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East Brampton Trunk Sewer Twinning

Process and Practice

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TRIECA Conference 2018
Presentation Outline

Project Background

- Scope of work and original design
- Problems with constructability of design
- Timing

Action

- GEMS retention
- Re-design by contractor
- New proposal and alternative options
- Approval
- Execution

Project Success

- Effectiveness
- Satisfaction
- How it functions today
BACKGROUND

Original Planning and Design

• Region tendered project, with approved design

• Creek crossing access for machinery

• Concrete box culvert with backfilled approaches

• Questions from contractor regarding feasibility and constructability of proposed plan
Original plans included a 3.6m x 3.6m x 6m box culvert to be installed
- Culvert vs. existing grade and backfilling
- 100 year old flood level elevation
- Vehicle traffic on crossing
BACKGROUND

- Settlement within creek bed potential issue
- Significant infilling (approximately 135m³) of clear stone for access road
ESC measures shown on drawing with approximate location of crossing
BACKGROUND

INSTALL 3600mm x 3600mm TEMPORARY BOX CULVERT TO FACILITATE TEMPORARY ACCESS ROAD. CONTRACTOR TO ENSURE ALL EQUIPMENT AND MATERIAL IS STORED BEYOND THE 100 YEAR STORM LEVEL WHEN NOT IN USE. CONTRACTOR TO NOTE AND CONSTRUCT THE TEMPORARY CULVERT AS FOLLOWS:

1. MIMICO CREEK IS A WARM WATER FISHERY AND URBANIZED STREAM. ALL CONSTRUCTION WITHIN THE VICINITY OF THE CREEK TO TAKE PLACE BETWEEN JULY 1 AND MARCH 31. UNDER NO CIRCUMSTANCES SHALL WORK TAKE PLACE BETWEEN APRIL 1 AND JUNE 30.
2. CULVERT CAPACITY DESIGNED FOR 5 YEAR STORM EVENT.
3. PLACE 270R WEAVE DENSITY OR EQUIVALENT GEOTEXTILE FILTER FABRIC AT THE BASE OF THE CHANNEL BENEATH THE CULVERT.
4. CULVERT TO BE PLACED SO IT IS 15% TO 30% SUBMERGED DURING NORMAL FLOW PERIODS TO PROVIDE FOR FISH PASSAGE.
5. CULVERTS SHALL BE 8m LONG MIN.
6. CLEAR STONE SHALL BE USED TO BACKFILL BETWEEN CULVERT AND CREEK EMBANKMENT. STONE SHALL BE WASHED FREE OF SEDIMENT PRIOR TO INSTALLATION.
7. CROSSINGS SHALL BE INSPECTED BY THE CONTRACTOR AFTER EVERY RAINFALL AND ANY DEBRIS ACCUMULATION IN FRONT OF THE CULVERT SHALL BE REMOVED AND ANY LOCALIZED SLOPE FAILURES OR EROSION CONTROL FAILURES SHALL BE REPAIRED IMMEDIATELY.
8. ALL MATERIALS USED IN THE CONSTRUCTION OF THE TEMPORARY CULVERTS/ CROSSING SHALL BE CAREFULLY REMOVED IN THE PRESENCE OF THE ENGINEER.
9. NO EXCAVATION OR CUTTING INTO THE WATERCOURSE BED OR BANKS SHALL BE UNDERTAKEN DURING INSTALLATION OF THE TEMPORARY CULVERT. CHANNEL BED AND BANKS TO BE RESTORED TO PRE-CONSTRUCTION CONDITION FOLLOWING REMOVAL OF TEMPORARY CULVERT CROSSING. EXISTING GRAVEL BED TO BE RE-EXPOSED AND BANK DISTURBANCE TO BE MINIMIZED DURING RESTORATION. BIODEGRADABLE EROSION CONTROL BLANKET TO BE SECURED TO BANKS ABOVE WATER LEVEL USING LIVE STEAKS. ADDITIONAL LIVE STAKES TO BE INSERTED IN TWO ROWS ALONG THE TOPS OF BANK TO ENHANCE STABILITY AND RIPARIAN HABITAT. SEE DETAIL 2 DWG 57988-D FOR FURTHER DETAILS.

Notes provided on drawing for timing window, placement of culvert, use of clean stone, inspection and rehabilitation notes.
ACTION - GEMS

Design, Proposal, Alternatives

- Multiple CSP pipe installation
- Simple installation and removal
- 12.8m² vs 7.75m² of total area for flow
  - Less fill $\rightarrow$ less material $\rightarrow$ less impact $\rightarrow$ less cost
- Reusable materials
Preliminary Proposed Alternative Design

East Brampton Trunk Sewer – Mimico Creek Crossing at Station 0+050

- Silt Soxx along crossing
- Silt fencing and straw bales installed on site as per approved Dwg. 57988-D
- Kelley Blocks – Edge Protection
- 270R Filter Cloth and Combigrd membrane
- Pea Gravel and/or Sand Bags to fill voids
- 4 x No. 1.4m Steel Pipe
- 6m wide, 25mm thick Steel Road plates to distribute passing vehicular weight
- 5 x 36” OR 3 x 1.3m Steel Pipes for over-flow and rain events

*Depth of Water Level on March 21st, 2017 was approximately 0.350m
*All in-water work shall be supervised by GEMS
* Crossing shall be inspected for ESC daily by W&B staff, as well as following significant rain events and monthly by GEMS staff
APPROVAL PROCESS

- GEMS + Contractor = working drawings
- Submission to and approved by Region and TRCA
- Alternative options, flow conveyance, Erosion and Sediment Control (ESC), contingency plans, risk
APPROVAL PROCESS

- By changing the design, risk placed on Contractor to pay fees, approval process (timing) and success of new design

- Bailey Bridge was another alternative discussed – footings, soils, timing made it unfeasible
TAKEAWAY

GEMS 5 Cs Principle: From Conception to Construction through to Completion, working in Compliance and Collaboration
TIMING - In-Water Construction Windows

FLEXIBILITY......Considerations

Sensitivity of the Fish Community
- Know the risk to life stages, mitigate impact if possible

Type of Activity
- Underground tunnel and vehicle traffic over top of creek

Duration of Construction
- Approximately 12-16 months, low risk of sediment release

Erosion and Sediment Control Monitoring
- Enhanced ESC measures – go that extra mile
- Performance during construction – review post rain events for debris jams

THERE ARE SITUATIONS WHERE IN-WATER WORK CAN OCCUR BEYOND THE USUAL GUIDELINES IT WILL DEPEND ON POTENTIAL RISK TO FISH, RISK MITIGATION, ESC MONITORING AND PRIOR APPROVAL FROM REGULATORY AGENCIES
Project Success

1. **Productive Collaboration**
   - Building cooperative relations between contractors, consultants and public agencies
   - Building trust in relationships
   - Effective meetings, scoping, start up plans, good tenders etc.

2. **Flexibilities**
   - Know the rules
   - Know the flexibility in the rules and managing risk (Contractor assumes risk when changing design, including approval process)
   - Practical construction timing windows

3. **Common End Goals, Good Budgeting**

4. **Communication (site meeting), Reporting & On-going Monitoring**

5. **Approval of Changed Design in 2 Week Period**
Questions?

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