THE WAY WE GREEN

MILL CREEK RAVINE WATER QUALITY AND EROSION

TRANSFORMING | EDMONTON
BRINGING OUR CITY VISION TO LIFE

WELCOME

Public Information Session #2

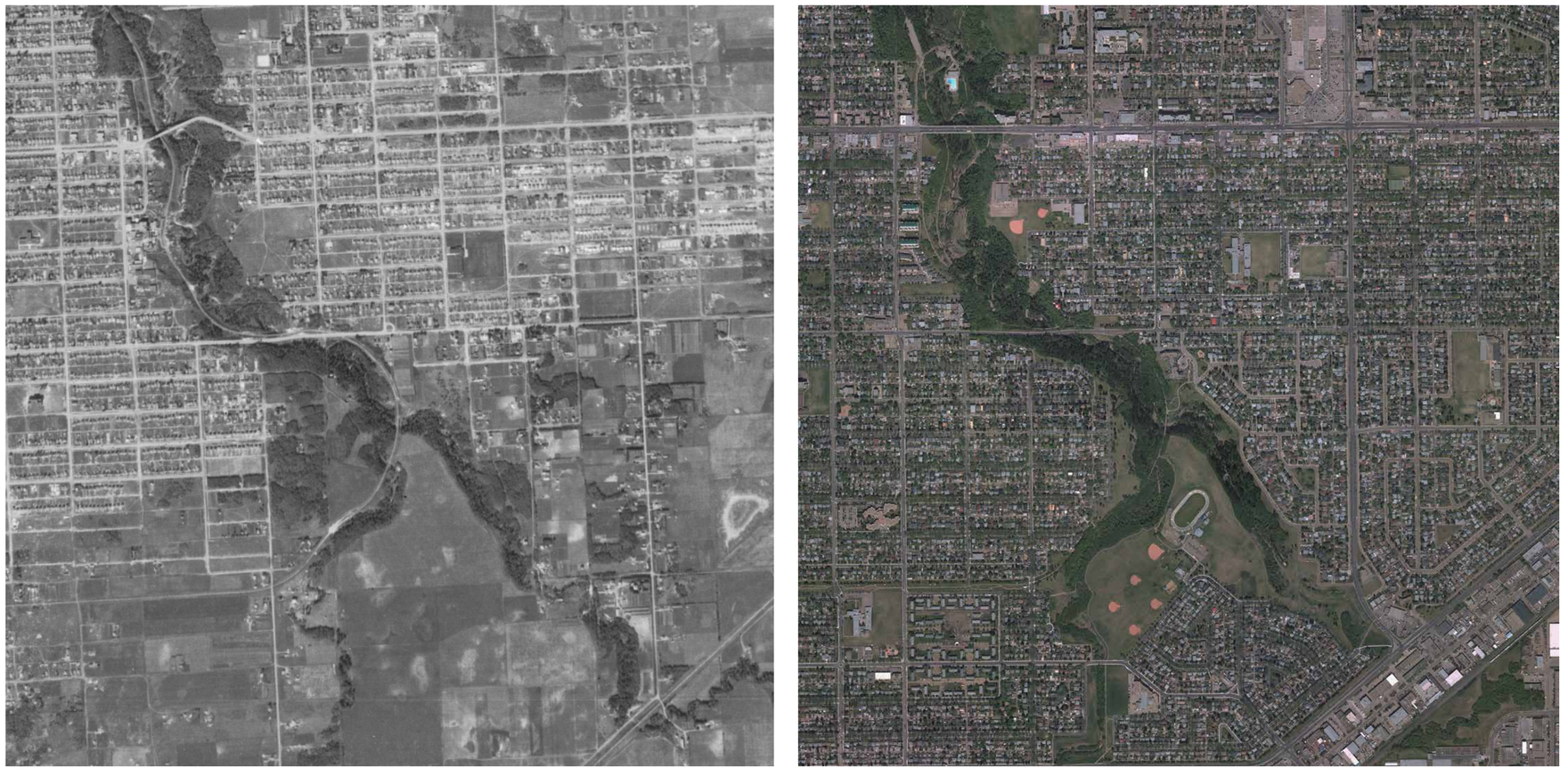
Thursday, November 3, 2016
5:00 – 7:00 p.m.

Tonight you can:

- Learn about how the City plans to deal with water quality and erosion issues in Mill Creek
- Ask questions of the project team
- Leave us your feedback

