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Concerns Re: The Waterloo Moraine, September 3, 2024

Dear Wilmot Council Members and Waterloo Regional Council

Currently there is land expropriations proposed for areas of Wilmot as well as a budget being allocated for road work throughout the township. Both of these issues have the capacity to present serious threats to the Regional of Waterloo's potable water supply impacting both groundwater and surface water features. There are also significant, risks to A1 farmlands and crops that could pose health risks to livestock and humans. There are risks being posed to existing critical infrastructure located locally and downstream including oil and gas lines and electrical towers.

The Places to Grow Act was written over 30 years ago before we had modflow models and modern mapping techniques. Back then people believed if gas were put on the ground it magically evaporated not realizing the risks of chemical spills. The MOE believed that clay till was impermeable forever, never realizing that it simply slowed the rate of water flow. Back then we believed plastic would last forever. That was before naturally occurring bacteria ate the PE tape causing it to thin and tented up and rip allowing salt to corrode the metal of an oil pipeline called the Kalamazoo.

The Places to Grow Act was written before most citizens even knew what a Moraine was. It was written before the public knew our main water supply was based on groundwater and aggregates randomly distributed by the melting of ancient glaciers that resulted in our wells. It was written in an age when we believed we had plenty of water and that it was limitless but that was before Elmira lost it's entire water supply to the chemtura spills. It was before people learned that NDMA contaminated the water in Cambridge. It was before the Walkerton Water crisis. It was before we heard the words: Climate Change.

The goal of this report is to assure that the Township of Wilmot is reasonably informed prior to the decisions regarding land expropriation and the vast expanse of freed up lands for the sake of fast reckless development prospects. I don't know if I am writing a document that will facilitate meaningful change to avert the risks or simply writing an obituary for your municipal water supply. That decision is unknown to me. I simply want to be sure there is no plausible deniability on the part of the Township of Wilmot or the Region of Waterloo on risks I am about to disclose to you. These are among the issues that have kept me without sleep for quite some time.

I have divided the topics into three categories

Topic 1: Waterloo Moraine: how it works and the laws that apply to it.

Topic 2: The cost of natural capital assets, farmlands and water supplies

Topic 3: The cost of screwing up

Attachment 1 is an informational document I wrote to teach various groups about the Moraine. It illustrates the hydro geological function with information specific to the complex geology of the Waterloo Moraine. It is a system I've studied for over 20 years. I participated in numerous public processes with UW professors such as Alan V. Morgan, Emil O. Frind and Larry Lamb and I am proud to have met them. They've passed but their knowledge stays with me. They taught me in the forests of the West Side Lands and at meetings and via personal correspondences exchanged over many years. I've walked Moraine systems with the Ontario Geological Survey of Canada's team as they showed me how the sub-straits are laid out like a dog's breakfast in some spots and right next to it lines of sand go straight

down into the deep aquifer systems. They taught me about the need for ground penetrating radar in out-wash Moraines at the Arkell research centre in Guelph along with members of the US Geological Survey (USGS)

Attachment 1 pg 2 bottom illustration: Glacial lobes specific to the Waterloo Moraine have formed multiple watershed systems throughout Ontario including that of Georgian Bay, Lake Huron, The Lake Erie, Lake Ontario and Lake Simcoe. It shaped the distribution of sediment and the biology of the soil that allows for fertile farmlands to exist. The sediment melted off these glaciers, influenced where aquifers and rivers exist and it shaped our local biodiversity based on the PH balance of sediment and the flora and fauna drawn to those unique environments.

Attachment 1 pg 3 top illustration: Our aquifers are often stacked above each other and hill slopes can act as primary recharge contributing to vast amounts of groundwater. Topography is not enough to mitigate risks to wells or intakes in our area. We need to use ground penetrating radar on hill slopes to understand the connectivity of surface to groundwater.

We need boreholes done to a greater depths to better understand all the aquifers that could be impacted as projects are proposed for construction. The first 12 meters are influenced by surface water activities such rain cycles, flood or drought. Under that depth we have quarternary geology which is the land formed 2.85 million years ago to present.

Deep bore hole data provides information on sediment type and sediment is habitat for the beneficial soil biota that serves to filter our water supply. We are home to natural bacteria in the soil that consumes plastic, noted in research by a Waterloo student named Daniel Burd who found the enzyme at the Waterloo Erb Street Landfill.

