order to reserve the 12 months required to fulfill the one year of Canadian or equivalent-to-Canadian experience requirement. The results are communicated to the applicant in writing.
 - If this situation applies to you and your confirmatory exams were waived, once you obtain the required amount of Canadian or equivalent-to-Canadian work experience, you will update your Employment History Table with the Canadian or equivalent-to-Canadian employment (and the associated Validators). Contact the APEGS experience review staff to re-assign whatever is necessary in the online system in order for you to update the Employment History Table and associated Validator(s) or insert new examples if applicable.
- If at least 12 months of the experience in the Employment History table is Canadian or “equivalent-to-Canadian” then four years of experience is granted toward professional registration and experience review may be complete. The results are communicated to the applicant in writing.

- Note that equivalent-to-Canadian experience requests on international experience are not permitted at the member-in-training application stage. They are only permitted at the professional member application stage.

Other information for both engineering and geoscience applicants – Academic Review cases:

All experience reporting requirements detailed in this Guide are the same for academic review cases as for members-in-training seeking experience approval for professional registration with these exceptions:

1. One additional year of experience is needed for academic review cases for a minimum total of five years of experience that needs to be listed in the Employment History table of the **Competency Assessment System**.
2. For engineer-in-training applicants, only the Category 1 competencies need to be submitted and passed (Technical Competence) in order to waive confirmatory exams.
3. For geoscientist-in-training applicants, only Categories 2 and 3 competencies need to be submitted and passed in order to waive confirmatory exams.
4. Only two Validators are required and Validators do not need to be professional engineers, professional geoscientists or equivalent (but if you have more than two Validators including any professional engineers or equivalent, that is fine).
5. The experience submitted needs to be closely related to the discipline of the bachelor's since that is the education that is being confirmed.
6. Equivalent-to-Canadian experience requests on international experience are not permitted for Academic review cases (i.e., member-in-training applicants). They are only permitted at the professional member application stage.
7. Strictly project management experience is not acceptable in order to waive confirmatory exams. The majority of the experience submitted for academic review cases has to include direct experience in application of theory. In the case of applicants with strictly project management experience, there is normally no application of theory present in the applicant's work directly. A lack of direct experience in application of theory, specifically engineering design and engineering or geoscience analysis prevents the committee from judging if confirmatory exams can be waived. Project management experience cannot be used in isolation to judge the university level, technical learning required in order to waive confirmatory exams.
 - Note that after an applicant has become a member-in-training, they can submit project management focused competency examples for review in the applicable competency if that applicant still needs the 12 months of Canadian or equivalent-to-Canadian experience.

The member-in-training applicant who has confirmatory exams waived based on the experience submitted will be informed of any experience requirements remaining in order to become a professional member including the remaining competencies, Canadian or equivalent-to-Canadian experience, Validator requirements, etc.

Overall process for experience review – Academic Review cases:

Step 1 – complete all information requested in the **Competency Assessment System**.

For engineering applicants, only the competencies for Competency Category 1 are required (you should have only that category assigned to you in the **Competency Assessment System**. If that is not the case, contact experience-review@apegs.ca).

For geoscience applicants, only the competencies for Competency Categories 2 and 3 are required (you should have only those two categories assigned to you in the **Competency Assessment System**. If that is not the case, contact experience-review@apegs.ca).

Because the purpose of this submission is to assess whether you have an education at a sufficient level in order to perform acceptable engineering work at the minimum standard for professional registration, the information provided should focus on the technical aspects of your work including analysis, design and the application of engineering theories and principles.

Once you have everything entered, you select the button to Submit for validation then all Validators will receive notification directly from the system on how to do their part.

Step 2 – Once validation is complete, the ERC assesses the submission.

Step 3 – If the ERC approves the experience and confirmatory exams are waived, the APEGS academic review staff will be informed, at which time staff will check your file to make sure everything for your member-in-training application is complete.

Step 4 – After your member-in-training application is approved (you will receive specific notice about this from APEGS), the appropriate sections and competencies will be opened up in the **Competency Assessment System** for you to complete.

9 MEMBERS-IN-TRAINING TRANSFERRING FROM OTHER ASSOCIATIONS

Experience is not transferable as a member-in-training if it was reviewed and approved by another Association in Canada equivalent to APEGS, with some exceptions:

- If the experience was assessed in the same **Competency Assessment System** as APEGS uses, then it might be acceptable.
- If the experience was assessed using a different framework altogether then it might be transferable if all four years were reviewed and approved in their entirety.

Contact the APEGS experience review staff at experience-review@apegs.ca to inquire about how it can be transferred if any of the above scenarios apply to you.

Normally applicants are advised to finish the entire process to becoming a professional member in the other Association, then transfer to APEGS as a professional member under inter-Association mobility.

See also section 1.1 – Applicability, Coming into Force and Transition.

10 PROFESSIONAL LEVEL MUTUAL RECOGNITION AGREEMENTS

The professional level Mutual Recognition Agreements (MRAs) are agreements with licensing bodies outside Canada that recognize academic preparation plus some international work experience. Under these MRAs, applicants have to submit Canadian or equivalent-to-Canadian experience and provide references from three professional engineers, professional geoscientists or equivalent (including professional geoscientists, engineering licensees, geoscience licensees, etc).

For full information on which organizations/countries APEGS has MRAs with and what is required of applicants who apply under a professional level MRA, see the APEGS website under Apply, 'International mobility – engineers' or 'International mobility – geoscientists' as applicable.

For applicants who qualify under a professional level MRA, after they have been approved as a member-in-training, they may be granted 36 months of work experience based on their membership with the other licensing body depending on the specific provisions of the MRA, then they submit their Canadian or equivalent-to-Canadian work experience in the **Competency Assessment System**. They are required to enter full details in the Employment History Table for their entire experience history plus:

- For engineering applicants, complete these eight competencies carried out in a Canadian or Equivalent-to-Canadian work environment: 1.1, 1.6, 1.9, 2.1, 2.2, 2.3, 5.1, 6.2. APEGS staff will assign those eight competencies in the **Competency Assessment System** after the applicant has been approved as an engineer-in-training and has created their CBA account. If you are one of these applicants and you see more than those eight competencies assigned to you in the **Competency Assessment System**, contact the experience review staff at the APEGS office to have it corrected at experience-review@apegs.ca.
- For geoscience applicants, contact APEGS experience review staff for the steps applicable in your situation.

11 FREQUENTLY ASKED QUESTIONS

FAQs about the competency assessment process can be found on the APEGS website under Apply, FAQs – Applicants, FAQs pertaining to experience reporting: <https://www.apegs.ca/Portal/Pages/faq-applicants>

Appendix E-1 – Engineering Competency Framework

1. Technical Competence (minimum overall competence level: 3)

Competencies

- 1.1 Demonstrate knowledge of regulations, codes, standards, and safety - this includes local engineering procedures and practices as applicable.
- 1.2 Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.
- 1.3 Analyze technical risks and offer solutions to mitigate the risks.
- 1.4 Apply engineering knowledge to design solutions.
- 1.5 Be able to understand solution techniques and independently verify the results.
- 1.6 Safety awareness: Be aware of safety risks inherent in design; and demonstrate safety awareness – on-site; possible safety authorization/certificate as appropriate.
- 1.7 Demonstrate understanding of systems as well as of components of systems
- 1.8 Exposure to all stages of the process/project life cycle from concept and feasibility analysis through implementation.
- 1.9 Understand the concept of quality control during design and construction including independent design check and independent reviews of design, field checks and reviews.
- 1.10 Transfer design intentions to drawings and sketches; Understand transmittal of design information to design documents.

2. Communication (minimum overall competence level: 3)

Competencies

- 2.1 Oral.
- 2.2 In writing.
- 2.3 Reading and comprehension.

3. Project and Financial Management (minimum overall competence level: 2)

Competencies

- 3.1 Awareness of project management principles.
- 3.2 Demonstrate increasing level of responsibility for project planning and implementation.
- 3.3 Manage expectations in light of available resources.
- 3.4 Understand the financial aspects of their work.
- 3.5 Ask for and demonstrate response to feedback.

4. Team Effectiveness (minimum overall competence level 3)

Competencies

- 4.1 Work respectfully and with other disciplines/people.
- 4.2 Work to resolve differences.

