

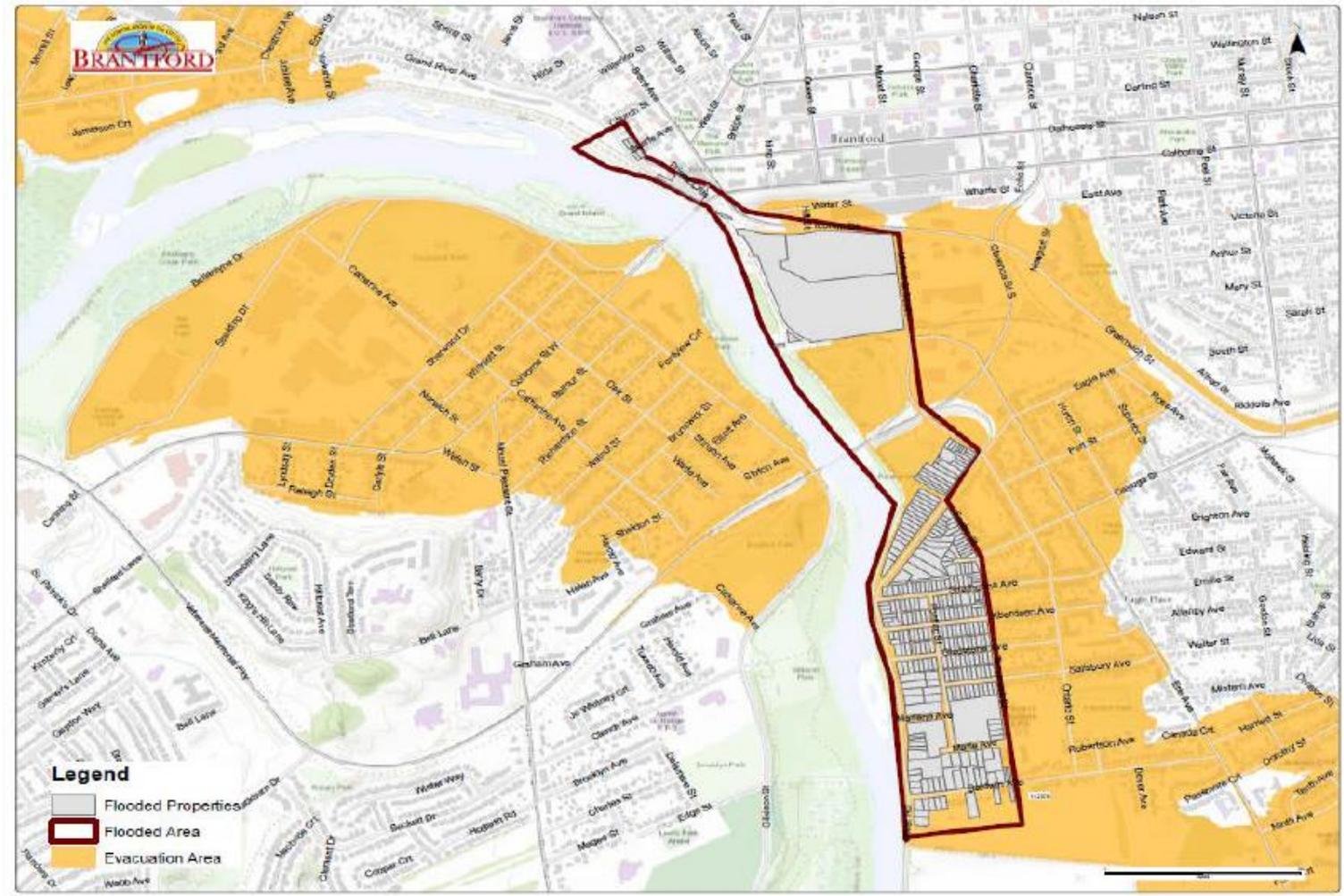
# Brantford Ice Jam Mitigation Class Environmental Assessment

Public Information Centre  
February 11, 2026



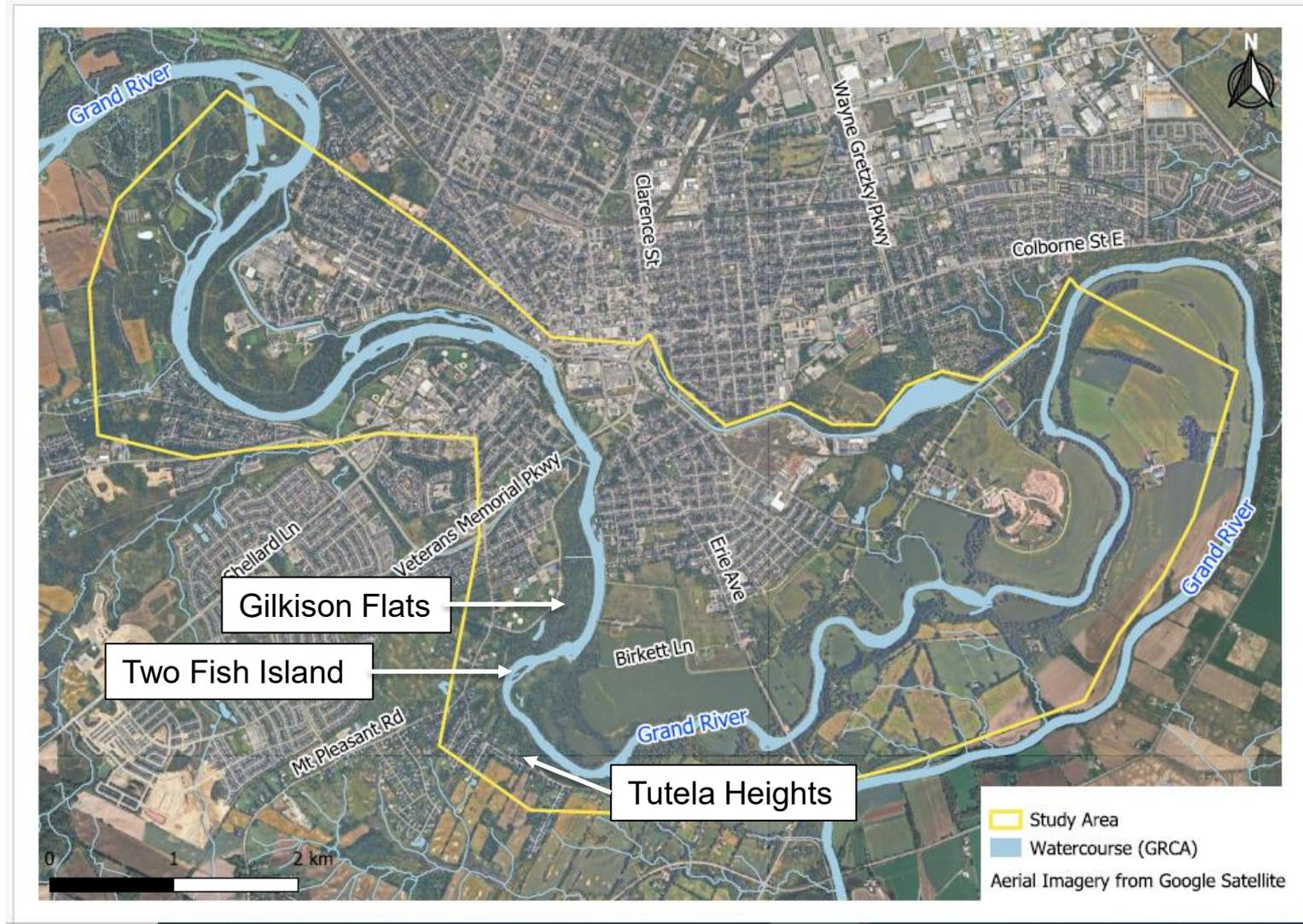
# Study Problem

- The Gilkison Flats reach of the Grand River has a history of ice jam occurrences.
- In February 2018, a major ice jam set in through the reach, overtopping and circumventing flood protection along portions of the dike system through the City.
- 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.



# Class EA Study Area

- The study area is centred on the Gilkison Flats reach, around Two Fish Island, and around the bend at Tutela Heights.
- Ice jams occur in this area almost every winter and sometimes several times during a winter season.



