

The Role of the Owner in Ensuring Design Completeness

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Introduction

Design-Bid-Build projects in Canada are commonly understood to be those where the design is completed by the owner before tendering the project. After contract award, the successful contractor executes this tender design. In theory, this procurement model should have little need of design-related change orders because if the tender design is truly a fully completed design, there should be negligible design issues to be dealt with by the contractor during construction. However, the owner's tender design is often not complete, requiring it to undergo modification after contract award, which then leads to contractor requests for change (due to the impacts of amended design which were not foreseeable from the tender design).

What is Incomplete Design?

By definition, an incomplete design is one that requires more effort to reach the status of Issued for Construction ("IFC") drawings which will not be subject to further change. Having a set of drawings titled "100% Design" (and often even IFC) is unfortunately not a guarantee that the design is actually completed. A non-exhaustive list of the additional design effort that might still be required includes: finishing design elements labelled "on hold" or "in abeyance"; coordinating individual finished designs between the various design disciplines; completing specifications; actioning outstanding interdisciplinary design review comments; amending design following late confirmation of owner-supplied or owner-specified equipment details; and amending design to secure third-party acceptances or approvals or to satisfy late key stakeholder comments.

Design Completeness Report

If the owner's tender design is too incomplete, there is a risk that post-award design changes could be severe enough to: (i) partially or wholly invalidate the owner's business case; (ii) extend the completion date significantly past the owner's publicly announced completion date; and/or (iii) exceed the owner's total project budget (including contingency). Owners generally do not wish to take these risks (especially on politically sensitive projects).

Owners should therefore consider requiring their designer (via the Design Services Agreement) to produce a report (i.e.: a Design Completeness Report) alongside the tender design which accurately summarizes: (i) what design is outstanding; (ii) what key design inputs are needed to finish the outstanding design; (iii) how much time is needed to secure these design inputs and complete the design; and (iv) to what extent is the owner's risk of awarding a contract based upon the incomplete design tolerable?

A well-prepared Design Completeness Report will enhance the owner's ability to make a well-founded decision on whether or not to proceed with procurement on the current tender design, or to postpone the tender until design achieves a higher state of completion.

Design Review: Technical

Some key areas where owners should consider critically challenging the designer on the extent of tender design completeness (and which should be addressed by a Design Completeness Report, if possible), include the following.

Definition of Owner Functionality / Operational Requirements – Has the owner fully defined the project scope and has the designer addressed all aspects of it?

The entire purpose of the design is to achieve the owner's functional and operational requirements for the project. These are the primary design inputs that drive all of the subsequent detailed design and specifications. There must therefore be a high degree of certainty that these have been appropriately addressed by the design team and that they will not change post contract award. If there is any doubt, it may not be prudent to proceed with the procurement process. Late changes to primary project design inputs can have secondary impacts that are not immediately identifiable (and which can sometimes be severe enough to undermine the business case of a project).

Sufficiency of Project Lands – Does the design allow for agreements for project lands and have major issues that the contractor must be aware of been identified?

This includes the extent to which all permanent acquisition and easements are identifiable, the extent to which any remediation due to contamination has been defined and the extent to which special geotechnical and/or environmental measures are required by the contractor. This issue requires that the results of all legal, geotechnical and environmental surveys of the project lands are incorporated in the tender design. If these issues are not resolved in the tender design, there is a high risk that the contractor's work plan will be disrupted when new constraints are imposed during construction.

Accommodating Utility Owners – Have all the required utility diversions been discussed with the utility owners and have their requirements been incorporated into the design?

Utility owners often have significant requirements, such as restricted relocation "windows"; special protection of utilities; minimum spacing from other utilities; constraints on contractors' temporary site services; and self-performance of permanent utility relocations by the utility owner rather than by the contractor. Where there is a concern that delayed utility relocations might disrupt a major project, there is a case for carving out such utility relocations as a separate precedent contract (so that any such delay is less likely to delay the contract for the main project). As contractors cannot control the behavior of utility owners, it is imperative that owners secure their support on the project before the tender commences, via formal agreements, wherever possible.

Statutory Requirements – Has the designer identified all key requirements and how does the design address these?

Project schedules can be severely impacted by statutory requirements, especially those related to permits to construct, as well as environmental and ecological protection. The designer must be able to demonstrate to the owner how the design satisfies such requirements (other than for items that can be reasonably made a contractor responsibility in the contract).

Securing Third-Party Acceptance/Approval – Has the status of all acceptances or approvals been outlined in the tender documents?