5. Professional Accountability (Ethics & Professionalism) (minimum overall competence level: 3)

Competencies

- 5.1 Work with integrity, ethically and within professional standards.
- 5.2 Demonstrate an awareness of your own scope of practice and limitations.
- 5.3 Understand how conflict of interest affects your practice.
- 5.4 Demonstrate awareness of professional accountability.
- 5.5 Demonstrate an understanding of appropriate use of the stamp and seal.
- 5.6 Understand own strengths/weaknesses and know how they apply to one's position.

6. Social, Economic, Environmental and Sustainability (minimum overall competence level: 2)

Competencies

- 6.1 Demonstrate an understanding of the safeguards required to protect the public and the methods of mitigating adverse impacts.
- 6.2 Demonstrate an understanding of the relationship between the engineering activity and the public.
- 6.3 Understand the role of regulatory bodies on the practice of engineering.
- 6.4 Be aware of any specific sustainability clauses that have been added to practice guidelines that apply to their area.
- 6.5 To the extent possible, recognizing the applicant's position of influence, consider how sustainability principles could be applied and promoted in their specific work.

7. Personal Continuing Professional Development (minimum overall competence level: 3)

Competencies

- 7.1 Demonstrate completion of professional development activities.
- 7.2 Demonstrate awareness of gaps in knowledge and areas requiring further development.
- 7.3 Develop a professional development plan to address gaps in knowledge and maintain currency in field of practice.

Appendix E-2 – Engineering Competency Indicators – All Disciplines

Competency Category 1 – Technical Competence

COMPETENCIES (each require one example)	INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)
1.1 Demonstrate knowledge of regulations, codes, standards, and safety - this includes local engineering procedures and practices as applicable.	<ol style="list-style-type: none"> 1. Identify and comply with legal and regulatory requirements for project activities. 2. Incorporate knowledge of codes and regulations in design materials. 3. Prepare reports assessing project compliance with codes, standards, and regulations. 4. Recognize the need to design for code compliance while achieving constructability
1.2 Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.	<ol style="list-style-type: none"> 1. Demonstrate knowledge of materials, operations, project and design constraints, e.g. cost, design, material, labour, time, budget, production. 2. Demonstrate understanding of and coordination with other engineering and professional disciplines
1.3 Analyze technical risks and offer solutions to mitigate the risks.	<ol style="list-style-type: none"> 1. Demonstrate familiarity with system protection and/or damage/hazard mitigation objectives, philosophies, practices, procedures, and functions. 2. Identify risk areas including causes of risks and their impacts. 3. Develop risk management/mitigation plans. 4. Demonstrate an understanding of the difference between technical risk and public safety issues.
1.4 Apply engineering knowledge to design solutions.	<ol style="list-style-type: none"> 1. Prepare technical specifications. 2. Demonstrate use of theory and calculations to arrive at solutions. 3. Demonstrate the development of a unique design solution which could not be accomplished with a standard design solution.
1.5 Be able to understand solution techniques and independently verify the results.	<ol style="list-style-type: none"> 1. Demonstrate an understanding of the engineering principles used in the application of computer design programs and show/describe how the results were verified as correct. 2. Participate in an independent review and verification of solution techniques or analysis methods.
1.6 Safety awareness: Be aware of safety risks inherent in design; and demonstrate safety awareness – on-site; possible safety authorization/certificate as appropriate.	<ol style="list-style-type: none"> 1. Identify, incorporate, and/or participate in review of safety considerations, safety procedures and safety equipment as they apply to system operations and/or maintenance programs. 2. Demonstrate specific knowledge of safety regulations. 3. Incorporate explicit human and public safety considerations in design and all other professional activities. 4. Understand and account for safety risks associated with processes. Identify relevant protection equipment and process modifications to mitigate safety risks.
1.7 Demonstrate understanding of systems as well as of components of systems.	<ol style="list-style-type: none"> 1. Demonstrate an understanding of each element in a process. 2. Demonstrate and understanding of the interactions and constraints in the behavior of the overall system. 3. Manage processes within the overall system (monitor and, where needed, modify processes to achieve optimum outcomes).
1.8 Exposure to all stages of the process/project life cycle from concept and feasibility analysis through implementation.	<ol style="list-style-type: none"> 1. Demonstrate awareness of project concerns and roles of other stakeholders in the project stages: <ol style="list-style-type: none"> i. Identification: generation of the initial project idea and preliminary design ii. Preparation: detailed design of the project addressing technical and operational aspects iii. Appraisal: analysis of the project from technical, financial, economic, social, institutional and environmental perspectives iv. Preparation of specifications and tender documents: preparation of tender document, inviting and opening of tenders, pre-qualification, evaluation of bids and award of work v. Implementation and monitoring: implementation of project activities, with on-going checks on progress and feedback

COMPETENCIES (each require one example)	INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)
	vi. <i>Evaluation: periodic review of project</i>
1.9 Understand the concept of quality control during design and construction including independent design check and independent reviews of design, field checks and reviews.	<ol style="list-style-type: none"> 1. Conduct checks, including field checks, to verify the validity of design. 2. Follow Quality Management Principles in Practice. 3. Prepare quality control plans, including frequency and test parameters, for specific processes or products. 4. Evaluate test results, determine adequacy, and develop recommended action. 5. Demonstrate peer review. 6. Demonstrate completed project, systems or sub-systems meet project objectives in terms of functionality and operational performance
1.10 Transfer design intentions to drawings and sketches; Understand transmittal of design information to design documents.	<ol style="list-style-type: none"> 1. Ability to review designs of others and communicate findings and issues, including suggested alternatives. 2. Demonstrate communication of ideas and concepts to project team members. 3. Demonstrate understanding of value of project completion reports and lessons learned reports to application in future projects by self or others. 4. Produce sketches, notes, documentation and design documents to prepare proposals, preliminary, and final design drawings for acceptance by the client and approval by regulatory authorities.

Competency Category 2 – Communication

COMPETENCIES (each require one example)	INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)
2.1 Oral.	<ol style="list-style-type: none"> 1. Communicate in a simple and concise manner. 2. Communicate official project data with team members, clients, contractors 3. Ability to express both technical and non-technical issues and ideas clearly to both technical and non-technical personnel. 4. Presentations to technical and non-technical groups; presentations to superiors and subordinates; internal (colleagues) and external (clients) presentations 5. Presentation of project parameters to the public 6. Demonstrate active participation in and contribution to meetings
2.2 In writing.	<ol style="list-style-type: none"> 1. Tailor communications to the intended audience. 2. The ability to write and review technical documents 3. Ability to write clear memos and reports to both technical and non-technical personnel. 4. Use drawings and sketches to demonstrate key points and concepts 5. Demonstrate a written report on a technical subject 6. Demonstrate a written report on field observations 7. Take training in technical report writing 8. Work with common office programs (e.g. Excel, Word, Outlook, internet browsers)
2.3 Reading and comprehension.	<ol style="list-style-type: none"> 1. The ability to review technical documents, to understand the implications and to summarize key points.

Competency Category 3 – Project and Financial Management

COMPETENCIES (each require one example)	INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)
3.1 Awareness of project management principles.	<ol style="list-style-type: none"> 1. Awareness of resource planning, budgeting, change management, scope management, schedule and unforeseen issues in managing a project from start to end. 2. Understand the impacts that benefits and risks of various design solutions have on a project 3. Understand the needs and expectations of internal and external clients
3.2 Demonstrate increasing level of responsibility for project planning and implementation.	<ol style="list-style-type: none"> 1. Follow and contribute to development of project management plans 2. Be aware of future improvements and demands as well as other ongoing projects. 3. Demonstrate increasing responsibility for client contact and management 4. Demonstrate how project planning activities and interaction with others has increased over the training period. 5. Participate in managing and adapting a schedule. 6. Demonstrate awareness of issues related to other disciplines that might affect the project, maintaining contact and communication to discuss and resolve issues.
3.3 Manage expectations in light of available resources.	<ol style="list-style-type: none"> 1. Update schedule and budget on regular basis and communicates status 2. Provide market assessment and availability of materials for a project. 3. Meet deadlines
3.4 Understand the financial aspects of their work.	<ol style="list-style-type: none"> 1. Demonstrate cognizance of project budget during design and construction 2. Provide technical/financial report and compare the options. 3. Demonstrate the understanding of the place of finance in business decisions 4. Understand principles of budgeting and financing 5. Understand the relevant business processes 6. Demonstrate an understanding of working with and developing contracts
3.5 Ask for and demonstrate response to feedback.	<ol style="list-style-type: none"> 1. Demonstrate implementation of lessons learned, and performance reviewed in meetings 2. Show willingness to accept comments and criticism 3. Identify situations where you received feedback and how you responded to that feedback. 4. Demonstrate appreciation of the scope of a project and an appropriate response when a project varies beyond the scope.

