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Elements of a Toronto Geomorphic Systems Master Plan Environmental Assessment

Devin Coone and Daniel McCreery

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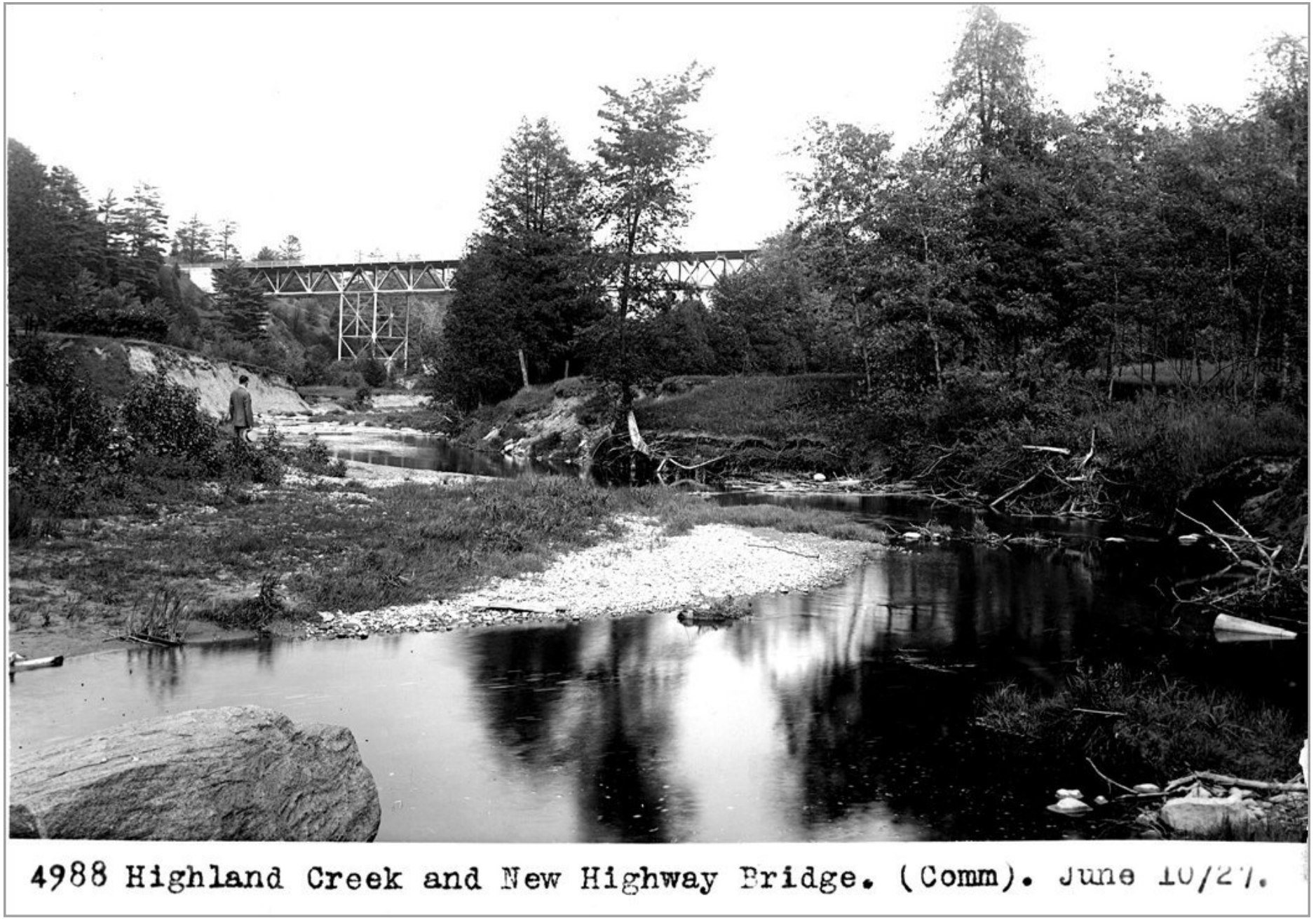
Agenda

- What is a Geomorphic Systems Master Plan?
- Geomorphic Systems Master Plan Process
- Insights and Challenges

