

## Enclosure 1



## Astotin Creek Resiliency Study



## ABOUT THE PROJECT

Astotin Creek and its tributaries have experienced three major flooding events in the past ten years. These events have caused flooded farmland, damaged county roads and threatened homes and industrial infrastructure within the Astotin Basin.

To help manage current and future water issues, Strathcona County is undertaking a detailed study to understand historical changes and current conditions for the Astotin Creek basin.

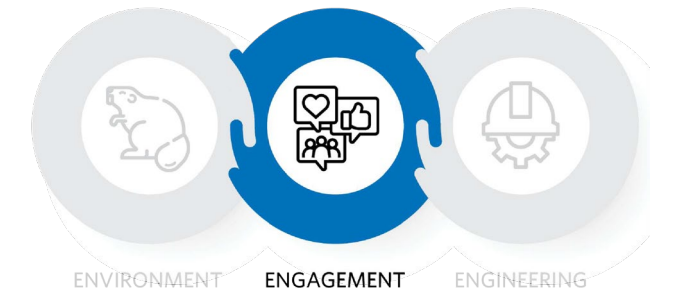
### The key goals of the study are to:

- Create an action plan that will address flood, drought, and water quality issues in priority areas within the Astotin Creek basin,
- Restore and enhance ecological connectivity and function in critical areas of the Astotin Creek basin, and
- Increase capacity, knowledge, awareness and participation by industrial landowners, private landowners, and agricultural producers in activities that can restore and maintain critical areas and functions of Astotin Creek.

The study will include technical assessments, analyses, planning and development of a Resiliency Action Plan. The technical work will be accompanied by Indigenous, stakeholder, and community engagement.

These three elements must be balanced when making decisions about Astotin Creek. The actions in the resiliency plan will reflect community and stakeholder input, sound engineering practices, and the need for a sustainable creek environment.





## ENGAGEMENT MILESTONES

Engagement Plan  
*Completed June 2021*

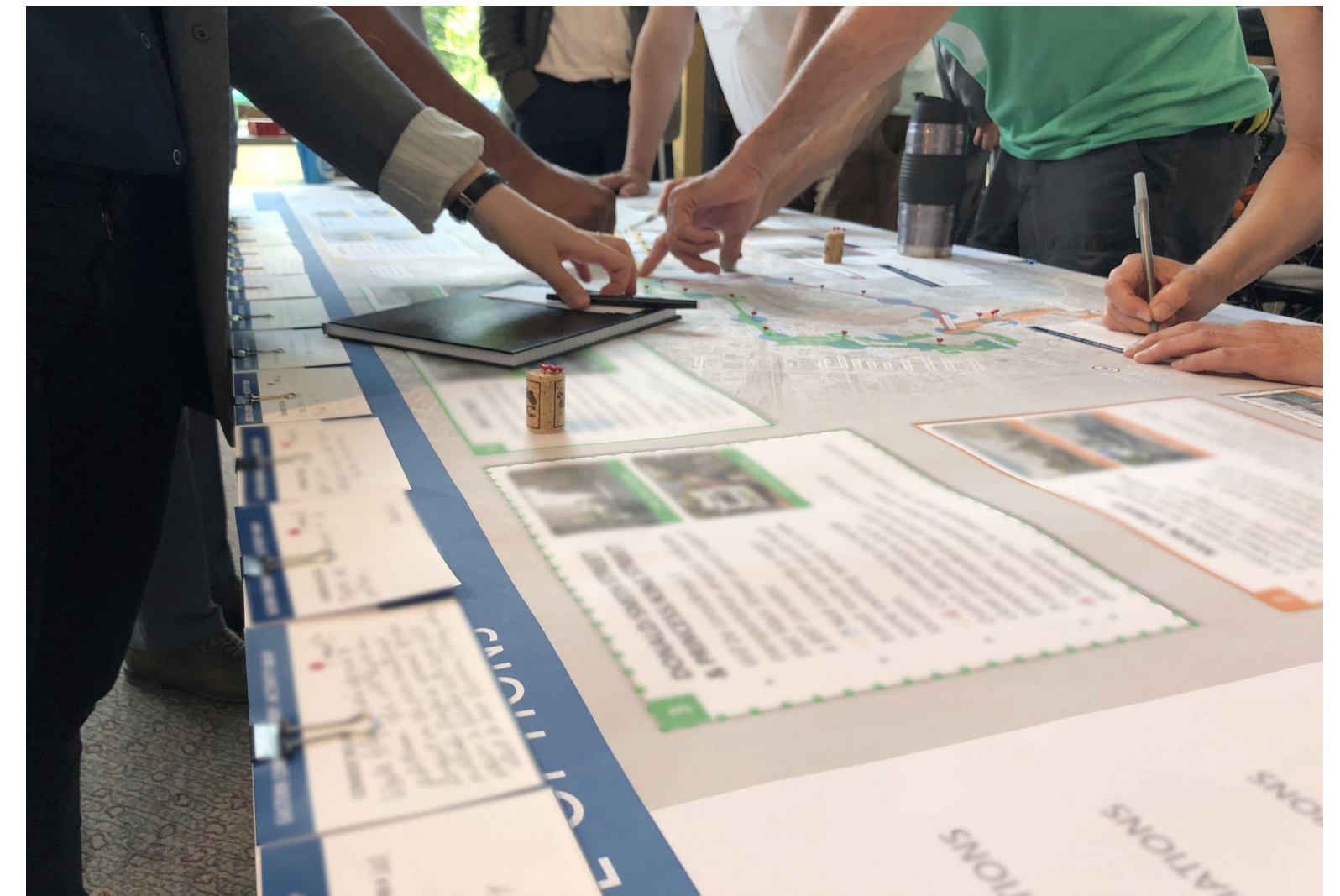
Virtual Engagement Sessions  
*Completed August 2021*

