A4LE Alberta Chapter

Annual Spring Conference

# DESIGN-BUILD 101: THE GOOD, THE BAD AND THE BETTER

Jasper, AB - March 17 2016

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# Presenters

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# Collaborators

- **Devin McIntosh** – Associate, technical resource leader
- **Mumtaz Anwar** – Associate, lead designer

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# Roadmap

1.0 Project Delivery Models
2.0 State of the Union
3.0 The Good
4.0 The Bad
5.0 Lessons Learned
6.0 Recommendations

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# 1.0 Project delivery models

*Design-Bid-Build* usually entails a stipulated sum (i.e. fixed price) construction contract. There is a single design team answerable to the owner (Government or school board).

*Public-Private-Partnership (P3)* includes an ownership and maintenance component over a long-term concession. The design team of record is answerable to the P3 consortium.



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# 1.0 Project delivery models

*Design-Build (DB)* entails a stipulated sum (i.e. fixed price) design AND construction contract. There is a single design team answerable to the builder.

*Draw-Build* is similar to *DB* except the design component is reduced as the owner issues prescriptive design and performance specs. The design team of record is answerable to the builder.



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# 2.0 State of the Union: current models

There can be some confusion because although there are primarily two models (*'grant-funded'* and *'design-build'*), these two names are not alternates in terms of project delivery:

*Grant-funded* refers to the funding model and it usually implies a traditional stipulated sum (fixed price) construction contract.

*Design-build* does refer to the delivery model.



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# 2.0 State of the Union: current models

*Grant-funded schools* require that the board source a full-service professional of record and then manage the project – usually delivered according to a stipulated sum construction contract – through to completion.

Depending on the experience of and resources available to the board this may or may not be an attractive option.

The professional of record represents the board's interests at all stages.



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# 2.0 State of the Union: current models

In the recent rounds of A. I. projects, *design-build* has morphed into *draw-build* with the addition of the role of bridging architect (BA) and his/her expanded scope:

To accelerate the project, A.I. and the BA identify a model and work with the school board to customize the design to meet school board specific needs.

Competing teams led by a builder submit a fixed price to complete detailed design and construct the school.



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# 2.0 State of the Union: current models

*Draw-build* – a variant of *design-build* – results from the advanced design and detailed requirements that become limitations imposed on the Design-Builder.

These attributes along with tight delivery deadlines allow little time for design. The professionals on the successful DB team must complete (i.e. *draw*) full construction documents in order to get shovels in the ground asap.



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# 3.0 The Good

The project moves quickly to the tender stage as the Bridging Architect focuses on customizing an already-proven core school.

Preparation of the construction documents (by the builder's professionals) is accelerated because there is little opportunity to re-visit design decisions.



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# 3.0 The Good

As the schools, requirements and process are now standardized, there is little uncertainty for builders preparing their submissions, leading to better pricing.

The Bridging Team remains on board to represent the interests of the owner.  There is a second set of eyes for reviews at all stages: construction documents and site reviews.



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# 3.0 The Good

To avoid a conflict of interest for the Professionals of Record, the bridging team creates the PCO/ CCOs, reviews the costs of changes and certifies progress.



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# 4.0 The Bad

For the professionals

The professionals are creative types: the constraints imposed by schedule discourage exploration.

The DB generally wants as little interference as possible from the consultant team in order to manage costs, however the professionals of record are required to sign Schedules A, B and C and must therefore uphold a level of performance.



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# 4.0 The Bad

For the professionals of record

They may not see a single progress claim or change order sent to A. I. by the D-B:

- were the costs fair and reasonable?
- were professional fees charged (that we were not aware of)?



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# 4.0 The Bad

## Between professionals

The bridging team upholds the interests of the owner whereas the professionals of record remain answerable to the builder.

In a peer review the owner engages the designers and the peer reviewers.  Both are working in the interest of the owner. The peer reviewers advise on quality and value.  The owner is free to implement or ignore the recommendations.



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# 4.0 The Bad

For the school board

The transition between the bridging team and the D-B's professionals of record:  this new team answers  to the builder who is looking to reduce costs.

There are tasks through the design stage that are not always 'owned' by one party or the other.

Some elements that would normally be tackled during detailed design are addressed by the BA.



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# 4.0 The Bad

## For the school board

The Design-Builder is only required to meet code: what's not shown can become an extra if it's beyond code, even if fully supported by the AR as necessary to create a properly functioning school.



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# 4.0 The Bad

## For the school board
## The Design-Builder is only required to meet code:



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# 4.0 The Bad

For the school board – impact on resources

Boiler size: if boiler exceeds a certain capacity, the individual responsible for maintenance requires certification.

Bridging cannot mandate boiler size: when the D-B team finds efficiencies in going to a larger boiler, it increases labour costs for the school board.



