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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



# East Brampton Trunk Sewer

Crossing 1 - Mimico Creek

## Legend

-  Esha Fashion Inc
-  Feature 1
-  Feature 2
-  Feature 3
-  Steeles Ave At Torbram Rd





# East Brampton Trunk Sewer

Crossing 2 - Mimico Creek

## Legend

-  Esha Fashion Inc
-  Feature 1
-  Feature 2
-  Feature 3
-  Steeles Ave At Torbram Rd



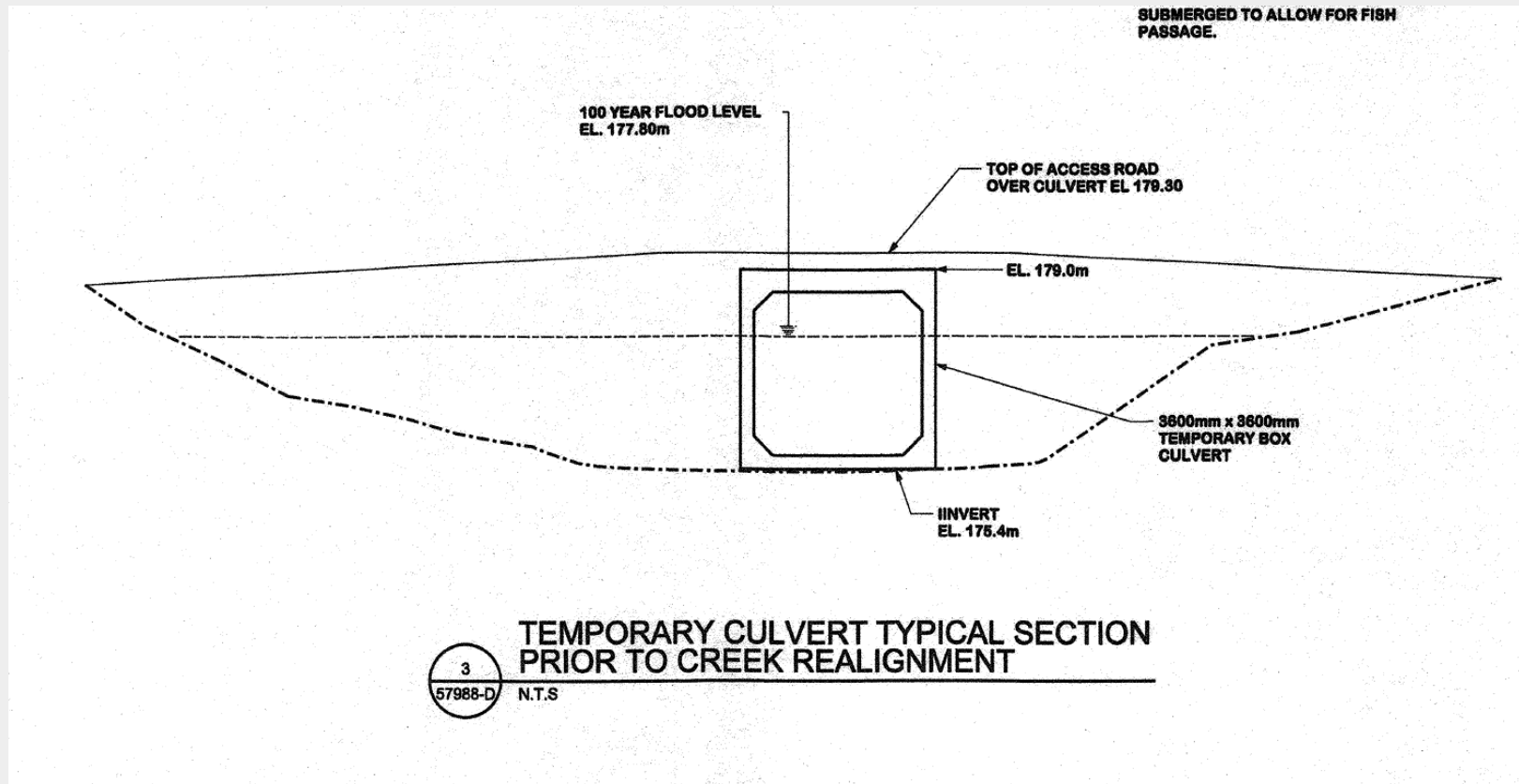