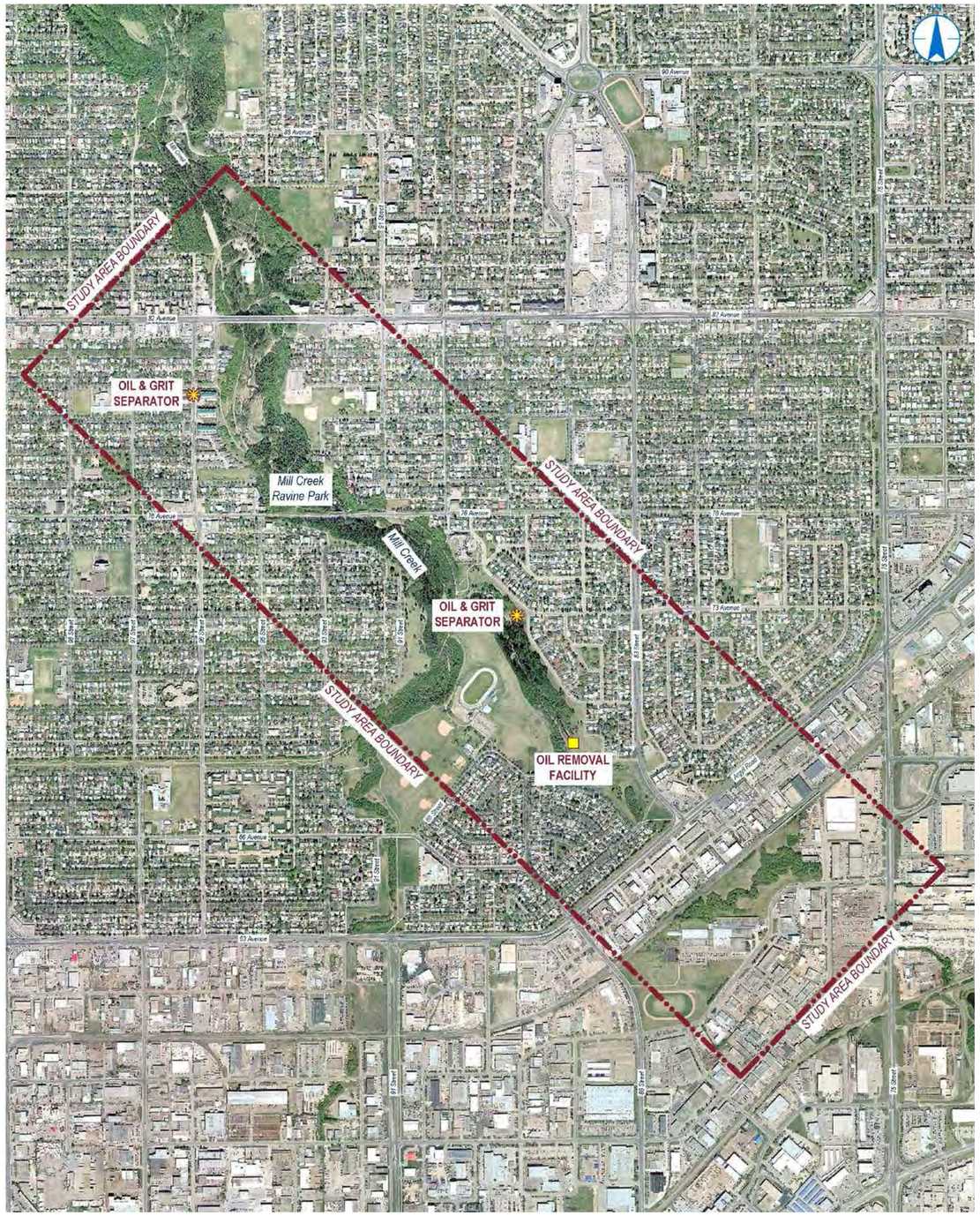
Background

- More frequent and severe rainstorms, along with runoff from urban development around Mill Creek, increase creek flows and cause erosion.
- In addition to slumping banks and damaging bridges, erosion also increases the amount of sediment suspended in the creek water, which ultimately ends up in the North Saskatchewan River.
- In order to improve water quality and reduce erosion, the City is considering various improvements.
- Improvements may include oil and grit separators, ponds, wetlands and a new sewer to divert the increased flows from more severe rainstorms and urban development.



1949 aerial photo (left) and current aerial photo (right)

Mill Creek Ravine



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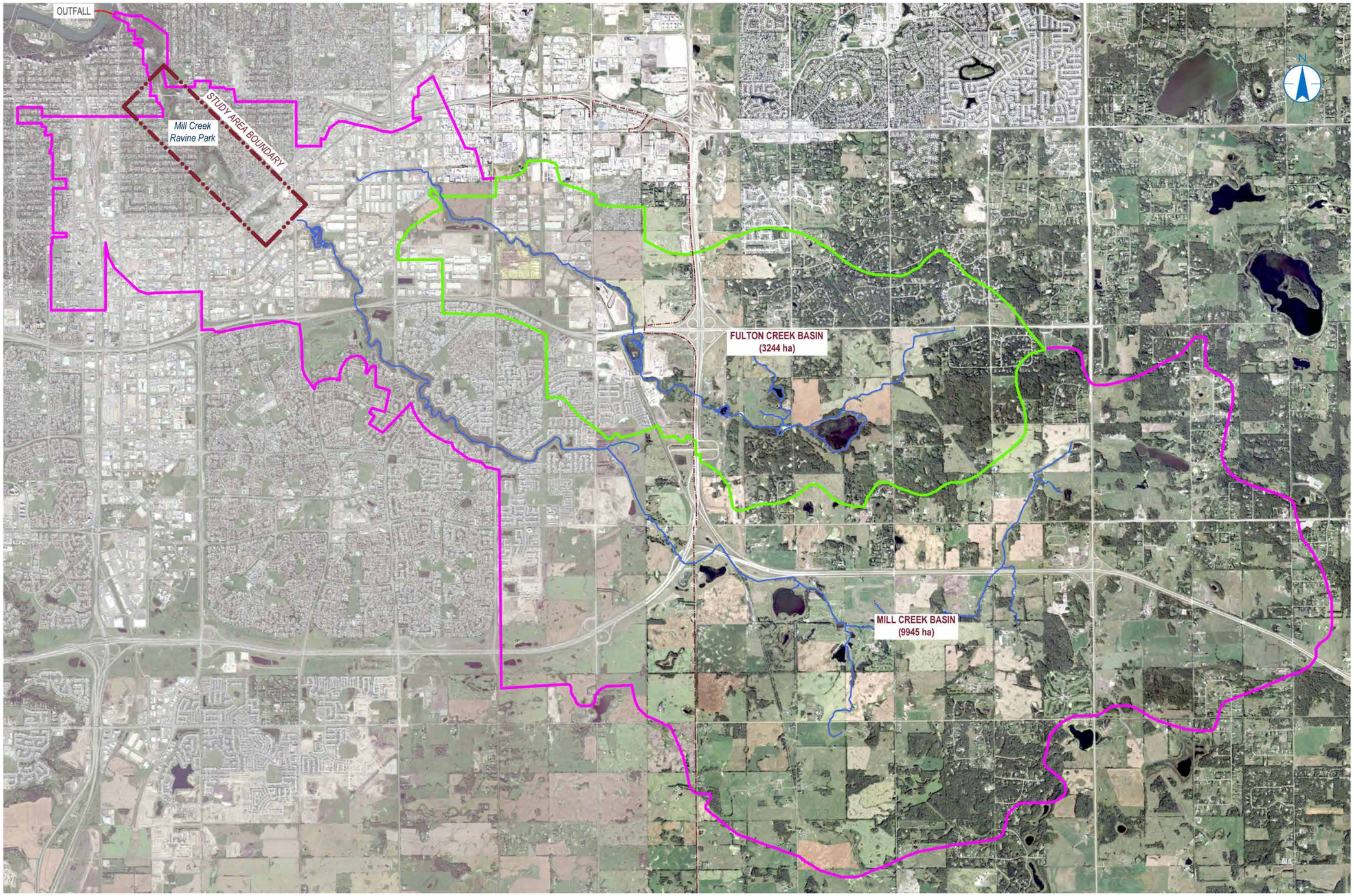
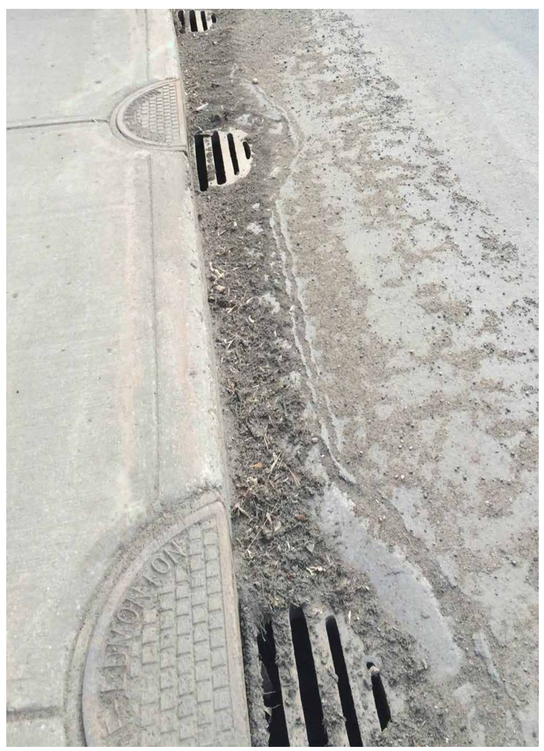
Mill Creek Basin