Some areas of the Waterloo Moraine are so pristine the water lacks Tritium. It was not affected by the nuclear testing & bombs that spread tritium throughout the world's watersheds. That is worth protecting for the long term.

There is data to suggest that extremely good water quality is influenced by the presence of naturally occurring beneficial biota and the researcher exploring this is Professor William Shotyk who is the Bocock Chair for Agriculture and the Environment at the University of Alberta and the first scientist to quantify the purity of water. He is the man who found the purest water supply on earth in Tiny Township. Running that water through a Brita filter would contaminate it.

Attachment 1 pg 3 bottom illustration: Salt has closed wells in Waterloo Region and we've spent millions trying to keep them viable. There was 21 million spent to offset issues of Vinyl Chloride at Greenbrook Wells but it is still at risk of road salt infiltration aka Chloride. The cross section illustration, by UW professor Mike Stone, shows how water is drawn towards wells which acts as a straw creating a vacuum effect. Surface topography alone will not adequately protect water in our region. Road salt may take a long time to reach wells, but it still remains a threat to the long term viability of our local groundwater supply. Road salt in water can harden arteries leading to heart and stroke disease, high blood pressure and heart attacks. It can also act as a chemical that can increase the toxicity of other chemicals particularly agricultural pesticides such as 2,4 D which can convert to DDT when exposed to chlorides.

During the time of the Roman Empire salt was used as a weapon. Soldiers spread it on the fields of their enemies to starve them. It destroyed both farmlands and fisheries. It is toxic to crops and to people in high amounts. Road salts poses a risk to A1 farmlands, potable water supplies and the Grand River. We need to be careful how we plan the roads and what we use to de-ice.

Attachment 1 pg 4 top picture: This is an illustration of of the water draw down effect. This is the zone of influence at the surface around a well. We passed the Ontario Source Water Protection Act to protect the intake zones like this. We passed the ESL policy in Waterloo to make sure the land use around our water supply is suitable for use now and in the future and not subjecting primary recharge areas to risks of contamination or spills.

Attachment 1 pg. 4 bottom picture: Riparian buffer zones are used throughout the Region as a means to prevent water contamination and the release of debris and salt in water bodies. It is a surface water solution to mitigate risk.

Attachment 1 pg 5: The Ontario Government, Regional Governments and local governments have spent billions trying to mitigate the risks to Ontario's potable water supply yet the current Source Water Act are policies specific to protecting the intakes only. It doesn't have regard for the source water collection areas which may be at a great distance from the point where the water is actually taken. The Greenbrook Wells are in Kitchener but the wellhead originates from areas including Laurel Creek Watershed which overlaps Wilmot and Waterloo at the North West Corner. We need to protect the high water recharge.

Attachment 1 pg 6: The Waterloo Moraine has been one of the most studied geological features in the history of source water protection. That is a legacy built by Government, educational institutions like UW, Wilfrid Laurier and community combined. We know where the Moraine is and we've effectively created laws locally to protect this feature. We innovated the use of Watershed Studies. The Laurel Creek Watershed Study was the first of its kind allowing professors and students to have a hands on learning of what this system held. There were creek studies, biological inventories, climate data and sediment studies, benthic data that we can all still use as baseline data to this day.

We innovated an Environmentally Sensitive Land Policy to protect water at the Regional Level by restricting high polluting activities from water sensitive areas. We created baseline data OUTSIDE of site specific development plans to gather information without bias. We still use to build a safer more sustainable community without having to rely only on the work of a developer's hired experts. We choose to take a proactive approach so when developers present their work, we have existing comparative analysis on the same lands already completed to help form our understanding of the land.

Attachment 1 page 7: In spite of local planning efforts we are still at risk of developments and gravel pits encroaching upon the primary recharge areas of our Moraines. The Provincial law doesn't recognize our ESL policies to stop gravel pits. The Doug Ford government is using MZOs to bypass public planning processes and with Bill 185 they restrict concerned citizens from participating in Ontario land tribunals. This is anti competitive abuse of dominance because Ontario citizens are taxpayers and stake holders in the community at the local Provincial and Federal Levels. The Competitions Act applies to all companies.

