ALTO HSR Citizen Research Initiative

Research Note

Norway's Quality Assurance Scheme

An International Precedent for Independent Review of Major Public Investment Decisions

Headline Finding

Since 2000, Norway has operated a mandatory two-gate external Quality Assurance scheme (QA1 and QA2) under the Ministry of Finance for all major public investment projects. Twenty-five years of operating evidence across approximately 160 reviewed projects demonstrates that systematic external review materially improves cost discipline: roughly three-quarters of post-QA2 projects have been delivered within their parliamentary cost frame, against pre-QA cost overruns documented at 59 to 183 percent on Norwegian transport projects.

Applied to the Canadian context, the Norway scheme provides a working institutional template for the independent review of the High Performance Rail (HPR) alternative that the Initiative has been advocating before final corridor selection. ALTO's published $75 billion cost figure is a concept-stage estimate that, by Norwegian standards, has not yet been subjected to either external concept-stage review (QA1) or stochastic pre-budget cost validation (QA2). A federal investment of ALTO's scale and policy importance would unambiguously fall within the scope of mandatory independent review under any institutional design comparable to Norway's.

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1. Origin and purpose of the scheme

Norway's Quality Assurance scheme — known in Norwegian as kvalitetssikringsordningen, abbreviated KS1 and KS2, and rendered in English-language documentation as QA1 and QA2 — was established in 2000 by the Norwegian Ministry of Finance in response to a recurring pattern of cost overruns and weak strategic justification on Norwegian megaprojects through the 1980s and 1990s. The scheme was created with two specific objectives: to avoid embarrassing budget overruns on projects already under construction, and to filter out flawed investment cases that should not have been started at all.

In its initial form (2000–2005) the scheme consisted only of QA2 — quality assurance of the management base and cost estimates immediately before parliamentary funding approval. From 2005 onwards, QA1 was added as an upstream gate covering the choice of conceptual solution itself, before the project enters the pre-project (preliminary design) phase. The two-gate structure has remained substantially unchanged since 2005, with periodic recalibration of thresholds and procedural detail through Ministry of Finance circulars. The current governing circular is R-108/23 (subsequently superseded in part by R-108/25), which specifies documentation requirements, review procedures, and ministerial accountabilities.

The scheme is mandatory. It applies to all government investment projects with an estimated total cost frame above the threshold value of approximately one billion Norwegian kroner (approximately CAD 130 million in 2026 terms), and approximately 300 million NOK (approximately CAD 39 million) for digitalisation projects. The petroleum sector is exempt. State-owned enterprises with their own investment authority — including Bane NOR (the railway infrastructure operator), Nye veier (the highways agency), and Statnett (the transmission operator) — operate parallel internal QA regimes that closely mirror the central scheme. The result is that essentially every Norwegian federal infrastructure investment of comparable scale to ALTO would be subject to mandatory independent external review at two specific decision points.

2. Structure of the two review gates

2.1 QA1 — Quality assurance of concept choice

QA1 is performed by the end of the concept appraisal phase, before a Cabinet decision to start a pre-project. The purpose, as stated in the Ministry of Finance documentation, is to ensure that the decision to start a pre-project and the choice between alternative concepts are subject to political control, and that the documents underlying the decision base are of high quality.

As the basis for the QA1 review, the proponent ministry or agency must prepare a Conceptual Appraisal document (Konseptvalgutredning, abbreviated KVU). The KVU must include:

- A needs analysis identifying the underlying problem the project is intended to address;
- A goals and objectives statement specifying the societal outcomes the project is intended to deliver;
- A requirements analysis identifying functional and operational specifications;
- An alternatives analysis encompassing at minimum the zero option (do nothing) and at least two other conceptually different alternatives;
- A cost-benefit analysis covering each alternative.

The external reviewer assesses whether the documentation adequately supports the proposed conceptual choice and whether the alternatives analysis is genuine — that is, whether the do-nothing case and the conceptually different alternatives have been evaluated rigorously rather than treated as nominal foils to a predetermined preferred option. The reviewer's recommendation goes to Cabinet for political decision; Cabinet may accept the recommendation, modify it, or reject the project entirely. The QA1 reviewer does not have decision authority — but the recommendation is on the public record, and a Cabinet decision contrary to the QA1 recommendation requires explicit political accountability.

