

# Brantford Ice Jam Mitigation Class Environmental Assessment Presentation Transcript

Presented by Taylor Stevenson on behalf of Montrose Environmental.

## Slide 1 - Introduction

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0:03

Good morning. My name is Taylor Stevenson.

0:05

I'm a Senior Environmental Planner with Montrose Environmental and part of the project team that is completing the Brantford HDM Mitigation Class Environmental Assessment.

0:14

Other members on the project team include Katelyn Lynch, Samanta Martinez, Lisa Stocco, and Serena Catania from Grand River Conservation Authority, as well as Jennifer Elliott from the City of Brantford.

## Slide 2 – Study Problem

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0:31

So the study problem for this environmental assessment study, the Gilkison Flats reach of the Grand River has a history of ice jam occurrences.

0:40

In February 2018, a major ice jam set in through this reach, over topping and circumventing flood protection along portions of the dike system through the city.

0:50

The event required evacuations of thousands of city residents, caused extensive damages and cost to homes and public infrastructure, and required extensive emergency service operations from agencies.

1:04

As you can see in the figure, the yellow area is the area where residents had to evacuate in Brantford, the red is the area that was flooded, and the Gray shaded area shows the properties that were flooded.

## Slide 3 – Class EA Study Area

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1:21

So the Class EA study area is centered on the Gilkison Flats reach around Two Fish Island and around the bend at Tutela Heights.

1:28

This section of river features large meander bends, sandbars and a channel restriction at the bend upstream of Two Fish Island, as well as a change in channel slope which flattens in the area of Oxbow Row.

1:40

Ice jams occur in this area almost every winter and sometimes several times during a winter season.

1:46

In 2018, the ice jam extended from upstream of Two Fish Island to approximately Brant Park.

## **Slide 4 – Background and Previous Studies**

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1:54

So in terms of background and previous studies that were completed prior to the start of this environmental assessment, the 2018 ice jam occurred and then in 2019, KGS Group completed an ice jam study to review the history of ice jams in Brantford.

2:12

They completed an analysis of weather conditions that can lead to ice jams and did a detailed description of the 2018 ice jam.

2:20

In 2021, Montrose, then Ecosystem Recovery Inc. initiated an ice jam mitigation feasibility study to develop a list of alternative mitigation measures to reduce ice jam potential in Brantford. Ten alternatives were carried forward for evaluation as part of this study.

2:40

The ERI feasibility study laid the groundwork for the class Environmental Assessment (EA) study to further evaluate the carried forward alternatives and select a preferred alternative.

2:51

So here we are now completing the class EA in 2025 and 2026.

## **Slide 5 – Conservation Ontario Class EA Process**

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3:03

So the Conservation Ontario class EA process is shown in the figure on this slide. The Brantford Ice Jam Mitigation class EA study is subject to the Environmental Assessment Act.

3:15

While many conservation authority projects are exempt from the Environmental Assessment Act, those classified as remedial flood and erosion control projects are subject to its requirements.

3:26

The Conservation Ontario class EA guides how flood and erosion control projects are planned and assessed.

3:33

In terms of where we are right now, we are currently preparing and completing environmental study report for this EA, which will then be posted for review for a 30 day period for the public.

## **Slide 6 – Work Completed between 2019 to 2021**

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3:48

The work completed between 2019 and 2021, Montrose completed a hydraulic and floodplain analysis, a fluvial geomorphological assessment, flood damages

assessment, held the Public Information Center (PIC) in late 2020, developed and evaluated mitigation options and development of a preferred alternative.

### **Slide 7 – Work Completed between 2019 to 2021 (continued)**

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4:11

Continuing on with the work that was completed between 2019 and 2021, specifically the hydraulic analysis results, Montrose developed a hydraulic model that was run with various dike scenarios subjected to the regulatory flood events.

4:31

The model includes the 2018 dike scenario, the existing dike scenario, and the no dike scenario. This slide here starts with the 2018 dike scenario.

4:43

The flooding of the model is representative of observed flooding instances during the 2018 Ice Jam, as seen in three key areas of flooding in Brantford.