Relevant Laws to protect water in Ontario include but are not limited to:

- Section 2 of the Provincial Policy Statement.
- Ontario Source Water Protection Act
- Safe Drinking Water Act
- Canadian Water Act
- Ontario Fish and Wildlife Conservation Act
- Federal Species At Risk Act
- Ontario Endangered Species Act
- UN Declaration on the Rights of Indigenous
- Species At Risk Act
- Navigable Water's Act
- Treaty laws
- Regional Official Planning Policies
- Municipal Official Planning Policies

Attachment 1 pg 8: The Haldimand Tract Agreement map is presented here.

Attachment 1 pg 9: The Ontario government never had regard for Treaty Lands. It is evident on the aggregate maps. This is an unreasonable map to work with because it lacks regard for every single water policy we have. This is based purely on resource extraction without consequence and it is theft of land in violation to domestic and international laws.

Attachment 1 pg 10: Bill C-226 is about the The National Strategy Respecting Environmental Racism and Environmental Justice. It has since received Royal Assent on June 10 2024. The policy states:

Consultation

(2) In developing the strategy, the Minister must consult or cooperate with any interested persons, bodies, organizations or communities — including other ministers, representatives of governments in Canada and Indigenous communities — and ensure that it is consistent with the Government of Canada’s framework for the recognition and implementation of the rights of Indigenous peoples.

It is not lawful for the Ontario Government to bypass Nation to Nation consultation.

It is not lawful for any municipality to make huge planning decisions regarding the rivers upstream of First Nations communities such as Six Nations without reasonable consultation.

The Nith River discharges into the Grand River in Paris Ontario and that flow is the primary water supply for Brantford, Brant County and Six Nations. There are no flood controls on the Nith as there is on the Grand River and we have oil and gas lines crossing this river. If the banks widen as a result of growth upstream, and that goes beyond the safety and constraints of critical infrastructure it could result in serious liability issues. It is important to facilitate dialogue with the downstream communities and infrastructure firms like Enbridge before we do anything to disrupt water quality, water flow, flow rates or water volumes upstream. It is their fish and water supply we impact. These are treaty issues.

Attachment 6 is a personal correspondence I had with Sam Sele, the Socio-Economic and ADR Specialist with the National Energy Board of Canada (Now called the CER: Canada Energy Regulator) that was CC’d to Adam Oswell the Regulatory Advisor with Enbridge Pipeline Inc. This document relates to Enbridge Line 10 oil pipeline but I provide it for reference to give insight on the fact that **Enbridge has legal obligations to meet safety and environmental standards that are compliant to both Provincial and Federal Law for the full life cycle of the pipelines they install.**

Attachment 6 pg 1: The National Energy Board states:

“Public Safety and the protection of the environment are the top priorities of the NEB. The Board holds companies accountable for the safe operation of their pipelines.”

Attachment 6 pg 4: Enbridge had to comply with Provincial and Federal policies with regards to the protection of nature and water supplies. In the case of the pipeline Enbridge Line 10 they had to have regard for the following issues:

- any environmental mitigation or monitoring committed to under conditions of permits issued by or agreements made with the Ontario Ministry of Natural Resources and Forestry, the Municipality of Hamilton and Conservation authorities
- site specific mitigation of risks to migratory birds
- site specific mitigation of risks to endangered species
- site specific mitigation of risks for wetlands
- site specific mitigation of risks for lands with drainage tiles, and irrigated lands in order to maintain integrity of the tile drains
- updated Environmental Alignment Sheets; and
- current drawings of typical construction practices

Attachment 6 page 5: The NEB considers many factors when conducting an environmental assessment including:

- Physical and meteorological environment
- soil, soil productivity and vegetation
- wetlands, water quality and water quantity
- fish, wildlife, and their habitat
- species at risk or species of special status and related habitat
- heritage resources
- traditional land and resources use
- human health aesthetics and noise

It is important for Wilmot Township, the Region and the Province to realize they don't have the judicial power to decide where to place a gas line, an oil pipeline or a hydro tower without regard for the design criteria and lawful compliance required for the engineering companies and pipeline companies doing the job.

We have areas in Waterloo Region where the sediment poses geological risks where pipes can sink and break when karst systems collapse.

I live in Waterloo and in my own subdivision we had water main break. We also had a drainage pipe sink so deep in the property next to my subdivision, that the work crews didn't even know if they could find it. They found it 12 feet below where it was originally placed.

The farmer of the land where my house was built, sold the land because his tires kept getting stuck in the mud because the ground so wet all the time.