Competency Category 4 – Team Effectiveness

COMPETENCIES (each require one example)	INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)
4.1 Work respectfully and with other disciplines/people.	<ol style="list-style-type: none"> 1. Demonstrate respect for others' responsibility and expertise. 2. Integrate engineering with other professional input.
4.2 Work to resolve differences.	<ol style="list-style-type: none"> 1. Demonstrate leadership in achieving team goals and resolving conflict. 2. Work to facilitate beneficial conflict resolution. 3. Exposure to training in conflict resolution.

Competency Category 5 – Professional Accountability (Ethics & Professionalism)

COMPETENCIES (each require one example)	INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)
5.1 Work with integrity, ethically and within professional standards.	<ol style="list-style-type: none"> 1. <i>Comply with the Code of Ethics in the jurisdiction of practice</i> 2. <i>Apply professional Ethics in meeting corporate directives</i>
5.2 Demonstrate an awareness of your own scope of practice and limitations.	<ol style="list-style-type: none"> 1. <i>Ask for help and incorporate input</i> 2. <i>Demonstrate interaction with your supervisor</i> 3. <i>Ask questions when needed</i> 4. Structural applicants only: <i>Understand the role of the StructEng (this indicator only shows if an applicant chooses to report against the structural indicators)</i>
5.3 Understand how conflict of interest affects your practice.	
5.4 Demonstrate awareness of professional accountability.	<ol style="list-style-type: none"> 1. <i>Awareness of the potential professional liability involved in all aspects of the design, construction and inspection process.</i> 2. Structural applicants only: <i>Understand the role of the StructEng and Independent Peer Reviews of work (this indicator only shows if an applicant chooses to report against the structural indicators)</i>
5.5 Demonstrate an understanding of appropriate use of the stamp and seal.	<i>Please note that understanding and awareness is what is required for this Competency.</i>
5.6 Understand own strengths/weaknesses and know how they apply to one's position.	<ol style="list-style-type: none"> 1. <i>Prepare a self-criticism list and the ways to mitigate or eliminate the weaknesses</i>

Continued...

Competency Category 6 – Social, Economic, Environmental and Sustainability

COMPETENCIES (each require one example)	INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)
6.1 Demonstrate an understanding of the safeguards required to protect the public and the methods of mitigating adverse impacts.	<ol style="list-style-type: none"> 1. Prepare public safety regulations and advice during design and implementation of a project. 2. Understand potential effects of Climate Change
6.2 Demonstrate an understanding of the relationship between the engineering activity and the public.	<ol style="list-style-type: none"> 1. Recognize the value and benefits of the engineering work to the public 2. Prepare a report regarding the impact of a project to public.
6.3 Understand the role of regulatory bodies on the practice of engineering.	<ol style="list-style-type: none"> 1. Recognize the importance of respecting the regional traditions and native regulations towards a project. 2. Understand the role and regulations of other professions whose practices overlap or interface with the practice of professional engineering.
6.4 Be aware of any specific sustainability clauses that have been added to practice guidelines such as Practice Guidelines, legislation, standards, community sustainability plans or sustainability requirements that apply to their area of practice.	Be aware of any specific sustainability clauses that have been added to practice guidelines such as Practice Guidelines, legislation, standards, community sustainability plans or sustainability requirements that apply to their area of practice.
6.5 To the extent possible, recognizing the applicant's position of influence, consider how sustainability principles could be applied and promoted in their specific work.	<ol style="list-style-type: none"> 1. Include sustainability analysis in project descriptions. 2. Provide a list of revisions made during design and implementation period of the project.

Competency Category 7 – Professional Continuing Professional Development

COMPETENCIES (each require one example)	INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)
7.1 Demonstrate completion of professional development activities.	<ol style="list-style-type: none"> 1. Participation in Community, Technical, Industry and/or professional association committees and task forces 2. Engagement in a variety of self-directed and formal professional development activities to learn and maintain currency in field of practice and report progress to applicable parties
7.2 Demonstrate awareness of gaps in knowledge and areas requiring further development.	<ol style="list-style-type: none"> 1. Gap analysis of knowledge and skills; highlight the 'gaps' that exist 2. Identification of areas of weakness where additional training is needed
7.3 Develop a professional development plan to address gaps in knowledge and maintain currency in field of practice.	<ol style="list-style-type: none"> 1. Plan to pursue training in areas of weakness and remedy gaps in knowledge 2. Planned activities may include in a variety of self-directed and formal professional development activities to learn and maintain currency in field of practice

Appendix E-3 – Engineering Competency Indicators for Structural – Category 1 only

You may choose to use the generic indicators for Technical Competence Category 1 shown in Appendix 2 or you may use the discipline-specific indicators when completing your entries. Categories 2 through 7 are the same for all disciplines.

Competency Category 1 – Technical Competence for Structural Engineering

<p style="text-align: center;">COMPETENCIES (each require one example)</p>	<p style="text-align: center;">INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)</p>
<p>1.1 Demonstrate knowledge of regulations, codes, standards, and safety - this includes local engineering procedures and practices as applicable.</p>	<ol style="list-style-type: none"> 1. Identify and comply with legal and regulatory requirements for project activities. 2. Prepare Permit Applications. 3. Incorporate knowledge of codes and regulations in design materials. 4. Prepare reports on standards and project compliance. 5. Recognize the need to design for code compliance while achieving constructability. 6. Experience with use of applicable Canadian codes and standards for design, constructions and testing. 7. Ability to research and apply suitable international codes as needed.
<p>1.2 Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.</p>	<p>Demonstrate through examples knowledge of:</p> <ol style="list-style-type: none"> 1. Interaction behaviours of structures with different materials. 2. Properties of various materials (e.g., steel, concrete, pre-stressed concrete, reinforced concrete, wood, masonry). 3. Material specifications and selection. 4. Constraints imposed on the structural system by requirements of other disciplines. 5. Optimal design and construction economics.
<p>1.3 Analyze technical risks and offer solutions to mitigate the risks.</p>	<ol style="list-style-type: none"> 1. Understanding fundamental structural phenomena of how structures are damaged or fail. 2. Understanding structural phenomena responses for preventing failure (structural stability). 3. Understand the various components of the design and how they contribute to the mitigation of risk. 4. Understand potential effects of Climate Change.
<p>1.4 Apply engineering knowledge to design solutions.</p>	<p>Demonstrate through examples, knowledge of:</p> <ol style="list-style-type: none"> 1. Loads and climactic data. 2. Tolerances, concrete placement, reinforcement, embedment, and welded and bolted connections. 3. Knowledge of overall design of structure and its response to the loads and demands. 4. Understand issues of serviceability and long term maintenance and function. 5. Selection of structural system, material to be used for the project. 6. Ability to design in more than one material. 7. Ability to analyze, design and detail lateral load resisting systems in the horizontal and vertical plane, including variable stiffness systems, geometric and/or mass irregularities. 8. Demonstrate design experience (or working knowledge of) the basic elements of a bridge (Abutments, Piles, Piers and pier caps, Retaining walls, Bridge deck systems). 9. Design to account for effects of elastic shortening, creep, shrinkage, relaxation of pre-stressing strands and differential settlement. 10. Design to account for temperature variations. 11. Identify and accommodate site-specific logistical issues in design and construction plans. 12. Demonstrate seismic knowledge using capacity design principles - mandatory for Engineers & Geoscientists BC applicants
<p>1.5 Be able to understand solution techniques and independently verify the results.</p>	<ol style="list-style-type: none"> 1. Demonstrate an understanding of the engineering principles used in the application of computer design programs. 2. Understand and have the ability to do approximate analysis to independently verify the results of technical software and solution. 3. Participate in an independent review process.