4:53

One, the intersection of Grand River Avenue and Scarf Avenue experienced flooding due to the adjacent Grand River Avenue gap in the dike system. Two, the Brantford Civic Center and Earle Haig Family Fun Park experience flooding due to the Civic Center gap being open in the dike system. And three, areas of River Road between Aberdeen Avenue and Baldwin Avenue, including Pontiac Street, experienced flooding due to overtopping of floodwaters over the River Road floodwall.

### **Slide 8 – Work Completed between 2019 to 2021 (continued)**

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5:24

There was also a model run for the existing dikes Ice jam scenario.

5:29

This ice jam scenario was run using the updated DEM terrain that includes the existing dike condition, which includes the Grand River Avenue and Civic Center dike gaps closed off.

5:44

The resulting flood model estimates the flood extent from the 2018 ice jam under the existing dike conditions, which provides a direct comparison to the 2018 dikes and the impact of improving the dikes system since 2018.

### **Slide 9 - Work Completed between 2019 to 2021 (continued)**

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6:05

The final model scenario was run with no dikes meaning it was modelled with all the existing dikes and flood mitigation infrastructure removed in Brantford.

6:16

As you can see, there is significantly more flooding, so it does show the importance that flood walls, dikes and other flood infrastructure play in downtown Brantford in terms of protecting residential areas, commercial areas, and infrastructure.

6:37

This model it provides an estimate of the maximum possible flood under a regulatory flood event if Brantford did not have any existing dike infrastructure.

### **Slide 10 – Work Completed between 2019 to 2021 (continued)**

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6:49

In 2021, Montrose also completed a fluvial geomorphological assessment and looked at the understanding of existing conditions of the river, implication of alternatives on the river, and looked at erosion hazards.

7:05

We also looked at flood damages from the 2018 event. We looked at theoretical flood damages for the no dike scenario and determined flood damages under various alternatives.

7:16

As you can see in the table on the slide, there were direct and indirect damages from the 2018 ice jam event and the total damages ended up being approximately \$9.59 million.

### **Slide 11 - Draft Preferred Alternative 2021**

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7:31

The draft preferred alternative from the 2021 work was an overbank relief of the upstream bend at Gilkison Flats area which included vegetation management, which is essentially removing all of the trees and vegetation and improving flood bank connectivity by lowering the overbank by 1 meter which is grading down the bank by 1 meter.

7:51

It also included raising dikes which was raising the River Road floodwall by 0.3 meters and installing a new floodwall at the top of the existing dike between Strathcona Avenue and Lauren Bridge.

### **Slide 12 – Baseline Environmental Studies 2025**

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8:08

So in 2025 we commenced the current class Environmental Assessment study and the baseline environmental studies we focused on were Natural Heritage, Cultural Heritage and Archaeological.

8:19

For Natural Heritage, the field visit took place by Montrose ecologists on April 9th and June 9th 2025. They focused on areas of the preferred alternative as you can see in the figure on the slide which included Gilkison Flats, River Road and SC Johnson Trail.

8:35

A total of 25 bat habitat trees were identified, 12 along SC Johnson Trail on River Road and 13 in the Gilkison Flats area. 3 vegetation communities were identified. A deciduous forest, cultural meadow and cultural woodland.

### **Slide 13 - Baseline Environmental Studies 2025**

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8:53

Continuing on with natural heritage, there was 1 confirmed species at risk found in Gilkison Flats area, which is Eastern Wood Peewee. It's a species of special concern.

9:02

There was 28 candidate species at risk, 1 confirmed significant wildlife habitat

associated with the eastern wood peewee, and seven candidate significant wildlife habitat.

### **Slide 14 - Baseline Environmental Studies 2025**

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9:16

For the cultural heritage resources and archaeological work, Timmins Martelle Heritage Consultants (TMHC Inc.), completed both of these scopes of work for cultural heritage.

9:26

They completed a cultural heritage report and 107 properties with identified potential built heritage resources and/or cultural heritage landscapes were found.