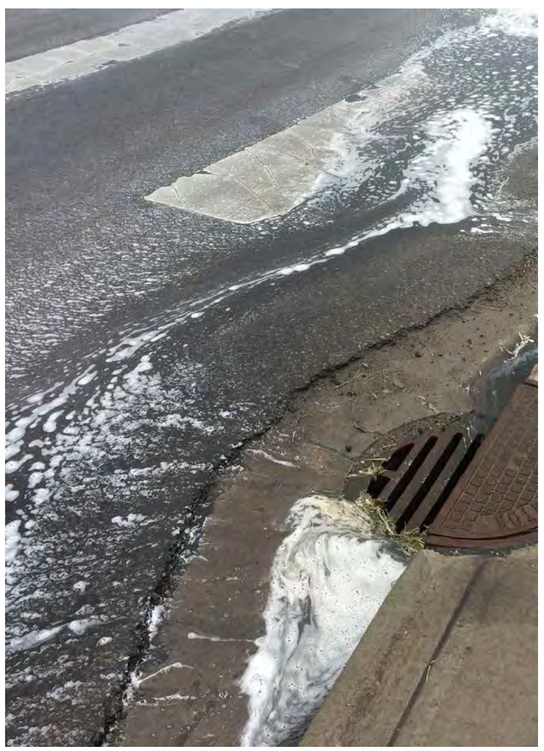
Stormwater from these areas enters Mill Creek just north of Argyll Road

Water Quality



Grit buildup from winter road sanding

Oil spill



Degraded water quality

Trash buildup

- Some stormwater enters the creek without treatment.
- Pollutants, such as oil and grit, can be washed into the creek via storm sewers.
- Water quality affects the environment and natural habitats.

Erosion

Bank erosion

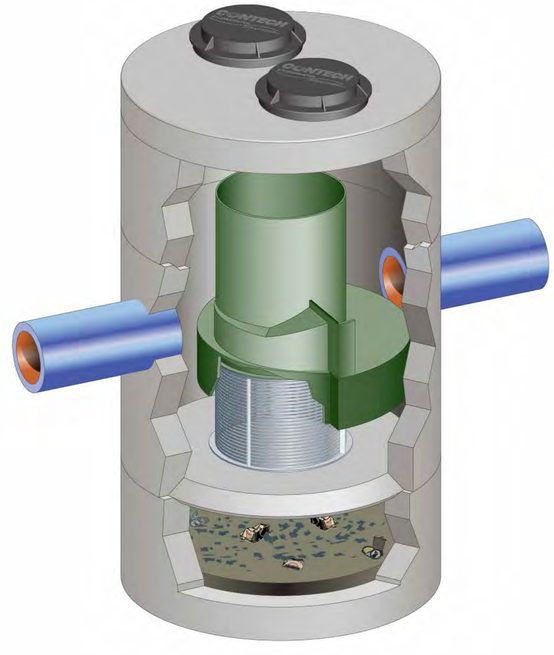
Bank failure

Undermining of erosion protection

- Erosion increases the amount of sediment suspended in the creek water.
- Erosion causes unstable banks and damages trails and bridges.
- The City of Edmonton is spending thousands of dollars each year on repairing the trails and eroded creek banks.

Past Improvement Projects

- Several water quality improvement projects have been constructed including:
  - » An oil removal facility was installed north of Argyll Road in 2000.
  - » Oil and grit separators were installed underground in Avonmore and Ritchie neighbourhoods in 2016.



Underground oil and grit separator schematic

Oil removal facility

Underground oil and grit separator

Feedback

Open House #1 was held on June 9th, 2016 to introduce the project and outline the challenges being faced in Mill Creek. Potential options that could improve water quality and reduce erosion were presented and the people who attended the open house or filled out the online survey were able to provide feedback.

