

# Avon River Aboiteau and Causeway Upgrading Design Preliminary Design Options

Joint-Council Meeting  
September 27, 2018

# Background

- The existing causeway, aboiteau and highway are an integral portion of the dyke system protecting the communities in Windsor and Falmouth and more than 1,600 ha (4,000 acres) of agricultural lands from flooding.
- The system is vulnerable to storm surges and requires upgrades to adapt to climate change and sea-level rise.
- The existing aboiteau was not designed to accommodate fish passage and has limited flexibility.
- Efforts have been made to increase fish passage at specific times of year in coordination with DFO, but are still limited based on the functionality of the current aboiteau

# The Existing Situation

- The current aboiteau structure is at the end of its life:
  - Engineering recommendation is to replace within 5 yrs and will take 3-4 yrs to construct a new structure
- Current concerns:
  - Structure cannot be dewatered
  - Safety concerns
  - No backup
  - Decreased flow capacity during structure maintenance
- Deferring the project for the future may mean significant challenges for future construction (in only 10-20 years)
- Upgrading costs expected to exceed \$25M plus longer bridges



If the gate fails in the open position (low tide view)





If the gate fails in the open / closed position – high tide view





# Project Objectives:

## **PUBLIC SAFETY**

- Maintain corridor over Avon River for Highway 101 Twinning and continuity of rail, trail and utility services
- Continued protection of communities and agricultural land from the effects of flooding and sea level rise / climate change

## **REGULATORY REQUIREMENTS**

- Improve Fish Passage (EA Condition & Fisheries Act)
- Minimize Environmental Impacts (i.e. Impact to Salt Marsh)
- Consideration of potential negative impacts to asserted or established Mi'kmaq Aboriginal or treaty rights.

## **MINIMIZE SOCIO-ECONOMIC IMPACTS**

- On business groups, farming, ski, canoeing, other recreation

# The Process



- Preliminary design options have been developed and we are now seeking feedback
- Key issues/concerns are being considered for further refinement or development of alternative options in an attempt to develop a solution that balances all interests



# Location Options









# Water Management Scenarios

## Options Initially Considered by CBCL:

### **Scenario “A”:**

- Maintain freshwater reservoir, with controlled fishway

### **Scenario “B”:**

- Maintain freshwater reservoir, with controlled fishway & pumping of lake water to maximize fish passage

### **Scenario “C”:**

- Controlled/partial tidal exchange, with open fish passage and dedicated fishways



## Scenario C: Partial Tidal Exchange (open fish passage & fishways)

- Provides controlled partial exchange of tidal water through “passive gate” operation and controlled size of opening
- Water levels would be approx. 0.6m to 2.1m (2-7 ft.) below the existing target water level of 2.7 m (9 ft). This tidal range is intentionally set to prevent the farming ditches from saltwater intrusion.
- Combination of permanent aboiteau opening and dedicated fishways used to maximize fish passage
- Adaptive design for anticipated climate change and sea-level rise

# Scenario C: Partial Tidal Exchange (open fish passage fishways)

## Results of Analysis:

- Improved flood protection (simpler, passive, standard system)
- System would be reverted back to a more natural tidal river
- Fish passage would be of very high quality for all fish species 24 hours a day, 365 days a year.
- Water levels would fluctuate regularly with tides
- Water would have different appearance (colour / turbidity)
- Competitive canoeing would be significantly impacted
- Recreational boating/fishing may be improved
- Mud flats would be exposed more frequently, but expected to develop into salt marsh



# Consultation – “What we’ve heard”

- A significant amount concerns were raised during and after the CLC Meeting Presentation on September 19<sup>th</sup>:
  - Lake water levels, salt water intrusion, business/waterfront impacts, freshwater irrigation, fish passage
- This is the purpose of the CLC meetings, to have feedback from the community
- A public information session is also organized for October 10<sup>th</sup> as an opportunity for additional feedback in a more open setting
- The design team heard and understood these concerns, and are now trying to address them as best as possible, by evaluating alternative option(s) in an effort to balance all interests