9:40

Built Heritage Resources include individual building structures or engineering works that have historical, architectural or cultural value and Cultural Heritage Landscapes are areas where natural and built elements combined to reflect significant historical or cultural patterns, including settlement layouts, land use, and human modified landscapes.

10:00

Out of the 107 properties with identified potential, 90 were found to require additional review, 21 potential built heritage resources and 3 culture heritage landscapes were determined to have potential culture heritage value or interest.

### **Slide 15 - Baseline Environmental Studies 2025**

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10:22

As part of the culture heritage study there was potential direct and indirect impacts identified for 18 potential Built Heritage Resources and 3 Cultural Heritage Landscapes. So direct impacts, indirect impacts and mitigations were considered as part of this study.

10:42

Alternative 4.02 B presents the most significant direct impact, positive and negative, to the cultural heritage resources.

### **Slide 16 - Baseline Environmental Studies 2025**

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10:56

TMHC also completed archaeological resources. They conducted a stage 1 archaeological assessment. The stage 1 background study indicated the study area had potential for the recovery of archaeological resources.

11:10

Stage 1 property inspection was conducted to evaluate current conditions and determine if any areas of archaeological potential remain intact.

### **Slide 17 - Baseline Environmental Studies 2025**

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11:20

Based on the completion of the Stage 1 archaeological assessment, the following recommendations are carried forward.

11:27

Disturbed or steeped areas, which was approximately 25% of the study area, there's no further assessment needed.

11:36

Potential archaeological areas, which was approximately 75% of this area, require a Stage 2 archaeological assessment before any construction occurs.

11:47

For any manicured grasslands and wood lots which are shown in green in the figure on the left, a test pit survey will be needed.

## **Slide 18 – Evaluation of Alternatives - 2025**

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12:01

So as part of the 2025 class EA Montrose did evaluation of the alternatives.

12:08

For the evaluation criteria, 10 alternative methods were carried forward from the 2021 Branford Ice Jam Feasibility Study, and these alternatives were re-evaluated in 2025.

12:22

Each alternative was assessed against a range of evaluation criteria which falls within the broad categories describing the study's environment. Each category was given the same weight of 25% each.

12:35

So in terms of the environments, we looked at #1 technical and engineering environment, which includes design, construction, operation and maintenance criteria #2 natural heritage environment, which includes terrestrial and aquatic criteria #3 socioeconomic and cultural environment, which includes public health and safety, archaeological value, built and cultural heritage resources, aesthetics, First Nations and planning criteria.

13:03

And #4 the economic environment which includes flood damage implementation costs, operations and maintenance and cost comparison criteria.

## **Slide 19 – Alternative 2.01**

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13:13

So now we will start going through the different alternatives that were evaluated as part of the EA (Environmental Assessment).

13:20

This first alternative is titled alternative 2.01, which is ice control structure at Wilkes Dam.

13:26

So then these are proposed ice control concrete piers in the Grand River.

13:35

So as you can see the advantages to this would be that it induces ice jams at the ice control structure and reduces downstream ice jam potential.

13:46

But the disadvantages that weigh the advantages on this alternative, there is costly

implementation and difficult access for maintenance and regular clearing of debris around the new structure, permanent loss of fish habitat and potential impacts to species at risk fish and mussels.

14:02

It may impact surface water intake for Brantford drinking water source, potential flood damage reduction is uncertain and there's potential backwater impacts upstream at Paris.

### **Slide 20 – Alternative 3.01**

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14:15

For alternative 3.01, this was channel streamlining at Two Fish Island.

14:21

So as you can see it would be realigning the riverbanks and armouring the riverbank, re-establishing a riffle structure, and again the disadvantages outweigh the advantages in this alternative.

14:38

The advantages would be there is no maintenance requirements and there's potential for high flood damage reduction, depending on the technical success factors in reducing the size of the ice jam and low operations and maintenance costs.

14:50

The disadvantages are that it would require a specialized design, costly implementation, moderate amount of uncertainty, it would have difficult construction, intensive flow management and dewatering requirements.