# BACKGROUND



- 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

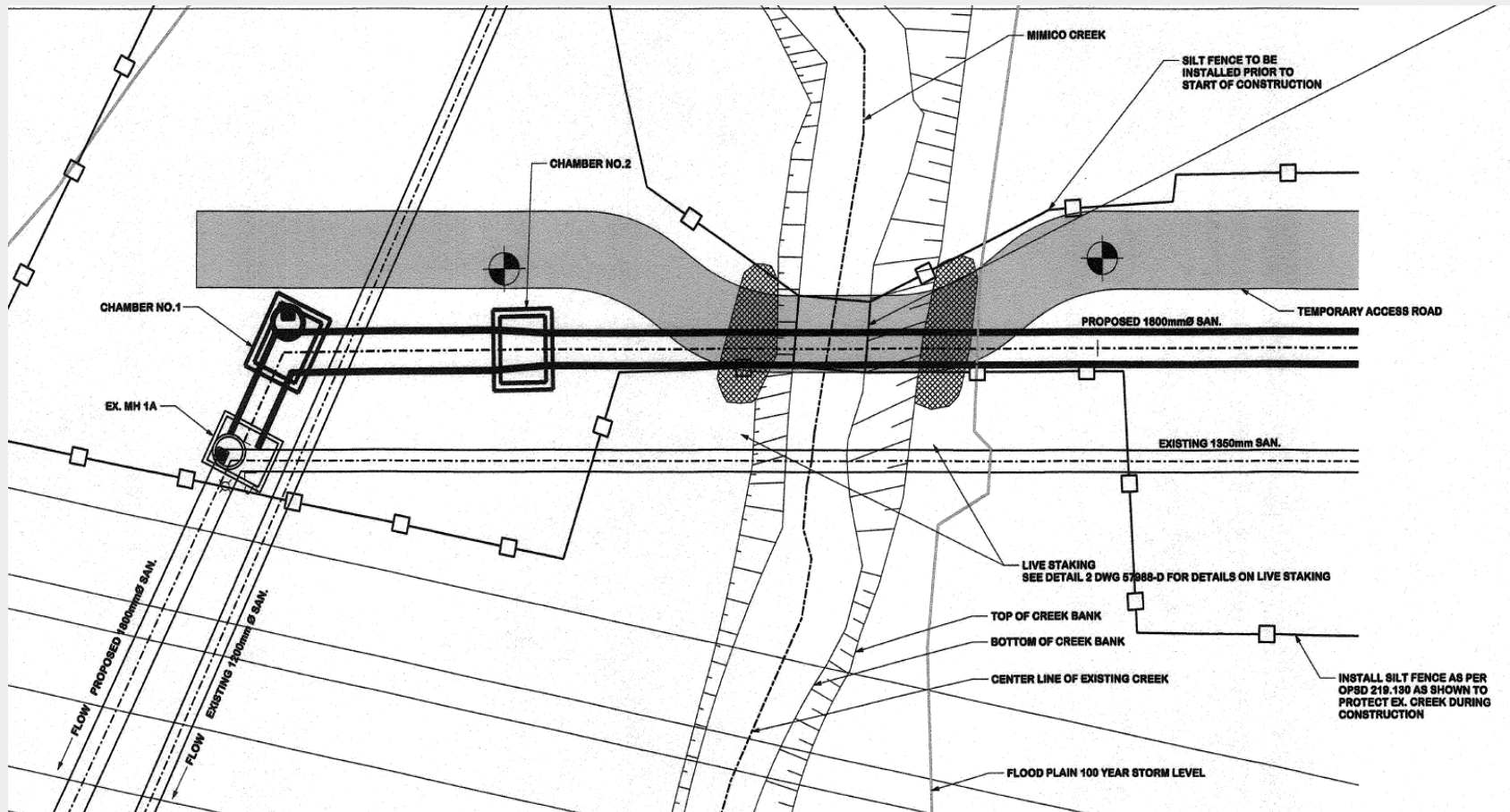
# BACKGROUND



- Settlement within creek bed potential issue
- Significant infilling (approximately 135m<sup>3</sup>) of clear stone for access road



# BACKGROUND



- 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 STRAEM. 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 6m 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