<p align="center">COMPETENCIES (each require one example)</p>	<p align="center">INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)</p>
<p>1.6 Safety awareness: Be aware of safety risks inherent in design; and demonstrate safety awareness – on-site; possible safety authorization/certificate as appropriate.</p>	<ol style="list-style-type: none"> 1. Be aware of safety risks associated with the construction of the structure. 2. Demonstrate an understanding of safety regulations for construction, presence of adjacent structures, geotechnical considerations, impact to the environment. 3. Demonstrate specific knowledge of safety regulations. 4. Understanding of site safety and worker compensation act. 5. Knowledge and experience with use of WCB regulations for design of fall arrest and fall protection lanyards, lifelines, anchors etc. 6. Incorporate explicit human and public safety considerations in design and all other professional activities.
<p>1.7 Demonstrate understanding of systems as well as of components of systems.</p>	<ol style="list-style-type: none"> 1. Demonstrate and understanding of the interactions and constraints in the behavior of the overall system. 2. Understand the role and responsibility of a specialty structural engineer. 3. Understand the integration of components to generate load paths.
<p>1.8 Exposure to all stages of the process/project life cycle from concept and feasibility analysis through implementation.</p>	<ol style="list-style-type: none"> 1. Demonstrate awareness of project concerns and roles of other stakeholders in the project stages: <ol style="list-style-type: none"> i. Identification: generation of the initial project idea and preliminary design. ii. Preparation: detailed design of the project addressing technical and operational aspects. iii. Appraisal: analysis of the project from technical, financial, economic, social, institutional and environmental perspectives. iv. Preparation of specifications and tender documents: preparation of tender document, inviting and opening of tenders, pre-qualification, evaluation of bids and award of work. v. Implementation and monitoring: implementation of project activities, with on-going checks on progress and feedback. vi. Evaluation: periodic review of project with feedback for next project cycle. 2. Prepare feasibility reports and proposals. 3. Demonstrate an understanding of how the different disciplines interact for a particular structural project; and how the structural engineers needs to obtain information from all these disciplines. 4. Demonstrate an understanding of the progression in design and economics from concept through to decommissioning.
<p>1.9 Understand the concept of quality control during design and construction including independent design check and independent reviews of design, field checks and reviews.</p>	<ol style="list-style-type: none"> 1. Demonstrate Quality Control in the Production of Structural Drawings & Engineering Calculations and reports, including review by the supervising professional. 2. Participate in independent structural concept review by a third party professional engineer. 3. Conduct site visits to observe and verify construction process as well to write field reviews for as built structural conformance to construction drawings. 4. Review shop drawings for compliance with design. 5. Participate in field review and demonstrate an understanding of roles of testing agencies in the field inspection process. Respond appropriately to site changes or work that is not compliant. 6. Operate in an ISO9001-certified environment.
<p>1.10 Transfer design intentions to drawings and sketches; Understand transmittal of design information to design documents.</p>	<ol style="list-style-type: none"> 1. Supervise the drafting of their design and produce sketches for the drafters/CAD technicians, and demonstrate document coordination and control. 2. Ensure that drawings reflect the design models and required behaviour. 3. The production of technical specifications for construction. 4. Be able to review and analyze designs of others and communicate findings and suggest alternatives.

Appendix E-4 – Engineering Competency Indicators for Civil: Municipal/Infrastructure – Category 1 only

You may choose to use the generic indicators for Technical Competence Category 1 shown in Appendix 2 or you may use the discipline-specific indicators when completing your entries. Categories 2 through 7 are the same for all disciplines.

Competency Category 1 – Technical Competence for Civil: Municipal/Infrastructure Engineering

<p align="center">COMPETENCIES (each require one example)</p>	<p align="center">INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)</p>
<p>1.1 Demonstrate knowledge of regulations, codes, standards, and safety - this includes local engineering procedures and practices as applicable.</p>	<ol style="list-style-type: none"> 1. Identify and comply with legal and regulatory requirements for project activities. 2. Prepare Permit Applications. 3. Incorporate knowledge of codes and regulations in design materials. 4. Prepare reports on standards and project compliance. 5. Recognize the need to design for code compliance while achieving constructability. 6. Interpret and apply regulations that affect the handling, transportation and disposal of waste materials.
<p>1.2 Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.</p>	<ol style="list-style-type: none"> 1. Demonstrate knowledge of materials and/or operations: Cost, Storage, Quality & Handling problems. 2. Develop and implement evaluation, maintenance or rehabilitation programs for infrastructure and operations. 3. Coordination with other disciplines.
<p>1.3 Analyze technical risks and offer solutions to mitigate the risks.</p>	<ol style="list-style-type: none"> 1. Demonstrate familiarity with system protection objectives, philosophies, and functions. 2. Identify risk areas. 3. Develop risk management plans. 4. Demonstrate an understanding of the difference between technical risk and public safety issues.
<p>1.4 Apply engineering knowledge to design solutions.</p>	<ol style="list-style-type: none"> 1. Collect, record, and analyze information from sources such as geological reports, subsurface investigations, and in situ testing. 2. Calculate material quantities and volumes using mathematical formulae, measurements and data from construction drawings and specifications. 3. Preparation of technical specifications. <p>Water & Wastewater Treatment:</p> <ol style="list-style-type: none"> 1. Conduct inventories of water supplies and assess impact of projected population growth on water supply demands. (Design water supply systems from wells, rivers, or lakes; Sample/analyze source water for purity and human suitability; Determine physical, chemical, and bacteriological characteristics of available water). 2. Design sanitary sewer systems. 3. Conduct model and flow analysis for public sewer facility design. 4. Demonstrate knowledge of lift station design. 5. Conduct inflow/outflow infiltration studies. 6. Design water treatment facilities (e.g. operations for sedimentation, flocculation and coagulation, filtering, disinfection and chlorination). 7. Apply methods of alternate technology (e.g. precipitation, absorption oxidation and ion exchange to remove metals and soften water). 8. Use standard methods for the treatment of waste water (Sample and assess waste water for physical, chemical and microbiological characteristics using tests; Select treatment processes for septic tanks and tile beds). 9. Select tertiary treatments for waste water.
<p>1.5 Be able to understand solution techniques and independently verify the results.</p>	<ol style="list-style-type: none"> 1. Demonstrate an understanding of the engineering principles used in the application of computer design programs. 2. Participate in an independent review process.

<p align="center">COMPETENCIES (each require one example)</p>	<p align="center">INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)</p>
<p>1.6 Safety awareness: Be aware of safety risks inherent in design; and demonstrate safety awareness – on-site; possible safety authorization/certificate as appropriate.</p>	<ol style="list-style-type: none"> 1. Identify and incorporate safety procedures, processes, and equipment. 2. Review and incorporate safety or system operating procedures. 3. Demonstrate specific knowledge of safety regulations. 4. Incorporate explicit human and public safety considerations in design and all other professional activities.
<p>1.7 Demonstrate understanding of systems as well as of components of systems.</p>	<ol style="list-style-type: none"> 1. Calculate and assess current or projected infrastructure needs according to their area of practice (include assessment for projected population growth). [a) Water supply and distribution networks, b) Sanitary sewer networks, c) Traffic systems (city, highway, lighting), d)Waste and waste water treatment, e) Solid waste management and disposal, f) Underground services]. 2. Demonstrate an understanding of each element in the process, and the infrastructure required.
<p>1.8 Exposure to all stages of the process/project life cycle from concept and feasibility analysis through implementation.</p>	<ol style="list-style-type: none"> 1. Demonstrate awareness of project concerns and roles of other stakeholders in the project stages: <ul style="list-style-type: none"> vii. Identification: generation of the initial project idea and preliminary design. viii. Preparation: detailed design of the project addressing technical and operational aspects. ix. Appraisal: analysis of the project from technical, financial, economic, social, institutional and environmental perspectives. x. Preparation of specifications and tender documents: preparation of tender document, inviting and opening of tenders, pre-qualification, evaluation of bids and award of work. xi. Implementation and monitoring: implementation of project activities, with on-going checks on progress and feedback. xii. Evaluation: periodic review of project with feedback for next project cycle.
<p>1.9 Understand the concept of quality control during design and construction including independent design check and independent reviews of design, field checks and reviews.</p>	<ol style="list-style-type: none"> 1. Conduct Field Checks to verify the validity of design. 2. Complete Quality Management Plan Checklist, and follow Quality Management Plan. 3. Prepare quality control plans, including frequency and test parameters, for specific construction processes or products. 4. Evaluate test results and determine adequacy. 5. Carry out or supervise field testing of materials or construction processes.
<p>1.10 Transfer design intentions to drawings and sketches; Understand transmittal of design information to design documents.</p>	<ol style="list-style-type: none"> 1. Demonstrate familiarity with CAD software and techniques for specific design requirements. 2. Demonstrate knowledge of capture and validation of as-built information. 3. Prepare complete drawings with sufficient cross sections and details and eliminate any discrepancies; Provide technical specification; Refer to the related items of the specification on each part and detail on the drawings. 4. Prepare rough sketches for the drafter and explain your intentions. 5. Ability to review designs of others and communicate findings and issues, including suggested alternatives.