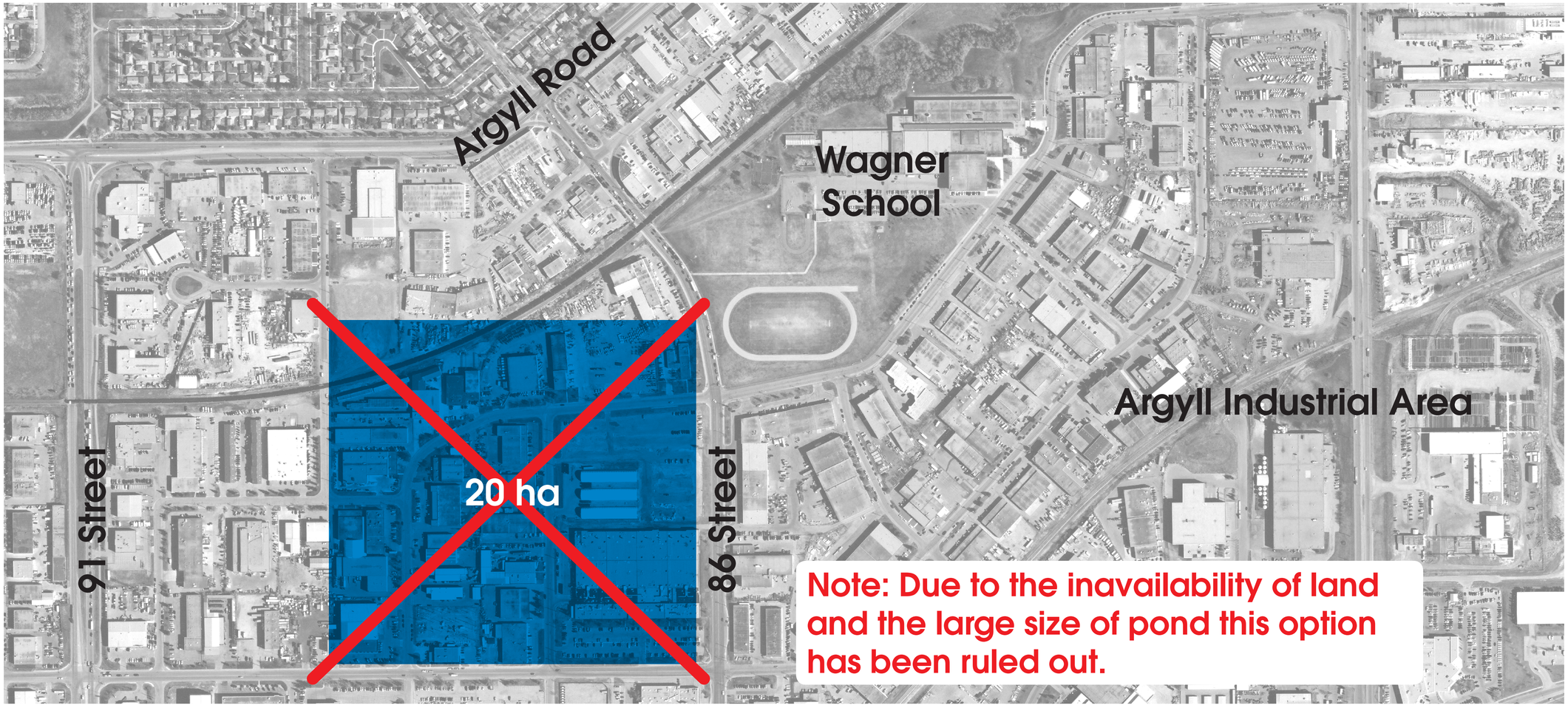
Topic	What We Heard	How We Responded
Erosion and flow	• Not enough data available to make a properly informed decision • Concerned about safety with drop offs and unstable banks • Upstream ponds and wetlands would be a welcomed solution	• City has investigated a new tunnel to connect two existing storm sewers to take high flows out of the creek but keep natural flows in the creek, in order to reduce erosion. • City is considering a small pond or wetland to improve water quality north of Argyll Road, but there is insufficient space for a large pond to reduce erosion.
Water quality	• Not enough information available regarding the water quality in the creek • Numerous concerns regarding the safety of the creek • Ponds and wetlands are preferred	• As there is insufficient room for pond(s), the City investigated installation of oil and grit separators to improve water quality. • City is considering a small pond or wetland north of Argyll Road to enhance water quality. Public input is required on whether a pond/wetland or oil and grit separators are preferred.
Trails	• Trails are a wonderful amenity and need to be properly maintained • There needs to be a better job done of preventing further erosion of the creek banks	• A tunnel connection between the two existing storm sewers is being investigated to take excessive flows out of the creek and reduce damage to the trails due to erosion.

Erosion: Options Investigated

Option	Will this option be investigated further?	Why?
Creek with a tunnel connection	✓	• A tunnel connection is the only option that will be able to mitigate the erosion issues in Mill Creek.
Creek without a tunnel connection: "Do Nothing"	✗	• This option will lead to further degradation of the creek as erosion would continue. • Trails will need to be relocated or closed permanently.
Wetlands or wet ponds in the industrial area upstream of the creek	✗	• The industrial area is largely developed. Therefore, there is insufficient room for a large wetland/pond to provide attenuation of flows in the Argyll Tunnel before entering the creek (would require at least 20 ha of land). • The pond option being proposed for the parkland north of Argyll Road would only address 4% of flows that cause erosion. The only way to significantly reduce erosion is the recommended tunnel connection.
Low Impact Development (LID) / Source Control	✗	• LID is being investigated under a separate project • Difficult to implement (would require homeowners and businesses in the basin to buy-in)

Erosion: Options Investigated

- A pond in the industrial area large enough to attenuate flow in the Argyll Tunnel would require 20 ha of land (roughly 5 Roger's Arenas or 26 CFL football fields!)
- The industrial area is greatly developed and a 20 ha section of land would be difficult and costly to obtain.
- Low Impact Development (LID) / source control is being investigated under a separate City study.
- LID and source control unlikely to have significant impact on creek flows without buy-in from most homeowners and businesses in the basin.

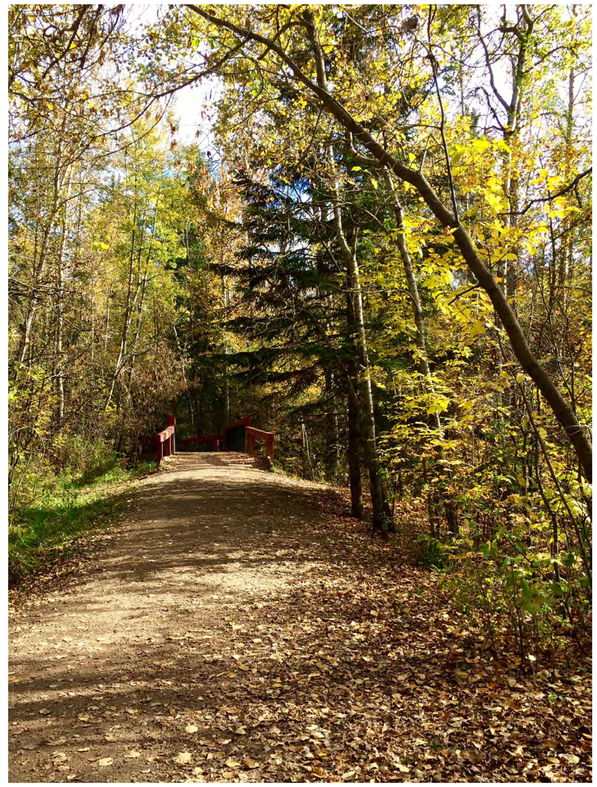


This pond location is shown for illustrative purposes only.

