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Gambling on Site Conditions- Risks in Stream Restoration

Stantec

SOURCE TO STREAM CONFERENCE, BRAMPTON, ON
HEATHER AMIRAULT, P.ENG., MICHAEL DHANRAJ, C.TECH.
MARCH 27, 2025

Agenda

1. Uncertainty vs Risk
2. Taking Risks
3. Managing Risks
4. Project Examples and Outcomes
5. Takeaways

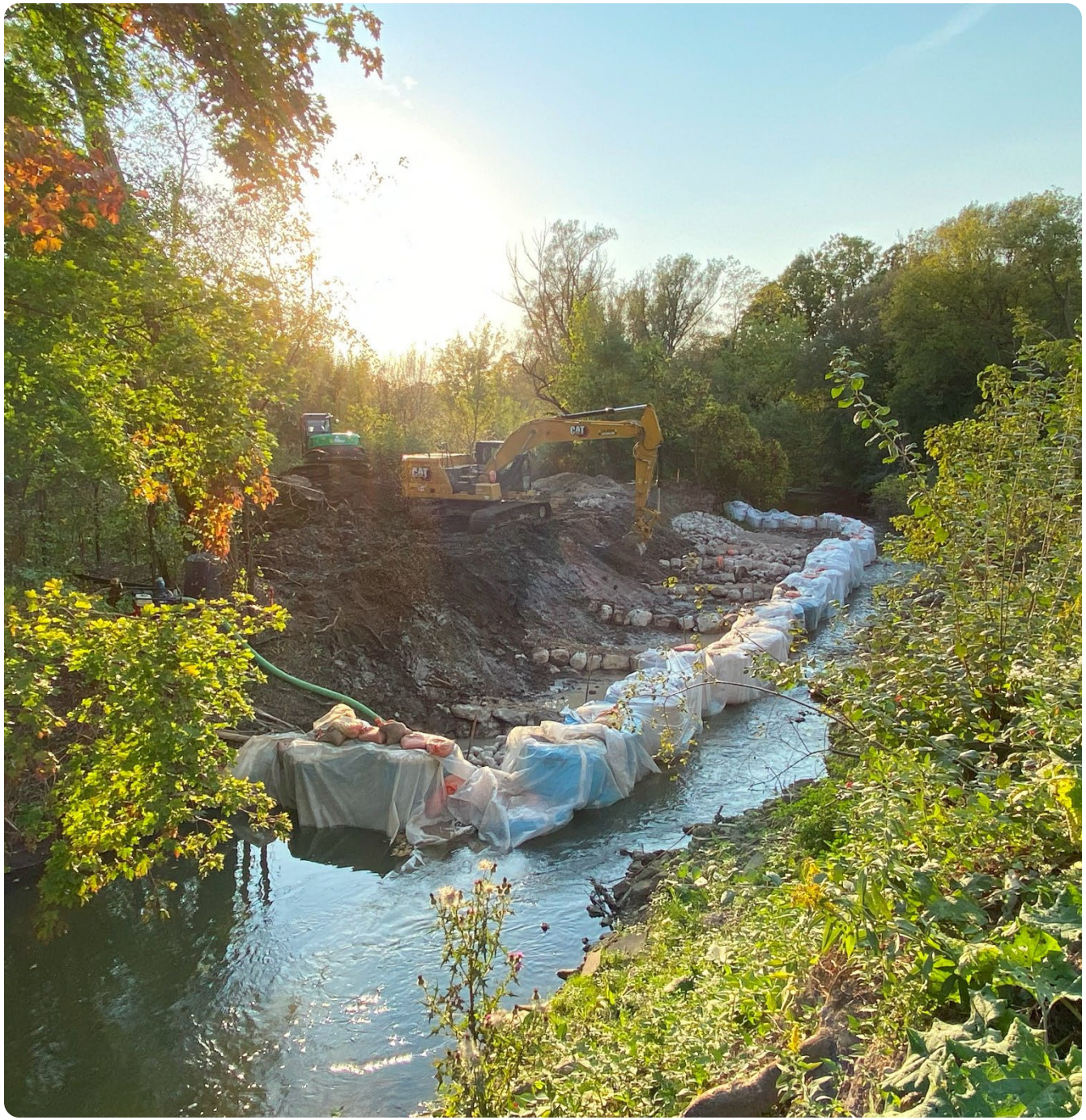
Uncertainty vs Risk

Uncertainty

Probabilities and outcomes are unknown and unpredictable.

