TO: GENERAL COMMITTEE

SUBJECT: PEST PREPAREDNESS UPDATE: EMERALD ASH BORER

PREPARED BY AND KEY CONTACT: K. RANKIN, M.Sc.F., R.P.F.
URBAN FORESTER (EXT. 4754)

SUBMITTED BY: R. W. MCARTHUR, P. Eng.
DIRECTOR OF ENGINEERING

GENERAL MANAGER OF INFRASTRUCTURE, DEVELOPMENT & CULTURE

CHIEF ADMINISTRATIVE OFFICER APPROVAL: CARLA LADD
CHIEF ADMINISTRATIVE OFFICER

RECOMMENDED MOTION

1. That the Emerald Ash Borer program as detailed in Paragraph 20 of Staff Report #ENG009-12 be adopted.

PURPOSE & BACKGROUND

2. The Engineering Department has been monitoring any potential issues that would affect the health of Barrie’s Urban Forest. Specifically, two serious threats to the health of our urban forests have been monitored by staff since 2004: the Asian Long-horned Beetle (Anoplophora glabripennis) and the Emerald Ash Borer (Agrilus planipennis). No natural predators or control agents are known to control the populations of these two insects. To date, these invasive beetles have not been discovered in Barrie or the surrounding area.

3. The City of Barrie is currently in a zone under regulation by the Canadian Food Inspection Agency (CFIA) for Swede Midge (Contarinia nasturtii), Japanese Beetle (Popillia japonica), Gypsy Moth (Lymantria dispar) and the Pine Shoot Beetle (Tomicus piniperda). While they are currently present within the City of Barrie limits, natural predators and/or control agents are keeping the populations of these non-native insects in check.

Asian Long-horned Beetle (ALHB)

4. ALHB is native to China and is considered a major pest of hardwood trees in many parts of the country. Based on the Chinese experience with this insect and the recent infestations in the United States and Vaughan, this beetle would survive and reproduce in the hardwood forests of southern Canada.

5. A variety of hardwood trees serve as hosts to ALHB. In Asia, the primary hosts are maple (Acer), poplar (Populus) and willow (Salix). Other hosts include; horse chestnut (Aesculus), birch (Betula), elm (Ulmus), sweet-gum (Liquidambar), ash (Fraxinus), mountain ash (Sorbus), mulberry (Morus), plum (Prunus), pear (Pyrus), black locust (Robinia), silk tree (Albizia), hackberry (Celtis), and sycamore (Platanus). All of these genera represent over 1,000 species which are vulnerable to ALHB while the first five genera have been found to support reproducing populations in New York and Vaughan.
6. The ALHB infestation in Vaughan resulted in the cutting, chipping and burying of over 23,000 hardwood trees. The estimated cost of tree survey, removal and disposal work required within Vaughan was over $8M in 2004, with an annual control cost of $6.5 million, and a replanting cost estimated to be in excess of $18 million. The ALHB infestation is currently considered "under control" within the Vaughan/Toronto Regulated Area, and the CFIA are monitoring the area for any further signs of its presence. Staff is monitoring the CFIA information provided on this pest, but it is currently anticipated to be eradicated within Vaughan.

Emerald Ash Borer (EAB)

7. The emerald ash borer attacks and kills all species of *Fraxinus* (white, green and red ash). Since its discovery near Detroit in the summer of 2002, the emerald ash borer has killed tens of millions of ash trees in southwestern Ontario, Michigan and surrounding states. It poses a major economic and environmental threat to urban and forested areas in both countries.

8. Municipalities that are currently regulated by the Canadian Food Inspection Agency (CFIA) due to the presence of EAB are illustrated in Figure 1, Appendix ‘A’, and listed below:
   a. Within the boundaries of the City of Sault Ste. Marie, in Northwestern Ontario;
   b. The area consisting of the Cities of Hamilton and Toronto, the Regional Municipalities of Chatham-Kent, Durham, York, Peel, Halton, Niagara and Waterloo and the Counties of Brant (including the City of Brantford), Elgin, Essex, Haldimand, Huron, Lambton, Middlesex, Norfolk, Oxford, Perth and Wellington, in Southern Ontario;
   c. The City of Ottawa and the United Counties of Leeds and Grenville in Eastern Ontario;
   d. Parts of the City of Gatineau in Western Quebec; and
   e. The area consisting of the Municipalities of Carignan, Chambly, Richelieu, Saint-Basile-le-Grand and Saint-Mathias-sur-Richelieu, in Quebec.

9. In 2007, the CFIA confirmed the presence of the EAB in Toronto. In Ontario, the emerald ash borer has recently been confirmed on Manitoulin Island and in the United Counties of Prescott and Russell. In Quebec, it has also been discovered within the cities of Gatineau and Montreal.

10. The following table illustrates several Ontario municipalities 2011 budgets and long-term estimates, (where published), for their EAB Program (total cost of inventory, monitoring, treatment, removal and replacement planting).