Triple Bottom Line Assessment of Erosion Reduction Options

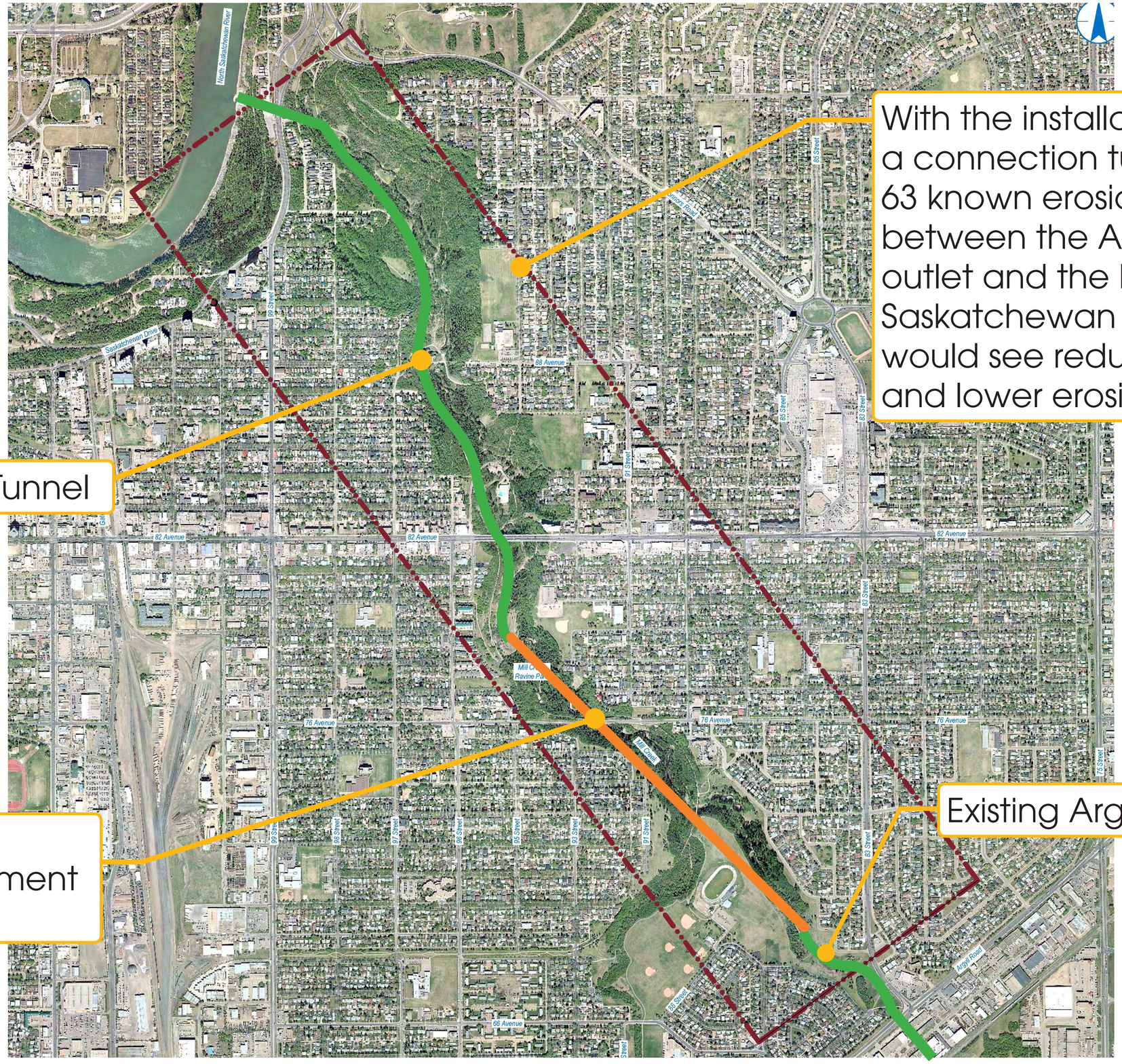
We assessed two options using the "triple bottom line assessment", which is a method for comparing options based on environmental, social and financial values. Based on the assessment, the tunnel connection is the best option to move forward with.

Bottom Line Values	The Creek with a tunnel connection	The Creek without a tunnel connection
Environment	• Return creek to a more natural state • Provincial support for maintaining the natural waterway	• Continued erosion damage due to higher-than-natural flows • The province doesn't support unnatural repair such as rip-rap being used for ongoing repairs
Social and Community	• Trails and bridges less susceptible to closure • Will facilitate future creek daylighting by removing high flows	• Intermittent trail closures and bridge closures due to erosion damage • Some trails could become closed permanently if they cannot be relocated
Financial/ Economic	• High capital investment (~$50 Million) • Minimal operation and maintenance costs • Significantly reduced erosion repair costs	• Current resources are insufficient to keep up with ongoing erosion repairs. ~$30M in erosion repairs have been identified in Mill Creek north of Argyll Road. This does not account for future erosion damages. • Future erosion repairs are likey to increase in cost as envirionmental regulations become more strict.



One of many trails and bridges in Mill Creek Ravine

Proposed Tunnel Connection



With the installation of a connection tunnel, 63 known erosion sites between the Argyll Tunnel outlet and the North Saskatchewan River would see reduced flow and lower erosion rates.

Existing Mill Creek Tunnel

Proposed Tunnel Connection (Alignment to be determined)

