



# WE WANT TO GO BACK TO THE FUTURE

FROM THIS



BACK TO THIS



Submission to General Committee, Markham Council  
Monday June 15, 2020

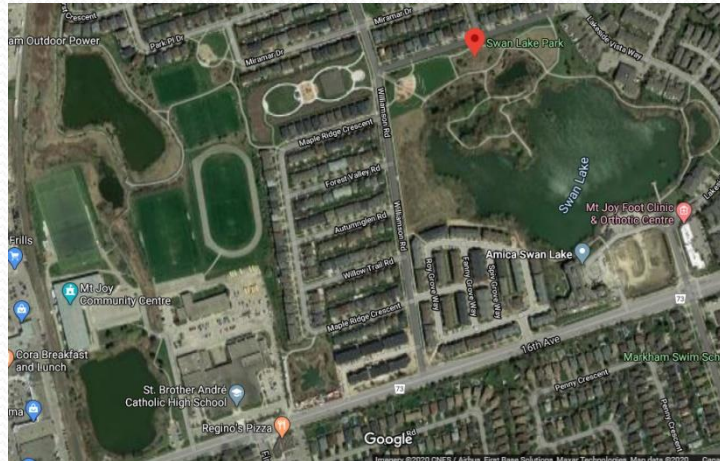
# Swan Lake Park and Mount Joy Park

- Underutilized jewels within Markham – great recreational facilities
- But Swan Lake is dying – too much phosphorus from goose droppings and stormwater runoff. Invasive plant species overtaking the Park
- **For Greensborough – this is a community highlight**
  - **To us, Swan Lake Park is what Toogood Pond is to Unionville**

**Please stop managing Swan Lake as a stormwater pond!**

**Mount Joy  
Park**

Approx.  
20 acres  
(8 Ha)



**Swan Lake Park  
& Lake**  
25 acres (10.5 Ha)

**Swan Lake**  
13.5 acres (5.5 Ha)

# Swan Lake: Three Pathways Forward

## Drain & Convert to Wetland/ Park



- Partially drain, plant bulrushes, water plants
- Still supports stormwater management needs
- Eliminates geese, cyanobacteria
- One time cost, minimal ongoing costs

## Just Worry About Containing Bacteria



- Fish kill, March 2012
- Water based plants dying
- Regular algae blooms
- Role is to monitor and manage Cyanobacteria
- Deal with cyanobacteria every 3-5 years

## Restore & Sustain



### Restore

- Water quality, fish and water based plants
- Shoreline, wildlife habit
- Address invasive plants

### Invest and Sustain

**Staff report rejects Drain & Convert; perpetuates Containment strategy  
Our lower cost proposal supports Restore and Sustain**

# There are many interconnected elements in a healthy ecosystem

## Interconnected Elements within Swan Lake Park



Today's staff report only addresses containment strategies for:

- Level 1 water quality and Level 4 Goose Management

**No concern or focus on environmental elements or restoration**

# Recommendation On Staff Proposals

## **Staff Report – \$2,150,000 over 20 years**

- ✓ Troublesome lake, but worth keeping – we agree!
- ✓ Please support Chemical Treatment in 2021 (\$250,000)
- X Reject, reactive 5 year chemical treatments
  - At best contains cyanobacteria, requires costly monitoring
  - Perpetuates unstable aquatic environment
- X Reject approval for fish kills
  - Minimal impact on phosphorus, unnecessary environmental damage. Many better alternatives available!
- ✓ Maintain Goose Management Program

## **Staff Report Does Not Address**

- a) Inflow of Phosphorus from stormwater runoff
- b) Need and benefits of oxygenation

## Our Two Stage Proposal

# Stage 1: Restore Water Quality in Swan Lake

**Total Cost Over 20 Years - \$1,485,000 (30% lower)**

### ✓ **Proactive Chemical Treatments Every 3 Years**

- Start with recommended treatment in 2020 (\$250,000)
- Monitor water levels only year before treatment, save \$490,000
- More frequent, lower cost treatments (\$150,000 cost as proposed for 2017) offset by 2 more treatments – still saves at least \$100,000
- More stable aquatic environment – at least 12 good years, up from at best 8 under staff recommendation

### ✓ **Invest \$325,000 in programs to reduce incoming and existing phosphorus and increase oxygen levels**

- Provides improved stable, oxygenated environment, basis for full aquatic restoration program
- Cost recovered by less frequent or lower cost chemical treatments

