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Subject: Stormwater Management - General Issues Meeting - Nov. 30 2022 - Agenda Item 8

As a long-term resident of Hamilton, and as a trained ecologist and physical geographer, I have long been disturbed by the destructive trends I have seen in the way development has changed the natural hydrological systems and made this city more and more vulnerable to the threats of flooding due to climate change and loss of soil permeability. I have also grown tired of having constant reminders of this city's shortfall in funding for infrastructure maintenance, and news of infrastructure failures that plague residents and are blamed on this shortfall. It is time that Hamilton had a stable funding system for stormwater management, one that is funded by those who most contribute to the problem. Basing stormwater fees directly on measures of permeability and active water management by land owners is far and away the best way to achieve equitable and stable funding. The opportunity for land owners to reduce such fees by managing runoff would incentivise actions that will ultimately reduce the city's flood risks, mitigation costs, and infrastructure demands.

Hamilton has a complex hydrological situation. The location of the old city, on relatively flat plains left by proglacial lakes and surrounded by a steep escarpment with only a few major valleys by which water from a huge flat hinterland must flow, leaves many residential and business areas vulnerable to flooding during major storms. Much of the area above the escarpment has relatively thin glacial till over a bedrock of thick fractured dolomite and limestone. In many areas, this till is covered by heavy clay deposited in postglacial lakes. In its natural state, the clay would have impounded runoff in low hollows to form ephemeral wetlands, which would have percolated slowly into the till where it would recharge groundwater, then either been lifted by tree roots to sustain soil moisture or released into bedrock to replenish streams flowing into the valleys. We have lost much of the surface storage capacity, first through agricultural drainage, and then through impermeable urban functions, and we have bypassed the slow downward movement of groundwater with storm sewers that remove water from the surface to protect that urban infrastructure. This makes much of the city vulnerable to flash floods during significant rainfall events or sudden snow melt if the storm sewer capacity is exceeded. It also makes us more vulnerable to drought during dry years, as the reserve of groundwater is often depleted.

There are two ways to handle the serious risk of future floods. The first and most immediate need is to raise funds to improve our stormwater management infrastructure and to protect other infrastructure from high water. This needs to be done as equitably as possible, with those most responsible for storm runoff paying their share of the bill. A stormwater levy based on the amount of impermeable surface on any property puts the costs mainly on those generating the problem.

The second is to reverse, as much as is practically possible, the changes we have made to the natural hydrological cycle. We can dramatically decrease overland flow and increase groundwater recharge even within our urban areas. The creation of new wetlands, as the Hamilton Conservation Authority is doing on the East Mountain, is a big step, but it can only be a first step. We need to scale such improvements to actions that can be replicated by the individual landowner and reward those who act responsibly. Water barrels, rain gardens, bioswales, retention ponds, permeable driveways, roof top gardens and improved tree canopy can all be compensated by reduction of the stormwater levy for owners who reduce their runoff and increase water infiltration. Conversely actions that adversely affect

the natural water cycle, such as expansion of impermeable building footprints, hardscaping, surface drains, pumping of water into storm sewers can be offset by increasing the levy.

The current system of funding for stormwater management based on municipal water use penalises home owners and businesses who recycle or reuse water onsite and act to manage rainwater responsibly, while subsidising owners who pipe stormwater directly into sewers. It also compromises the city's ability to implement other environmental initiatives like water conservation, which would, under the current system, leave storm sewer management underfunded.

A stormwater levy is the fairest, most progressive way to achieve both natural reduction of flooding danger in Hamilton and funding for man-made mitigation of the risk.

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