

Beaverbrook – Understanding the Storm Water Management Threat

Why stopping ClubLink from redeveloping the Kanata Golf Course is critical for all Homeowners in Beaverbrook

A backgrounder on flood risk due to the geology of Beaverbrook, Kanata Lakes, the Kanata Golf Course, and the potential impact of ClubLink's plans

Monday, December 11, 2023

If you read nothing else...

Beaverbrook's risk of flooding is increasing due to a decades-long trend of more frequent extreme rainfall volumes over short timeframes, which our local stormwater management systems were not designed for.

Beaverbrook is "downhill" from Kanata Lakes, the Kanata Golf Course, and the Beaver Pond, so no area of Beaverbrook would be immune from an extreme rain event.

ClubLink's desire to redevelop the Kanata Golf Course substantially adds to that risk. The Kanata Lakes Golf Course is also the Stormwater Management (SWM) system for itself and many of Kanata Lakes homes in and around the Golf course. Re-development of the Kanata Golf Course would mean compromising or disabling its SWM system almost immediately after construction starts (with unknown impact), with its replacement potentially as long as a decade later.

Given that the Kanata Golf Course is adjacent to Beaverbrook's west edge, any disruption of its SWM system presents a risk not only to adjacent Beaverbrook homes but ultimately all of Beaverbrook due to the local geology.

The KBCA recommends that Beaverbrook residents support the KGPC and the City of Ottawa in opposing ClubLink in court and at Queens' Park, including donations to the KGPC to fund the Legal, Technical and Planning professionals required to oppose ClubLink.

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Summary

Due to the geology of Kanata North and weather trends in recent years, Beaverbrook is at risk of flooding. In addition, should the redevelopment of the Kanata Golf Course into homes be approved, it would significantly increase that risk, both during and after construction.

- Kanata North lands absorb water poorly. Soils are thin and drain quickly to bedrock just below the surface, which flows to the stormwater management sewers, ditches, gullies and creeks. We only have the Watts, Kizell and Shirley’s Brook (small creeks) for stormwater drainage, eventually into the Ottawa River.
- The lands for the Beaverbrook/Kanata Lakes communities tilt from West to East, meaning water will drain to Beaverbrook in the event of a major rain storm that overwhelms the stormwater management facilities in either Kanata Lakes or Beaverbrook.
- There was flooding in Beaverbrook in 2009-11, which caused flooded basements and sewage back-ups in several areas, and that was with moderate rainfall rates over weeks of rainy weather.

- Fast forward to 2023. The Ottawa area is seeing increasingly long and intense wind and rainstorms, including in Aug 2023 in the Riverdale area of Ottawa (100mm), BC, and the North Eastern US (350mm+) have all seen flash floods of one or more months of rain in half-day to 4-day timeframes resulting in catastrophic flooding.

In Aug 2022, 100 mm of rain in 36 hours caused the Beaver Pond to rise 2m, overflowing the banks, which, if it had happened in the spring, may have flooded Kanata Lakes and Beaverbrook.

- The City of Ottawa has recently come to acknowledge that the Storm Water Management (SWM) systems built in the last 50 years are at risk of being inadequate for coming storms. Recently, the City announced that they will be doing extensive dredging and maintenance on most of the SWM ponds/facilities in Kanata North in the next two years. Plans for SWM upgrades are not yet on the radar but should be.
- A key SWM facility is the lands of the Kanata Golf Course. It provides the SWM drainage and holding ponds for itself (70 hectares, 172 acres) and an additional 70 hectares (172 acres) of residential and commercial buildings in Kanata Lakes for a total of 150 hectares.
- Enter ClubLink. As owners of the Kanata Golf Course, they wish to tear up the existing golf course and SWM system and ponds and redevelop with 1500 homes and a new SWM design, which the city has rejected as inadequate.
- The threat of ClubLink being allowed to redevelop is twofold:
 - ◊ Redevelopment could take as long as 10 years, and the first thing that will happen is they will scrape the area to bedrock (current sub-division building practice), destroying the SWM system.
 - ◊ There is also a risk that the provincial government could override the City and allow development, turning a blind eye towards deficiencies in stormwater management.

The answer is to block all avenues for ClubLink, both in the courts (on the ongoing 40% agreement court case) and stormwater management deficiencies.

The Nature of Kanata North and Stormwater Management

Kanata North lands (including the Kanata Golf Course) consist mostly of thin silty clay base soils of approximately 2 to 8 ft (50 to 200 cm) in depth over pure Canadian Shield rock, with occasional deep pockets of clay ([Leda clay](#)). This means the land's ability to absorb snowmelt and rain is limited. Kanata North depends on Stormwater Management (SWM) to avoid flooding.