My next door neighbour's house moaned and shifted. She evacuated her family quickly. Tarion did the inspections and a support beam needed to be replaced because her home shifted. The brick work is still a little crooked.

Just because your ready to build the roads in Wilmot doesn't mean the infrastructure companies are ready to install pipelines, communication systems and sewers without question or need to comply with Provincial and Federal safety standards or proper engineering protocols. Don't just run these plans by Enbridge. Include the CER into the planning dialogue too. It's very good to have them as an observer.

Attachment 1 page 17: The International Joint commission states: "It is clear that human and ecosystem health in the Great Lakes basin cannot be protected without protecting ground-water resources."

For the scale of the proposed land expropriation and expansion of development lands to the point you will need "to polish the water of the Nith River" indicates you MUST consult with the Government of Canada and the United States via the International Joint Commission on this proposal. Both nations have collectively invested billions trying to maintain the health of Lake Erie. This project in my view, is a threat to the health of Lake Erie.

Topic 2: The Value of Natural Capital, Farmland & Water Supplies.

Attachment 1 pg 11 Top picture : In the 2011 census of Agriculture Ontario was noted as having 12.6 million acres of land in agricultural production with just 5.6% of Ontario's Land Base. The yield on this land is double or more than that of the Prairies even though the land mass is less than a quarter of the farmland of either Saskatchewan or Alberta.

Attachment 1 pg 11 Bottom picture: Aggregates employ 35,000 people directly and indirectly including 3.2 Billion GDP and 1.8 million in Labour income whereas the Canadian

Agricultural Sector (2008) employ 2.2 million jobs (1 in 8 in Canada) and generates 99 Billion in GDP, 8.1% of Canada's Total GDP.

Attachment 1 pg. 12 top chart: 1% of Waterloo Region's water priced at 1 cent per litre generates \$18,184 in municipal revenues per day, making \$6,637,160 annually in perpetuity. This value does not include the value of water for use in manufacturing, food processing, agricultural or residential use. It does not include the fact there is no growth without a viable water supply. These are the values submitted to the Ontario government when David Wellhauser and I submitted a Request for Review for a Waterloo Moraine Protection Act using the Environmental Bill of Rights.

Attachment 1, pg 13: Natural wetlands can filter out nitrate and phosphate issues 80-90% if protected. They are critical habitats to protect for indicator species such as mole salamanders, mayflies, fairy shrimp and other species. Think of them as the canaries in the mind shaft.

Topic 3: The cost of screwing up

Attachment 1 pg 18 and 19: This features quotes and warnings from area politicians, MPs and other people about the risks we face in the Grand River Watershed. I will highlight this one from Environmental Commissioner Gord Miller who said:

"Kitchener Waterloo is ground zero when it comes to population growth and the issues about the carrying capacity of the watershed. Obviously groundwater resources aren't there for hundreds of thousands more people. Do you go to the big pipe in the Lake? If you do, what do you do about sewage? Do you still discharge from the Grand and change the hydro geology of the river? Either we change our lifestyles and kind of growth...or the environment crumbles."

Gord Miller, KW Record November 2, 2005

Attachment 1 pg 16 upper photo: Nitrates and phosphates are among the water-soluble fertilizers commonly applied to farmlands in Waterloo Region but corn can be damaged by dry weather causing high levels of nitrogen to build up in the plants impacting silage, green chop and grazing corn. This can turn poisonous to life stock and post serious risks as silo gas because it causes high nitrogen dioxide levels. If there is not enough water for photosynthesis in the plant to happen, the corn turns toxic.

Attachment 1 pg 16 lower photo: In 2012 there were significant contamination issues involving Atrazine that impacted the groundwater of the Ogalala Aquifer and watersheds to the south of the Great Lakes. This is the map for it.

Attachment 5 page 1: Atrazine is the largest chemical used as an agricultural pesticide in the Grand River Watershed. It is used in corn and soy crops in Waterloo Region. Syngenta, the manufacturer of Atrazine, was sued by 2000 water utilities in the US and they settled paying 105 million US for water contamination. There is no data to indicate the impact of this pesticide in Canada. The President of Syngenta sat on the steering committee of Health Canada's Pesticide Management Regulation Agency (PMRA) at the time. Perhaps it is time we look into seeing if our aquifers have any adverse impacts? I raised that concern to elected officials in 2012.