Existing Argyll Tunnel

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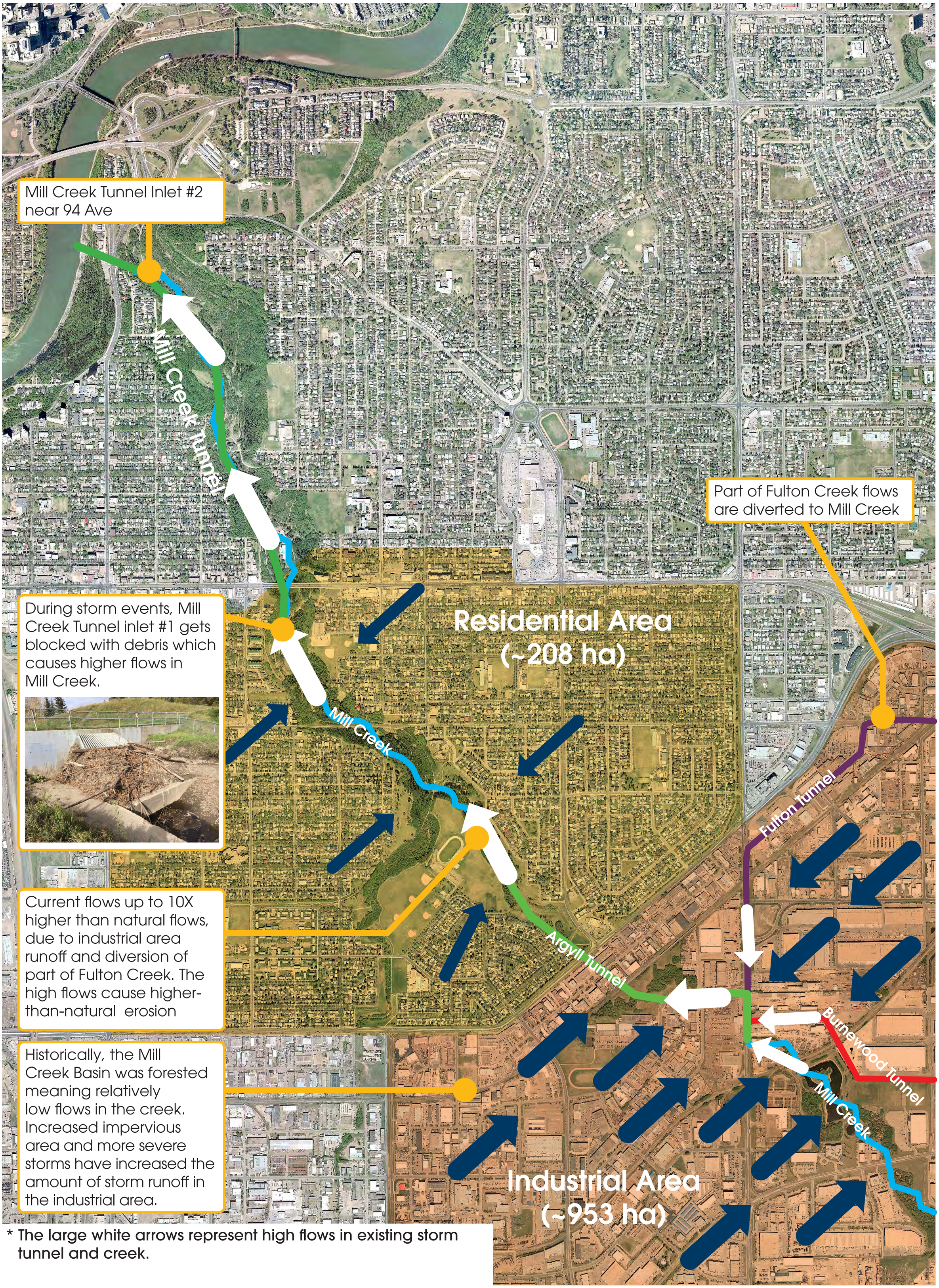
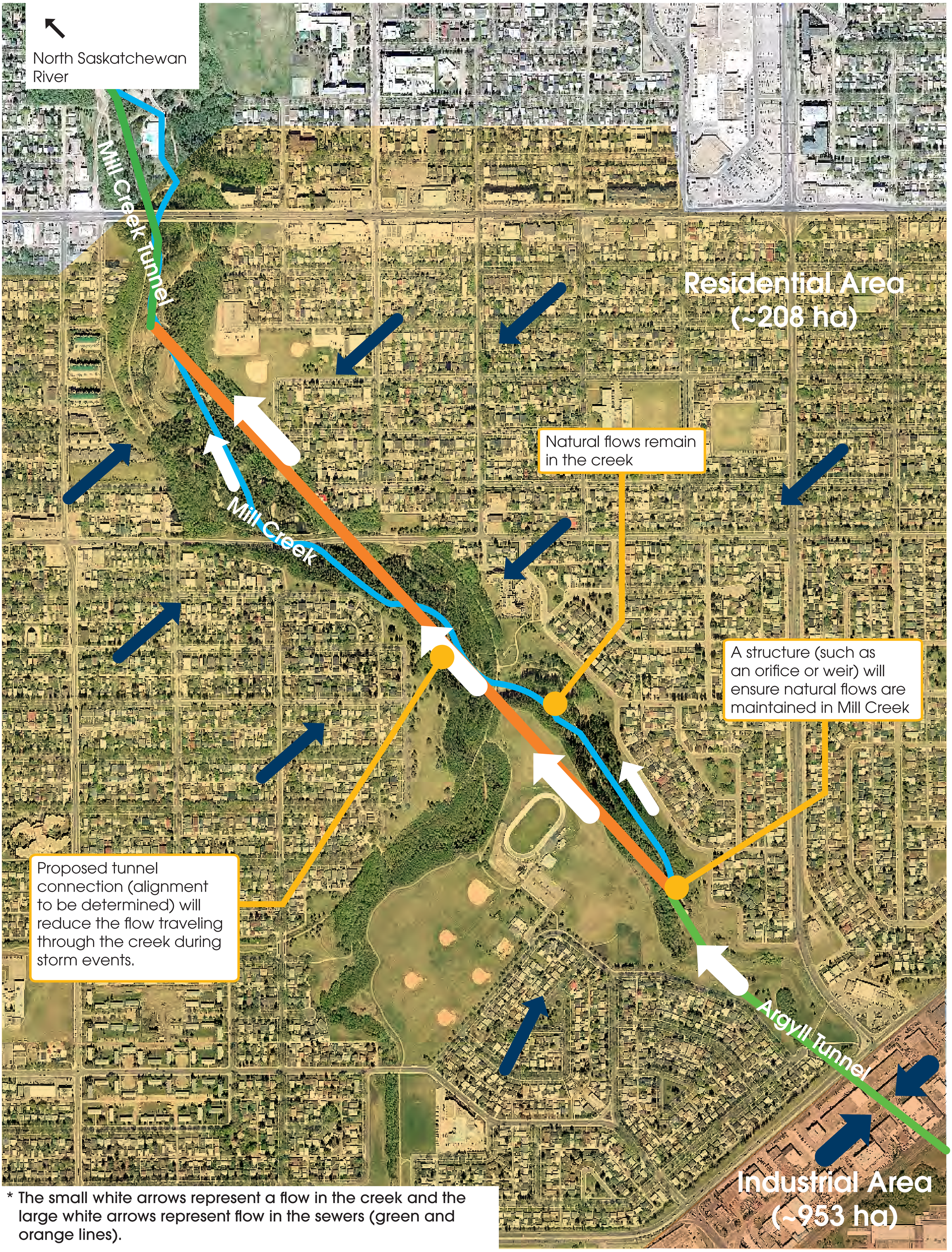
Storm Event in Existing Condition



* The large white arrows represent high flows in existing storm tunnel and creek.