Present preliminary engagement results to Technical Working Group  
*September 2021*

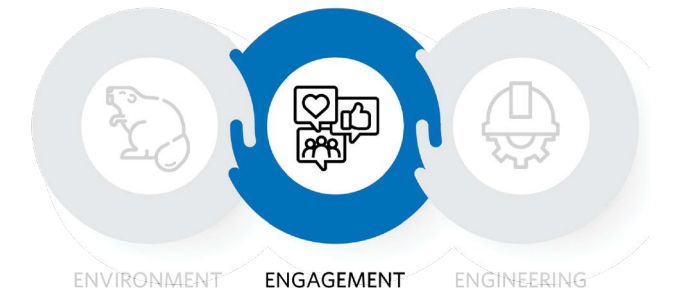
Indigenous engagement  
*Fall 2021*

"What We Heard & Did" summary  
*October 2021*

Validation of Study & Action Plan with stakeholders  
*November 2021*



# PROJECT ENGAGEMENT & TIMELINES

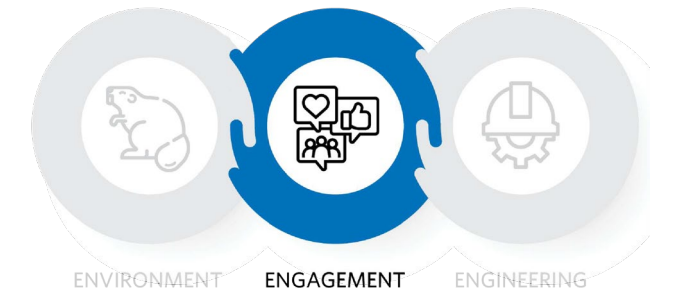


## ENGAGEMENT APPROACHES

Project introduction letter and emails	<i>May 2021</i>
Road signs – four locations along major rural routes in the north	<i>May to November 2021</i>
Public engagement newsletter	<i>May &amp; August 2021</i>
Postcards (approximately 700 basin area residents & businesses)	<i>June &amp; August 2021</i>
Scoop survey (mixed topic survey)	<i>June 2021</i>
Social media	<i>July &amp; August 2021</i>
Public engagement calendar	<i>July 2021</i>
County Living Newsletter	<i>July 2021</i>
Stakeholder engagement invite letters & emails (78 letters)	<i>July 2021</i>
Stakeholder engagement package mailouts (78 stakeholder packages + emails)	<i>August 2021</i>
Project e-newsletter	<i>August 2021</i>
Online stakeholder engagement sessions (afternoon & evening session)	<i>August 10, 2021</i>
Online public engagement session:	<i>August 11, 2021</i>
Virtual open house and survey	<i>August 11-31, 2021</i>



## KEY TOPICS



### BEAVERS

- Concerns with beaver impacts and control
- Part of nature
- Lands being affected by beavers from flooding (negative) to providing water for cattle (positive)

### FLOODING

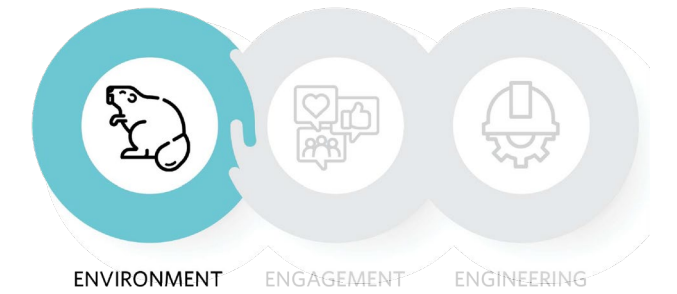
- Accessibility issues
- Flooding issues since 1990s
- Flood waters being pumped from one site to another
- Impacts to agricultural lands

### DEVELOPMENT

- Pipeline servicing problematic
- Condition of dams, weirs, and culverts is concerning
- Development has impacted the creek
- Riparian areas – width/condition
- Flooding is natural, sometimes too extensive



