

INFORMATION ITEM TO THE KINGSTON ENVIRONMENTAL ADVISORY FORUM

TO: Chair and Members of KEAF

FROM: The Climate Change Working Group

DATE OF MEETING: October 1st, 2012

SUBJECT: KEAF response to January 10th, 2012 Council Resolution regarding Impact of Climate Change on City Infrastructure

BACKGROUND INFORMATION:

At the January 10th, 2012 Council meeting, the following motion was approved by Council:

Direction to the Kingston Environmental Advisory Forum (KEAF)

WHEREAS Climate Change influences may be causing negative impacts on City infrastructure (i.e. Flood events, etc) and the Kingston Environmental Advisory Forum (KEAF) has a group of specialists researching aspects, trends and effects of climate change;

THEREFORE BE IT RESOLVED THAT the Kingston Environmental Advisory Forum (KEAF) be directed to report their findings to the Environment, Infrastructure and Transportation Policies Standing Committee at such a time as they have sound date; and

THAT if possible, a recommendation and/or definition of 'Normal' events and trends be included.

At the January 23rd, 2012 Kingston Environmental Advisory Forum above motion was referred to the Climate Change Working Group and this report is in response to that motion.

RECOMMENDATION:

WHEREAS Council, at its regular meeting held January 23, 2012 approved a resolution directing the Kingston Environmental Advisory Forum to research and report to the Environment, Infrastructure and Transportation Policies on findings regarding trends and effects of climate change on municipal infrastructure; and

WHEREAS the Climate Change Working Group presented a report to the Kingston Environmental Advisory Forum at its October 1, 2012 meeting:

THEREFORE BE IT RESOLVED THAT a copy of this report be forwarded to the Environment, Infrastructure and Transportation Policies Committee as KEAF's response to its findings regarding trends and effects of climate change on municipal infrastructure.

DISCUSSION:

- There is a powerful international consensus on the subject of climate change. It is happening; many of the mechanisms are well known; debates about the effects of anthropogenic greenhouse gases continue, but there is no credible argument against the fact of climate change.
- The Intergovernmental Panel on Climate Change (IPCC) in its Fourth Assessment Report (AR4, 2007) contains the following statements that are relevant to council's question:
 - i. "It is *very likely* that hot extremes, heat waves and heavy precipitation events will become more frequent." [emphasis in original]
 - ii. "Extra tropical storm tracks are projected to move poleward, with consequent changes in wind, precipitation and temperature patterns, continuing the broad pattern of observed trends over the last half-century."
 - iii. "Increases in the amount of precipitation are *very likely* in high latitudes..." [emphasis in original].
- It is worth remembering that people still think in terms of "global warming" but that the description is misleading. "Consequent changes in wind, precipitation and temperature patterns" are likely to include, for example, snow events and ice storms. Further information, including an IPCC "Summary for Policymakers" can be found at: <http://www.ipcc.ch/>
- Natural Resources Canada has studied Canada's vulnerability to Climate Change and its 2007 results "From Impacts to Adaptation" (including a chapter on Ontario) can be found at: <http://www.nrcan.gc.ca/earth-sciences/climate-change/community-adaptation/assessments/132>.
- Environment Canada has ample resources on the question of climate change and adaptation, including the vulnerabilities of municipal infrastructure. Many of those resources can be found at: <http://www.ec.gc.ca/sc-cs/default.asp?lang=En&n=4CD42550-1>
- Ontario has recently released its "Climate Ready: Ontario's Adaptation Strategy and Action Plan 2011-2014." It is available at: http://www.ene.gov.on.ca/environment/en/resources/STDPROD_081665.html
- The Environmental Commissioner of Ontario released his assessment of the Ontario Plan on March 7, 2012. He gave the plan — within which Kingston's efforts would presumably have to be fitted — a qualified endorsement. From the Environmental Commissioner's own media release: "*The Commissioner's report says the government must improve its strategic plan by prioritizing the actions that are needed, setting specific targets and timelines, identifying dedicated funding, and outlining the responsibilities of key government ministries.*" The Environmental Commissioner's report is available at:

http://www.eco.on.ca/index.php/en_US/pubs/special-reports/2012---ready-for-change-an-assessment-of-ontario-s-climate-change-adaptation-strategy/media-release---ready-for-change

- The Ontario “Community Adaptation Initiative” provided funding for municipal adaptation projects. Funding has just been ended. http://www.climateontario.ca/p_cai.php
- Engineers Canada and Natural Resources Canada fund an initiative entitled Public Infrastructure Engineering Vulnerability Committee (PIEVC), which includes a risk assessment protocol that municipalities can apply to a range of built infrastructure, including roads, sewers, water supply. Further information is available at: http://www.pievc.ca/e/index_cfm
- Little Cataraqui Creek Conservation Authority has recently concluded floodplain mapping and those results may be of relevance to future Kingston City planning. (The City of Kingston Engineering Dept. knows about the LCCCA work).

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- City staff are aware of these resources and others.

The City of Kingston’s calculations for so-called I/D/F (intensity, duration, frequency) curves on which infrastructure planning rely have not been reviewed in the recent past and are perhaps due for reassessment.

Director Mark Van Buren of the City of Kingston Engineering Department has been in contact with Environment Canada. He is sensitive to the needs for Kingston’s standards to be consistent with changing provincial guidelines and with advice flowing for senior levels of government. He is also aware of the likely need to update City of Kingston “design parameters.”

- A common focus on the local effects of climate change is increased rainfall (of note is that decreased rainfall is given little if any attention, this despite the fact that many residents depend upon well water). Also commonly ignored is the effect of increased heat which will be experienced particularly in the urban areas because of heat absorption by brick, concrete and tarmac infrastructure. Most city infrastructure has a low albedo and the effect of absorbed heat is evident both day and overnight particularly in summer heat waves. Whereas local increased rainfall may lead to private and public property damage, increased heat waves may lead to private and public property damage, public illness and death.
- Articles in the *New Scientist* give a background on the urban heat island effect, its estimated magnitude, its consequences, health effects and some suggestions for amelioration. Associated with the articles are the appropriate journal references.

[Cities will swelter on summer nights](#)

<http://www.newscientist.com/article/dn6017-cities-will-swelter-on-summer-nights.html>

'Green roofs' could cool warming cities

<http://www.newscientist.com/article/dn12710-green-roofs-could-cool-warming-cities.html>

City parks could cool urban areas by 4°C

<http://www.newscientist.com/article/dn11862-city-parks-could-cool-urban-areas-by-4c.html>

White roofs can cool cities

<http://www.newscientist.com/article/mg20527464.600-white-roofs-can-cool-cities.html>

<http://www.newscientist.com/article/mg14519704.400-white-paint-on-a-hot-tin-roof.html>

- As an aside, it is of import to note that actions taken to ameliorate the urban heat island effect can also have significant benefits in the area of public health that are independent of heat adaptation . Three examples are to be found at-

Cities use of Parks to improve Public Health

<http://www.planning.org/cityparks/briefingpapers/physicalactivity.htm>

Children with Attention Deficits Concentrate Better After Walk in the Park

<http://jad.sagepub.com/content/12/5/402.abstract>

Effectiveness of Green Infrastructure for Improvement of Air Quality in Urban Street Canyons

<http://pubs.acs.org/doi/abs/10.1021/es300826w>

ATTACHMENTS

N/A