## Our Two Stage Proposal

# Stage 2: Initiate Restoration Programs

**A) Approve \$10,000 in 2020 for Strobe Lights/Goose Consultant**

**B) Request staff reports within 1 year on:**

- A proposal for programs to reduce incoming phosphorus and improve oxygen levels
- A robust Fish Management Program to restore Toronto and Region Conservation Authority approved species and aquatic habitat
- Engage with TRCA on a program for restoration of the shoreline and land based environmental elements that addresses invasive species and restores wildlife habitat
- Establishment of a Stewardship Policy for Swan Lake and Swan Lake Park that sets management goals and response mechanisms for when things exceed management standards.

**C) Adopt a Restoration Policy for Swan Lake & Swan Lake Park**

# For Success - Address Two Phosphorus Sources

**Source 1** – Phosphorus already in the lake

**Source 2** – Phosphorus on its way

- Phoslock /aluminum only treat phosphorus in the lake
- Reducing incoming amounts lowers future treatment costs

**Each year over 30 kg of phosphorus enters the lake**

a) 50% due to Geese b) 50% due to stormwater runoff

**If nothing done to reduce incoming**

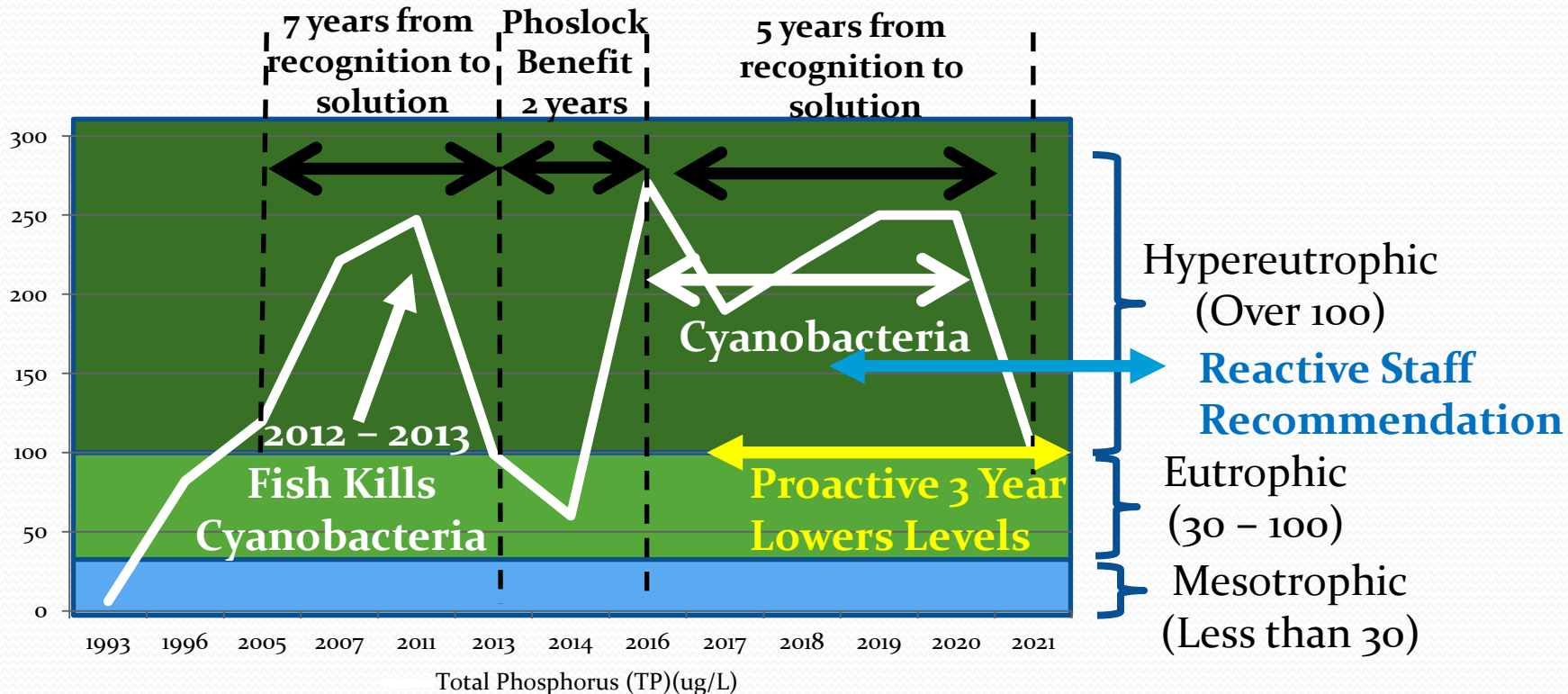
- After 3 years need chemicals to treat 90 kg; 5 yrs. – 150 kg