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# 4.0 The Bad

For the owner – impact on contract price
BMS systems: each board has preferred vendors according to which staff have been trained.
Bridging docs cannot mandate the BMS provider.

The D-B may claim that they must break a contract in order to suit the board's needs. It's not always known if there was a contract and what the value was.



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# 4.0 The Bad

Tendering

D-B teams mistakenly view the bridging drawings as 80 or 90% drawings.  Most disputes result from interpretation.

The D-B period is too short for the professionals to produce the detailed work required: bids are often based on incomplete – i.e. bridging – docs.

Honorarium does not allow for appropriate resources to prepare detailed information.



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# 4.0 The Bad

## Tendering

Late awarding of sub-contracts allows the D-B to change products or suppliers (for example flooring) which can cause re-design, re-issue of colour boards for re-approval by bridging, AR and school boards.



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# 5.0 Lessons Learned

We observed the D-B directing the AR to replace a higher quality material (metal composite panel shown in our docs) with less expensive cladding. In the opinion of the D-B it was not compulsory to maintain the materials of *'design intent'* shown in the bridging documents.

As BA we had to debate the requirements of the project, resulting in lost time for all parties.



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# 5.0 Lessons Learned

Flipside: on another project as AR, an intelligent solution to a sanitary drainage issue by our sub-consultant during detailed design resulted in a reduction in the length of the line. This saved the builder a significant amount in infrastructure costs.

A.I. expected this saving to be passed on as a Change Order credit.

We weren't privy to resolution of this issue.



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# 5.0 Lessons Learned

Site servicing

In a design-bid-build model, the civil engineer determines the entire scope through multiple meetings with the municipality.



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# 5.0 Lessons Learned

Site servicing

Bridging scope is often difficult. On four recent schools, services were shown to the PL:

- the D-B wanted extra $$ to go further. This should flow to A.I. from the municipalities because they are not defined at time of tender
- many municipalities balk at responding to multiple bidders during the tight tender period



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# 5.0 Lessons Learned

Site servicing

Off-site improvements and tie-ins are different than the connection fees for utilities which are predictable for the bidders.

This gap in the D-B model should be acknowledged with a cash allowance. It reduces the risk – and therefore the costs – to the D-B.



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# 5.0 Lessons Learned

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# 5.0 Lessons Learned

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# 5.0 Lessons Learned

Modulars

Confirming the supplier after D-B award is a risk: 80% chance of assumption error (foundations/screw piles, floor thickness impacts grading, parapet height requires flashing revisions, shipping and craning costs…) and a change order will result.

Often, AR drawings are well underway months before the modular supplier is identified by A.I.



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# 6.0 Recommendations

Create a list of “deferred design” items, for example:

- steel joists, connections
- door hardware: meeting(s) and close collaboration are required between hardware consultant, school board and electrical designer



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# 6.0 Recommendations

"Deferred design" items – cont'd:

- gymnasiums: power and data, lighting, sound system: BA works with the school board at a high level of detail based on existing installations however their needs become more fully defined when permanent staff bring their vision



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# 6.0 Recommendations

Equipment:

School board A defines M & E attributes for their schools, then purchases equipment to suit, taking the uncertainty out of the design equation.

They develop their F+E package to suit the building's infrastructure, which is standard 'across the board'.



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# 6.0 Recommendations

Equipment – cont'd:

Based on a customizable A.I. checklist, school boards' equipment inventory should be included with bridging documents at time of tender even if the underlying M & E systems are not fully designed according to these needs.



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# 6.0 Recommendations

Equipment – cont'd:

Based on a customizable A.I. checklist, school boards' equipment inventory should be included with bridging documents at time of tender even if the underlying M & E systems are not fully designed according to these needs.



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# 6.0 Recommendations

| CURRENT RATING | TYPE | 2 POLE - 2 WIRE NO GROUND | | 2 POLE - 3 WIRE GROUNDING | | 3 POLE 4 WIRE GROUNDING |
|---|---|---|---|---|---|---|
| | | 125V | 250V | 125V | 250V | 125/250V |
| 15A | STRAIGHT BLADE |  1-15R |  2-15R |  5-15R |  6-15R | |
| | TWIST-LOCK |  L1-15R | |  L5-15R |  L6-15R | |
| 20A | STRAIGHT BLADE | |  2-20R |  5-20R |  6-20R |  14-20R |
| | TWIST-LOCK | |  L2-20R |  L5-20R |  L6-20R |  L14-20R |
| 30A | STRAIGHT BLADE | |  2-30R |  5-30R |  6-30R |  14-30R |
| | TWIST-LOCK | | |  L5-30R |  L6-30R |  L14-30R |
| 50A | STRAIGHT BLADE | | |  5-50R |  6-50R |  14-50R |
| | TWIST-LOCK | | | | |  CS6364/65 |

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# Questions

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