Risk

Probabilities of the possible outcomes are known.



Taking Risks

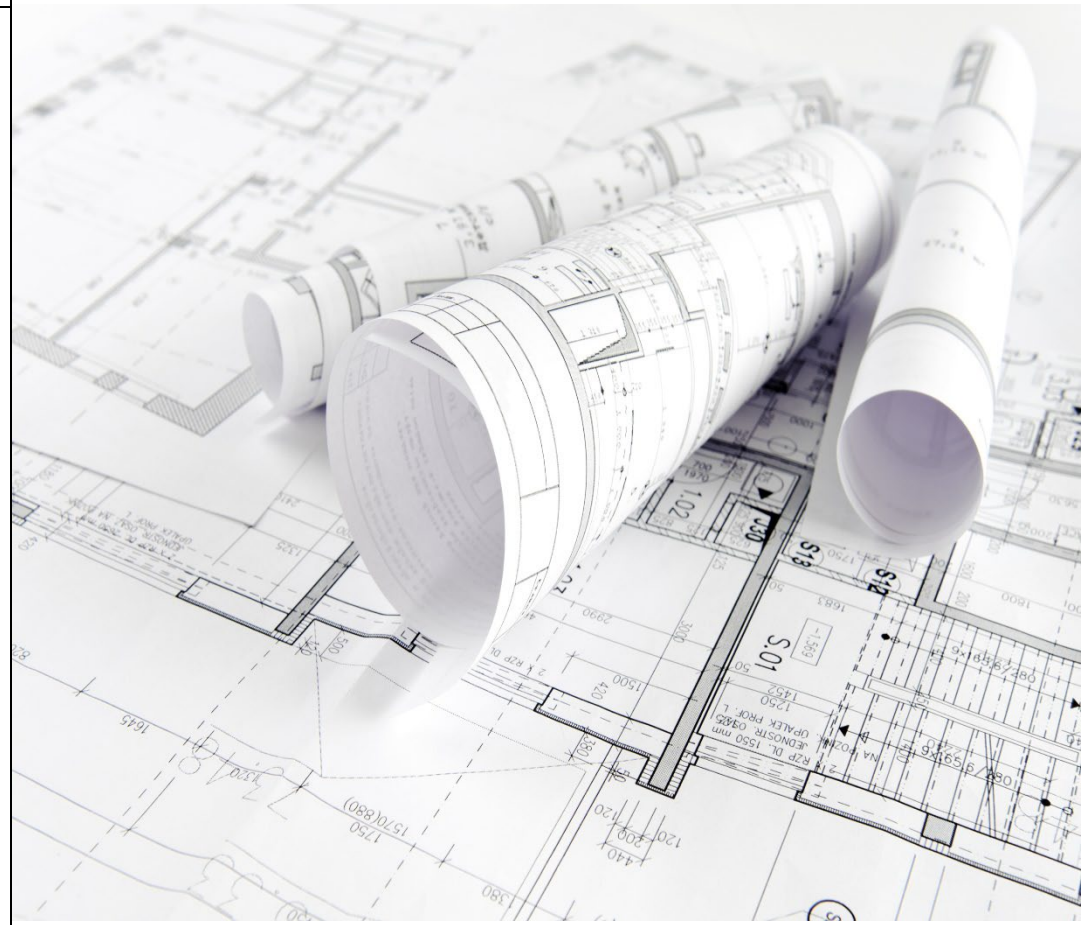
- Budget
- Schedule
- Resources
- Site Conditions

Managing Risks

→ Pushes the risk into the construction phase

Management techniques:

- Include provisional items in tender packages
- Have a contingency budget
- Have a flexible schedule



Managing Risks

**It’s ok to take risks,
as long as you know you’re taking them.**

- Understand the risk involved.
- Weigh the options & consider potential outcomes
- Only take “calculated risks”
- Inform client of relevant risks