15:03

There is a potential to create downstream impacts to Brantford. There's a permanent loss of riparian habitat and potential impacts the species at risk of bats and high potential for archaeological value.

### **Slide 21 – Alternative 3.02**

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15:16

Alternative 3.02 is new channel bypassing the bend.

15:21

So as you can see in the figure, this is a proposed 30 metre wide relief channel that would bypass the Grand River.

15:30

Again the disadvantages outweigh the advantages on this alternative, the advantages are low maintenance requirements, relatively low impact to aquatic habitat and low operations and maintenance costs.

15:41

And the disadvantages are a highly specialized design, costly implementation and moderate amount of uncertainty in terms of success.

15:49

There's a potential for groundwater and excess soil management difficulties, potential loss of terrestrial habitat of about approximately 4 hectares.

15:59

There's potential impacts, the species at risk habitat for bats, high potential for archaeological value and a high land acquisition and easement agreement requirement.

## **Slide 22 – Alternative 4.01A and 4.01B**

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16:11

Alternative 4.01 A and 4.01 B is left over bank relief at the bend.

16:18

So this is proposed vegetation clearing and floodplain benching area on the, I guess, the South side of Grand River just South of Two Fish Island on the other side of Gilkison Flats.

16:32

This would include removing the vegetation and grading down the bank to improve floodplain conveyance in this area.

16:44

The disadvantages did outweigh the advantages in this alternative again.

16:48

The advantages were easy implementation and low maintenance requirements, low impact to aquatic habitat, opportunity for invasive vegetation removal and restoration with native vegetation species, improved floodplain connectivity to the river.

17:05

The disadvantages were potential excess soil management and erosion and sediment control difficulties, disturbance to approximately 4.7 hectares of terrestrial habitat, potential impacts the species at risk bat habitat, high land acquisition and easement agreement requirements and the potential flood damage reduction really depends on ice jam reduction.

17:26

So it does not improve flood damage equivalent to the 2018 ice jam and so really the results in terms of reducing ice jam and flooding are somewhat uncertain.

## **Slide 23 – Alternative 4.01A and 4.01B**

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17:44

Alternative 4.02 A and 4.02 B is similar, but on the other side of the river in the Gilkison Flats area.

17:52

This is one's titled right over bank relief upstream of bend. For this alternative, this would be removing the native material and all of the vegetation in the black hatched area.

18:10

The advantages outweighed the disadvantages on this alternative and this is actually the highest flood damage reduction of all of the alternatives.

18:22

So as you can see, the advantages are easy implementation and low maintenance requirements. There's a proven effectiveness to reduce flood elevations and in this case flood elevations could be reduced by up to 0.3 or 0.4 of a meter.

18:39

There's low impact to aquatic habitat, opportunity for invasive vegetation species removal and restoration with native vegetation species.

18:47

There is high flood damage reduction, as I said before, of all of the alternatives and a decrease in annual costs associated with flood damages.

### **Slide 24 – Alternative 5.02**

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18:59

Alternative 5.02 is channel relief at River Road, so this would include removing native material and the River Road embankment to allow a relief area for flood flows.

19:14

The disadvantages did outweigh the advantages in this alternative.

19:17

The advantages include low maintenance requirements, proven effectiveness to reduce flood elevations, low impact to aquatic habitats, opportunity for invasive vegetation species removal and restoration, and improve floodplain connectivity to the river.

19:32

The disadvantages are heavy design and construction effort, utilities coordination and transportation implementations, potential impacts to historic landfill located on GRCA lands, potential for groundwater and excess soil management difficulties, disturbance to 1.1 hectares of terrestrial habitat, potential impacts to species risk bat habitat and high land acquisition.

20:02

As you can see in this alternative River Road would be closed and that is another reason that this would be a disadvantage in this area due to the high land acquisition associated with this alternative.

### **Slide 25 – Alternative 5.03**

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20:19

Alternative 5.03 is similar to 5.02.

20:22

It's channel relief at River Road. However, in this scenario, in addition to cutting down the floodplain area and River Road bank, instead of closing River Road, River Road would be realigned.