Attachment 5: This is a correspondence shared with the Federal Government raising concerns on issues of Endocrine Disruption and the Grand River by way of Atrazine as well as sewage overflows along the Grand River. Our Water Treatment systems rely on a balance of biota for the treatment to work but when heavy rainfalls happen there was the release of raw and partially treated sewage in the river causing fish to change sex.

Attachment 5 pg 2: I researched the liability risks regarding issues of water contamination and found the following information that states:

“Historically the courts are more likely to prosecute municipalities rather than high levels of government.”

Attachment 7 is the report, Value-of-Life estimates in an economic cost assessment by John Livernois. It was commissioned paper 15 of the Walkerton Inquiry. Go to page 3 of the report, the abstract states the following:

This paper concludes, therefore, that the total cost at risk from a future water contamination event like Walkerton’s - that is, the sum of the tangible costs plus the statistical value of the lives lost and illnesses suffered - could be valued at about \$155 million.

Attachment 2 pg 4: Professor Frind’s report states the following about Walkerton

It took over a decade for the Province to follow the Region’s initiative by developing a province-wide groundwater protection framework. This was done in response to the well-known tragic event in 2000 at the town of Walkerton Ontario, where a municipal well became contaminated by E. coli, resulting in seven deaths and many severe illnesses. A public inquiry, the Walkerton Commission, was formed to examine the causes of the contamination. It soon became apparent that the immediate cause, runoff from a cattle pasture near the well led to this disaster because of a criminal failure to carry out the mandatory disinfection procedures (O’Connor 2002a). This was compound by a lack of standards for wellhead protection.

Attachment 2 pg 4: Professor Emil Frind and Tammy Middleton produced the article titled Towards water sustainability for Waterloo Region in 2014. on page 4 it identifies the fact that in 1989 a severe local groundwater contamination of n-nitrosodimethylamine (NDMA) resulted in the closure of all of Elmira’s wells. It was the sudden closure of the water supply of an entire town of 8,000 people with a contaminated area of four square kilometer in extent. There was the swift installation of pipelines from the City of Waterloo to Elmira to assure the community a viable potable water supply.

Attachment 3 This is a list of Professor Emil Frind’s work from 2002 to 2008 showing all the public presentations he personally gave, warning cities, the Region and Townships against inappropriate land uses involving properties in Wilmot Township and the Waterloo North West Corner. It relates to impacts by traffic, the need for the ESL, the costs of development and long term risks to our water supply etc.

It would be wise for the township of Wilmot to make the effort to gather each one of these reports that are currently at the City of Waterloo and Region of Waterloo because this is sworn expert evidence which I have used during OMB Case PL071044. The City of Waterloo, the Region of Waterloo, the government of Ontario by way of the Ontario Municipal Board case PL071044 has has no plausible deniability on these risks. And I am the person who launched that OMB appeal case and successfully won my concessions at the expert’s meeting. Mr. Frind was among my sworn experts.

Attachment 1 page 14: This illustrates the cost of building a Lake Erie pipeline based on estimates given in 2008.

It has no regard for current minimum wages or prices of steel which has increased.

It doesn’t include the cost to move the water uphill from Lake Erie

They would have to build a new power facility to accommodate the movement of the water and that and it’s not part of this estimate.

The Grand river would loose status as a Natural Heritage River and put 50% of Canada’s native fish species at risk.

The entire river would become a sewer

The plans as proposed would have us gather the water at the base of the Grand River at the most concentrated point of contamination to be used as our potable water. We cannot remove viruses or small particulate contaminants eg. Covid, Microplastics, PBDE, NDMA etc.

The plans have no mitigation for the reversal of flow caused by high winds and weather events where the Grand meets Lake Erie

There is no cost estimate on how much this water will cost us per litre.

Attachment 1 page 15: Zebra Mussels block intake pipes and when we use chloride to kill them it results in algae blooms where we discharge the chloride laced water which also clogs up intakes. We know that Lake Erie is a Lake under stress at risk of dead zones due to eutrophication, toxic algae issues which can cause blue baby issues in humans, it has invasive species and is at risk of bulk water taking from Canada, the US and multinational agencies. It has suffered massive fish and bird kills due to its toxicity issues. Will the water even be drinkable?

Knowledge is like a stitch in time that can save 9. Please plan with care.

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