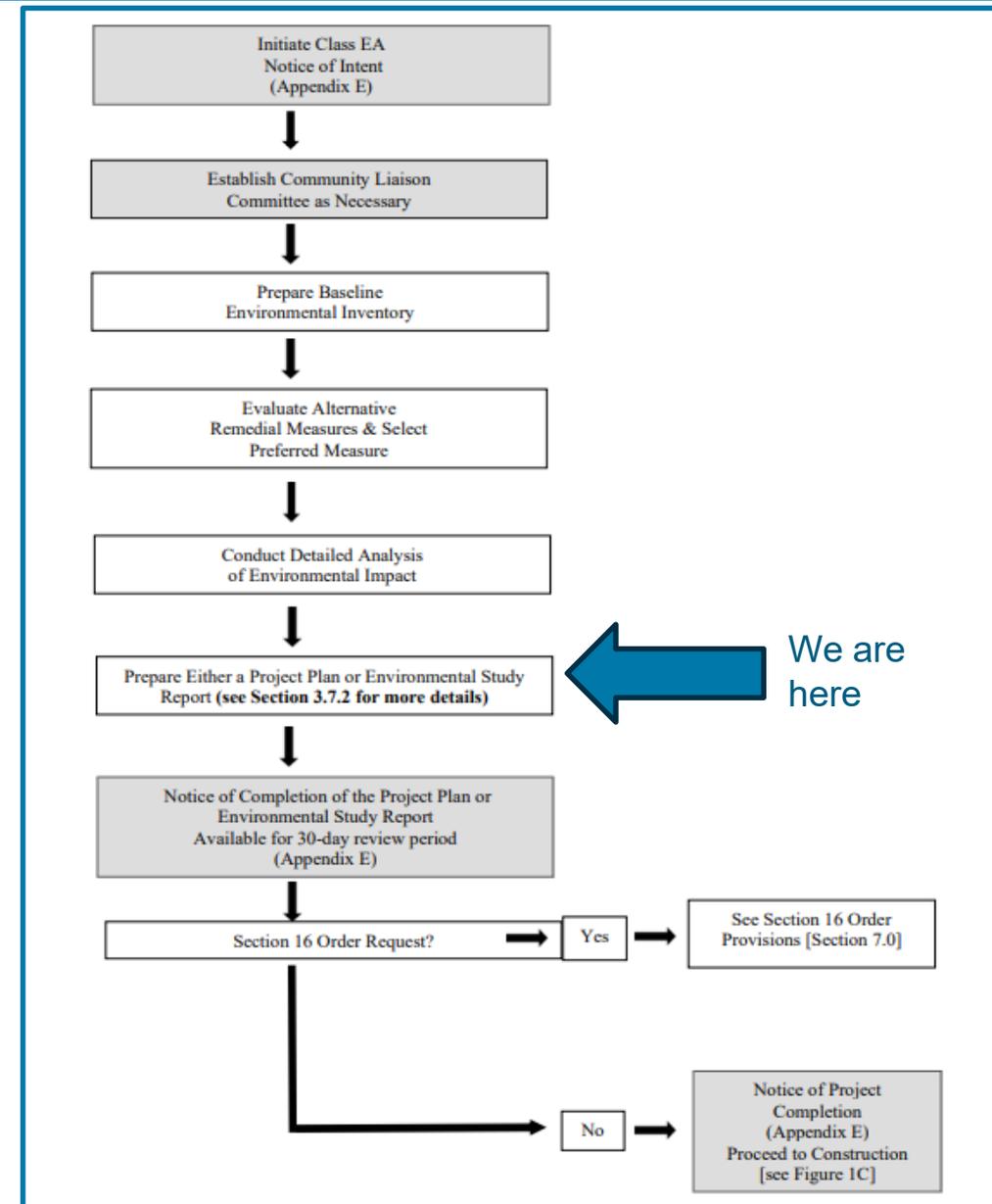
# Background & Previous Studies



- 2018: Ice Jam occurred
- 2019: Ice Jam Study (by KGS)
  - History of ice jams in Brantford
  - Analysis of weather conditions that can lead to ice jams
  - Detailed description of the 2018 ice jam
- 2021: Feasibility Study (by ERI)
  - 10 alternatives to reduce Brantford's ice jam potential
- 2025: Class EA (by Montrose)

# Conservation Ontario Class EA Process

- Follows Ontario's *Environmental Assessment Act (EAA)*.
- Most Conservation Authority (CA) projects are exempt from the EAA, but Remedial Flood and Erosion Control Projects are subject to its requirements.
- The Conservation Ontario (CO) Class EA guides how flood and erosion control projects are planned and assessed.



# Work Completed between 2019-2021

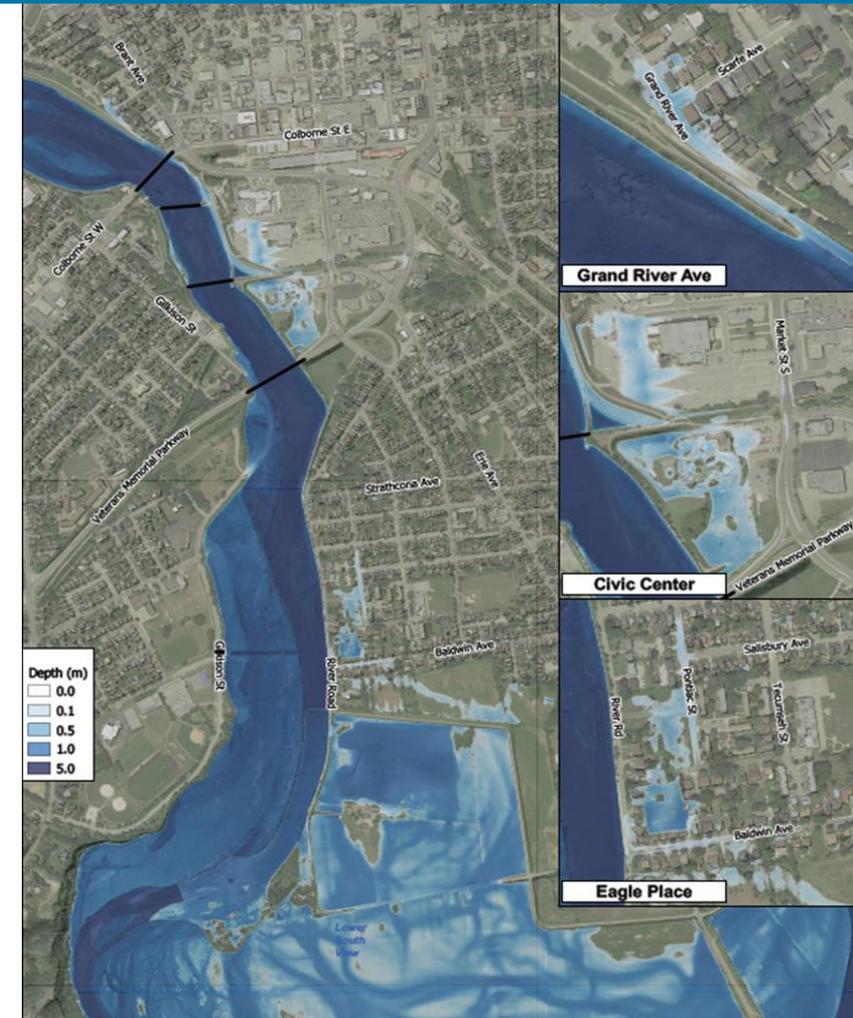


- Hydraulic analysis (Floodplain analysis)
- Fluvial geomorphological assessment
- Flood damages assessment
- Public Information Centre (PIC)
- Developed & evaluated mitigation options
- Development of a preferred alternative

# Work Completed between 2019-2021 (continued)

## Hydraulic Analysis Results (2018 Dikes)

- This scenario was modeled using dike conditions from the 2018 ice jam (e.g., Grand River Ave and Community Centre gaps open)
- Flooding during the 2018 ice jam seen in 3 key areas:
  1. The intersection of Grand River Avenue and Scarfe Avenue
  2. The Brantford Civic Centre and Earle Haig Family Fun Park
  3. Areas of River Road between Aberdeen Avenue and Baldwin Avenue, including Pontiac Street



### Brantford Ice Jam Mitigation Study

Figure 4-5  
2D Ice Model Results - 2018 Ice Jam Event (2018 Dykes)

Data Source: Ecosystem Recovery Inc., 2020.



1:10,000

Project: 2039  
Brantford Ice Jam Mitigation Study  
Date: 26/8/2021



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# Work Completed between 2019-2021 (continued)

## Hydraulic Analysis Results (No Dikes)

- This scenario was modeled with all existing dikes and flood mitigation infrastructure removed
- Provides an estimate of the maximum possible flood under a Regulatory flood event if Brantford did not have any existing dike infrastructure



# Work Completed between 2019-2021 (continued)

## Fluvial Geomorphological Assessment

- Established understanding of existing conditions, implication of alternatives on the river, and erosion hazards