20:38

So the advantages and disadvantages there are fairly similar to 5.02. Again, the disadvantages outweighed the advantages.

### **Slide 26 – Alternative 7.01**

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20:47

Alternative 7.01 is raising the dike in flood walls.

20:52

So this includes raising the River Road flood wall by 0.3 meters and installing a new flood wall at the top of the existing earthen and dike North of Strathcona Avenue.

21:13

As you can see for this advantage includes design and implementation relatively simple. There's a proven effectiveness to reduce flood elevations.

21:20

There's an increased flood resiliency to mitigate climate change, low disturbance to terrestrial habitat, a low potential for archaeological value, high flood damage reduction, low implementation and maintenance costs, and decrease in annual cost associated with flood damages.

21:37

Disadvantages for this one is that it does not improve ice jam occurrence or severity.

21:43

It impacts the riverscape aesthetics by raising the flood wall by a 0.3 meters, which is 1 foot and there is medium term traffic management required on River Road just during construction.

## **Slide 27 – Evaluation of Alternatives**

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21:58

So this is a summary of our evaluation of alternatives table.

22:03

As you can see here, it has the alternatives on the top and then the environment and criteria on the left. The total scores are on the bottom.

22:13

So alternative 4.02 A, 4.02 B and alternative 7.01 had the highest scores of all alternatives.

22:22

By combining alternative 4.02 B and alternative 7.01, we ended up getting a score of 18 to 20 so the preferred alternative is a combination of 4.02 B and 7.01.

## **Slide 28 – Selection of Preferred Alternative**

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22:42

As you can see on the slide, as I stated, the preferred alternative is a combination of 4.02 B up over bank, relief of upstream bend, grading of west over bank at Gilkison Flats area and alternative 7.01 raise dike and flood wall protection with a sub-alternative which includes raising of earth and dike a new flood wall on the crest of the existing dike between Strathcona Avenue and Lauren Bridge.

## **Slide 29 – Selection of Preferred Alternative**

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23:11

So this shows alternative 4.02 B which is part of the selection of preferred alternative and that was previously explained in the evaluation alternatives.

23:23

So again the yellow shaded area will be cleared of vegetation and trees and that area will be graded down approximately 1 meter to improve floodplain connectivity and improve floodplain conveyance.

## **Slide 30 – Selection of Preferred Alternative**

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23:46

Alternative 7.01 is raised dike and flood wall protections.

23:50

So as you can see in the figure, the River Road flood wall is the orange line in the figure and that will be raised by approximately 0.3 meters.

24:01

Dike protection is currently in place in Brantford and is considered the most proven alternative for a flood mitigation.

24:10

The existing River Road flood wall extends from Strathcona Avenue upstream to the Hamilton Brantford Rail Trail South of Baldwin Avenue. This River Road flood wall, it largely protects the Eagle Place neighborhood.

### **Slide 31 – Selection of Preferred Alternative**

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24:28

For the sub-alternative 7.01 raising of earth and dike new flood wall on the crest of existing dike between Strathcona Avenue and Lauren Bridge.

24:38

So this was included as a maintenance enhancement as part of alternative 7.01 and it was based on completing the baseline environmental inventory.

24:52

This maintenance enhancement recommendation was identified as you know, improving flood protection in downtown Brantford.

25:03

So the dike system through this stretch it although it was not threatened during the 2018 ice jam event, the section of dike has been assessed for opportunities for raising based on open water and ice jam flood elevation results.

### **Slide 32 – Next Steps**

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25:23

So for next steps in the Class Environmental Assessment study, we will be compiling responses and input that has been received from the Public Information Center and from First Nations engagement.

25:35

We will refine the environmental impact assessments and alternative rankings. We will finalize the evaluation and selection of preferred alternative. We will issue a notice of completion of the Class Environmental Assessment environmental study report and post that for public review and comment for 30 days.

25:51

After that, we will note we will issue a notice of project completion and then move on to detailed design and construction.

### **Slide 33 – Questions**

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26:04

That is the end of my presentation. Thank you very much.