Red Hill Valley Project
Integrated Monitoring Plan

Public Works Committee
September 17, 2018

Presentation Outline

1. Project History Summary
2. Engagement
3. Findings / Recommendations
4. Conclusions

1. Project History Summary

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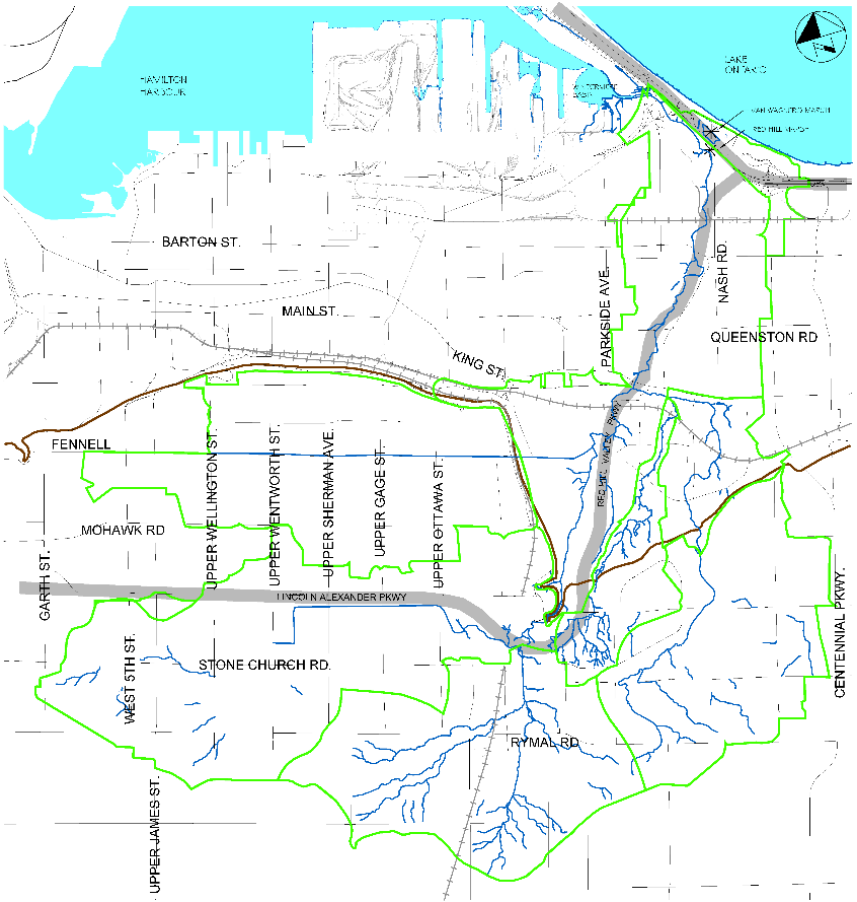

1. Project History Summary

- The idea of a highway through the Red Hill Valley was initially proposed in the 1950s
- Approved by Provincial Joint Hearing Board in 1985, funding in 1987
- Funding for Red Hill Valley section suspended by Province in 1990 (focus on East-West Section – “the Linc”)
- Funding restored in 1995, with a re-design process initiated in 1997 (Red Hill Watershed Action Plan – 1998)
- Subsequent Impact Assessment and Design Process completed in 2003

1. Project History Summary

Project Scope

- The Red Hill Valley Project was an environmentally integrated infrastructure project with several components, including:
  - An 8 km, four-lane, controlled access freeway
  - The re-alignment of over 7 km of Red Hill Creek
  - 14 Stormwater Quality Management (SWM) Facilities
  - 3 Flood Control Facilities
  - A 2.9 km Combined Sewer Overflow (CSO) Storage Pipe
  - A Landscape Management Plan (trails, parks…)
- ***Final construction phase ended in 2007, at which point the City began a multi-year environmental monitoring plan developed as a condition of multiple agency approvals to confirm the effectiveness of the new infrastructure and associated environmental management system***

1. Project History Summary

Requirements

- Environmental compliance monitoring for the Red Hill Valley Project was required as outlined in the following documentation:
  - MOE Exemption Order, 1997
  - Red Hill Creek Watershed Plan, 1998
  - Impact Assessment Design Process, 2003
  - Master Permit Application, 2004*
  - Various Permitting Compliance Reports, 2004-2011
  - Individual Permits and Authorizations specific to the respective construction contract phases (both Federal and Provincial)