Looking Back

- Wet Weather Flow Management Master Plan



4988 Highland Creek and New Highway Bridge. (Comm). June 10/27.

City of Toronto Archives, Fonds 16, Series 71, Item 4988

Prioritization of Critically Exposed Sanitary Sewers

- Toronto has numerous critically exposed sanitary sewers and other infrastructure within the valleys across the city
- The GSMP Master Plan is a long-range plan to evaluate the risks to City infrastructure and develop solutions for protecting that infrastructure.
- The recommended solutions in a Master Plan are developed within an implementation plan that can be carried out as separate projects over an extended timeline

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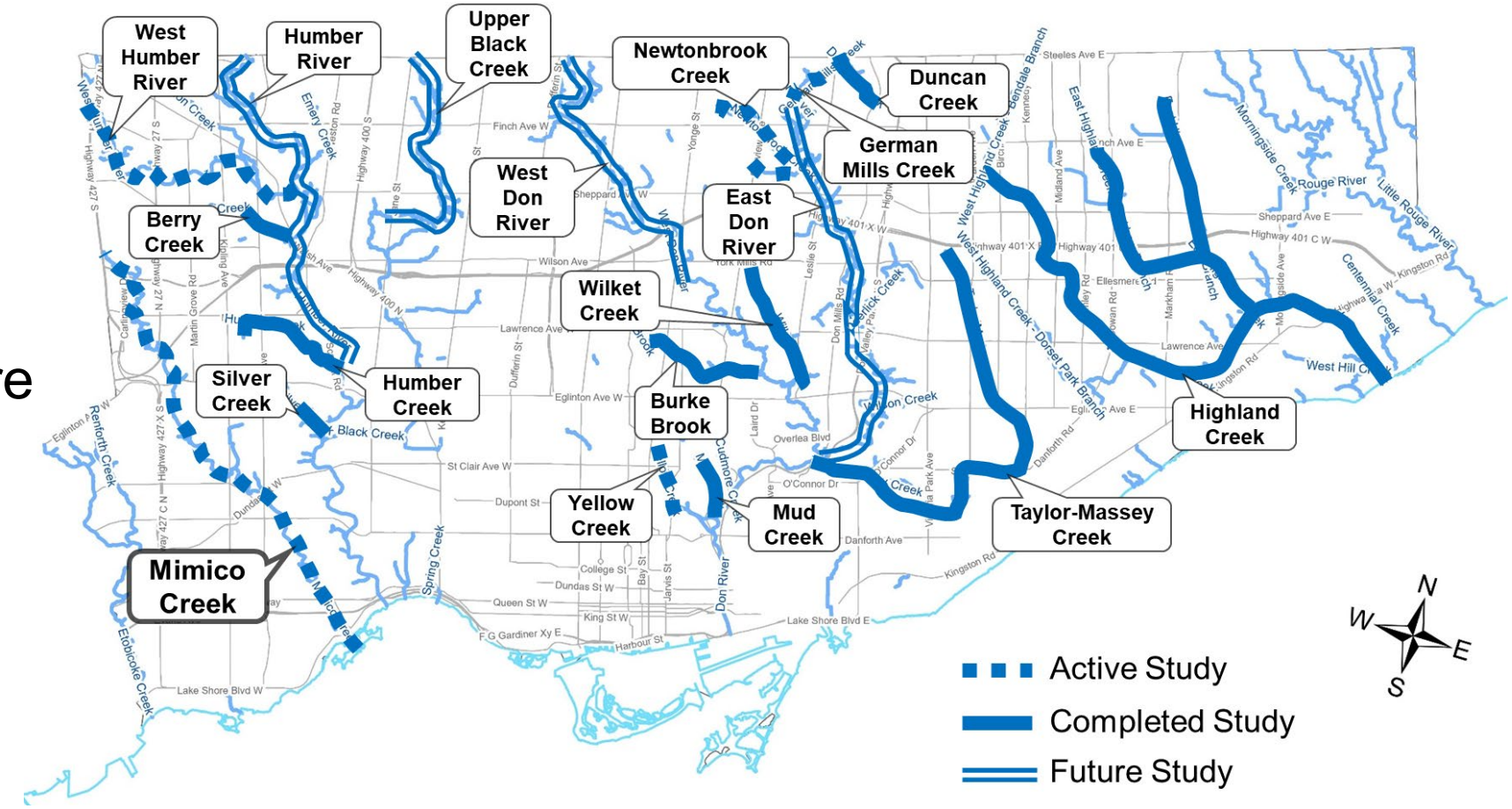
Watercourse studies across the City