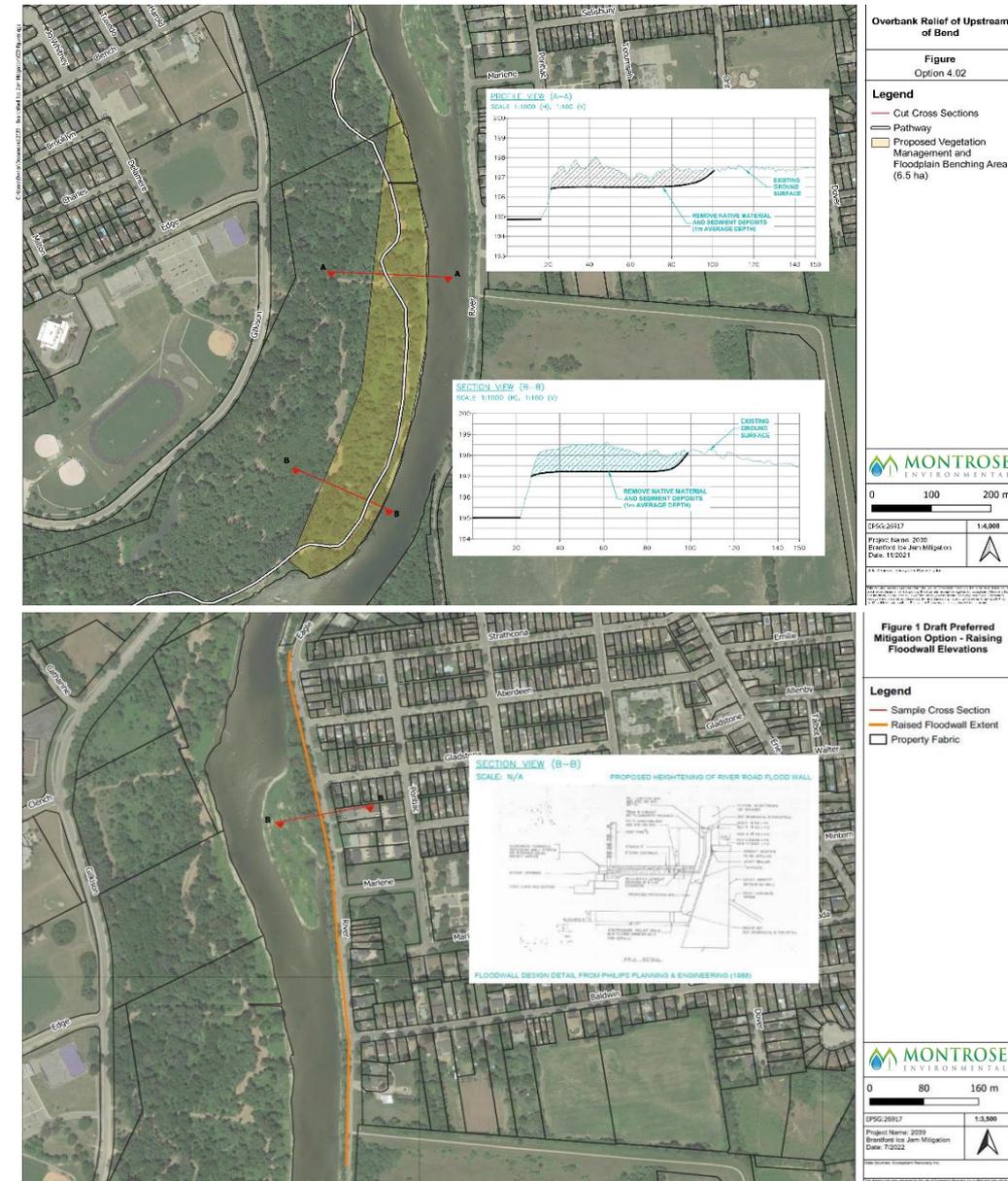
## Flood Damages

- Determined flood damages from the 2018 event
- Determined theoretical flood damages for no dikes scenario
- Determined flood damages under various alternatives

Costs	Amount (CAD\$ 2017)
Direct Damages	
a) Building Damages	\$6.34M
b) Vehicle Damages	\$0.63M
c) Road Damages	\$0.91M
d) Pathway Damages	\$0.94M
Total Direct Damages	<b>\$8.82M</b>
Indirect Damages	
a) Emergency (5.7%)	\$0.50M
b) Economic (3%)	\$0.26M
Total Indirect Damages	<b>\$0.77M</b>
Total Damages	<b>\$9.59M</b>

# Draft Preferred Alternative - 2021

- Part A: overbank relief of upstream bend (Gilkison Flats Area)
  - Vegetation management
  - Improve floodplain connectivity by lowering overbank by 1m
- Part B: raising dikes
  - Raise River Rd floodwall by 0.3m
- Dike enhancement (b/w Strathcona Ave and Lorne Bridge)



# Baseline Environmental Studies - 2025



## Natural Heritage

- Field visits took place on April 9 & June 9, 2025
- Focused on areas of the preferred alternative (Gilkison Flats, River Rd, SC Johnson Trail)
- Total of 25 bat habitat trees identified (12 along SC Johnson Trail/River Rd & 13 in FOD7 in Gilkison Flats).
- Three vegetation communities were identified:
  1. Deciduous Forest
  2. Cultural Meadow
  3. Cultural Woodland

# Baseline Environmental Studies - 2025



## Natural Heritage

- 1 confirmed Species at Risk (SAR) within Gilkison Flats area – Eastern Wood-pewee (SC)
- 28 candidate SAR (6 birds, 3 plants, 4 herpetofauna, 1 insect, 6 mammals, 4 fish, 4 mussels)
- 1 confirmed Significant Wildlife Habitat (SWH) – Special Concern or Rare Wildlife Species (Eastern Wood-pewee)
- 7 candidate SWH

# Baseline Environmental Studies - 2025



## Cultural Heritage Resources

- Timmins Martelle Heritage Consultants (TMHC Inc.) completed a Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment
- 107 properties with identified potential Built Heritage Resources (BHRs) & /or Cultural Heritage Landscapes (CHLs)
- 90 found to require additional review – 21 potential BHRs and 3 CHLs determined to have potential Cultural Heritage Value or Interest (CVHI)

# Baseline Environmental Studies – 2025



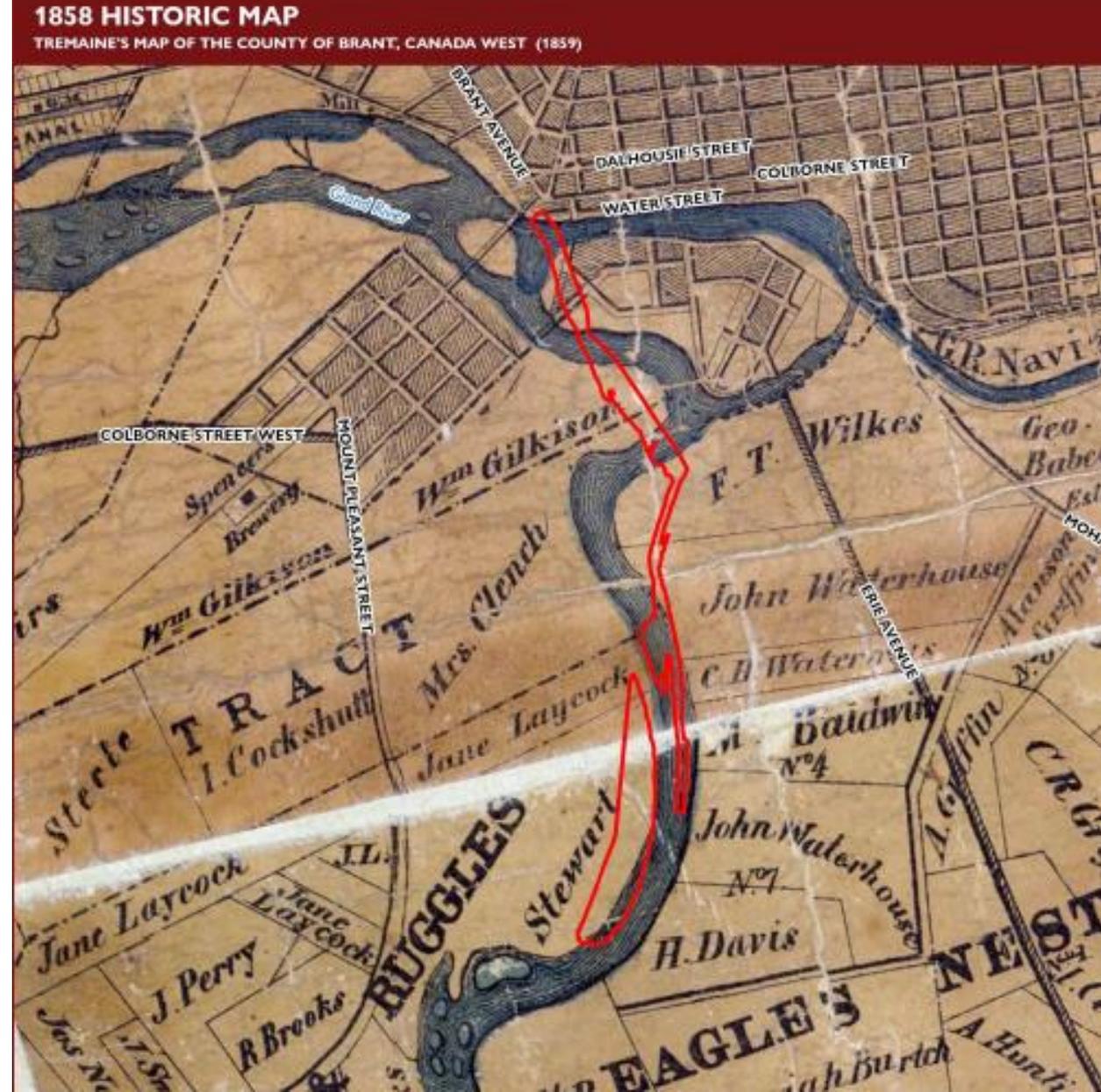
## Cultural Heritage Resources

- Potential direct and indirect impacts identified for 18 potential BHRs and 3 CHLs
- Direct impacts, indirect impacts and mitigation measures were considered
- Alternative 4.02B presents the most significant direct impact (positive and negative)

# Baseline Environmental Studies - 2025

## Archaeology Resources

- TMHC conducted a Stage 1 archaeological assessment
- Stage 1 background study indicated the study area had potential for the recovery of archaeological resources
- Stage 1 property inspection was conducted to evaluate current conditions and determine if any areas of archaeological potential remain intact



# Baseline Environmental Studies – 2025

## Stage 1 Archaeological Assessment – Recommendations:



Source: TMHC

- Disturbed or steep areas (25%) → no further assessment needed
- Potential archaeological areas (75%) → Stage 2 assessment required before any groundwork
- Manicured grasslands & woodlots → test pit survey needed