Appendix E-5 – Engineering Competency Indicators for Electrical: Power and Industrial – Category 1 only

You may choose to use the generic indicators for Technical Competence Category 1 shown in Appendix 2 or you may use the discipline-specific indicators when completing your entries. Categories 2 through 7 are the same for all disciplines.

Competency Category 1 – Technical Competence for Electrical: Power and Industrial Engineering

COMPETENCIES (each require one example)	INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)
1.1 Demonstrate knowledge of regulations, codes, standards, and safety - this includes local engineering procedures and practices as applicable.	<ol style="list-style-type: none"> 1. Identify and comply with legal and regulatory requirements for project activities. 2. Incorporate knowledge of codes and regulations in design materials. 3. Prepare reports on standards and project compliance. 4. Recognize the need to design for code compliance while achieving constructability.
1.2 Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.	<ol style="list-style-type: none"> 1. Have knowledge of plant layout and operations. 2. Preparation of technical specifications. 3. Coordination with equipment vendors and other discipline engineers. 4. Demonstrate involvement with feasibility studies.
1.3 Analyze technical risks and offer solutions to mitigate the risks.	<ol style="list-style-type: none"> 1. Demonstrate familiarity with system protection objectives, philosophies, and functions. 2. Identify risk areas. 3. Develop risk minimization plans.
1.4 Apply engineering knowledge to design solutions.	<p><i>Note: Each example should demonstrate a different design solution or facet of your application of knowledge.</i></p> <ol style="list-style-type: none"> 1. Demonstrate an understanding of the engineering principles used in the application of computer design programs. 2. Demonstrate use of theory and calculations to arrive at solutions. 3. Demonstrate why a unique design solution could not be accomplished with a standard design solution. 4. Ability to calculate fault levels and select equipment to withstand the available fault current. 5. Understanding ground currents and potential rise and designing grounding system that would protect life and property. 6. Perform load calculations for sizing service and distribution equipment including future provisions. 7. Design circuits and systems with consideration for efficiency and power quality. 8. Using engineering principles, determine voltage level, transformation and distribution methods that provide the most economic and sustainable system. 9. Understand source and cause of harmonics and methods used to minimize the effects of harmonics on the system. 10. Design electrical control and protection schemes for transmission and distribution systems.
1.5 Be able to understand solution techniques and independently verify the results.	<ol style="list-style-type: none"> 1. Demonstrate an understanding of the engineering principles used in the application of computer design programs. 2. Perform Field Checks.
1.6 Safety awareness: Be aware of safety risks inherent in design; and demonstrate safety awareness – on-site; possible safety authorization/certificate as appropriate.	<ol style="list-style-type: none"> 1. Identify and use relevant safety procedures, processes, and equipment. 2. Develop maintenance programs. 3. Design test plans and equipment. 4. Implement inspection results. 5. Review and alter safety or system operating procedures when necessary. 6. Demonstrate specific knowledge safety regulations.

<p align="center">COMPETENCIES (each require one example)</p>	<p align="center">INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)</p>
<p>1.7 Demonstrate understanding of systems as well as of components of systems.</p>	<p>1. Demonstrate a working knowledge of the basic components of power generation -- Including: generators, switchgears, transformers, electronic drives, capacitors/reactors, voltage regulators, high and low voltage switches, cables/trays and conduits, overhead lines, protection and control equipment, fault protection/isolation devices and their coordination, specification of power grid interfaces, grounding systems.</p> <p>2. Manage processes within the overall system (monitor and, where needed, modify processes to achieve optimum outcomes).</p>
<p>1.8 Exposure to all stages of the process/project life cycle from concept and feasibility analysis through implementation.</p>	<p>1. Demonstrate awareness of project concerns and roles of other stakeholders in the project stages:</p> <ul style="list-style-type: none"> i. Identification: generation of the initial project idea and preliminary design. ii. Preparation: detailed design of the project addressing technical and operational aspects. iii. Appraisal: analysis of the project from technical, financial, economic, social, institutional and environmental perspectives. iv. Preparation of specifications and tender documents: preparation of tender document, inviting and opening of tenders, pre-qualification, evaluation of bids and award of work. v. Implementation and monitoring: implementation of project activities, with on-going checks on progress and feedback. vi. Evaluation: periodic review of project with feedback for next project cycle.
<p>1.9 Understand the concept of quality control during design and construction including independent design check and independent reviews of design, field checks and reviews.</p>	<p>1. Demonstrate peer review.</p> <p>2. Demonstrate completed project, systems or sub-systems meet project objectives.</p> <p>3. Participate in regular meetings and discussions with project members, both electrical and other disciplines, to ensure quality, scheduling, deadlines and budgeting are not compromised during both design and construction stages.</p> <p>4. Review designs, procedures and manuals to ensure design guidelines are adhered to.</p> <p>5. Consult with and seek input, including design and field review, from other project members throughout the project design and construction.</p> <p>6. Perform testing and commissioning upon completion of the product/project to ensure all design criteria, terms and conditions and applicable safety standards and regulations have been met.</p> <p>7. Demonstrate understanding of ISO 9000.</p>
<p>1.10 Transfer design intentions to drawings and sketches; Understand transmittal of design information to design documents.</p>	<p>1. Demonstrate communication of ideas and concepts to project team members.</p> <p>2. Demonstrate produced design documents required minimum additional interaction with other designers, contractors and commissioning personnel.</p> <p>3. Demonstrate the value of project completion reports and lessons learned reports to application in future projects by self or others.</p> <p>4. Understand established and acceptable symbols and terminology used in preparation of design drawings.</p> <p>5. Create sketches, notes and documentation to prepare proposals, preliminary, and final design drawings for acceptance by the client and approval by regulatory authorities.</p>

Appendix E-6 – Engineering Competency Indicators for Materials, Metallurgical and Mineral Processing – Category 1 only

You may choose to use the generic indicators for Technical Competence Category 1 shown in Appendix 2 or you may use the discipline-specific indicators when completing your entries. Categories 2 through 7 are the same for all disciplines.

Competency Category 1 – Technical Competence for Materials, Metallurgical and Mineral Processing Engineering

COMPETENCIES (each require one example)	INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)
1.1 Demonstrate knowledge of regulations, codes, standards, and safety - this includes local engineering procedures and practices as applicable.	<ol style="list-style-type: none"> 1. Identify and comply with legal and regulatory requirements for project activities. 2. Incorporate knowledge of codes and regulations in your area of practice. 3. Understand regulations that affect the handling, transportation and disposal of waste materials. 4. Experience using standards (e.g. ASTM) for testing. 5. Demonstrate awareness of safety documents, standards and regulations (e.g., WorkSafe, ASHRAE, material safety data sheets).
1.2 Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.	<ol style="list-style-type: none"> 1. Demonstrate knowledge of materials application, usage and/or operations: cost, storage, quality and handling problems. 2. Develop and implement evaluation, maintenance or rehabilitation programs for facilities and operations. 3. Coordination with other disciplines. 4. Materials selection and design for specific applications (e.g. biomedical, automotive, aerospace, electronics).
1.3 Analyze technical risks and offer solutions to mitigate the risks.	<ol style="list-style-type: none"> 1. Demonstrate familiarity with metallurgical system protection objectives, philosophies, and functions. 2. Identify risk areas. 3. Demonstrate an understanding of the development of risk management plans. 4. Demonstrate an understanding of the difference between technical risk and public safety issues. 5. Demonstrate awareness of Statistical Process Control and its role in detecting process deviations and associated risks.
1.4 Apply engineering knowledge to design solutions.	<ol style="list-style-type: none"> 1. Perform heat and mass balance calculations including data reconciliation. 2. Report on metallurgical accounting in a plant. 3. Circuit design and selection. Equipment sizing including throughput, residence time, and chemical kinetics calculations. 4. Failure analysis using microstructural and analytical characterization techniques (OM, SEM, TEM, XRD, AA). Demonstrate understanding of failure modes (e.g. creep, fatigue, corrosion, hydrogen cracking). 5. Use of equilibrium phase diagrams (Temperature-Composition, eH-pH, and Evans Diagrams) or non-equilibrium diagrams (TTT diagrams), or experimental determination of phase equilibria. 6. Perform alloy composition calculations. Demonstrate understanding of effects of alloying ingredients and strengthening mechanisms. 7. Pilot-scale testing of new processes. 8. Design and implementation of environmental control technologies for gas, liquid, and solid waste streams. Demonstrate understanding of strategies for tailings disposal. 9. Demonstrate understanding of mechanical properties and testing: stress-strain behaviour, fracture mechanics, fatigue, creep, toughness. 10. Design for corrosion prevention (coatings, thin films, materials selection). 11. Design weld parameters and prepare welding procedures.
1.5 Be able to understand solution techniques and independently verify the results.	<ol style="list-style-type: none"> 1. Participate in an independent review process. 2. Demonstrate an understanding of the engineering principles used in the application of computer design programs.