Storm Event with Proposed Tunnel Connection

Tunnel Connection Objective: To restore the creek to natural flows



* The small white arrows represent a flow in the creek and the large white arrows represent flow in the sewers (green and orange lines).

Water Quality: Options Investigated

Option	Will this option be investigated further?	Why?
Oil and grit separators throughout the basin	✓	• Oil and grit separators strategically located in the basin can improve water quality by removing sediment and hydrocarbons
Group of oil and grit separators at Argyll Tunnel outlet	✗	• This option was evaluated to be more risky and less valuable than the oil and grit separators distributed throughout the basin
Wetlands or wet ponds	✓	• Small wetland or wet pond north of Argyll Road could replace two of the proposed oil and grit separators. This pond would treat 4% of the flows that enter Mill Creek. • Insufficient room for large wetland/ponds to provide large scale treatment and flow attenuation
Bioswale	✗	• The level of stormwater treatment would be minimal

Water Quality: Preferred Options

Oil and Grit Separators

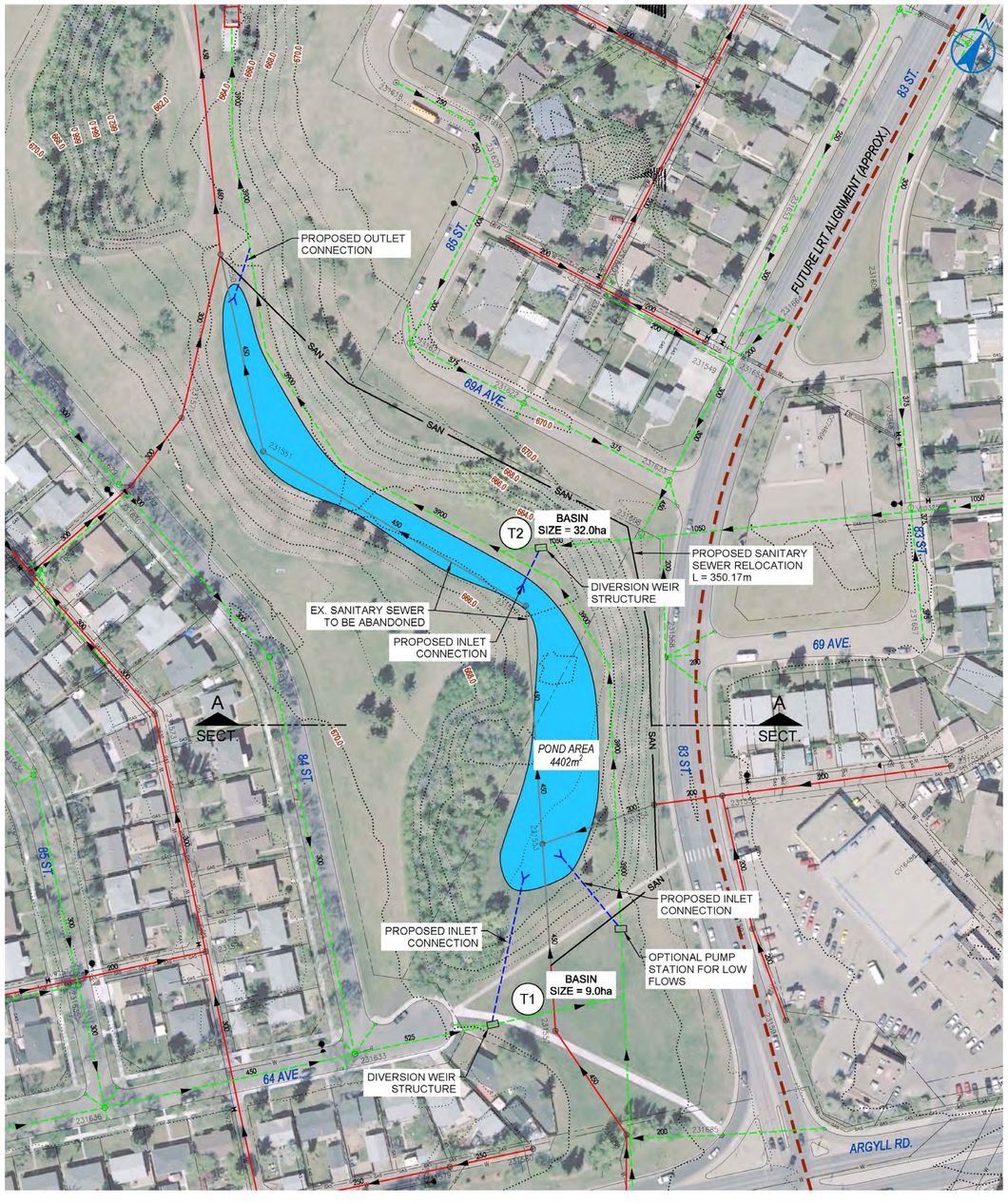
- Install up to 6 high priority oil and grit separators throughout industrial area surrounding Argyll Road in the near future.
- Install up to 30 oil and grit separators in the future in the Mill Creek basin (in the industrial area and at outfalls from residential areas).
- Oil and grit separators remove sediment and hydrocarbons from stormwater before release into the creek.
- Oil and grit separators are cost effective (Average approximately $1 Million each)
- Can be implemented over several years.
- 2 already installed (Avonmore and Ritchie).