# What we hear you would like to see

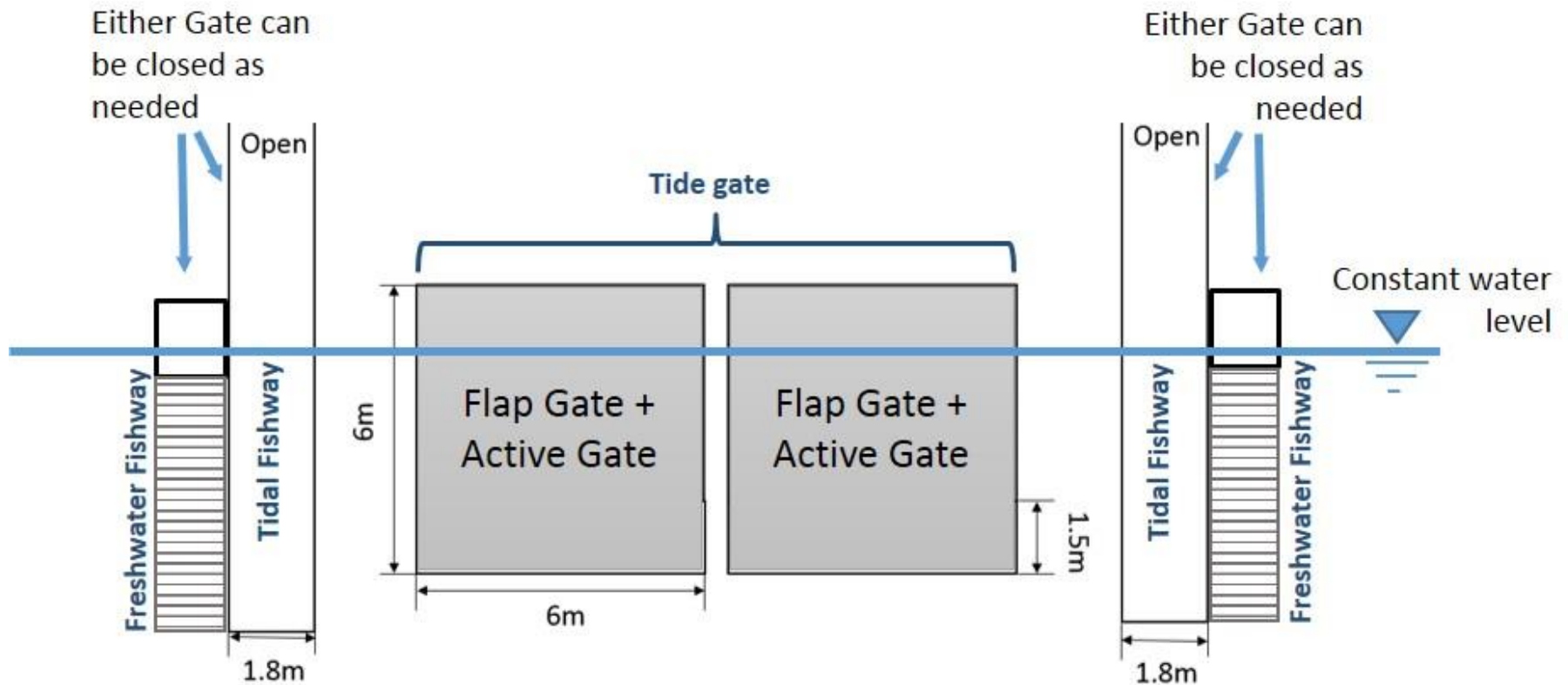
## Hybrid Option “D”:

- Currently being explored/developed by CBCL
- Would have the ability to maintain a freshwater lake
- Would have the opportunity for improved fish passage
- Adaptable design, water management/operation can be adjusted if goals change in the future
- Water level control would be much better than current conditions

The goal is to provide an **adaptable** and **flexible** solution that can maintain the target lake level and increase/maximize fish passage opportunities