<p align="center">COMPETENCIES (each require one example)</p>	<p align="center">INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)</p>
<p>1.6 Safety awareness: Be aware of safety risks inherent in design; and demonstrate safety awareness – on-site; possible safety authorization/certificate as appropriate.</p>	<ol style="list-style-type: none"> 1. Use of non-destructive evaluation techniques for weld evaluation. 2. Review and assess results for equipment and material evaluation. 3. Understand and account for safety risks associated with processes. Identify relevant metallurgical processes and personal protection equipment to mitigate safety risks. 4. Review, identify and incorporate safety procedures, system operating procedures, processes and equipment. 5. Demonstrate specific knowledge of safety regulations. 6. Incorporate explicit human and public safety considerations in design and all other professional activities.
<p>1.7 Demonstrate understanding of systems as well as of components of systems.</p>	<ol style="list-style-type: none"> 1. Demonstrate understanding of complex Process Flow Diagrams and of each unit operation in the process. 2. Development of process improvement initiatives. Demonstrate understanding of continuous improvement philosophy and practice. 3. Demonstrate understanding of effects of process modifications on downstream processes and final product. 4. Demonstrate familiarity with control systems and strategies. Demonstrate understanding of limitation of process control.
<p>1.8 Exposure to all stages of the process/project life cycle from concept and feasibility analysis through implementation.</p>	<ol style="list-style-type: none"> 1. Demonstrate awareness of project concerns and roles of other stakeholders in the project stages: <ol style="list-style-type: none"> i. Identification: generation of the initial project idea and preliminary design. ii. Preparation: detailed design of the project addressing technical and operational aspects. iii. Appraisal: analysis of the project from technical, financial, economic, social, institutional and environmental perspectives. iv. Preparation of specifications and tender documents: preparation of tender document, inviting and opening of tenders, pre-qualification, evaluation of bids and award of work. v. Implementation and monitoring: implementation of project activities, with on-going checks on progress and feedback. vi. Evaluation: periodic review of project with feedback for next project cycle.
<p>1.9 Understand the concept of quality control during design and construction including independent design check and independent reviews of design, field checks and reviews.</p>	<ol style="list-style-type: none"> 1. Conduct Field Checks to verify the validity of design and fabrication. 2. Complete Quality Management Plan Checklist, and follow Quality Management Plan. 3. Prepare quality assurance plans, including frequency and test parameters, for specific construction processes or products. 4. Evaluate test results and determine adequacy. 5. Carry out or supervise field testing of materials or welds. 6. Carry out or supervise implementation of new processing equipment.
<p>1.10 Transfer design intentions to drawings and sketches; Understand transmittal of design information to design documents.</p>	<ol style="list-style-type: none"> 1. Demonstrate communication of ideas and concepts to project team members. 2. Demonstrate understanding of value of project completion reports and lessons learned reports to application in future projects by self or others. 3. Ability to review designs of others and communicate findings and issues, including suggested alternatives. 4. Development of welding data cards.

Appendix E-7 – Competency Indicators for Building Enclosure Engineering – Category 1 only

You may choose to use the generic indicators for Technical Competence Category 1 shown in Appendix 2 or you may use the discipline-specific indicators when completing your entries. Categories 2 through 7 are the same for all disciplines.

Competency Category 1 – Technical Competence for Building Enclosure Engineering

<p style="text-align: center;"><u>COMPETENCIES</u> (each require one example)</p>	<p style="text-align: center;"><u>INDICATORS</u> (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)</p>
<p>1.1 Demonstrate knowledge of regulations, codes, standards, and safety - this includes local engineering procedures and practices as applicable.</p>	<ol style="list-style-type: none"> 1. Identify and comply with legal and regulatory requirements for project activities. 2. Prepare or review drawings and specifications for permit applications, tender, and construction. 3. Incorporate knowledge of codes, standards and regulations in design documents, particularly Parts 5, 9 and 10 (BC Building Code of the applicable code, those sections associated with condensation control, water penetration control, heat, air and moisture transfer, and Parts 3 and 4 of the applicable code and Vancouver Building Bylaw as they apply to the building enclosure. 4. Recognize the need to design for code compliance while achieving constructability. 5. Use knowledge of applicable codes and standards for construction and testing.
<p>1.2 Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.</p>	<p>Demonstrate a thorough understanding of the following areas of theory and technical knowledge as they relate to the performance of the building enclosure and as outlined in the references to the <i>Professional Practice Guidelines for Building Enclosure Engineering Services (BC)</i> or the guideline for the jurisdiction in which you propose to practice:</p> <ol style="list-style-type: none"> 1. Materials Knowledge including physical and chemical properties, mechanisms of deterioration, behaviour and performance thresholds with respect to other materials and environments (Section 3.1.2.1.1 of the referenced guideline). 2. Building Physics including boundary conditions, environmental impact, structural loads, hygrothermal calculations, analysis simulation, consideration and accommodation to prevent problematic accumulation of moisture within the building enclosure (Section 3.1.2.1.2 of the referenced guideline). 3. Components, Assemblies and Other Building Systems including interdependence, integration of theoretical and technical knowledge and assessment of the appropriate of heat, air and moisture control functions with respect to elements that comprise the building enclosure (Section 3.1.2.1.3 of the referenced guideline).
<p>1.3 Analyze technical risks and offer solutions to mitigate the risks.</p>	<ol style="list-style-type: none"> 1. Demonstrate the ability to apply informed, professional judgment calls where risk assessment is concerned. 2. Identify risks and benefits of alternatives. 3. Determine the consequences of selection of alternatives, decisions and actions. 4. Determine relative costs of various acceptable alternatives. 5. Demonstrate an understanding of implications to risk of the application of local construction practices.
<p>1.4 Apply engineering knowledge to design solutions.</p>	<p>Demonstrate familiarity with the content and preparation of building enclosure related construction documents and apply this knowledge to the design and design review of building enclosures, including:</p> <ol style="list-style-type: none"> 1. assessment of exposure conditions related the building site, determination of appropriate external environmental loads and assessment of internal loads imposed on the building enclosure due to use and occupancy. 2. development and determination of appropriate building enclosure assemblies, selection of components and materials for the environmental conditions and compatibility with adjoining materials and consideration of service lives and relative durability of materials and components. 3. calculation of heat, air and moisture transfer through elements and assemblies in conformance with good practice. 4. confirmation of continuity of primary heat, air and moisture control functional surfaces or barriers throughout the building enclosure. 5. review and analysis of designs of others. Communication of findings and suggestion of alternatives.