**Reduce future costs (\$3,000 per tonne) by more effective goose management and by redirecting stormwater**

- Staff proposal does not address stormwater sources nor outline ways to improve effectiveness of goose management.
- More can and needs to be done!



# History of Swan Lake and Phosphorus



- Staff proposal reacts to excessive levels and perpetuates large swings in phosphorus levels as realized after treatment in 2013
- We recommend a proactive 3 year treatment policy – lower phosphorus levels on average and a more stable environment

# Restoration Programs Should Consider Phosphorus Removal and Oxygen Enhancement

Possible Contributors to Long Term Sustainability	Possible Impact	
	Phosphorus	Oxygen
<b>Internal Load (Legacy Phosphorus)</b>		
<b>Chemical (Phoslock/ Aluminum)</b>	High	No
<b>Physical Alterations</b>		
A) Circulators	Moderate	High
B) Pumping/ recycling only	Low	Moderate
C) Fountains	Low	Low
<b>External Sources</b>		
<b>Physical Alterations - all elements</b>	Moderate	No
<b>Goose Management - all elements</b>	Moderate	No
<b>Phosphorus Removal</b>		
<b>Natural Enhancements</b>		
A) Aquatic plants	Moderate	Low
B) Biomanipulation	Moderate	Low
C) Floating Islands	Low	Low
<b>Physical Alterations</b>		
A) Biovaes (with pumping & recycling)	Moderate	Moderate
B) Pump and refresh	Moderate	Low
C) Algae Harvesting	High	Moderate

- Staff report focuses only on treating phosphorus in the lake (Internal Load).
- Programs needed to address external sources, and removal by means other than chemical treatment
- Programs that address phosphorus and enhance oxygen should be given top consideration

# Potential Ways to Reduce Incoming Phosphorus by 30% - 45%

**Potential Impact of Various Long Term Solutions**

		Annual (kg)	Reduction Goal	Potential Impact (kg)
1)	Annual pump and refresh - 10% water volume, potentially 15% of legacy phosphorus.(Note 1)	27	10 - 15%	2.7 – 4.1
2)	Permanent redirection of stormwater flows to either existing stormwater ponds, stormwater sewers, or oil/grit separators	14	10 – 15%	1.4 – 2.1
3)	Aggressive program to minimize fall migration impact with light strobes and other geese mitigation programs	14.6	15 - 25%	2.2 – 3.6
4)	Recycling of water through a new bioswale (Note 2)	27	7.5 – 10%	2.0 – 2.7
	<b>Potential Annual Impact</b>			<b>8.3 – 12.5</b>

- Staff report provides no programs for reducing Incoming Phosphorus.
- Effective approaches to reduce Incoming Phosphorus will reduce costs of future chemical treatments, repaying initial investment

# Goose Management: Program Options

Canada Geese at Swan Lake		When			Program Options						
Types	Why They are Here	Spring	Summer	Fall	Nesting Habitat	Oiling of Eggs	Food For Goslings	Disruption On Water	Relocation (Molting)	Culling	
Resident Geese	Nest here. If food and habitat are good will stay after breeding. Will typically return to lake where they were born.	✓	✓	✓	✓	✓	✓	✓	✓	N/A	
Visiting Geese	Have nested elsewhere but move here for food and/or safety		✓	✓				✓	?		
Migrating Geese (Spring)	In spring, short stops for rest enroute to northern nesting areas.	✓						✓			
Migrating Geese (Fall)	In Fall, return with brood and if food sources nearby and weather is good will stay for long periods. Counts record over 1,500 per night during November.			✓				✓			