2.2 QA2 — Quality assurance of the management base and cost estimates

QA2 is performed at the end of the pre-project phase, before the project is submitted to Parliament (Stortinget) for funding approval. The control aspect is the explicit primary objective: the reviewer examines the documentation behind the proposition presented to Parliament with emphasis on cost estimates, and provides an independent recommendation on the budgeted cost frame.

The methodological core of QA2 is stochastic cost estimation. Rather than a single deterministic cost figure, the reviewer produces a probability distribution of total investment cost using either mathematical-analytical methods or Monte Carlo simulation tools. The Ministry of Finance standard is that the parliamentary budgeted cost is normally set at P85 — the 85th percentile of the cost distribution — with a separately defined target cost (typically the median or P50) that commits the executing agency. The rationale, stated explicitly in the governing literature, is that simple deterministic cost estimates are systematically skewed and do not provide sufficient assurance that the parliamentary budget will not be exceeded.

The QA2 reviewer also produces a forward-looking management challenge assessment, charting the operational risks for the remaining project phases. This includes contractor and procurement risks, scope-change risks, schedule risks, and stakeholder risks. The output is a project-specific reduction list (kuttliste) — a pre-identified set of scope items that can be removed during execution if costs trend toward the upper bound of the distribution. This is a structurally important feature of the system: it preserves project flexibility within the parliamentary cost frame rather than requiring formal re-authorization for each cost overrun.

3. Who performs the reviews and how independence is preserved

The QA reviewers are external private-sector consultants on a Ministry of Finance framework agreement. The current framework (entered September 2023) covers seven consortia, each comprising several Norwegian or Norwegian-affiliated firms. The named consortia include Holte Consulting, Menon Economics, A-2 Norge, Dovre Group Consulting, the Institute of Transport Economics (Transportøkonomisk institutt), and several others in various combinations. It is compulsory to use one of these pre-approved consortia; ad hoc retention of consultants outside the framework is not permitted.

Several institutional features preserve the independence of the review:

- The Ministry of Finance — not the project-proposing ministry — selects the reviewing consortium for each project, by call-off against the framework. This separates the funding-approval ministry from the project-promoting ministry, removing the conflict that would arise if the proponent could choose its own reviewer.

- The reviewer is required to follow pre-defined methodological requirements set out in the Ministry of Finance circular. The reviewer does not have discretion to redefine the scope of the review or to renegotiate methodology with the proponent.
- Reviewers are subject to standing conflict-of-interest restrictions. A consortium that has performed concept-stage advisory work on a project is generally precluded from performing the QA review on the same project.
- The QA reports are public documents (with limited commercial-confidentiality redactions) and are catalogued by NTNU's Concept Research Programme, which has tracked every QA review since the scheme's inception.

The cost of the review itself is small in proportion to the investment under examination — typically a fraction of one percent of project capital cost — and is a budgeted line item in the Ministry of Finance's project-development funding rather than a charge against the project ministry.

4. Empirical track record after twenty-five years

The Concept Research Programme at the Norwegian University of Science and Technology (NTNU) has systematically tracked the cost performance of every project subject to the QA scheme since 2000. The accumulated evidence base now covers approximately 160 QA2 reviews and approximately 60 QA1 reviews — sufficient sample size to draw robust conclusions about whether external QA materially improves cost discipline.

4.1 Cost performance after QA2

Independent academic studies converge on a consistent finding: post-QA2 Norwegian projects substantially out-perform the international cost-overrun benchmarks. The most recent comprehensive review (Welde and Klakegg, 2022) finds that approximately 75 percent of projects subjected to external QA have been delivered within their parliamentary cost frame. A multi-country study covering Norwegian, Danish, and Swedish rail and road infrastructure projects completed between 2008 and 2022 (Love et al., 2025) concludes that Scandinavian infrastructure projects are generally delivered "on cost, over time" — within their approved budgets, though often behind schedule.