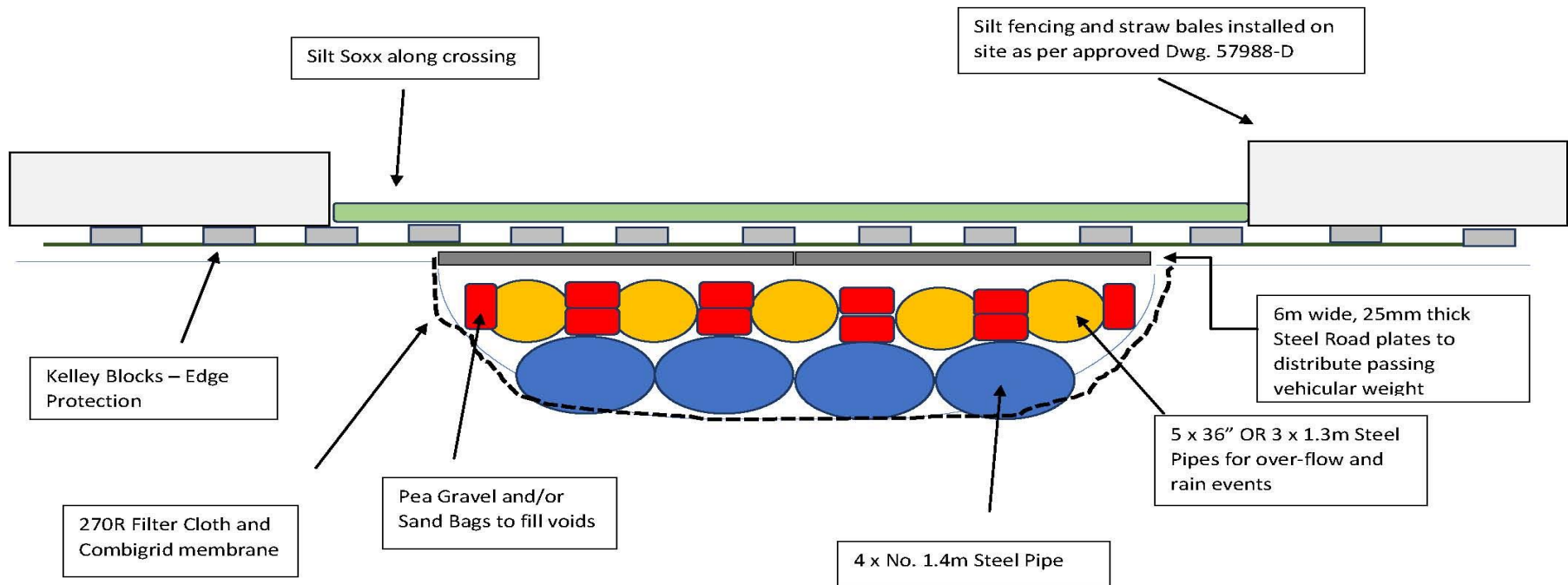
# ACTION - GEMS

## Design, Proposal, Alternatives

- Multiple CSP pipe installation
- Simple installation and removal
- 12.8m<sup>2</sup> vs 7.75m<sup>2</sup> of total area for flow
- Less fill → less material → less impact → less cost
- Reusable materials

# Preliminary Proposed Alternative Design

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



\*Depth of Water Level on March 21<sup>st</sup>, 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



Technical drawing of a bridge section (A) showing a cross-section of a bridge structure. The drawing includes labels for various components:

- "LOCK BLOCK" WALL PARAPET
- 2mm THICK STEEL PLATES (3m WIDE X 6m LONG) - WELDED - 8mm TAB PLATES
- 50mm CLEAR STONE
- STRATAGRID UPON 270R GEOMEMBRANES
- 5 No. 900mm STEEL FLUMES - 20mm THICK
- 4 No. 1,4m ID STEEL PIPE FLUMES, 20mm THICK
- REGULAR DEPTH OF FLOW - 400mm FROM INVERT
- PEA GRAVEL BAGS BETWEEN STEEL PIPES


Dimensions are provided:

- 12,053 (width of the parapet)
- 2,189 (height of the structure)

The drawing is labeled **A SECTION** and **MIMICO CREEK SCALE 1:43**.

Client:	Project No.:
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0	2017.07.11	FOR REVIEW	ST	RM	MS			
REV	DATE	DESCRIPTION	DRN	CHK	APP	PM		

**WARD & BURKE**  
**MICROTUNNELLING**

Client:	Project No.:
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# 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







2017/04/12





2017/04/12





2017/04/12



# TAKEAWAY



# **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





2018/02/21

# Questions?

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