**Note: Culling of geese requires a license. Granted only if you can demonstrate that all other options have failed.**

## Goose Management:

# Program Effectiveness

<b>Our Perception on Effectiveness of Goose Mangement at Swan Lake</b>		
<b>Current Programs</b>	<b>Effectiveness</b>	<b>Issues/ Concerns</b>
Nesting Habitat	Limited Options	Number of natural areas. Challenging to control
Oiling of Eggs	Successful	Active annual program. Success apparent. About 4 families in 2020. Less than previous years.
Food for Goslings	Limited Success	Requires restricting access to shoreline from water. Result is visual blocking of views of lake and access for fishers.
Disruption on Water - Dogs	Use of dogs Ineffective	Practical only during migrating periods
<b>Proposed Additional Programs</b>		
Disruption on Water - Strobe Lights	Unproven. Low cost. Potentially very large impact.	Should impact all classes of birds all seasons
Relocation	Limited. Resident Geese not the primary problem.	Can only be gathered up during molting season (June) so works for resident geese and visiting geese available during that period.
<p><b>Our Recommendation: Implement Immediately (Under \$10,000)</b></p> <p>1) Hire expert consultant experienced with goose management and relocation programs (\$2,000)</p> <p>2) Purchase 9 Floating Strobe Lights and install immediately (\$6,500)</p>		

# Robust Fish Management Program Needed

## PLEASE REJECT STAFF RECOMMENDED FISH MANAGEMENT PROGRAM

- It is a request for sanctioned fish kills of troublesome catfish and goldfish that stir up the phosphorus from the bottom
- Many more effective ways to address phosphorus in the lake
- Short sighted to authorize fish kills in a lake approved for fishing and vital feedstock for osprey, herons, cormorants and gulls.

## DO AUTHORIZE:

1. Programs to improve oxygen levels
2. A Fish Management Program designed to support a diverse species of TRCA sanctioned fish such as sunfish, bass, algae and mosquito eating minnows

**Note the green murky water that is now the typical look of Swan Lake**



The few remaining fish in the murky green water of Swan Lake are feedstock for a number of birds such as osprey, herons, cormorants and gulls. (Photo courtesy of Don Fowler)

# Our Lower Cost Restoration Proposal

## Use funds where they do the most good

1. Schedule chemical treatment every 3 years
2. Reduce Monitoring costs by 70% (\$490,000)
  - Staff proposal built on annual water quality testing. Detailed testing only needed in year prior to treatment so amount of chemical can be calculated. Cyanobacteria testing may still be required in short term.
3. Reduce chemical treatment costs by \$100,000 over 20 years
  - Lower individual treatment costs offset by need for 2 more treatments. (Assume costs of \$150,000 – as in 2018 recommendation)
4. Invest \$325,000 in creative phosphorus reduction and oxygen enhancement programs – costs almost fully recovered by lower chemical treatment costs. (\$100,000 – cost of moderate program quoted in 2012)

**30% LOWER COST OVER 20 YEARS.**

**BETTER ENVIRONMENTAL OUTCOME**

## Our Proposal:

# Restoration of Swan Lake Water at 30% Lower Cost

		Swan Lake Water Quality - 20 Year Costs			
		Staff Proposal		Friends of Swan Lake Park Proposal	
		Every 5 Years No Investment	Every 3 Years No Investment	Every 3 Years With Investment	
Program Components	Per Year/ Application				
Goose Management	\$ 5,000	20 \$ 100,000	20 \$ 100,000	20 \$ 100,000	20 \$ 100,000
Water Monitoring	\$ 35,000	20 \$ 700,000	6 \$ 210,000	6 \$ 210,000	6 \$ 210,000
Fish Management	\$ 5,000	20 \$ 100,000	0 \$ -	\$ -	\$ -
Phoslock or Aluminum	\$ 250,000	5 \$ 1,250,000	1 \$ 250,000	1 \$ 250,000	1 \$ 250,000
Phoslock or Aluminum	\$ 150,000		6 \$ 900,000		
Phoslock or Aluminum	\$ 100,000			6 \$ 600,000	
Strobe Lights/ Relocation	\$ 15,000			5 \$ 75,000	
Aeration , Biological, Bioswale	\$ 200,000			1 \$ 200,000	
Redirect Stormwater	\$ 50,000			1 \$ 50,000	
<b>Total 20 Year Cost</b>		<b>\$2,150,000</b>	<b>\$1,460,000</b>	<b>\$1,485,000</b>	
<b>Environmental Impact</b>		<b>Poor</b>	<b>Improved</b>	<b>Healthy</b>	
Number of Low Phosphorus Years		8	12	12	
Number of High Phosphorus Years		12	8	8	
Improvement in Oxygen Levels		No	Some	Significant	
Impact on Aquatic Life		Volatile	Stable	Healthy	
Expected Trophic State		Hypereutrophic	Eutrophic	Eutrophic/ Mesotrophic	