This stands in sharp contrast to the international cost-overrun literature. Flyvbjerg, Skamris Holm and Buhl (2003), in their analysis of 258 transport infrastructure projects across 20 countries, document mean cost overruns of 45 percent on rail projects and 20 percent on roads. Pre-QA Norwegian transport projects analysed by Odeck (2004) showed cost overruns ranging from 59 percent to 183 percent. The introduction of mandatory external QA materially compressed this distribution.

4.2 The harder finding: front-end cost escalation persists

The more nuanced finding from the Norway evidence concerns the front-end phase — the period between QA1 (concept-stage) and QA2 (pre-funding). Even with mandatory QA1 review, average cost escalation between QA1 and QA2 has been approximately 40 percent across the projects studied by Welde and Odeck (2017) and subsequent updates. The underlying mechanism is well-understood: as a project moves from concept appraisal to detailed pre-design, scope clarification typically reveals cost drivers that were not captured in the initial conceptual estimate. The Norwegian Planning and Building Act (which gives municipalities and

regional authorities significant influence over alignment, station siting, and environmental mitigation) is a documented contributor to this front-end scope expansion.

In response, the Ministry of Finance introduced in 2019 a formal requirement that all major projects maintain a continuous change log of cost and scope changes during the front-end phase, with the explicit objective of constraining QA1-to-QA2 escalation. The 2025 update of the governing circular (R-108/25) further tightens the change-log requirement and adds a structured benefit realisation plan to QA2 documentation.

4.3 Implications for the Canadian context

Two implications follow. First, the Norwegian evidence demonstrates that systematic external QA does materially improve post-funding cost discipline — the central rationale for adopting an analogous scheme in Canada is empirically supported, not merely procedural. Second, the persistence of front-end cost escalation even with QA1 in place reinforces the analytical importance of reference-class adjustment of concept-stage cost estimates. ALTO's published $75 billion figure is a pre-QA1-equivalent estimate; the Norwegian empirical record predicts an average of approximately 40 percent escalation through the equivalent of pre-project phase, which alone would lift the figure to approximately $105 billion before any of the additional adjustments that the Initiative's reference-class analysis applies.

5. Norway QA versus Canadian federal practice

Table 1 sets out the principal institutional features of the Norway scheme alongside current Canadian federal practice for major investment projects. The differences are structural rather than incidental.

Table 1. Norway QA1/QA2 versus Canadian federal practice

Feature	Norway QA1 / QA2	Canada (federal practice)
Mandatory threshold	≈ CAD 130 million (NOK 1B); CAD 39M for IT	No equivalent threshold-triggered mandatory external QA
Concept-stage external review (QA1)	Required before Cabinet approves pre-project	Internal departmental review only; no mandatory external concept review
Pre-funding external review (QA2)	Required before Storting funding vote	Treasury Board review; not external; not stochastic by default
Cost basis for Parliament	P85 of probability distribution	Typically deterministic point estimate; risk-adjusted reserves vary by project
Reviewer selection	Ministry of Finance call-off against pre-approved consortia framework	Project-proposing department selects its own consultants
Public availability of QA report	Public document (with commercial redactions)	Generally not published; subject to ATIP
Concept alternatives required	Zero option plus at least two conceptually different alternatives	Variable; not standardised across departments
Track record	≈160 QA2 reviews since 2000; ≈75% on-budget delivery	No directly comparable institutional review record

The most consequential differences are at the concept-stage gate. Canada has no equivalent of QA1 — no mandatory external review of conceptual alternatives before a project enters the pre-design phase. The Treasury Board Secretariat's Directive on the Management of Projects requires departmental project complexity and risk assessments, but these are internal and do not include external evaluation of whether the conceptual choice is defensible against substantively different alternatives. The result is that Canadian federal projects can advance from concept selection through pre-design to budget submission without ever being subjected to genuinely independent third-party scrutiny of the conceptual choice itself.

ALTO is a paradigmatic example of this gap. The conceptual choice between high-speed rail (ALTO), high-frequency rail (HFR, the 2021 Joint Project Office concept), and high-performance rail (HPR, the alternative the Initiative has developed) has not been the subject of any structured external review. Under Norwegian rules, this comparison would be the literal substantive content of QA1, and Cabinet could not authorize a pre-project on any one of the three concepts without first having the comparison externally reviewed.

6. Application to the ALTO corridor decision

Five specific implications follow from applying the Norway QA framework as an analytical lens to the ALTO project.