Water Quality: Preferred Options

Small Pond or Wetland North of Argyll Road

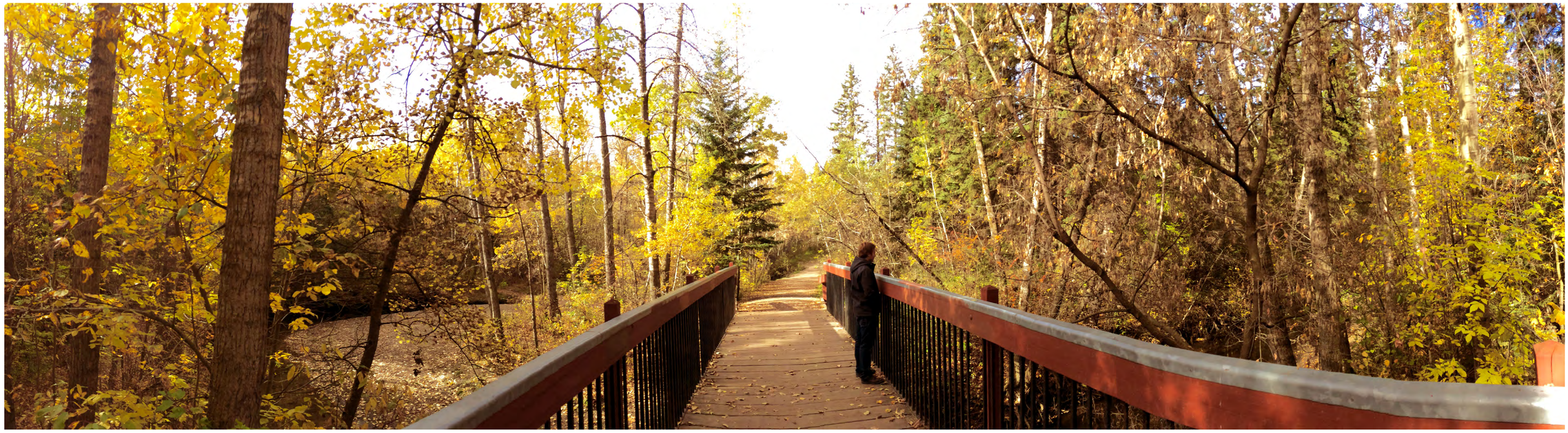
- Could replace 2 of the proposed oil and grit separators
- Cost is approximately 2.5 times as much as the two oil and grit separators that it would replace
- Adjacent to toboggan hill
- This option is being considered because the previous public survey indicated a preference for ponds or wetlands to be used to improve water quality

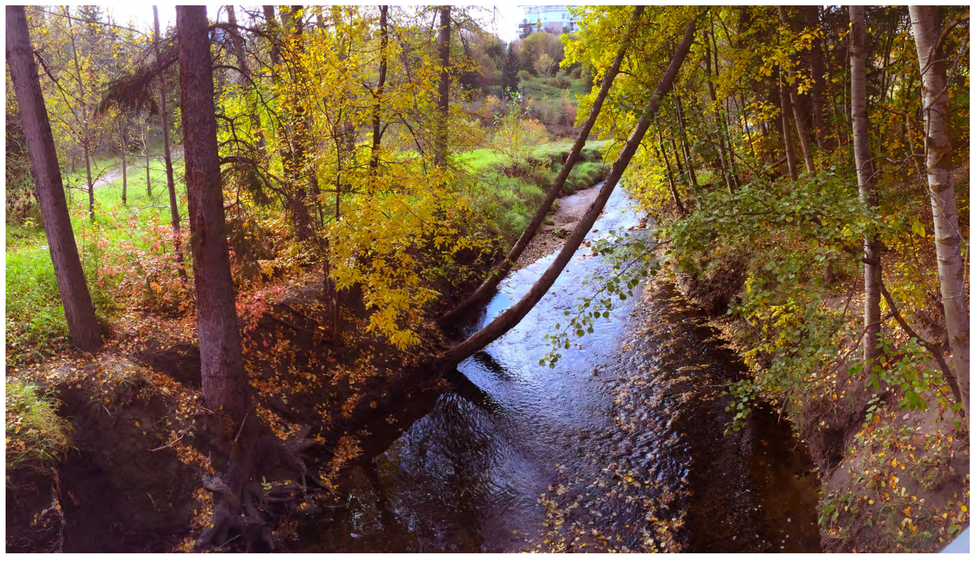
The City specifically wants to know whether this pond or 2 oil and grit separators in this location are preferred.



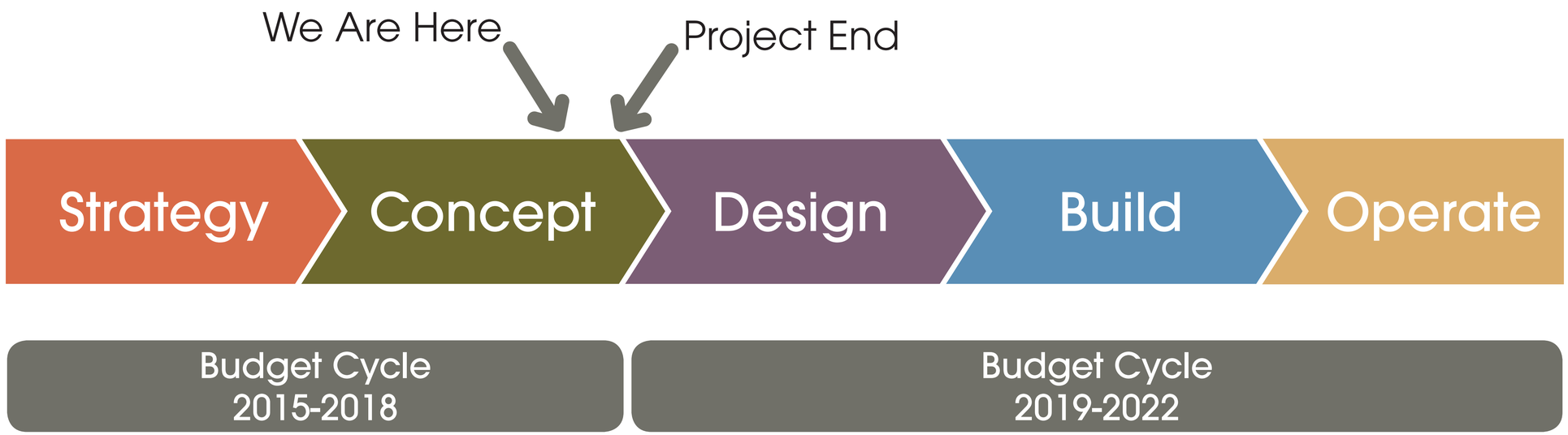
What's Next?

- Water quality and erosion reduction concept will be refined based on public input recieved
- Project goes to City Council for Approval and Funding
- If funding approved, design begins
- Construction likely in 2018 and beyond





Project Process Strategy



Project Timeline

- Survey #2: Available Nov. 3-18, 2016 at **http://millcreekwaterquality.mindmixer.com**
- Project Wrap-Up: End of November 2016

For more information, please visit **edmonton.ca/millcreekwaterquality**