In addition, narrow creeks – Kizell and Shirley's Brook – provide Storm Water Management drainage to the North and West for much of Kanata North, over NCC lands, and ultimately to the Ottawa River. Beaverbrook drains to Watt's Creek and Kanata South.

At issue are downstream residents and the NCC (as these creeks cross the NCC-controlled greenbelt). The NCC has already told the City of Ottawa that they will not accept any increase in water volume for these creeks due to erosion concerns.

See: **Shirley's Brook and the Kizell Creek**

So, what is Storm Water management, and how does it work?

For more info: **Understanding Stormwater Management**

Any city has two types of water management systems:

- **Sanitary** sewers handle household wastewater (toilets, showers, sinks)
- **Stormwater** sewers, ditches, creeks, and ponds handle snowmelt and rainwater

From the flooding perspective, SWM has 4 key functions: Collection, Conveyance (Transfer), Retention and Detention.

Collection: takes two forms. Absorptive surfaces, such as lawns, fields, parks etc., can absorb and retain water in soils. Otherwise, water is collected through drains on roads and open areas (large fields), ditches and natural water courses (local gullies, creeks, etc.).

Conveyance: Drain-collected water is directed via pipes, creeks, etc., ultimately to an open body of water, the Ottawa River, but in Kanata North, is typically directed to SWM “ponds” to retain and delay the water.

Retention & Detention: “SWM Ponds” are used to store excess water temporarily and, where possible, allow it to be locally absorbed. This is done to avoid overwhelming the SWM system in surge conditions, such as one or more of a combination of the spring thaw, extended rain and “extreme rain events”.

SWM design is driven by an understanding of the peak level of water overload that can occur. You have likely heard the term “100-year storm”.

SWM planning is driven by the risk of a surge in stormwater in a single event or period of time. For example: a one or multi-day rainstorm or snowmelt over a two-month period. A 100-year storm is one where the volume of water and timeframe have a 1% chance of occurring in any given year. A 2-year storm has a 50% chance of happening, and so on.

SWM is passive. The size of the stormwater channels (pipes, creeks, ditches) and ponds are sized to cope with, typically, the 100-year storm scenario.

However, they require maintenance, which the City has neglected. The Aug 8, 2022, 100mm storm, which caused the Beaver Pond to rise 2 m revealed that the main drainage pipe (to the Kizell Creek) was plugged with algae, which took the City 48 hours to realize and correct.

Changes in SWM Planning

In 2020+, there are several issues with SWM planning and calculating SWM projections.

Until about 2010, SWM's 100-year storm was based on historical records; as rain/snowmelt characteristics had been historically stable, the design standards for a region or city rarely changed.

Several years ago, Environment Canada supplemented historical data with multi-year projections of storm severity based on recent annual trends with multiple time frames (1, 2, 5, and 10 years).

Unfortunately, the City of Ottawa has been slow to recognize this, using 10-year-old historical standards until recently. In 2023, the City is updating its standards and presumably also looking at projections.

A consequence of these changes is the City is now aware that SWM ponds and pipes built/installed 20 or 50 years ago cannot meet 2023+ standards. Witness an announcement by the City that all SWM ponds in Kanata North will be dredged and have other maintenance performed in the next 2 years. However, that does not resolve the problem that older facilities no longer meet the 100-year standard, so are at higher risk of failing in 2023+.

Bottom line – Beaverbrook is at a higher risk of flooding due to local SWM being below current standards.

Winds and Rains – what's the weather trend?

In 2017, the KBCA worked with Hydro One on dealing with trimming and removing trees in the backyards of Beaverbrook homeowners. The Forestry Director for Hydro One (which manages 20,000 km of hydro corridors in Ontario, almost all lined by trees), said that “the frequency and severity of wind storms has been increasing steadily since 2000”.

Since the first major tornado in Dunrobin in 2018, the City of Ottawa and the surrounding area are now seeing annual Tornado or similar wind events (Derecho of 2022)

The same is true of the frequency of snowmelt/rain volumes and timeframes. Note: all of the events in the list below are historically unprecedented. There is no history of these types of events in the last 30+ years.

- The frequency and height of spring water levels on the Ottawa River (Constance Bay) since 2000.
- Beaverbrook saw flooding conditions from 2009 through 2011.
- 100 mm of rain fell in 36 hours in August 2022. The Beaver Pond rose 2 m from its seasonal low point to overflow the banks to a record level, more than any recent spring.
- 50-75 mm of rain fell in 90 minutes in August 2023, impacting Ottawa's Riverside community and causing extensive local flooding ([CTV News](#))



- During the summer of 2023, cities in Vermont and Pennsylvania saw multi-day events, resulting in 350+mm of rain, which is consistent with extreme weather events (including Derechos) which were formerly only seen in the southern US, moving north at an increasing rate.

Ignoring these trends would not be responsible, regardless of why this is happening.

Where does this trend lead?