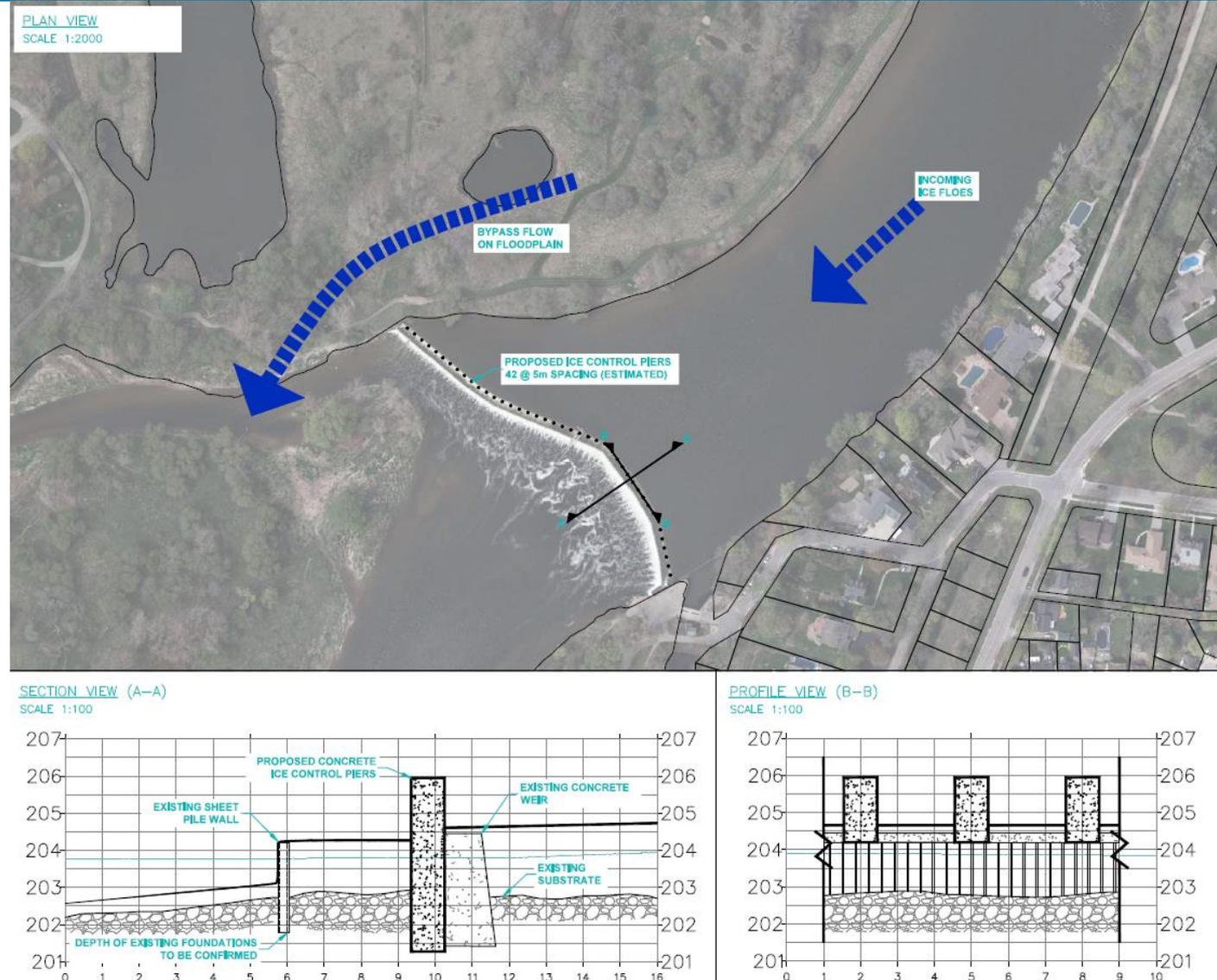
# Evaluation of Alternatives – 2025

## Evaluation Criteria

- 10 alternative methods carried forward from 2021 Brantford Ice Jam Feasibility Study. These alternatives were re-evaluated in 2025.
- Each alternative was assessed against a range of evaluation criteria which falls within the broad categories describing the study's "environment":
  1. **Technical/engineering environment** – design, construction, operation and maintenance
  2. **Natural Heritage environment** – terrestrial & aquatic
  3. **Socio-economic/Cultural environment** - public health and safety, archaeological value, built and cultural heritage resources, aesthetics, First Nations, planning
  4. **Economic environment** – flood damage, implementation costs, operations and maintenance, cost comparison

# Alternative 2.01

Advantages	Disadvantages
Induce ice jams at the ICS, reducing downstream ice jam potential	Costly implementation and difficult to access for maintenance and regular clearing of debris
	Permanent loss of fish habitat (potential impacts to SAR fish and mussels)
	May impact surface water intake for Brantford drinking water source
	Potential flood damage reduction is uncertain
	Potential backwater impacts upstream at Paris



**FIGURE 2.01**

**OPTION 2.01**

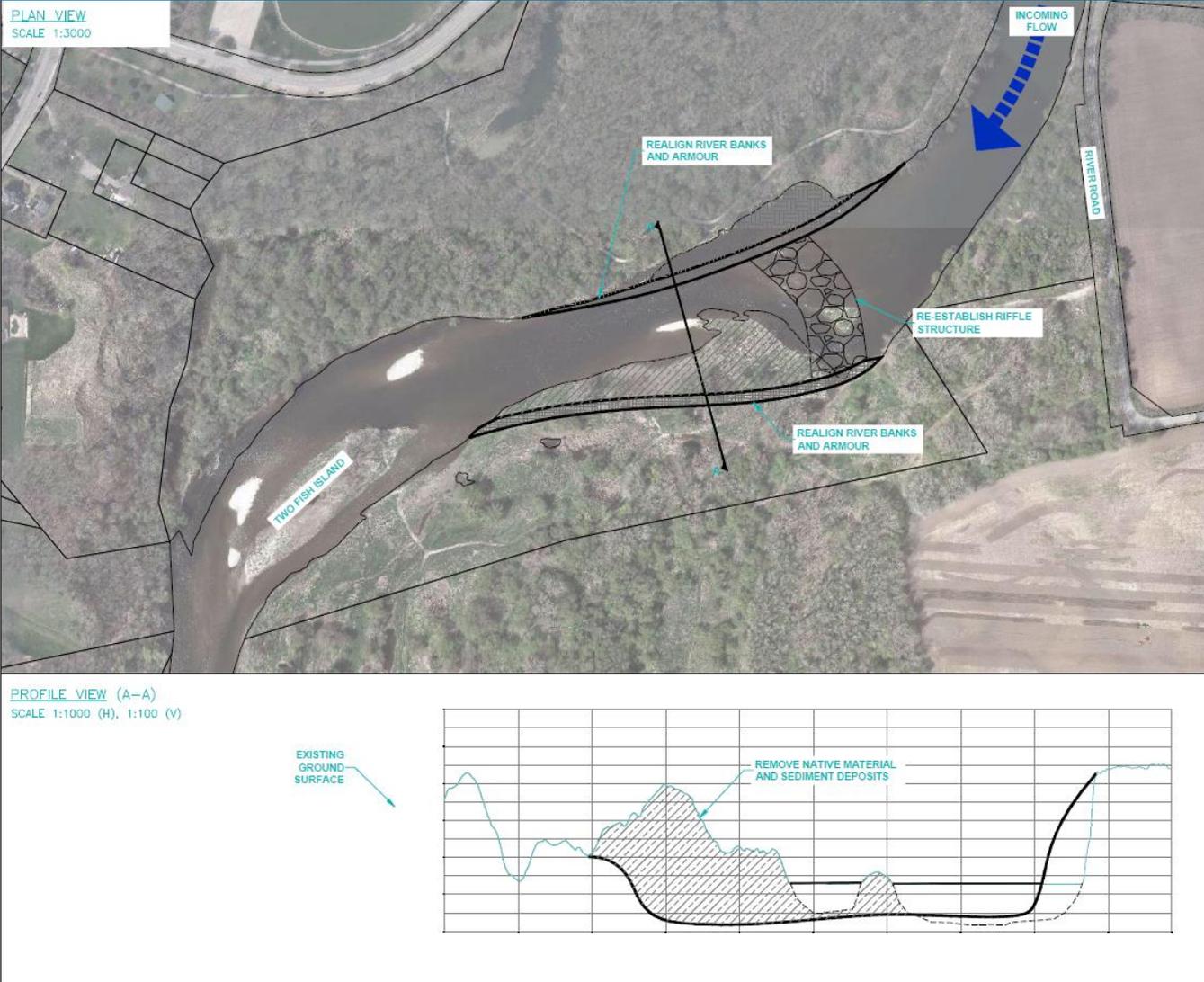
**ICE CONTROL STRUCTURE (ICS) AT WILKES DAM**

**CONCEPT**



# Alternative 3.01

Advantages	Disadvantages
No maintenance requirements	Specialized design, costly implementation, moderate amount of uncertainty
Potential for high flood damage reduction depending on technical success factors in reducing size of jam	Difficult construction, intensive flow management and dewatering required
Low operations and maintenance costs	Potential to create downstream impacts to Brantford
	Permanent loss of riparian habitat and potential impacts to SAR habitat (e.g. Bats)
	High potential for archaeological value