<p align="center">COMPETENCIES (each require one example)</p>	<p align="center">INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)</p>
<p>1.5 Be able to understand solution techniques and independently verify the results.</p>	<ol style="list-style-type: none"> 1. Demonstrate an understanding of the building science/engineering principles used in the application of computer design programs. 2. Understand and have the ability to do approximate analysis to independently verify the results of technical software and solution. 3. Participate in an independent review process.
<p>1.6 Safety awareness: Be aware of safety risks inherent in design; and demonstrate safety awareness – on-site; possible safety authorization/certificate as appropriate.</p>	<ol style="list-style-type: none"> 1. Demonstrate awareness of safety risks associated with the evaluation, design and construction of the building enclosure. 2. Demonstrate knowledge of site safety and worker compensation act. 3. Demonstrate knowledge and experience of regulations for design and use of fall arrest and fall protection systems. 4. Incorporate explicit human and public safety considerations in design and all other professional activities. 5. Demonstrate knowledge of how safety considerations affect design decisions.
<p>1.7 Demonstrate understanding of systems as well as of components of systems.</p>	<ol style="list-style-type: none"> 1. Demonstrate understanding of the interactions and constraints in the behaviour of the building enclosure in the context of the overall building as well as other functions that the building enclosure may perform. 2. Demonstrate understanding of the integration of the building enclosure system with the other building systems.
<p>1.8 Exposure to all stages of the process/project life cycle from concept and feasibility analysis through implementation.</p>	<p>Demonstrate awareness of project concerns and roles of other stakeholders in the project stages:</p> <ol style="list-style-type: none"> 1. Identification: generation of the initial project idea and preliminary design. 2. Preparation: detailed design of the project addressing technical and operational aspects. 3. Appraisal: analysis of the project from technical, financial, economic, social, institutional and environmental perspectives. 4. Preparation of specifications and tender documents: preparation of tender document, inviting and opening of tenders, pre-qualification, evaluation of bids and award of work. 5. Implementation and monitoring: implementation of project activities, with ongoing checks on progress and feedback. 6. Evaluation: periodic review of project with feedback for next project cycle. <p>For non-construction projects, demonstrate exposure to all phases of the project from initial considerations and client contact to final conclusions.</p>
<p>1.9 Understand the concept of quality control during design and construction including independent design check and independent reviews of design, field checks and reviews.</p>	<ol style="list-style-type: none"> 1. Demonstrate an understanding of roles and responsibilities of others in the construction quality assurance and control process (architect, contractors, testing agencies). 2. Demonstrate quality control in the production of drawings, calculations and reports, including review by the supervising professional. 3. Conduct site visits to observe and verify construction of building enclosure elements, and write field review reports for the purpose of confirming substantial compliance with the construction documents and the building code. 4. Identify deviations from the design intent as well as variations in site conditions from those planned or expected and respond appropriately to site changes or work that is not compliant. 5. Review test results, manufacturers' product information, shop drawings, prototypes, and samples in order to assist in determining whether the construction of the building enclosure is in substantial compliance with the construction documents. 6. Demonstrate an understanding of the difference between Quality Control and Quality Assurance.
<p>1.10 Transfer design intentions to drawings and sketches; Understand transmittal of design information to design documents.</p>	<ol style="list-style-type: none"> 1. Design and prepare detail drawings that clearly identify the work required at various building enclosure locations and identify if designs produced by others adequately address required performance. 2. Produce sketches, notes, documentation and design documents to prepare proposals, preliminary, and final design drawings for acceptance by the client and approval by regulatory authorities. 3. Incorporate figures and sketches into reports to convey engineering opinions. 4. Review designs of others and communicate findings and issues, including suggested alternatives.

Appendix E-8 – Competency Indicators for Software Engineering – Category 1 only

You may choose to use the generic indicators for Technical Competence Category 1 shown in Appendix 2 or you may use the discipline-specific indicators when completing your entries. Categories 2 through 7 are the same for all disciplines.

Competency Category 1 – Technical Competence for Software Engineering

COMPETENCIES (each require one example)	INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)
1.1 Demonstrate knowledge of regulations, codes, standards, and safety – this includes local engineering procedures and practices as applicable.	<ol style="list-style-type: none"> 1. For design and project activities, identify legal and regulatory requirements for information control, auditing and security (e.g. Bill C198 CSOX) – information access and protection of privacy legislation, and non-disclosure or intellectual property agreements. 2. Incorporate knowledge of standards (such as: coding standards, interface standards for hardware and software operating systems, external standards for programming languages and tools, technical interfaces, internal standards, IEEE/ISO/IEC Standards) in design materials. 3. Prepare reports assessing project compliance with codes, standards, and legal/regulatory requirements. 4. Ensure that appropriate codes, standards, and legal/regulatory requirements are complied with in the design and implementation process.
1.2 Demonstrate knowledge of materials, or operations as appropriate, project and design constraints, design to best fit the purpose or service intended and address inter-disciplinary impacts.	<ol style="list-style-type: none"> 1. Demonstrate knowledge of business or industrial processes, operations, project and design constraints, e.g. timeline, cost, physical, operational availability, reliability, user competence, failure rate, maintenance downtime and support. 2. Demonstrate knowledge of appropriate existing software components, package, frameworks, APIs, libraries, development stacks, software patterns, both internal (to the development organization) and external (open-source or proprietary). 3. Demonstrate understanding of and coordination with other engineering and professional disciplines. 4. Demonstrate use of software development best practices (e.g. code reviews, revision management, and automated deployment) to ensure process integrity.
1.3 Analyze technical risks and offer solutions to mitigate the risks.	<ol style="list-style-type: none"> 1. Demonstrate familiarity with system protection, security and/or damage/hazard mitigation (e.g. from unexpected loads, unintended uses, cyberattacks, catastrophic failures and losses, etc.). 2. Identify risk and threat areas including causes of risks and their impacts to the client and public. 3. Perform FMEA. Clearly identify the remaining risks and worst case scenario. 4. Develop risk management/mitigation plans.
1.4 Apply engineering knowledge to design solutions. Adopt application-proven and field-proven design approaches whenever feasible.	<ol style="list-style-type: none"> 1. Conduct Business or Industrial Process Analysis. 2. Identify functional requirements and non-functional requirements (relevant quality attributes). 3. Apply Software Engineering Principles to System Synthesis and Design of a software-intensive system to obtain optimal results (Develop or select a suitable system and software architecture; Select an appropriate development technology (framework, language, tools) Decompose the system; design interfaces between software components; etc. Trace key design choices to functional and non-functional requirements, etc.). 4. Demonstrate the development of a unique solution which could not be accomplished with a standard design solution. 5. Adopt application-proven and field-proven design approaches whenever feasible.
1.5 Be able to understand solution techniques and independently verify the results.	<ol style="list-style-type: none"> 1. Demonstrate an understanding of the application, selection and adaptation of available software engineering tools to support specific tasks in the software development life-cycle. 2. Show /describe steps taken to independently verify the results of available software engineering tools, APIs, frameworks, libraries etc.

<p align="center">COMPETENCIES (each require one example)</p>	<p align="center">INDICATORS (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)</p>
<p>1.6 Safety awareness: Be aware of safety risks inherent in design; and demonstrate safety awareness – on-site and possible safety authorization/certificate as appropriate.</p>	<ol style="list-style-type: none"> 1. <i>Demonstrate compliance to local design and programming standards, including privacy regulations, language, product quality and functional safety standards, cybersecurity standards, system and software quality requirements and evaluation, requirements for specific regulatory purposes and ethical considerations.</i> 2. <i>Demonstrate application of crossover domains and protection of data.</i> 3. <i>Demonstrate incorporation of elements in software design that protects/ensures public interest, user protection, security and safety.</i> 4. <i>Demonstrate post-failure analysis of causes of failure and suggest solutions to prevent further disasters.</i> 5. <i>Identify risks through operations with respect users goals, how you ensure safety of data and user integrity and how implement xxx to ensure user integrity.</i> 6. <i>List the risk or fault exclusion terms or conditions.</i>
<p>1.7 Demonstrate understanding of systems as well as of components of systems.</p>	<ol style="list-style-type: none"> 1. <i>Demonstrate a decomposition and understanding of the modularity of a software solution.</i> 2. <i>Show an understanding of the software's operating environment (e.g. operating systems, network components, physical devices, software libraries and frameworks, external systems), and constraints in the behaviour of the overall system.</i> 3. <i>Demonstrate understanding of systems architecture from a safety perspective as well as of components of systems on their safety data or statistics from manufacturers.</i>
<p>1.8 Exposure to all stages of the process/project life cycle from concept and feasibility analysis through implementation.</p>	<p><i>Demonstrate the applicant's contribution to the following stages of the project lifecycle:</i></p> <ol style="list-style-type: none"> 1. Identification/Elicitation of Requirements: <i>confirmation of operational distribution or deployment mission profile or scenario, critical system performance parameters, utilization requirements, operational life-cycle and operating environment, user expectations and system operational requirements.</i> 2. Preparation: <i>effective use of software development process or life cycle and adaptation of development process to the requirements, including use of third-party simulation schemes such as HIL techniques.</i> 3. Appraisal: <i>analysis of the project or features from technical, timeline/financial, economic, social, user requirements, institutional and environmental perspectives.</i> 4. Preparation of specifications, design team integration and subcontracting: <i>preparation of design specifications, integration of design team, engagement and integration of external system suppliers or subcontractors.</i> 5. Implementation, validation and monitoring: <i>implementation of project activities with on-going checks on progress and feedback; project management (agile or waterfall/traditional), training and support of users including user documentation.</i> 6. System Life Cycle Support: <i>system maintenance, review of system efficiency, iterative optimization, system retirement.</i>
<p>1.9 Understand the concept of quality control during design and construction including independent design check and independent reviews of design, field checks and reviews.</p>	<ol style="list-style-type: none"> 1. <i>Ensure user and stakeholder expectations are met.</i> 2. <i>Ensure the software design meets technical expectations,</i> 3. <i>Prepare quality control plans for the entire design and implementation process, including frequency and test parameters, for specific processes or products.</i> 4. <i>Evaluate test results, determine adequacy, and develop recommended action.</i> 5. <i>Demonstrate independent peer review and validation of design.</i> 6. <i>Demonstrate that completed project, systems or sub-systems meet project objectives in terms of functionality, operational performance and cost.</i> 7. <i>Understand design limitations and exclusions in terms of safety.</i> 8. <i>Demonstrate root cause analysis in production/live systems.</i>