**Lower cost, 12 out of 20 good years, significantly better environmental outcome**



# Restoration of Swan Lake Park Needed



Markham manages Swan Lake Park as a “Natural Spaces, Wildlife Places” park. Natural areas such as Swan Lake Park provide shelter and food for wildlife, remove pollutants from air and water, produce oxygen through photosynthesis and provide valuable recreational and educational opportunities.

Unfortunately, the land based environmental elements in Swan Lake Park have also been allowed to deteriorate over the years.

As illustrated in this map, the land based natural areas have been overtaken by invasive plants.



# Markham Seems to Get It!

Environmental elements are a central part of planning:

- **Green Print (2011)** - 50 year plan to transform Markham into one of the most sustainable cities in North America
- **Parks Renaissance Strategy** – “a framework for the re-imagination of, reinvestment in, Markham’s existing parks and open spaces”
- **Wildlife Management Guidelines** (report April 2018)
  - “... will endeavour to identify and protect natural heritage systems and wildlife habitats to conserve biodiversity for future generations”
- **Stormwater Management Guidelines** (2016)
  - “Consider the protection of sensitive natural resources and propose appropriate restoration/naturalization measures for areas where these resources have been previously impacted”

# But... Why Not at Swan Lake?

## **Swan Lake – An Orphan Lake Without a Policy Framework**

- **Not under TRCA jurisdiction** - not linked to a Rouge River tributary
- **Not a Stormwater Pond**, even though it is managed by that group
- Governing document is the developers 1993 “Aspirational” design plan
- Staff says this is not “City Policy” but can’t tell us what the city policy is

## **What is City Policy? – Containment or Restoration?**

- Markham is rightly proud of its commitment to the environment and wildlife elements in our community.
- There are many success stories – unfortunately Swan Lake and Swan Lake Park are not good examples of these policies at work.
- We ask that Council to address these shortcomings and commit to the restoration of Swan Lake and Swan Lake Park - starting today!

**It’s time to find a permanent solution!**

## Others Have Similar Problems and Are Dealing With Them



Rental Canoes at Professors Lake in Brampton

- Original 1993 plan for Swan Lake included “paddle” sports and sports fishing
- What happened to those ideas?

## Brampton Council wants to clean up city lakes

- In Fall 2019, Brampton Council authorized its staff to establish programs to enhance the environmental elements in several of its local water bodies
- Pursuing funding from the Toronto and Region Conservation Authority, the Federal Environmental Damages Fund and the Green Municipal Fund.
- Perhaps these sources are available to support restoration programs for Swan Lake and Swan Lake Park?

Summary:

## Recommendations On Staff Proposals

### **ACCEPT STAFF RECOMMENDATIONS FOR:**

1. Chemical treatment in 2021 (\$250,000)
2. Continuing goose management program

### **REJECT THE FOLLOWING PROPOSALS:**

1. Subsequent reactive chemical treatment program triggered after 2 years in excess of 150  $\mu$ /L
2. Fish Management Program that authorizes fish kills

## Summary:

# We ask the Committee to Adopt the Following:

1. A Restoration Policy for Swan Lake and Swan Lake Park
2. Approve a phosphorus chemical treatment every three years
3. Invest \$325,000 in phosphorus reduction and oxygen enhancement programs in 2021
4. Authorize \$10,000 to be spent in 2020 for Goose Relocation Consultant and installation of strobe lights
5. Ask staff to report back to committee in 1 year on:
  - a) What programs and related costs would be required to improve oxygen levels in Swan Lake adequate enough to support a Fish Management Program that restores the variety of fish in the Lake
  - b) On a Stewardship Policy for Swan Lake and Swan Lake Park including an outline on what programs, with the related costs, would be required to restore the aquatic and land based habitats within Swan Lake and Swan Lake Park.



**Friends of  
Swan Lake Park**

**PLEASE LET TODAY BE THE  
FIRST DAY TOWARDS  
THE RESTORATION OF  
SWAN LAKE AND SWAN LAKE PARK**

General Committee, Markham Council  
Monday June 15, 2020