**FIGURE 3.01**

**OPTION 3.01**

**CHANNEL STREAMLINING AT TWO FISH ISLAND**

**CONCEPT**

▲

**MONTROSE ENVIRONMENTAL**

SCALE: AS NOTED

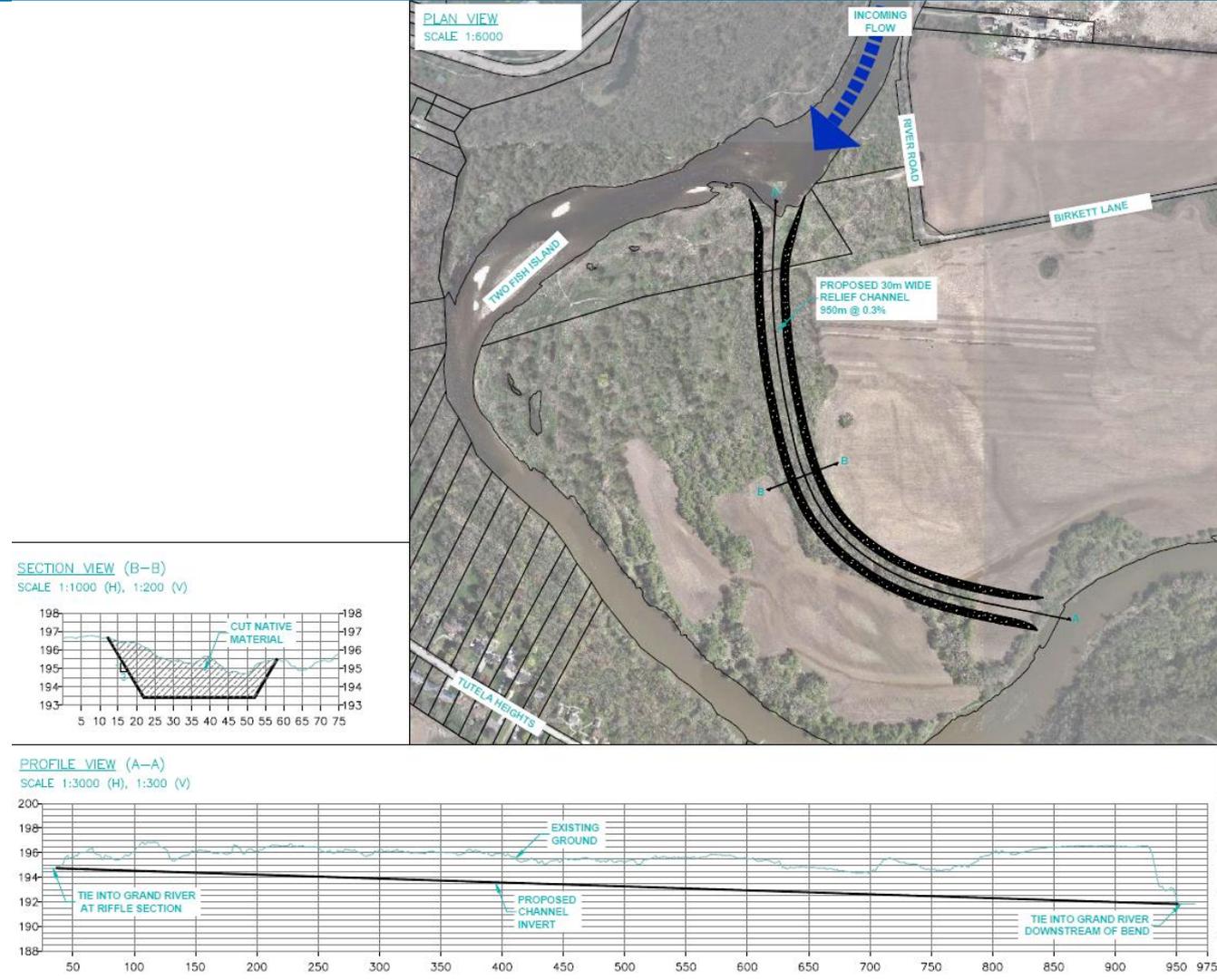
GCS: NAD83 UTM 17N

BY/CHECK: BD/CJM

DATE: 2021-03-11

# Alternatives 3.02

Advantages	Disadvantages
Low maintenance requirements	Highly specialized design, costly implementation, moderate amount of uncertainty
Relatively low impact to aquatic habitat	Potential for ground water and excess soil management difficulties
Low operations and maintenance costs	Permanent loss of terrestrial habitat (~4 ha)
	Potential impacts to SAR habitat (e.g. bats)
	High potential for archaeological value
	High land acquisition/easement agreement requirements



**FIGURE 3.02**

**OPTION 3.02**  
NEW CHANNEL  
BYPASSING BEND

**CONCEPT**



SCALE: AS NOTED

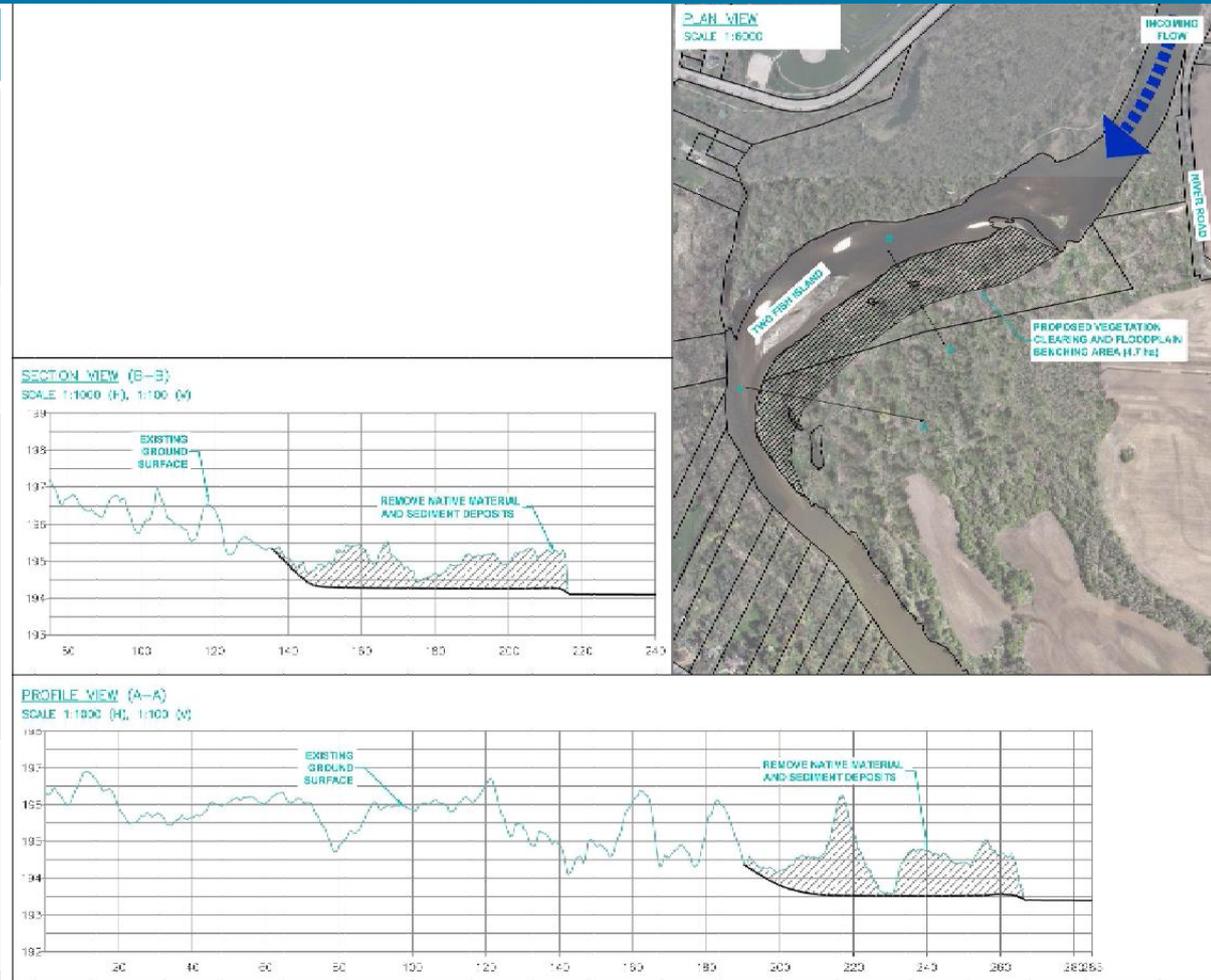
GCS: NAD83 UTM 17N

BY/CHECK: BD/CJM

DATE: 2020-12-21

# Alternative 4.01A & 4.01B

Advantages	Disadvantages
Easy implementation, low maintenance requirements	Potential excess soil management and erosion and sediment control difficulties
Low impact to aquatic habitat	Disturbance to ~4.7 ha of terrestrial habitat
Opportunity for invasive vegetation removal and restoration with native vegetation species	Potential impacts to SAR habitat (e.g. Bats)
Improved floodplain connectivity to the river	High Land acquisition/easement agreement requirements
	Potential flood damage reduction depends on ice jam reduction, does not improve flood damage equivalent to 2018 jam