For Beaverbrook and the rest of Ottawa (and other Cities in Canada), the risk is increasing extreme wind and water event-related damage, which will dramatically strain city, utility and provincial budgets (which were not on anyone's “dance card”), including:

- **Wind:** a high priority for tree management (single greatest cause of electrical line damage), wind-impacted infrastructure upgrades (e.g., power lines)
- **Rain & snowmelt:** SWM infrastructure retrofits – new storm sewers, increase SWM pond capacity

Beaverbrook is lower than Kanata Lakes

Water finds its own level. If there is even a small elevation difference, water will flow.

With that in mind, Beaverbrook is 2m or more below Kanata Lakes, even for its highest elevation points.

If there is a SWM problem, such as the Beaver Pond overflowing into the streets, an extreme rain event that is too much for the storm sewers or the Golf Course SWM having been dismantled, Beaverbrook will flood before Kanata Lakes.

For details, see: **Elevation Differences Map**

Why turning the Kanata Golf Course to Homes adds to Beaverbrook's flood risk

The Kanata Golf Course runs along the entire west edge of Beaverbrook. Any compromise of its stormwater management system would increase the flood risk to Beaverbrook.

During Construction

The current practice for subdivision development is first to scrape the land to bedrock. The following photo is of the KNL lands north of the Beaver Pond, which was formerly a forested area:



Scraping the Kanata Golf Course for development would compromise the existing SWM infrastructure the golf course provides. To what extent is unknown.

To the KBCA's knowledge, no risk assessment has been done regarding the interim SWM system during the construction phase by either ClubLink or the City of Ottawa

Suffice it to say that bare rock and blasting rubble have no ability to retain water and where that water would flow to is unclear. That represents a potentially large risk.

After Construction

At the Ontario Land Tribunal on the 7000 Campeau development application case (the official name for the ClubLink development application), the City's stormwater management expert and the KGPC expert rejected ClubLink's SWM proposal on several points.

While ClubLink was awarded approval from the OLT, they attached (something like) 292 conditions on the SWM design that ClubLink would have to resolve to the City of Ottawa's satisfaction before construction could begin.

The City is on record as having not approved ClubLink's SWM proposal.

And, that is all a side issue as the project is still being appealed at the Superior Court of Ontario on the 40% greenspace agreement (which likely will continue for years).

However, the reality of housing development in Ontario is the province has the last word. While they cannot override the Superior Court of Ontario, if the courts eventually find for ClubLink, then they have full authority to override the City of Ottawa via an MZO (Minister's Zoning Order).

If that happens, there is a risk that ClubLink gets to build an inadequate SWM, which, again, has a disproportionate risk for Beaverbrook.

Kanata Lakes Beaverbrook Area



This map shows the Kanata Lakes Beaverbrook communities, with the 417 to the South, the Beaver Pond to the North and March Road to the East. The dividing line is the Kanata Golf Course's Eastern edge.

The Kanata Golf Course

The Kanata Golf Course is also a Storm Water Management facility that uses ponds and absorption of the golf course fairways, greens, and surrounding greenspace.



The Kanata Golf Course is about 70 hectares (172 acres). It contains two Storm Water Management (SWM) ponds, one quite deep, plus has drainage to those ponds and ultimately drains to the Beaver Pond.

The SWM drainage area

The Golf Course is the SWM drain for the course, and approx. another 70 hectares of surrounding residential and commercial properties (the area contained within the orange line) for a total of 150 hectares. The orange line represents the outline of the composite area of the golf course and homes that share its stormwater management system.