# Hybrid Option "D"



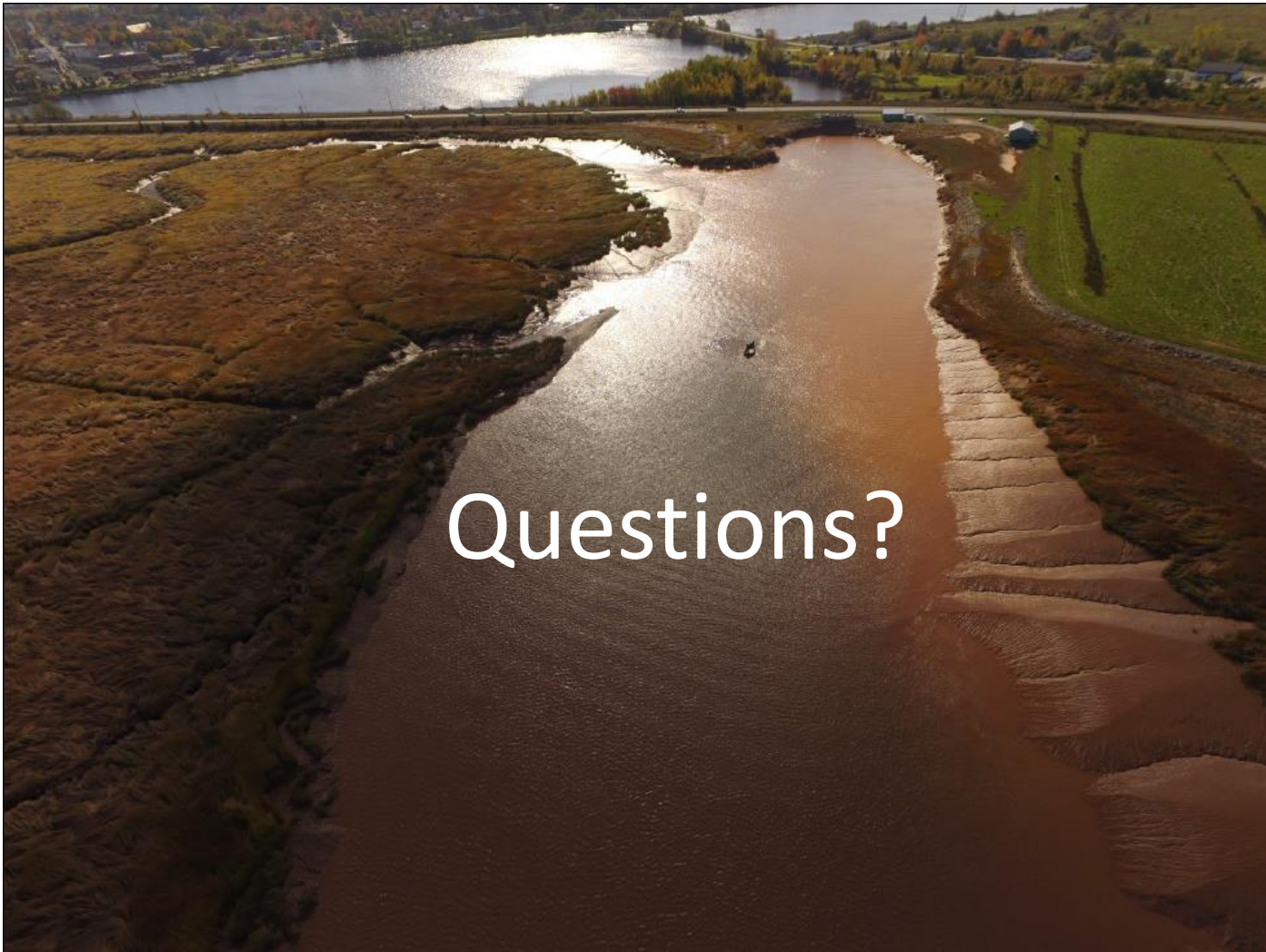


Photo from van Proosdij (2018)