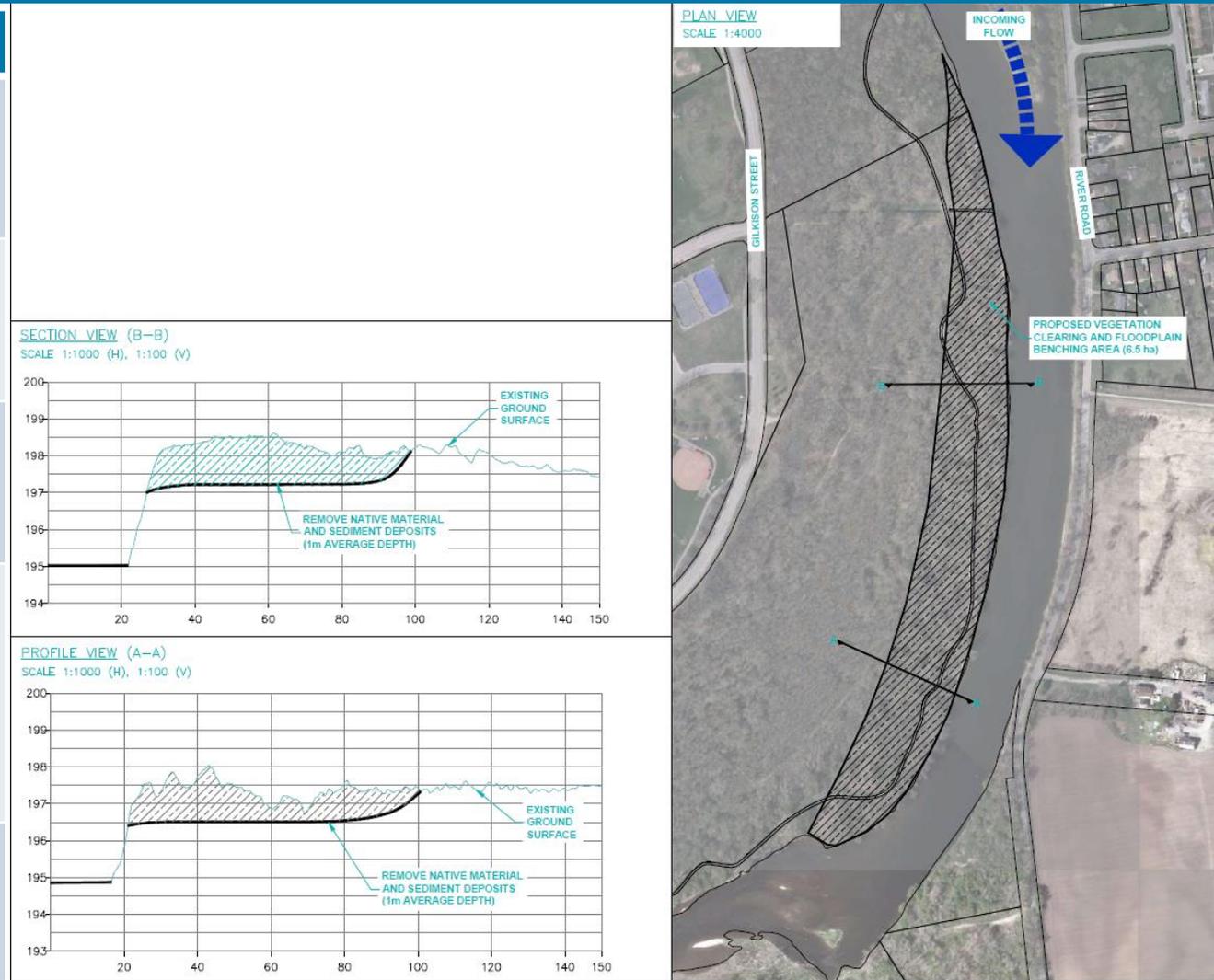


**FIGURE 4.01**  
**OPTION 4.01**  
**LEFT OVERBANK RELIEF AT BEND**  
**CONCEPT**

  
  
 SCALE: AS NOTED  
 GCS: NAD83 UTM 17N  
 BY/CHECK: BD/CJM  
 DATE: 2021-03-10

# Alternative 4.02A & 4.02B

Advantages	Disadvantages
Easy implementation, low maintenance requirements	Disturbance to ~8 ha of terrestrial habitat (50% invasive vegetation)
Proven effectiveness to reduce flood elevations	Potential impacts to SAR habitat (e.g., Bats)
Low impact to aquatic habitat	High potential for archaeological value
Opportunity for invasive vegetation species removal and restoration with native vegetation species	
Highest flood damage reduction of all alternatives	
Decrease in annual costs associated with flood damages	



**FIGURE 4.02**  
**OPTION 4.02**  
RIGHT OVERBANK  
RELIEF UPSTREAM  
OF BEND

**CONCEPT**



SCALE:	AS NOTED
GCS:	NAD83 UTM 17N
BY/CHECK:	BD/CJM
DATE:	2020-03-10

# Alternative 5.02

Advantages	Disadvantages
Low maintenance requirements	Heavy design and construction effort, utilities coordination and transportation implications
Proven effectiveness to reduce flood elevations	Potential impacts to historic landfill located on GRCA owned lands
Low impact to aquatic habitat	Potential for groundwater and excess soil management difficulties
Opportunity for invasive vegetation species removal and restoration with native vegetation species	Disturbance to ~1.1 ha of terrestrial habitat
Improved floodplain connectivity to the river	Potential impacts to SAR habitat (e.g., Bats)
	High land acquisition