**Innovative new process combining all permitting documentation into an integrated submission*

1. Project History Summary

Purpose

- The purpose of the Integrated Monitoring Plan is to:
  - Evaluate the performance of the Environmental Management System (i.e. design and mitigation techniques) constructed as part of the Red Hill Valley Project
  - Provide the necessary information to adjust and/or optimize the plan recommendations through a process of Adaptive Management

- The Monitoring Plan is considered to be *integrated* and *holistic*, in that the intent is to assess the entirety of the environmental impacts of the project, rather than individual attributes of the natural system

1. Project History Summary

Scope

Monitoring Component	What is monitored?
Groundwater	• Groundwater levels • Baseflow • Groundwater quality
Surface Water	• Water levels and flows (flood control facilities) • Water levels and flows (other features)
Water Quality	• SWM Facility (and creek) water quality • SWM Facility sediment quality
Stream Morphology	• Form and stability of channels • Rates of channel erosion and deposition • Channel substrate material
Fisheries	• Fish numbers and diversity • Benthic invertebrates • Water temperature • Fish passage and habitat
Terrestrial Ecology	• Vegetation (quantity and diversity) along creek and at SWM Facilities • ELC Mapping • Monitoring of breeding birds and amphibians • Review of special studies by others (turtles, flying squirrels)

2. Engagement

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Government Agency Committee (GAC)

- City of Hamilton
- Hamilton Conservation Authority
- Department of Fisheries and Oceans
- Ministry of Natural Resources and Forestry
- Ministry of the Environment and Climate Change (now Ministry of the Environment, Conservation and Parks)

Objective

- Provide input to scope through permitting and review
- Annual reporting and associated feedback from GAC

2. Engagement

Joint Stewardship Board

Meetings and Presentations held:

- February 2014
- June 2015

Objective

- To communicate findings and receive feedback on findings

3. Findings / Recommendations

3. Findings / Recommendations

Red Hill Valley Parkway Flood Management System

- 100 year performance standard established
- July 26, 2009 event greater than a 100 year storm (1.5x)
- Forensic study has determined all infrastructure to be operating per design objectives
- Some minor Operation and Maintenance improvements recommended

3. Findings / Recommendations

Red Hill Creek System

- Subjected to numerous large storms shortly after construction
- Caused some initial instabilities and erosion
- Adjustments to channel form and structures required (2010 / 2015) particularly through Kings Forest Golf Club
- Riparian zone is well established with predominantly native species

3. Findings / Recommendations

Stormwater Management Facilities and Wetlands

- Flood Control Facilities
  - Dartnall, Greenhill, Davis (Ongoing)
  - Operating per design requirements
- Stormwater Quality Control Facilities
  - Eleven (11) City owned; three (3) Ministry of Transportation owned
  - Largely performing per design requirements; some ongoing improvements being conducted by City

3. Findings / Recommendations

Red Hill Valley

- No negative impacts from roadway on groundwater (quantity / quality) and creek base flows
- 100+ ha of valley restoration undertaken by Kayanase
- Wildlife surveys
  - Forty-two (42) species of birds
  - Four (4) species of amphibians

3. Findings / Recommendations

1. Continue to monitor:

- Groundwater levels
- Surface water (flood control facilities, including Davis Creek Facility)
- CSO Discharges
- Water quality (including SWM facility effectiveness, watershed monitoring)
- Erosion (including King's Forest GC)
- Riparian zone / vegetation (including invasive species)
- Benthic invertebrates
- Turtles

Intent is to support operations and management (adaptive practices)

3. Findings / Recommendations

2. Review Operations and Maintenance practices related to:

- Minor localized flood susceptible locations (2010 report)
- Stormwater management facility sediment accumulation and inspections
- Localized erosion
- Corridor maintenance (‘natural’ infrastructure)

3. Consider Climate Change resiliency study with the Ministry of Transportation Ontario (MTO)

4. Assess / address bed load from Buttermilk Falls reach upstream of King’s Forest

3. Findings / Recommendations

5. Consider / support ‘cleanout’ days with Public or other partners

6. Consider transplanting local native fishes

7. Consider carp control in lower wetlands / marshes

8. Review / assess need for further valley restoration / management and invasive species monitoring/management

9. Consider preparation of a stand-alone report documenting the full scope of the work by the Kayanase

4. Conclusions

4. Conclusions

- Red Hill Valley Project Integrated Monitoring Plan has been completed in accordance with the full requirements of the approval agencies
- The environmental management systems, designed as part of the roadway's implementation, are meeting their intended purpose to mitigate impacts and improve the ecosystem's function
- A set of future works has been identified to be integrated into existing City programs and / or conducted through agreements with other stakeholders (e.g. Hamilton Conservation Authority)