- 9 Completed Studies
- 5 Active Studies
- 4 Planned Future Studies



Current GSMPs

- German Mills Creek
- Mimico Creek
- Newtonbrook Creek
- West Humber River
- Yellow Creek

Planned GSMPs

- East Don River
- Upper Black Creek

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GSMP Framework

Phase 1: Issue Assessment and Problem Confirmation

Phase 2: Development of Alternative Solutions

Phase 3: Define and Evaluate Alternative Solutions

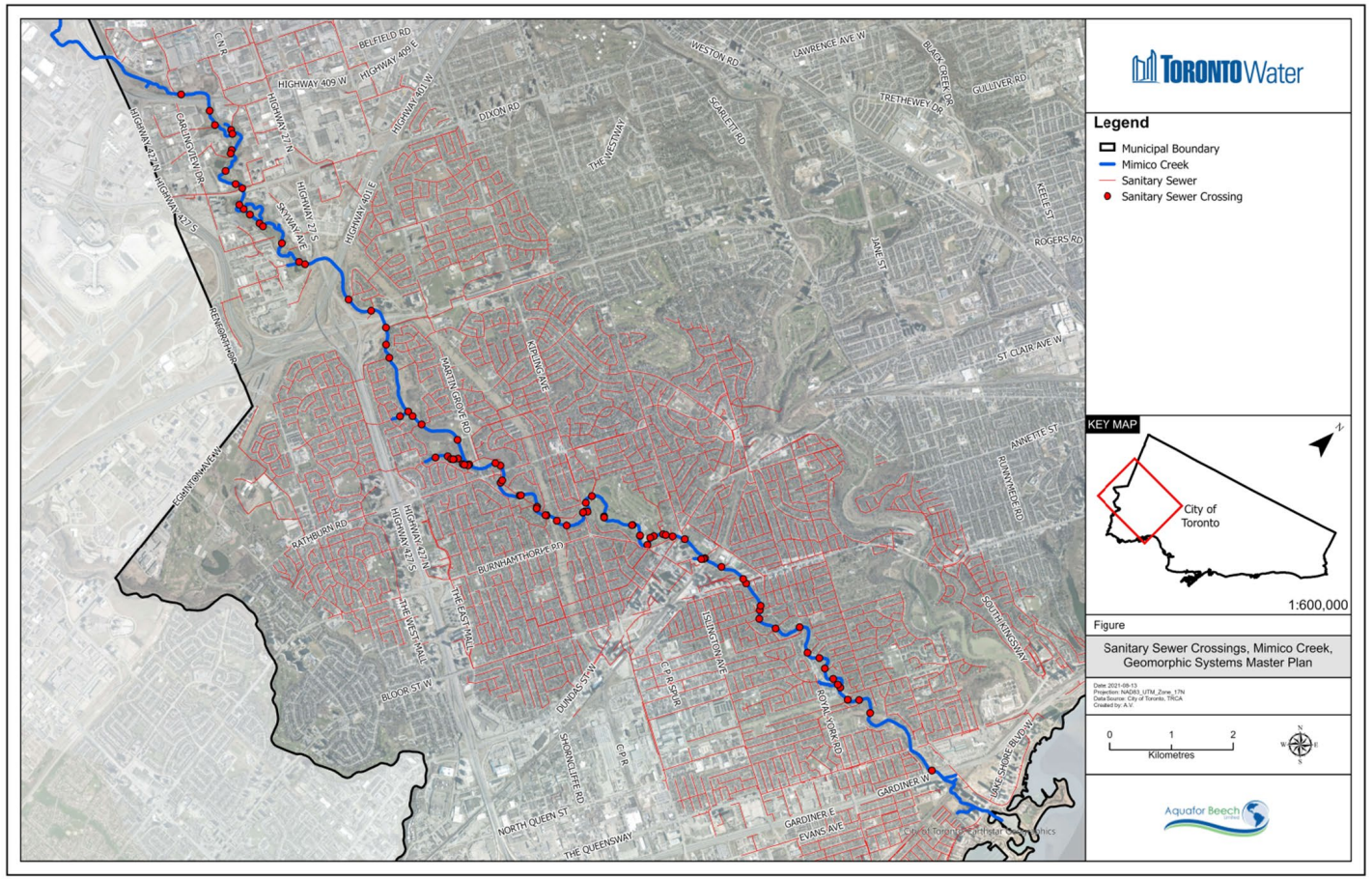
Phase 4: Selection of Preferred Solutions