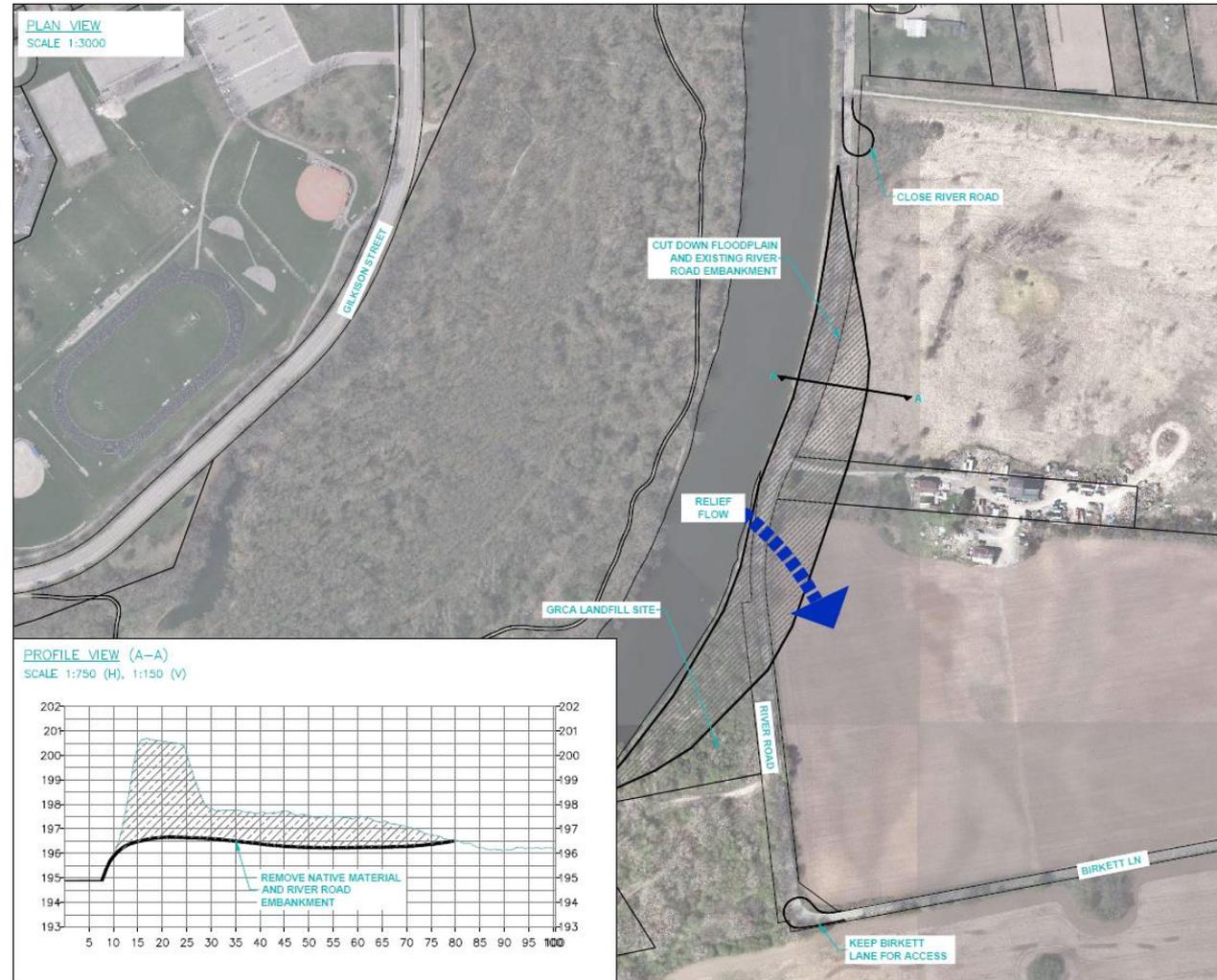


FIGURE 5.02

OPTION 5.02  
CHANNEL RELIEF AT  
RIVER ROAD

CONCEPT



SCALE: AS NOTED

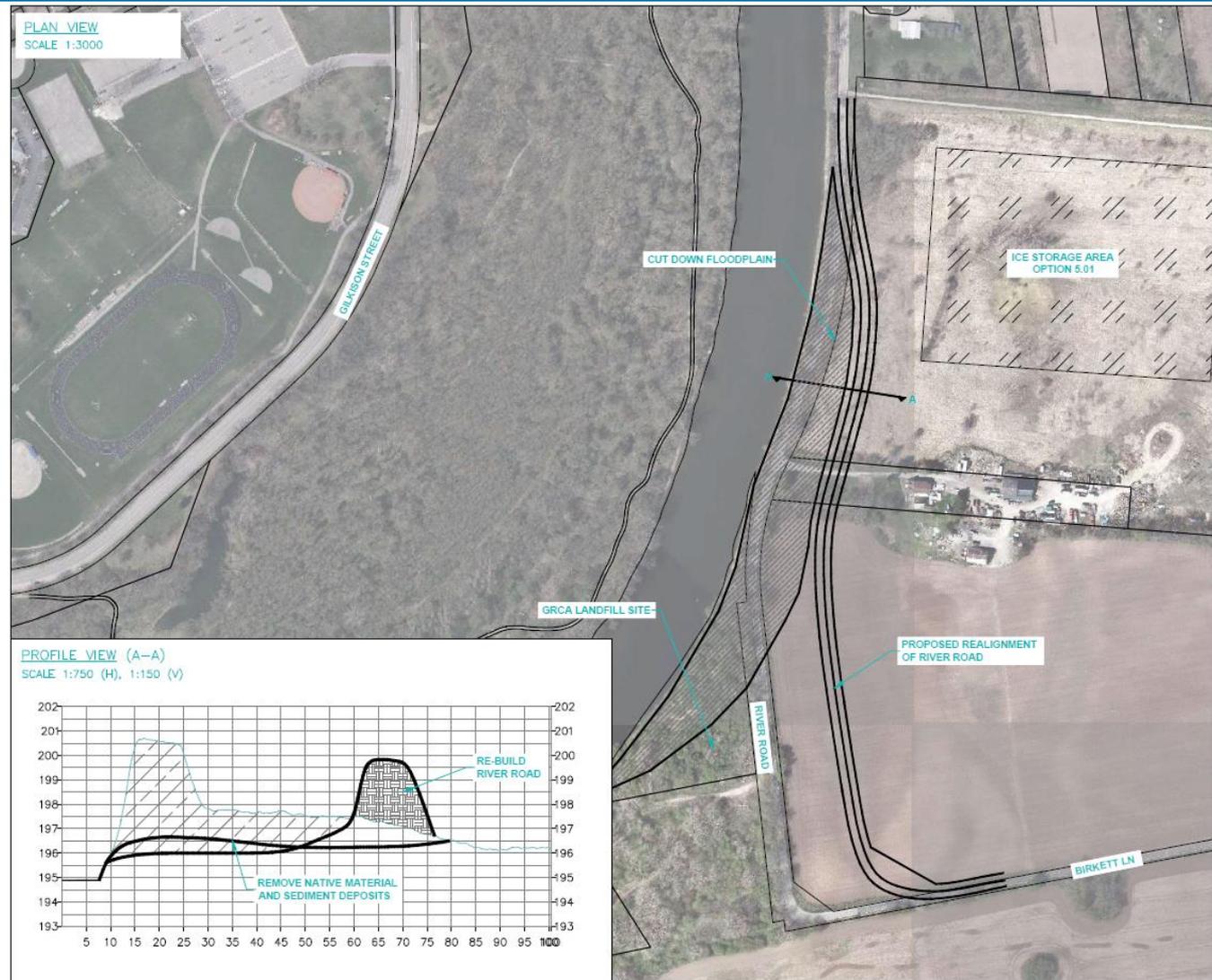
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BY/CHECK: BD/CJM

DATE: 2021-03-10

# Alternative 5.03

Advantages	Disadvantages
Low maintenance requirements	Heavy design and construction effort, utilities coordination and transportation implications
Proven effectiveness to reduce flood elevations	Potential impacts to historic landfill located on GRCA owned lands
Opportunity for invasive vegetation species removal and restoration with native vegetation species	Disturbance to ~1.1 ha of terrestrial habitat
High flood damage reduction	Permanent impacts to road alignment resulting in road closure
	High land acquisition/easement requirements



**FIGURE 5.03**

**OPTION 5.03**  
CHANNEL RELIEF AT RIVER ROAD

**CONCEPT**





SCALE: AS NOTED

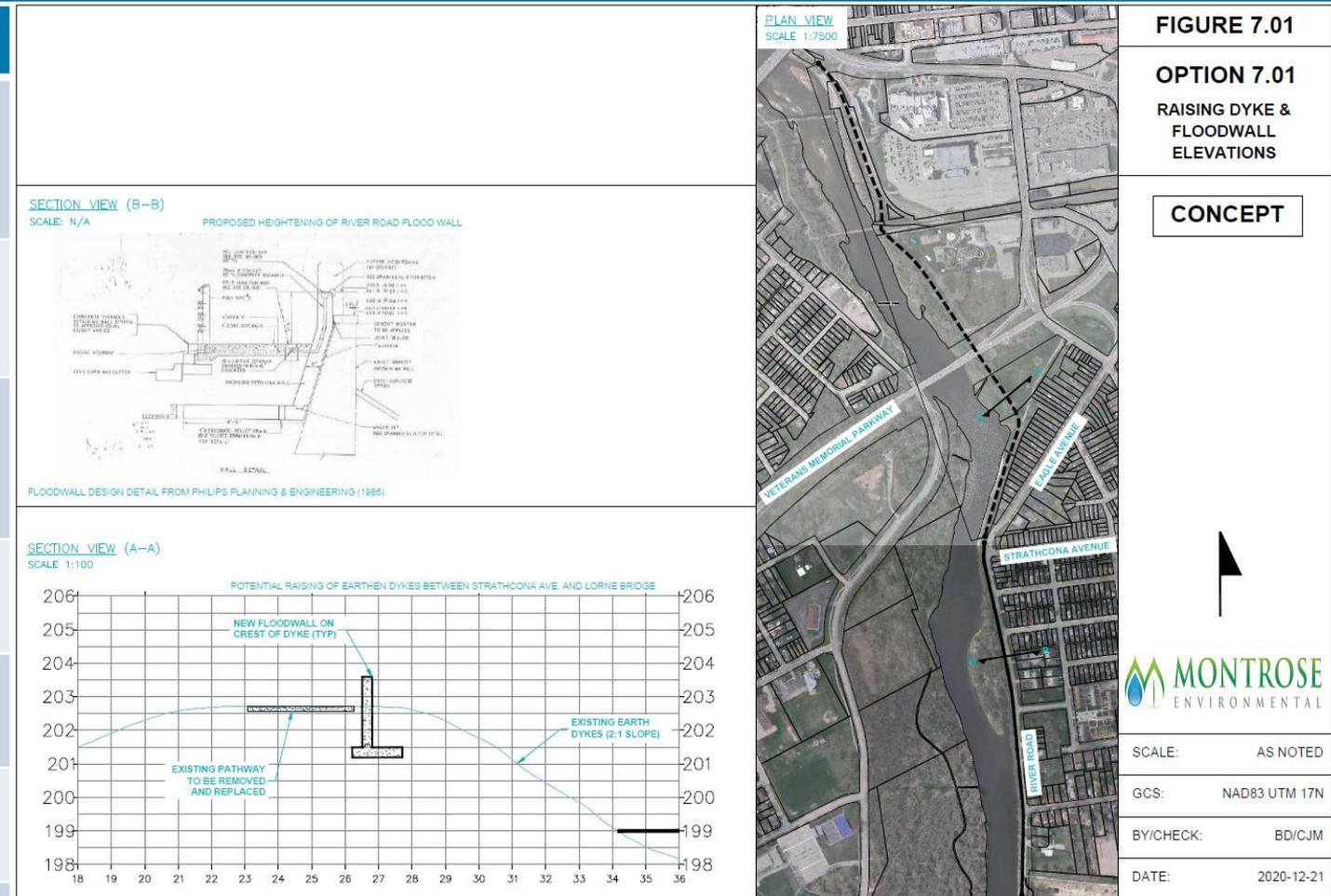
GCS: NAD83 UTM 17N

BY/CHECK: BD/CJM

DATE: 2021-03-10

# Alternative 7.01

Advantage	Disadvantage
Design and implementation relatively simple	Does not improve ice jam occurrence or severity
Proven effectiveness to reduce flood elevations	Impacts to riverscape aesthetics by raising floodwall
Increased flood resiliency to mitigate climate change	Medium-term traffic management required on River Rd during construction
Low disturbance to terrestrial habitat	
Low potential for archaeological value	
High flood damage reduction	
Low implementation & maintenance costs	
Decrease in annual costs associated with flood damages	