No design requiring third-party acceptance or approval should ever be released at Issued for Construction (IFC) until such acceptance or approval has been obtained, because further design change may be required to obtain it. Any delay by the owner in securing these acceptances and approvals often delays contractors. Accordingly, wherever possible, a Design Completeness Report should specifically identify all outstanding acceptances and approvals, as well as the progress-to-date in securing those that are still outstanding.

Mitigating Stakeholder Impact – Have the concerns of key project stakeholders been addressed?

Such stakeholders might include local residents, local businesses, special interest groups, local municipal operations and emergency services, etc. Addressing their concerns might constrain the design, for example, by restricting site access and entail changes to construction sequencing; requiring temporary traffic/pedestrian/cycle diversions; imposing crane limitations which could influence the selection of equipment; introducing additional permanent access structures not previously considered, or local amenity enhancements considered necessary to secure local goodwill and political support of the project.

Coordination of Interdisciplinary Design – Is the design buildable?

Most capital projects are interdisciplinary in nature and require the professional services of civil, geotechnical, structural, mechanical and electrical engineers, as well as architects, among others. In many areas of a project, design components from these disciplines are above, under or next to each other. Accordingly, spatial coordination is critical to ensure that the designs shown on separate discipline drawings can actually be built. It is essential that one party to the design team take a lead role in conducting such interdisciplinary design coordination. Owners and designers should not rely on the contractor's identification of problems on site to achieve this interdisciplinary coordination. It is not the contractor's role to coordinate design in a Design-Bid-Build contract. Furthermore, coordination problems identified in contractor Requests for Information ("RFIs") can often result in justifiable contractor change order requests.

Reaching Design Completion

The construction industry generally oversimplifies the assessment of the time needed to complete design, because although design is an iterative process, it tends to be scheduled as a relatively simple linear process like construction, which it is not. This can result in unrealistic timelines for design completion.

Whenever possible, the owner should encourage its designer to clearly identify the principal "iterative design blocks" in a project, identify critical design inputs and estimate how long is required to secure these inputs and, subsequently, to complete the design. If the owner understands these principal iterative design blocks, it may, in some cases, have the opportunity to slightly adjust the project scope or make other decisions to help facilitate the timely completion of the design.

If this approach is followed, the estimate of the time required to complete the design will be more reliable. This will help the owner make better decisions when considering whether to postpone tendering until the design has reached a greater stage of completion.

Design Review: Commercial Risk

Ultimately, deciding to proceed to tender with an incomplete design is a commercial risk borne by the owner. If the design is incomplete, it must either be: (i) completed quickly post-award before main construction advances very far, with the contractor compensated by an all-encompassing change order; or (ii) completed over the course of construction via multiple change orders.¹ Clearly, the former scenario is preferred, as it will cause less disruption to the project. However, it is the author's experience that the latter scenario is far more common.

Where the designer confirms (ideally via a Design Completeness Report) that full design completion will only occur over the first year of construction or even later, an owner must assess whether the commercial risk of awarding the contract on this basis is defensible. One way an owner can do this is to evaluate the sensitivity of the project schedule and project budget to the impact of the change orders that are likely to be

necessary to compensate the contractor for the impacts of the revised design.

This type of risk assessment is often not formally completed, and even when it is, its preparation by non-specialists can limit its reliability. It is therefore recommended that owners ensure that such risk assessments (ideally based upon a Design Completeness Report) are produced wherever possible, and, if needed, with expert advice from specialists. If deemed necessary, such a risk assessment might include running a schedule risk analysis ("SRA") simulation for the probabilistic determination of project schedule and project cost² that specifically accounts for the impacts of the revised design during construction.

Conclusion

The commercial risk of awarding a Design-Bid-Build contract with an incomplete tender design is borne almost exclusively by the owner, yet it is a common occurrence. The magnitude of contractor claims due to the impact of post-award design completion is often a surprise to the owner. Accordingly, there is a case for the owner to constructively challenge its designers much more actively about: (i) the status of the incomplete design and (ii) how it might commercially impact the owner if a contract is awarded based upon it.

¹ Designers sometimes try to complete the design via answers to contractor Requests for Information ("RFIs") during construction without issuing change orders (or change directives) or formally revising IFC drawings. The extent to which this can be done should be limited, because if this process is abused, the owner's exposure to later justifiable contractor claims will accumulate rapidly. Hence, such actions will prevent the owner from having a real-time understanding of the commercial impact of the design finalization.

² See Yezdi Mistry's, "A Path to More Realistic Project Completion Dates," in *The Revay Report*, Vol. 37, No. 2 (May 2023).

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