6.1 ALTO's published cost figure would not be acceptable to Norwegian Parliament

Norway's QA2 standard requires that the parliamentary cost frame be set at P85 of a stochastic cost distribution — explicitly because deterministic point estimates are systematically skewed and do not provide sufficient assurance against budget overrun. ALTO's published $75 billion figure is a deterministic concept-stage estimate. By Norwegian standards, this figure would not be acceptable as the basis for a parliamentary funding vote regardless of how rigorously it had been internally derived. The Initiative's reference-class adjustment to a $143 billion central scenario and a $264 billion P97.5 scenario — the figures used throughout the underlying NPV analysis — is a methodologically conservative analogue of what a Norwegian QA2 review would produce. The Norwegian framework treats this kind of probabilistic framing as the minimum acceptable standard, not as a critical exercise.

6.2 The conceptual alternatives requirement has not been met

Norwegian QA1 requires evaluation of the zero option plus at least two conceptually different alternatives. The substantive comparison among ALTO (high-speed rail), HFR (the JPO 2021 high-frequency rail concept), and HPR (the high-performance rail alternative the Initiative has developed) is the conceptual choice that QA1 is designed to subject to external review. This comparison has not been structured, has not been externally reviewed, and is not present in publicly available ALTO documentation. A Norwegian QA1 reviewer would not have approved corridor selection on the documentation ALTO has produced to date.

6.3 ALTO is a paradigmatic case of the investment QA1 is designed to filter

The Initiative's iso-BCR analysis finds that ALTO at central reference-class parameters produces a benefit-cost ratio of approximately 0.11 against the threshold of 1.0 — that is, the project returns approximately eleven cents in benefits for every dollar invested. This is precisely the category of investment that QA1 was designed to filter out. The Norwegian scheme was created in 2000 to address what its founding documentation describes as "the type of flawed investment cases one had seen in the past" — projects that should not have been started at all, regardless of how well executed. A BCR of 0.11 at central parameters is the textbook profile of a flawed investment case. A Norwegian QA1 review would have flagged ALTO for substantive concept reconsideration, not procedural improvement.

6.4 The HPR alternative warrants concept-stage independent review

The natural recommendation that follows is structural rather than rhetorical. The HPR alternative — combining electrified passenger service along the existing Highway 401 corridor with freight relocation onto a parallel dedicated freight corridor — is a substantively different concept from both ALTO and HFR. The Initiative has developed the HPR framework to a level of detail comparable to the proponent-stage documentation that would underlie a Norwegian QA1 review. The next institutional step, by analogy with the Norwegian framework, is for the federal government to commission an independent concept-stage review of the three alternatives (ALTO, HFR, HPR) before any final corridor selection decision is reached. This is the substantive content of the policy recommendation in the Initiative's letter to Minister MacKinnon.

6.5 An adapted Canadian framework is feasible and proven

Norway is not a unique case. Comparable schemes operate in the United Kingdom (the Cabinet Office's Major Projects Authority and the Infrastructure and Projects Authority gateway reviews), the Netherlands (the OEI guidelines for cost-benefit analysis of major infrastructure), and at the European Investment Bank (independent ex-ante evaluation requirements). The absence of a Canadian federal equivalent is a gap in institutional design rather than a settled policy choice. Adapting the Norwegian framework to Canadian conditions — federal-provincial coordination, Indigenous consultation requirements, regional development considerations — is feasible within the existing Treasury Board policy architecture, and the design work has been substantially completed in academic literature (Samset, Volden, and colleagues at the Concept Research Programme have published the methodology in English).

7. Specific recommendations

Three recommendations follow from this analysis. They are presented in order from project-specific (immediately applicable to the ALTO corridor decision) to institutional (broader Canadian federal investment governance).

7.1 Independent concept-stage review of the three corridor alternatives

Before any final corridor selection decision is reached, the federal Department of Finance should commission an independent external review of the three corridor alternatives — ALTO, HFR, and HPR — modelled on Norwegian QA1. The review should be conducted by an external consortium not previously engaged on any of the three alternatives, against pre-defined methodological requirements specifying the comparison of needs, goals, requirements, alternatives, and cost-benefit analysis. The reviewer's report should be a public document and should be tabled before the federal Cabinet decision on the preferred concept. This is the substantive content of the Initiative's recommendation in its post-consultation correspondence with Minister MacKinnon.