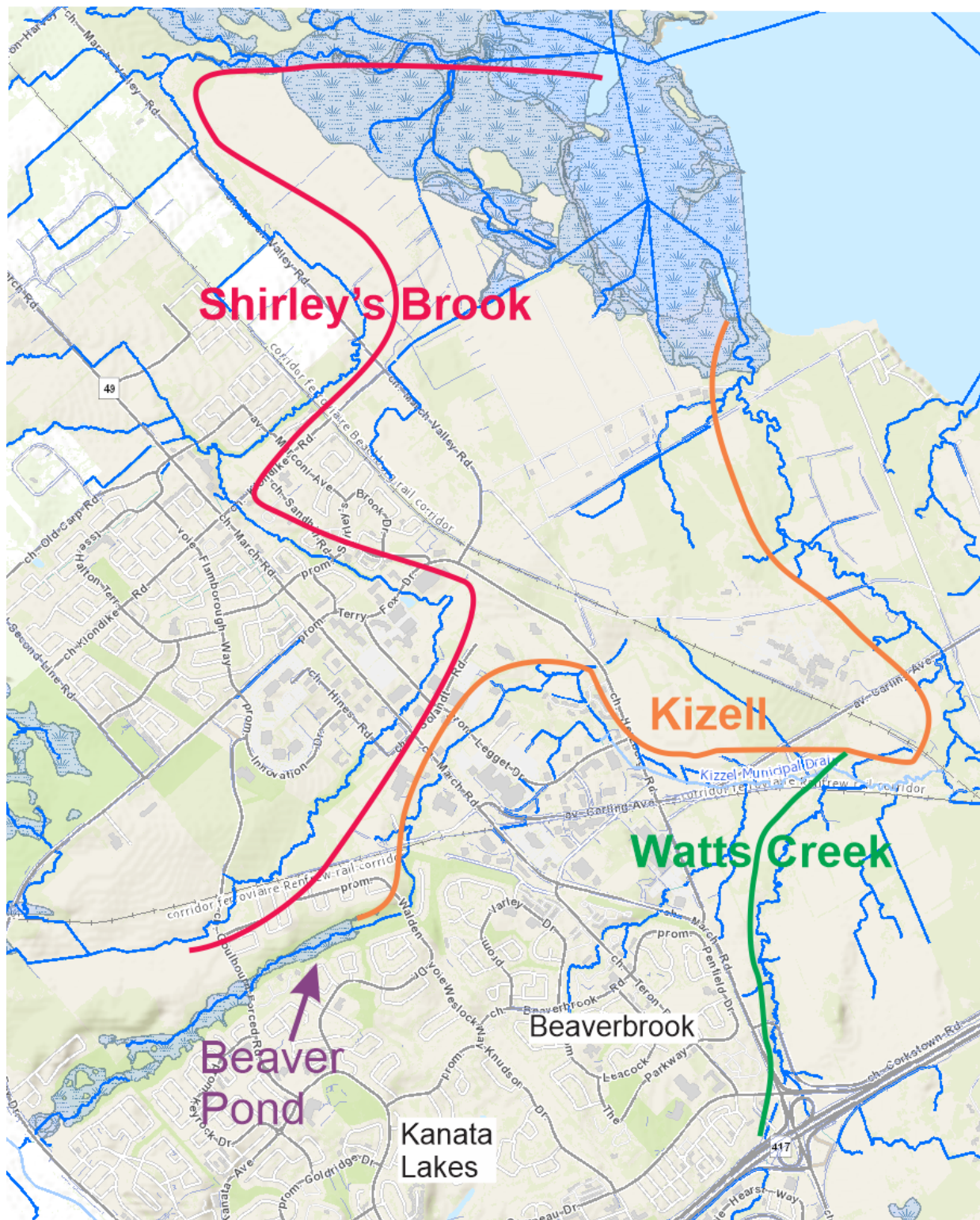
Critical is that the golf course and lands immediately West of Beaverbrook are all higher 2+m than those Beaverbrook properties to the East.



Shirley's Brook and the Kizell Creek

Shirley's Brook and the Kizell creek are the two final stormwater management drainage paths to the Ottawa River for Kanata Lakes and any post-2010 new development in Kanata North.

Note that Beaverbrook drains to Watt's Creek, north to Kizell and south to SWM drains in Kanata South.



Appendix

SWM expert opinions on ClubLink's proposal

City of Ottawa SWM Witness Statement (OLT hearing) [Gabrielle Schaeffer Witness Statement](#)

KGPC SWM Expert Witness Statement (OLT hearing) [Douglas Nuttall Witness Statement](#)

Elevation tools

How high is the land your home is built on?

[Elevation Map tool for KL/Beaverbrook](#)

Understanding Stormwater Management

Stormwater management is a crucial aspect of urban planning and environmental protection, aiming to control and use rainwater and melted snow effectively:

- **Collection:** Stormwater is collected from surfaces like roads, roofs, and other areas. This is done to prevent flooding and erosion and to reduce the impact on waterways.
- **Conveyance:** Once collected, stormwater is conveyed through a system of drains, gutters, and pipes. In some systems, stormwater is directly discharged into nearby water bodies; in others, it goes through treatment processes first.
- **Treatment:** Stormwater treatment is crucial to remove pollutants like oil, chemicals, heavy metals, and sediments. This can be done through various methods, such as filtration, sedimentation, and biological processes.
- **Detention and Infiltration:** In many modern stormwater systems, the water is detained in retention ponds or basins to allow sediments to settle and pollutants to degrade and, perhaps most importantly, ensure that a surge (spring runoff, extreme rainfall) does not overwhelm downstream drainage. This process also allows for the gradual infiltration of water into the ground, recharging groundwater supplies and maintaining the water cycle.

You can learn more about stormwater management by visiting these links:

- [Understanding Stormwater Management: An Introduction to Stormwater Management Planning and Design](#)
- [What Is Stormwater Management and Why Is It Important?](#)
- [Understanding the Purpose of Stormwater Management](#)
- [Stormwater Management: What It Is & Why It Matters](#)