## ASSESSMENT OVER THE LENGTH OF THE WATERSHED Three Land Use Zones



Upper Watershed  
Astotin Lake (Elk Island)  
Rural Residential Land Use



Middle Watershed  
Highway 15 Area  
Agricultural Land Use



Lower Watershed  
Bruderheim Area to N. Sask. River  
Industrial Heartland Land Use





## BIOPHYSICAL INVENTORY AND MAPPING

### What is involved

#### Field Surveys & Mapping

- Amphibians, breeding birds, mammals, fish habitat, water quality, vegetation, eDNA
- Wetlands, streams & updated watershed boundary

#### Searching existing data:

- Public / Govt databases (FWMIS, ACIMS)
- Citizen science – iNaturalist, NatureLynx Apps

### What we will describe

- Biodiversity and habitat
- Challenges to biological, chemical, and physical processes
- Potential for ecological restoration and water management



Access Online:

<https://www.iNaturalist.ca>

<https://www.NatureLynx.ca>

<https://www.strathcona.ca/astotin>



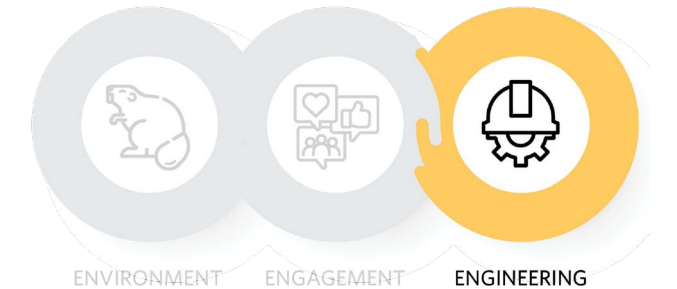


## SURVEY AND BASE DATA COLLECTION

### Data collected during our survey

- Survey of culverts, bridges, beaver dams, and other structures
- Water level and flow

This information will be used for the hydraulic model!





## COMPLETING THE ANALYSIS

Allows us to understand the current water system and determine how that may change in the future.

- Flood inundation and hazard maps (based on simulated flood depth and flood velocity)
- Identification of undersized crossings (ie. culverts and bridges)



### What data goes into the analysis?

- Climate data
- Rainfall intensity, duration, and frequency curves
- Flow data
- Land use information (past and present)



### What types of analysis do we do?

- Analysis of climate change impacts on flood risk frequency. Climate change data includes: precipitation, snowpack and temperature data.
- Development of rainfall-runoff models for flood events specific to Astotin basin



### What do we do with the analysis?

We develop a hydraulic model that includes:

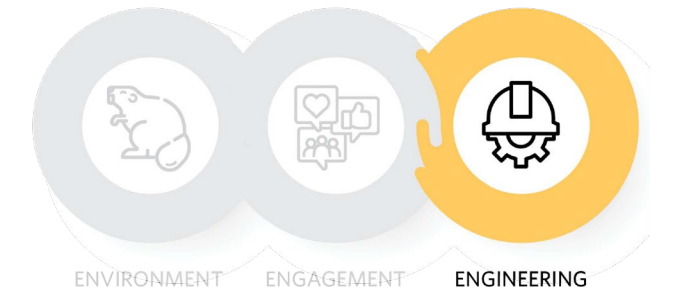
- Expected future flows taking into account climate change
- Floods with different likelihood and frequencies

We determine allowable water release rates for future developments.



## OBJECTIVES

- To identify existing drainage challenges and opportunities in the watershed within the County jurisdiction.
- To determine the maximum allowable discharge rate for future developments.
- To recommend improvements in the watershed to reduce flood and drought impacts and enhance water quality.
- To complete conceptual design of the selected stormwater management controls including capital costs and long-term life cycle costs.

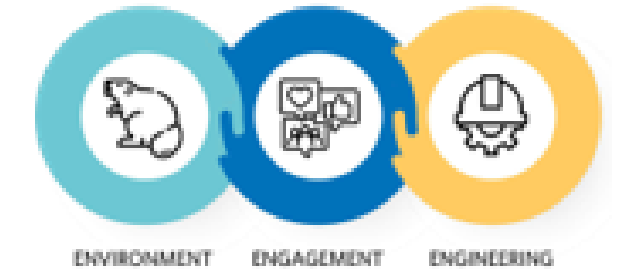


The plan will include a toolbox of low impact development and conventional stormwater best management practices.





## ENGAGEMENT AND THE RESILIENCY ACTION PLAN



The Resiliency Action Plan will be a prioritized set of recommendations and actions that the County, landowners, the public, and other stakeholders can use to guide development and conservation initiatives in the Astotin Creek Basin.

### ENGAGEMENT

Indigenous Engagement  
*Fall 2021*

What We Heard & Did Summary  
*October 2021*

Validation of Study and Action Plan  
with Stakeholders  
*November 2021*

### RESILIENCY ACTION PLAN

Draft Resiliency Action Plan  
*November 2021*

Presentation to Priorities Committee  
*November 2021*

Resiliency Action Plan  
*December 2021*

Presentation to Council  
*January 2022*