7.2 Stochastic cost framing for any preferred concept

Whichever concept is selected following the independent review, the Treasury Board submission for federal funding should be supported by a probabilistic cost distribution rather than a deterministic point estimate. The parliamentary cost frame should be set at P85 of the distribution, with a P50 target cost committing the executing agency, and a documented reduction list specifying scope items that can be removed during execution if costs trend toward the upper bound. This is the QA2 methodological standard and represents a minimum-acceptable framing for any federal investment of this scale and policy importance.

7.3 Federal institutional design: a Canadian QA scheme

The broader institutional implication is that Canada lacks a federal equivalent of Norway's QA1/QA2 framework, and that the absence is structural rather than incidental. The 2021 Joint Project Office Business Case for HFR — still not publicly released, with the Initiative's Access to Information request pending with Transport Canada — is itself a document that under Norwegian institutional design would have been a public QA1 deliverable subject to external review at the time. Establishing a Canadian analogue of the Norwegian scheme, with mandatory external concept-stage and pre-funding reviews for all federal projects above an appropriate threshold, would address a recurring weakness in Canadian federal infrastructure governance documented across multiple Auditor General reports. This is a longer-term recommendation, but the ALTO decision is precisely the kind of project that demonstrates why the institutional gap matters.

8. Sources and supporting documents

This research note draws on the institutional documentation of the Norwegian QA scheme, the academic literature on its empirical performance, and the Initiative's own ALTO analytical work.

Norwegian institutional documentation

- Norwegian Ministry of Finance, *Circular R-108/23* (English translation R-108/25), *'The State Project Model: Quality Assurance of Major Public Projects'*. The current governing circular for the QA scheme.
- NTNU Concept Research Programme, *'The QA Scheme — QA1 and QA2'*. Available at ntnu.edu/concept. The Concept Research Programme has tracked every QA review since the scheme's inception in 2000.
- Norwegian Ministry of Finance, *'The Norwegian Project Model'*, presentation to the Icelandic Federation of Industries, 2023. Available at vfi.is.

Academic literature on empirical performance

- Samset, K., Volden, G.H., Olsson, N., and Kvalheim, E.V. (2015). *'Governance Schemes for Major Public Investment Projects'*. Concept Research Programme Report No. 47, NTNU.
- Welde, M., and Odeck, J. (2017). *'Cost escalations in the front-end of projects — empirical evidence from Norwegian road projects'*. Transport Reviews 37(5).
- Odeck, J., Welde, M., and Volden, G.H. (2015). *'The impact of external quality assurance of cost estimates on cost overruns: empirical evidence from the Norwegian road sector'*. European Journal of Transport and Infrastructure Research 15(3).
- Welde, M., and Klakegg, O.J. (2022). *'Cost performance in major public investment projects after external quality assurance'*. Concept Research Programme.
- Love, P.E.D., Ahiaga-Dagbui, D., et al. (2025). *'On cost, over time: How Scandinavian transport infrastructure challenges conventional understanding of project delivery performance'*. International Journal of Project Management.
- Christensen, T. (2011). *'The Norwegian front-end governance regime of major public projects'*. International Journal of Managing Projects in Business 4(2).

Cost-overrun comparator literature

- Flyvbjerg, B., Skamris Holm, M.K., and Buhl, S.L. (2003). *'How common and how large are cost overruns in transport infrastructure projects?'* Transport Reviews 23(1), 71–88.
- Odeck, J. (2004). *'Cost overruns in road construction — what are their sizes and determinants?'* Transport Policy 11(1), 43–53.

Initiative supporting documents

- **ALTO_NPV_Research_Report** — full NPV methodology, results, and JPO 2021 comparison.
- **ALTO_IsoBCR_Research_Note** — iso-BCR=1 analysis identifying the parameter space within which BCR=1 is achievable.
- **ALTO_NPV_Analysis_v3** — Excel model with iso-BCR sheets at 3% / 5% / 8% TBS, discount-rate comparison, and Monte Carlo.