# Evaluation of Alternatives

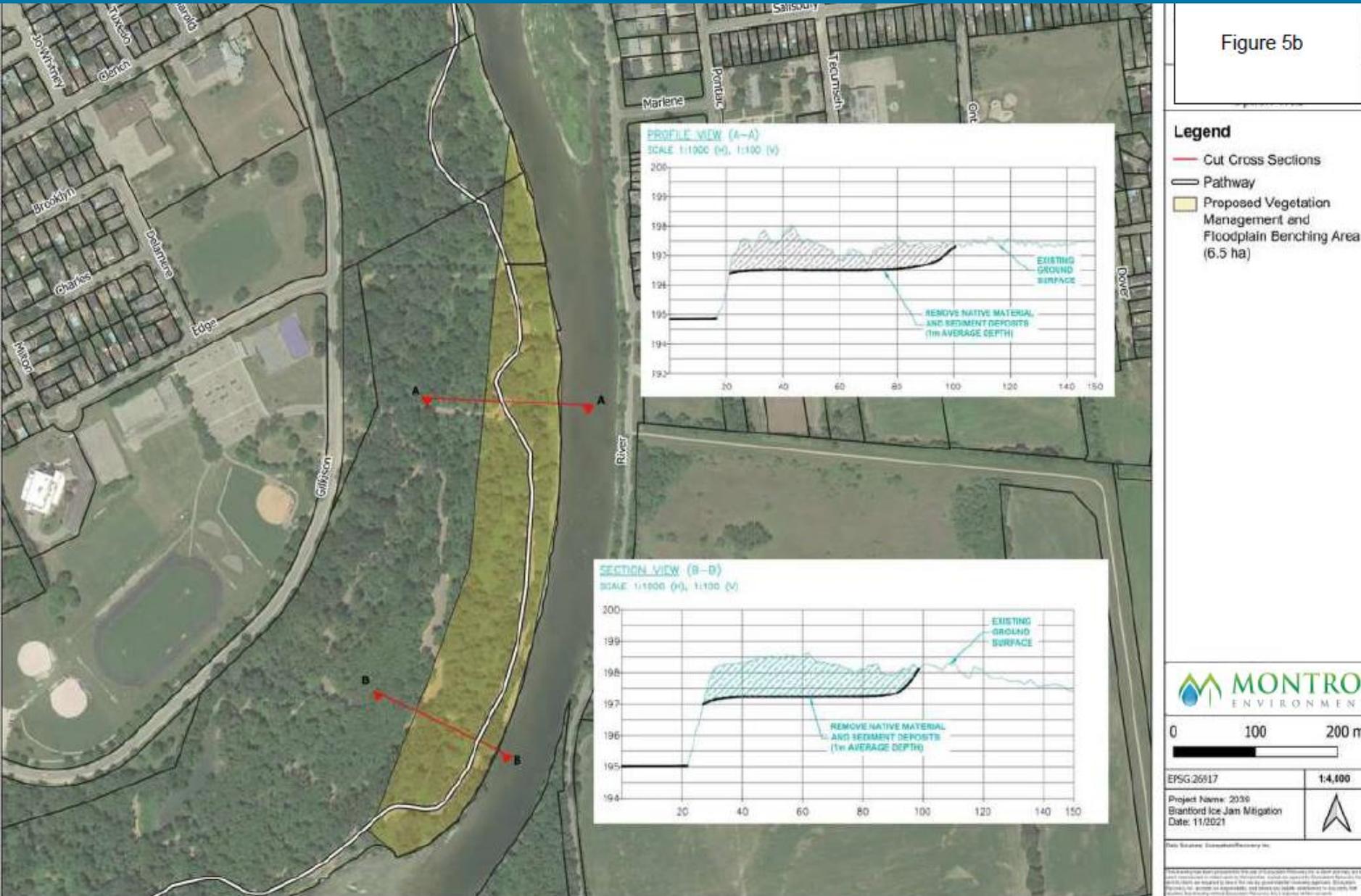
Category	Alternative 2.01 Ice Control Structure (ICS) Upstream of Brantford	Alternative 3.01 Channel Streamlining	Alternative 3.02 Bypass Channel	Alternative 4.01A Overbank Relief at Bend (Vegetation Clearing East Overbank)	Alternative 4.01B Overbank Relief at Bend (Grading of East Overbank)	Alternative 4.02A Overbank Relief Upstream of Bend (Vegetation Clearing West Overbank)	Alternative 4.02B Overbank Relief Upstream of Bend (Grading of West Overbank)	Alternative 5.02 River Road Realignment and Overbank Relief	Alternative 5.03 River Road Closure and Removal and Overbank Relief	Alternative 7.01 Raise Dike and Floodwall Protection	Preferred Alternative – Combination of 4.02B and 7.01
<b>Technical Score (/5)</b> (1 – Least Desirable / 5 – Most Desirable)	3/5	3/5	2/5	4/5	4/5	5/5	4/5	2/5	2/5	3/5	4/5
<b>Natural Heritage Score (/5)</b> (1 – Least Desirable / 5 – Most Desirable)	3/5	2/5	2/5	3/5	3/5	3/5	3/5	4/5	4/5	5/5	4/5
<b>Socio-economic /Cultural Score (/5)</b> (1 – Least Desirable / 5 – Most Desirable)	3/5	2/5	1/5	3/5	3/5	3/5	3/5	2/5	2/5	4/5	4/5
<b>Economic Score (/5)</b> (1 – Least Desirable / 5 – Most Desirable)	1/5	1/5	2/5	3/5	2/5	4/5	4/5	3/5	3/5	5/5	5/5
<b>Total Score (/20)</b>	10/20	8/20	7/20	13/20	12/20	15/20	14/20	11/20	11/20	17/20	18/20

# Selection of Preferred Alternative



- The preferred alternative consists of a combination of:
  - Alternative 4.02B – Overbank Relief of Upstream Bend (Grading of West Overbank)
  - Alternative 7.01 – Raise Dike and Floodwall Protection
    - Sub-Alternative – Raising of earthen dike (i.e., New floodwall on crest of existing dike) b/w Strathcona Ave and Lorne Bridge

# Selection of Preferred Alternative



## Alternative 4.02B

- Overbank Relief of Upstream Bend (Grading of West Overbank)

# Selection of Preferred Alternative



## Alternative 7.01

- Raise Dike and Floodwall Protection

# Selection of Preferred Alternative

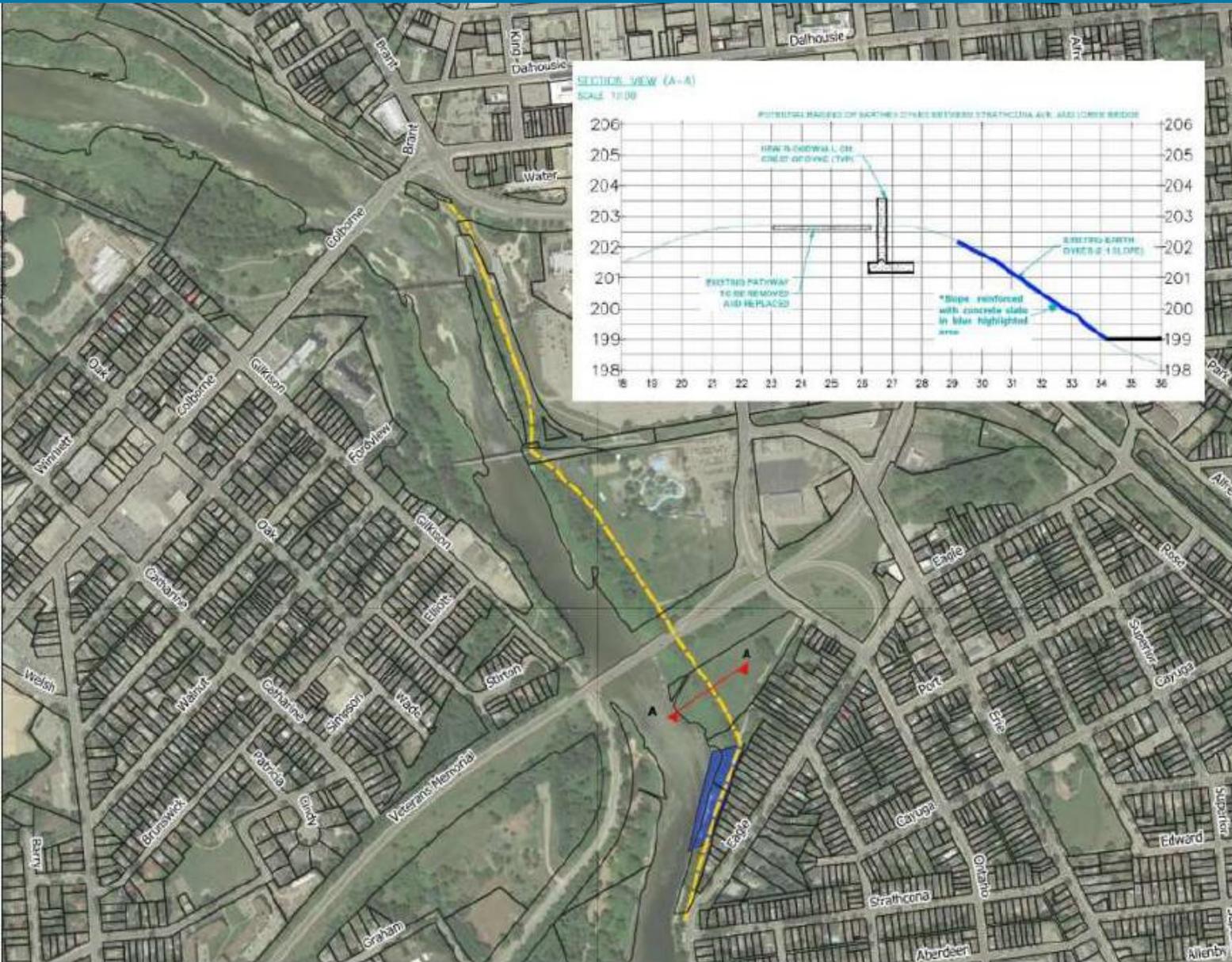


Figure 5c

## Legend

- Sample Cross Section
- Enhanced Concrete Slab Reinforcement
- Dyke Enhancement Extent
- Property Fabric

**MONTROSE**  
ENVIRONMENTAL

0 100 200 m

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Project Name: 2039  
Brantford Ice Jam Mitigation  
Date: 7/2022



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## Sub-Alternative 7.01

- Raising of earthen dike (i.e., New floodwall on crest of existing dike) b/w Strathcona Ave and Lorne Bridge

# Next Steps



- Compile responses/input received from PIC and First Nations engagement
- Refine environmental impact assessments and alternative rankings
- Finalize evaluation and selection of preferred alternative
- Notice of Completion of Class EA Environmental Study Report and post for public review and comment
- Notice of Project Completion
- Detailed Design and Construction

**Questions?**