Deliverables: Master Plan Report and Concept Design Briefs

Phase 1:
Issue Assessment and Problem Confirmation

- 42km of ongoing studies

- 134 sanitary sewer crossing
- 34 watermain crossings
- 62 lateral erosion risk sites
- 139 storm sewer outfalls



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Phase 2: Development of Alternative Solutions

- Technical risk assessments to define existing conditions (i.e. hydraulic, ecological, archaeological, etc.)
- Geomorphic & erosion hazard assessment
- Geomorphic risk assessment for Toronto Water infrastructure (risk to infrastructure ranked from 1 to 5)
- Development of preliminary rehabilitation strategies

Exposed Sanitary Sewer Crossing Example

Exposed concrete encasement surrounding 600 mm diameter sanitary trunk sewer

Signs of deterioration along encasement

Downstream channel conditions

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Phase 3: Define and Evaluate Alternative Solutions

- Finalization of restoration alternatives
  - Do Nothing
  - Local Works
  - Sub-Reach Scale Works
- Evaluation of alternatives
- Identification of proposed capital works projects

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Phase 3: Define and Evaluate Alternative Solutions

Local Works and Sub-Reach Scale Works differ in their geographic extent.

Alternative 2 – Example of Local Works

Alternative 3 – Example of Sub-Reach Scale Works

Solution Extent

- Generally, Alternative 2 is less than 100 m and Alternative 3 is greater than 100 m.
- Alternative 3 consists of extensive channel work and in some cases allows for connectivity between priority sites to address multiple water infrastructure sites.
- The specific extent of the recommended solutions will be confirmed after the study is completed.

Phase 3: Define and Evaluate Alternative Solutions

The following 5 categories of criteria were used to evaluate alternative solutions.

Physical & Natural Environment

Improves stability of stream and valley walls, flood conveyance, groundwater quality, vegetation, aquatic and terrestrial habitats including habitat for at-risk species, and minimised tree removals.

Economic Considerations

Evaluate total capital costs against recurring costs for maximum improvements and outcomes over a span of 50 years.

Infrastructure Risk

Addresses erosion and risk to City's water and sewer infrastructure.

Social & Cultural Environments

Protects built and cultural heritage as well as landscape and archaeological resources and assesses long term benefits for the community, minimum or short-term negative impacts, and consideration for impacts on private property.

Technical & Engineering Considerations

Evaluate regulatory agency standards, availability of staff and technical resources, maximum improvement for ecosystem and infrastructure.

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Phase 4: Selection of Preferred Solutions

- Development of an implementation plan
- Group priority sites into capital works projects
- Project design and construction costs
- Public consultation

Example: Implementation of channel works to protect sewer infrastructure recommended in the Highland Creek GSMP.

GSMP Deliverables

- Master plan report
- Concept design briefs for proposed capital works projects
- Short-term monitoring reports
- Climate Change Assessment

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Climate Change Assessment

- Climate and Environment
- Base Scope Determination
  - Hydrologic model considerations
- Building resilience into erosion control works

Prioritization of Capital Works Projects

- Based on active and recently completed GSMPs, there are approximately 75 projects across Toronto recommended for implementation.
- Around half of the projects are to address exposed sanitary sewer infrastructure in watercourses.

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Insights and Challenges

- Workload
- Prioritization
- Changing conditions and reassessment
- Addressing climate change

Questions

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