<p align="center"><u>COMPETENCIES</u> (each require one example)</p>	<p align="center"><u>INDICATORS</u> (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)</p>
<p>1.10 Transfer design intentions to drawings and sketches; Understand transmittal of design information to design documents.</p>	<ol style="list-style-type: none"> 1. <i>Demonstrate the ability to prepare or review software-specific drawings and sketches (ER diagrams, UML (Unified Modeling Language) diagrams, IDEF0, statecharts, pseudo-code etc.) of others and communicate findings and issues, including suggested alternatives.</i> 2. <i>Demonstrate communication of ideas and concepts to project team members.</i> 3. <i>Demonstrate understanding of value of project completion reports and lessons learned reports to application in future projects by self or others.</i> 4. <i>Produce software engineering design documentation with respect to requirements, architecture, technical (code, algorithms, interfaces and APIs) and end user documentation, including training and standard operating procedures, and document design and specifications for acceptance by the client/user and approval by regulatory authorities.</i>

Appendix G-1 – Geoscience Competency Framework

WORK EXPERIENCE COMPETENCIES (each require one example)		WORKPLACE EXAMPLES (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)	
1. PROFESSIONAL COMPETENCIES (PROFESSIONALISM)			
1.1	Comply with relevant legislation, regulations, and statutory reporting requirements		
		a	Apply for licenses and permits
		b	Undertake stakeholder consultations
		c	Complete and file reports and notifications
1.2	Practice within the bounds of personal expertise and limitations		
		a	Undertake self-assessment to identify personal limits
		b	Seek advice from professionals with more appropriate expertise
		c	Refer client to other professionals
1.3	Increase relevant knowledge, skills and level of performance over time		
		a	Attend conferences, workshops or courses related to area of practice
		b	Undertake focused research or learning to address knowledge gaps
		c	Obtain relevant specialty training or certification
1.4	Maintain constructive working relationships		
		a	Undertake and apply diversity training
		b	Provide and accept constructive feedback
		c	Contribute to workplace conflict resolution
1.5	Apply ethical principles		
		a	Communicate consequences of disregarding professional advice
		b	Respond to unethical behaviour of others
		c	Identify and address conflict of interest

WORK EXPERIENCE COMPETENCIES (each require one example)		WORKPLACE EXAMPLES (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)	
1.6	Respond to obligations and responsibilities to the public, to the natural environment, to clients and to employers		
		a	Undertake work activities in a manner that minimizes environmental impact
		b	Make decisions consistent with client or employer needs that protect the safety, health and welfare of the public
		c	Provide accessible and appropriate information to minimize public concerns
1.7	Contribute to health and safety in the workplace		
		a	Proactively address workplace health and safety
		b	Identify unsafe practices or hazardous situations
		c	Contribute to development of site-specific health and safety requirements
2. COMPETENCIES IN SCIENTIFIC METHOD			
2.1	Apply scientific principles		
		a	Use mathematical and statistical principles to analyze data
		b	Use principles of chemistry and physics to interpret data
		c	Formulate, test and evaluate hypothesis
2.2	Effectively utilize scientific literature		
		a	Undertake a literature search
		b	Critically analyze and incorporate published research
		c	Identify and acknowledge relevant sources
2.3	Identify uncertainty and ambiguity in data, and limits to knowledge		
		a	Identify bias in data collection
		b	Evaluate margin of error on results
		c	Display uncertainty in analytical results or interpretation

WORK EXPERIENCE COMPETENCIES (each require one example)		WORKPLACE EXAMPLES (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)	
2.4	Apply principles of quality assurance and quality control (QA / QC)		
		a	Follow established protocols in data collection or analysis
		b	Review project outcomes relative to quality standards
		c	Establish QA / QC standards
2.5	Undertake relevant investigation and due diligence		
		a	Research complete background information
		b	Review similar situations to identify known hazards and risks
		c	Consider potential unanticipated outcomes
3. COMPETENCIES IN AREA OF GEOSCIENCE PRACTICE			
3.1	Plan investigations based upon purpose of study, incorporating existing site-specific information and appropriate approaches		
			Examples of investigations:
		a	geological mapping
		b	geophysical survey
		c	baseline monitoring
		d	geohazard assessment
		e	drilling program
		f	sampling program
		g	environmental site assessment
		h	research project
3.2	Acquire, process and analyze data using appropriate methodologies		
		a	Use effective devices and instruments to acquire data
		b	Apply locational tools and principles to georeference data
		c	Analyze and process data using 3-D modelling software

WORK EXPERIENCE COMPETENCIES (each require one example)		WORKPLACE EXAMPLES (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)	
3.3	Incorporate relevant data from other sources		
		a	Integrate historical and current data
		b	Include local or regional information
		c	Identify analogs
3.4	Interpret and evaluate data to construct models consistent with purpose of investigation		
		a	Prepare and interpret logs, sections or maps
		b	Prepare and interpret spreadsheets, charts or diagrams
		c	Apply geoscience principles to generate models
3.5	Critically evaluate models		
		a	Address uncertainty and bias
		b	Compare and contrast analogous models
		c	Evaluate validity of model relative to objectives
3.6	Formulate conclusions and recommendations		
		a	Define drilling targets
		b	Assess site suitability and determine mitigation measures
		c	Assess feasibility based on resource estimation
		d	Provide alternative solutions and make recommendations
3.7	Adapt methodologies to address unfamiliar situations		
		a	Modify mapping or sampling methodologies in unfamiliar terrain or geological settings
		b	Adapt approach based on stakeholder values
		c	Integrate additional knowledge & skills to address unfamiliar situations
		d	Develop new techniques

WORK EXPERIENCE COMPETENCIES (each require one example)		WORKPLACE EXAMPLES (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)	
4. COMPLEMENTARY COMPETENCIES - COMMUNICATION AND MANAGEMENT			
4.1	Deliver and comprehend oral communication		
		a	Participate in a consultation or working group
		b	Deliver a geoscience lecture or presentation
		c	Describe a geoscience model to a client, peer or supervisor
4.2	Deliver and comprehend written communication		
		a	Prepare and respond to business correspondence
		b	Write a project or funding proposal
		c	Interpret and synthesize written information
4.3	Communicate technical information effectively to a variety of audiences		
		a	Create or adapt a presentation for technical and non-technical audiences
		b	Create or modify written material for technical and non-technical audiences
		c	Deliver a geoscience presentation to students
4.4	Manage activities		
		a	Plan or coordinate geoscience field work
		b	Plan or coordinate data collection or analysis
		c	Organize a conference, workshop or meeting
4.5	Use time management skills		
		a	Prioritize activities to meet deadlines
		b	Use scheduling tools
		c	Adapt schedule to changing situations
4.6	Provide direction to others		
		a	Provide instructions to students
		b	Advise team members or co-workers
		c	Supervise the work of others

WORK EXPERIENCE COMPETENCIES (each require one example)		WORKPLACE EXAMPLES (suggestions (not mandatory) on example content that is appropriate to demonstrate the competency)	
4.7	Contribute to budgetary management		
		a	Evaluate quotes
		b	Estimate costs
		c	Control expenditures
4.8	Apply basic principles of risk management		
		a	Mitigate risk associated with field work
		b	Coordinate activities to manage risk
		c	Communicate business risks associated with geoscience interpretations
4.9	Contribute to secure data management		
		a	Use data security software
		b	Protect confidential information or materials
		c	Develop or follow organizational data management protocols
4.10	Maintain comprehensive professional records		
		a	File and archive comprehensive and clear field observations
		b	Label, store and catalogue samples
		c	Prepare and retain business and administrative records

