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Conference

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Stormwater and Erosion
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Constructing Designs: Unifying the Contractor and Designer

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Agenda

1. Watercourse Engineering
2. Project Drivers & Constraints
3. Skillsets of Designer & Contractor
4. Methods of Effective Collaboration
5. Case Studies
6. Repercussions of Poor Collaboration

Watercourse Engineering

What is it?

- Watercourse Alterations
- Channel Bank Alterations
- Works Related to Conveyance
- Works Related to Sediment
- Works Related to Habitat



Project Drivers

Typical Reasons for Designs:

- Stabilization Requirements
- Flood Protection/Mitigation
- Infrastructure Considerations
- Habitat/Biological Considerations
- Realignments

Project Constraints/Criteria

- Design Requirements
 - What is the design goal, and what is required for design to be effective
- Environmental
 - Sediment, Species at Risk (SAR), Tree Preservation
- Cultural Heritage
 - Culturally significant artifacts, historical structures
- Infrastructure
 - Utilities, structures
- Existing Site Conditions
 - Site access, site orientation, site space and configuration
- Working Near Water
 - Water management, In-water works, Working in the dry

Criteria – Roles of Designers & Contractors

	Designer	Contractor
Design	Design specification for successful design	Methods to construct to specification
Environmental	Requirements of environmental regulators	Installation of mechanisms of environmental protection
Infrastructure	Identify infrastructure that shall not be impacted, and consider infrastructure protection in design	Determine how construction can avoid impact to infrastructure, provide necessary risk mitigation
Existing Conditions	Present existing site conditions	Identify feasible approaches to navigate site
Working Near Water	Identify requirements of water management that will allow for constructability to design standard	Implement water management strategy

Designer Skillset

- Technical
- Understanding of specifications
- Familiar with design intention
- Aware of design criteria
- Communication of design plans
- Coordinated design with regulators/stakeholders



Contractor Skillset

- Understand equipment capabilities
- Understand practical installation
- On-site experience
- Resourceful with project materials
- Observes site conditions in real-time during project implementation
 - What's working
 - What's not working
 - What might benefit from a different strategy



Bringing it Together



ENGINEER
TOOLSET

CONTRACTOR
TOOLSET

Effective
Implementation



Methods of Effective Collaboration

- Correspondence prior to finalizing IFC Drawings/Specifications
 - Product Insight
 - Staging Insight
 - Construction Methodology Insight
- Openness to On-site Problem Solving
 - Work together, appreciate input from the field team
- Insight from product suppliers
 - Seek input from product representatives or engineers
 - Designers and contractors can then work to fit recommendations into construction

Case Study – Pre-IFC Correspondence

Project Background

- Souris River – Riverbank Stabilization
- Client had a preferred product and contractor
- Contractor had experience at the site
- Contractor had experience on same riverbank (upstream)
- Contractor had experience installing preferred product
- Designers had limited experience with product and site

Designer/Contractor Correspondence

- Meeting between designer and contractor
 - Site access and staging
 - Riverbank construction challenges
 - Material and source recommendations

Outcome

- Effective construction and staging plans
- ACB key-in detail compromises that were understood by the contractor
- Practical design bedding material recommendation



Case Study – Collaboration

Project Background

- Bank work on the Thames River in London, On
- Contractor noted concerns with designer dewatering plan
- Highly-sensitive at-risk mussel habitat
- High public scrutiny

Designer/Contractor Correspondence

- Collaborative isolation/dewatering redesign
 - Contractor concerned with seal of dam on rocky riverbed
 - Limited dewatering discharge locations
 - Brainstorming of compromises
 - On-site adaptation to circumstances
 - Contractor and designer both responsive and quick to act

Outcome

- Collaboration kept project tasks on-schedule
- Limited unnecessary disturbance to the channel



Case Study – On-site Collaboration

Project Background

- Restoration/modification to Montgomery Creek, Kitchener, ON
- Bank design specified coir-wrapped soil lifts
- Contractor identified alternative solution

Designer/Contractor Correspondence

- Timely and critical decision making
 - **Requires intentional salvage and stockpile of intact sod during initial site clearing**
- Sod matting offered improved restoration outcomes
- Designer collaborated with contractor to revise bank restoration

Outcome

- Enhanced vegetation reestablishment
 - Local seedbank and dormant vegetation material with associated flora and fauna
- Enhanced bank stability
- Healthier, more resilient restored channel section



Case Study – On-site Collaboration

Project Background

- Channel works at Laurel Creek in Waterloo
- Mature woodland
- Tree removal required

Designer/Contractor Correspondence

- Contractor identified functional changes to conserve trees
- Designer collaborated with contractor on design revisions
- Contractor revised grading and construction access

Outcome

- Contracted grading envelope with some minor field-fitting to make the connections work
- Fewer mature trees removed, more stability, more habitat



Repercussions of Ineffective Communication

- High Project Costs
 - Contractors trying to understand designer plans takes time
 - Designers trying to determine constructable designs takes time
- Project Failure
 - Misunderstanding of design plans
 - Impractical designs
- Environmental Damage
 - Possible result of project failure (i.e. sediment release from bank failure)
- Withheld Letter of Credit
 - Funds withheld until project completed effectively
- Legal Repercussions
 - Property damage, legislative non-compliance, etc.
- Missed opportunities
 - Tangible benefits and real value added to project outcomes
 - More satisfied clients, better functioning riparian corridors, reduced environmental disturbance



How do you emphasize collaboration
with your projects?



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