Excess Soil Management

Scenario:

- Soils testing during design vs. soils testing during construction

Mitigation:

Determine acceptable risks based on:

- Quantity of soil and receiver(s)
- # of tests during design vs during construction
- Inclusion of contingency / provisional items

Excess Soil Management

Risk:

- Testing during design adds clarity, allows for more accurate cost estimate
  - ➢ May still encounter unexpected soil conditions

- Postpone testing to construction phase
  - May encounter unexpected soil conditions
  - Not having right receivers lined up
  - Costs increasing from bid

Excess Soil Management

Remaining Risks:

- Receiver may require additional testing
- Unexpected encounters are always possible
- Receivers can have tight windows for receiving soils

Brierwood Creek (Weather/Construction Timing)

Background:

- Erosion on outer meander bend threatening rural road
- Proposed channel realignment
- Proponent plans construction for late fall, into winter

Risks:

- Late fall - winter construction
- Inexperienced contractor

Brierwood Creek (Weather/Construction Timing)

Mitigation:

- Water management system + back up system
- Experienced construction inspector on site full time

Outcome:

- Slow construction, impeded by weather and undersized construction equipment
- Weather impacts during construction required repairs in spring

Rock Lake (Material Sourcing)

Background:

- Shoreline erosion
- Design stone armoring to mitigate erosion

Risks:

- Estimating costs without complete understanding of local market
- Local sources may not be available, increasing bid costs
- Contractor may assume an “equivalent” material in bid

Rock Lake (Material Sourcing)

Outcome:

- Source for specified material was not close to project site
- Material transportation to project site cost more than estimated,
- Client had to apply for further grant funding, delaying project start

Long Lake (Site Conditions)

Background:

- Removal of the Water Control Structure (WCS)
- Restore the river channel to its natural state and improve fish passage
- Remote site, difficult access
- Design needed for permitting

Risk:

- Design based on limited site information
- Managing client expectations of design and construction

Long Lake (Site Conditions)

Mitigation:

- Experienced construction inspector on site full time
- Inclusion of ‘field fit’ language on drawings and permit applications
- Some materials available outside of immediate project footprint
- Recommendation of contingency budget

Long Lake (Site Conditions)

Long Lake (Site Conditions)

Outcome:

- Encountered unexpected field conditions: Insufficient material to complete riffle
- Required material imports & access route improvements
- Significant impact to project budget and schedule – time pressure to do ‘something’
- Field fit solution may not result in required fish passage

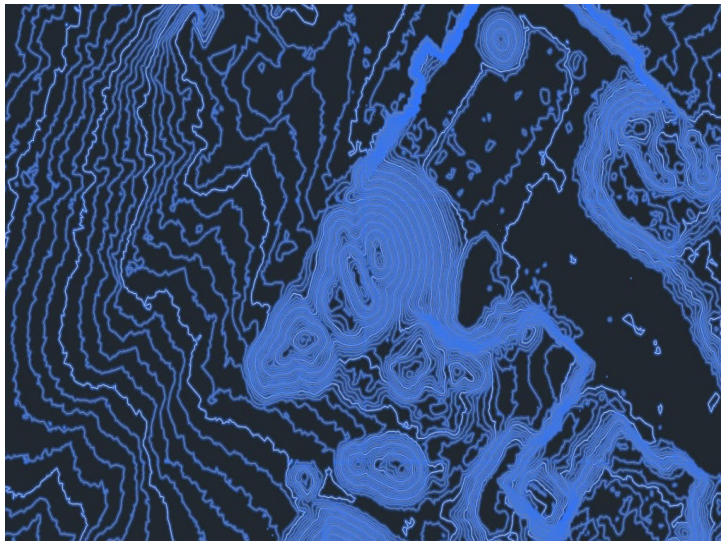
Risks (Other)

Utilities

LIDAR / Surface Data

Communication

Geotechnical



Takeaway

It’s ok to take risks, as long as you know you’re taking them.

Risk Management:

- Weigh the options- consider potential outcomes
- Only take “calculated risks”
- Include contingency in tenders
- Inform clients of relevant risks early in design
- Include experienced personnel in construction phase

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Questions?

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Thank you

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