ENGINEERS NOVA SCOTIA

Responsible AI use in engineering practice

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Use AI in a way that aligns with your duty to:

“Hold paramount the safety, health, and welfare of the public and the protection of the environment and promote health and safety within the workplace.”

Engineers Nova Scotia, Code of Ethics

Trust me.
I’m an algorithm.

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01 What are you doing?

02 What am I relying on you for?

03 What's the evidence that shows me that you can be relied on for that?

A bridge rehabilitation program

AI USE:

- Summarizing
- Drafting

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Before the report draft

Authorized use	An approved tool and permitted client data
Information protection	Privacy and confidentiality safeguards
Client disclosure	Client understands how AI contributed to the work

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“That review will never find the problem, because the problem isn’t on the page.”

Evidence of accuracy and completeness

ACCURACY

Trace findings in the report to the records

COMPLETENESS

Trace records to findings in the report

Artificial intelligence

An umbrella term that refers to a broad category of computing approaches that can perform tasks ordinarily associated with human intelligence.

LEARNING | COMPREHENDING | PROBLEM-SOLVING |

PERCEIVING | DECISION-MAKING | CREATIVITY |

AI systems

Expert systems	Explicitly encoded expert knowledge
Machine learning	Models learn patterns from data
Deep learning	Machine learning using layered neural networks
Generative AI	Produces text, images, audio, video, code
AI Agents	Can use tools to autonomously carry out tasks toward a goal

How AI shows up

- Built
- Bought or licensed
- Embedded
- Brought
- Others' work

A ferry terminal expansion

AI USE:

- Concept rendering
- Retrieving information
- Predicting

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The evidence depends on the use and context, and the scrutiny must match the stakes

CONCEPT RENDERING

It looks about right for the open-house purpose

RETRIEVAL AND PREDICTING

Data sources, assumptions, local relevance and uncertainty

A potato chip factory

AI USE:

- Classifying
- Predicting

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99.5% accurate

Is this good enough?

Sometimes, AI is not the answer.

Sometimes, the simplest, lowest-tech option is the better choice.

An office building

AI USE:

- Translating (inputs into software requirements)

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Supervision includes assessing understanding

“Walk me through how this matches what’s on the drawings.”

AI does not change your responsibility

AI does not change your responsibility

You are still accountable for the work

Space food

AI USE:

- Modelling
- Simulating
- Recommending

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Automation bias

Giving a machine’s recommendation more weight than the evidence behind it deserves

No compromise

When the stakes are high…even if there’s pressure to do so.

Evidence for initial screening

Underlying simulations	Checked against laboratory data
Model estimates	Tested on separate cases
Shortlisted designs	Detailed simulations and engineering review

Exercising your professional judgement is essential.

Even if that means going against a machine.

An environmental assessment

AI USE:

- Retrieving information – with an AI Agent

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“Checked and ready for use”

No human had checked it.

Human authority and enforced limits

Defined access and contact permissions

Approval by an authorized human reviewer

Limits enforced and tested in software

Records, exceptions and the ability to stop

Documentation

A project record others can use

“What would they need in order to see what the AI did, what you checked, and why you accepted it?”

Repeatability, reproducibility, replicability

Can the same team, using the same records and the same prompt to the same AI under the same condition get the same result?

If yes, that's repeatability

Reproducibility	A **different team** gets the same result using the original code and data.
Replicability	A **different team** gets the same general finding using *new* code, data, or experiments.

When AI materially contributes

“Registrants should disclose AI use to clients where AI materially contributes to analysis, calculations, recommendations, design decisions, or other substantive elements of a deliverable.”

Engineers Nova Scotia, Artificial Intelligence Guidance

Sufficient competence for the task

“If a registrant does not have the training or experience to competently understand the risks and limitations of AI tools, and the validity of AI results, then they should not use AI tools in their practice.”

Engineers Nova Scotia, Artificial Intelligence Guidance

- More time to explore options
- Consider new or novel ideas
- Reduce repetitive work
- Free your attention for the matters that deserve it

01 **What are you doing?**

02 **What am I relying on you for?**

03 **What's the evidence that shows me that you can be relied on for that?**

When your name goes on the work, it should carry judgement you're prepared to stand behind

Thank you for the good work you do

Thank you for using AI responsibly

Thank you.

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