<table>
<thead>
<tr>
<th>Municipality</th>
<th>2011 Budget</th>
<th>Projected Long-term Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Hamilton</td>
<td>$250,000</td>
<td>$36 million (over 10 years)</td>
</tr>
<tr>
<td>City of Burlington</td>
<td>$194,000</td>
<td>$11.3 million (over 10 years)</td>
</tr>
<tr>
<td>City of London</td>
<td>$1,194,000</td>
<td>$14 million (over 10 years)</td>
</tr>
<tr>
<td>Town of Oakville</td>
<td>$200,000</td>
<td>$15 million (over 10 years)</td>
</tr>
<tr>
<td>City of Ottawa</td>
<td>$450,000</td>
<td>n.a.</td>
</tr>
<tr>
<td>City of Toronto</td>
<td>$1,140,000</td>
<td>$68 million (over 7 years)</td>
</tr>
</tbody>
</table>

11. Unlike ALHB, the emerald ash borer is not under control and is spreading northward. It will eventually become established in Barrie and surrounding areas. In 2006, City staff instituted a moratorium on planting Ash species on public lands in Barrie and recommended that land developers and consultants omit ash from planting on private property.

12. Our current street tree inventory is over 31,500 trees of which 3,559 (11%) are ash, (reduced from 14.7% in 2004). The majority (2,174) of the ash inventory is relatively young; less than 16 centimetres in diameter (DBH) and was planted in new subdivisions as part of the streetscape works completed by land developers between 1995 and 2006.
13. Within City parks, environmental protected areas and other City owned woodlands there are estimated to be as many as 180,000 ash trees (of all ages and sizes). The majority (98%) of the City owned ash trees are within the 598 hectares of City owned forest within Barrie. Further tree inventory work in 2012 and 2013 will be completed to refine the estimates and locations of park and forest ash trees. There are estimated to be 1,690 ash trees growing in open space parkland (individual trees), some of which are in proximity to playgrounds, sports fields and in waterfront parks.

14. Research has shown that TreeAzin™ (derived from seeds of the neem tree) injected in the main stem, will inhibit emerald ash borer larval development, prevent adult emergence, affect adult fertility and provide preventative and curative treatments in the control of EAB. The pesticide TreeAzin™ was granted an Emergency Use Permit by the Pest Management Regulatory Agency. The following criteria have been developed by US and southwestern Ontario municipalities to select trees that are candidates for insecticide injection: high value ash trees; trees must have less than 30% dead branches; and trees must be in good general health. Injections must be repeated every two years to provide continued protection against EAB.

ANALYSIS

15. At the rate of spread and discovery of emerald ash borer in southern Ontario, staff anticipates that it will be present in Barrie in approximately 5-10 years. From the time of its establishment, it will likely take an estimated 10 years to spread throughout the City and cause wholesale mortality of all the ash trees in Barrie. The economic, social and environmental impact (cost) of removing a large, mature tree is exponentially higher than a small, young tree.

16. Treatment of an individual ash tree using TreeAzin™ costs approximately $6.00 per centimetre of diameter of the tree. Trees must be in good health and be a minimum of 20cm in diameter. Bi-annual treatment of all of the ash trees (not including woodlot trees) that would meet these criteria would have an average annual cost of approximately $252,000 and would have to be continued bi-annually for the lifespan of the tree. Due to the projected long-term costs, staff does not propose to implement a wide-scale program of TreeAzin™ injections. Instead, staff recommends identifying and selecting a small percentage of “specimen” trees that would be protected, based on tree size, quality and location.

17. The total cost of tree removal is greater when selected trees in an area are pruned or removed individually in a random manner as in a reactive program than it is when many trees in one area are pruned or removed in sequence, as with the street tree maintenance program. In sections of the City where there is street tree maintenance (pruning) scheduled, the removal of ash street trees is proposed to be integrated into the street tree maintenance program for the most cost-effective service delivery.

18. The average cost to remove and replace an open space ash tree in a park is $550. There are approximately 1,600 park ash trees, if replaced over a 10-year period (factoring in normal mortality rates over that time period) would cost $77,000 per year (140 trees per year). Ash tree replacements in Park and Environmental Protection (EP) areas are not recommended to commence until EAB is discovered within Barrie. Approximately 80 specimen Park trees are proposed to be identified and treated with TreeAzin™, at an annual cost of $6,000.

19. Using natural mortality rates by tree age (size class) projected over a 15 year period, staff anticipate that the EAB program would require the removal of approximately 3,400 ash street trees. Replacing the small, young ash is less costly than allowing them to grow larger prior to EAB infestation. Comparing the two approaches would result in:

   a) Proactive removal and replacement of young ash street trees starting in 2012 would result in a 15 year cost estimate of $1.9 million, and a 15 year annual average cost of $128,000.
b) Reactive removal and replacement of ash street trees only after EAB infestation would result in direct costs over a 15 year period of $2.5 million, and an average annual cost of $167,000. This estimate does not include the additional response time costs as a result of complaint calls resulting in inspections or removal costs being higher due to set up times (work areas spread out as opposed to systematic removal planning).

20. Staff are recommending a proactive approach to management of the current ash tree inventory. The following approach is proposed to commence in 2012 with items a) to d) being implemented prior to discovery of EAB within Barrie. Items e) to g) would commence after discovery of EAB within Barrie, which could potentially arrive as early as 2016.

2012-2015:

a) Identify specimen ash trees (>45 cm diameter and in good health and condition) for treatment with TreeAzin™ to be implemented in item e), below. Native ash trees will be selected on a preferential basis above cultivars and non-natives. Approximately 50 street trees and 80 park trees will be identified for treatment.

b) Begin a systematic removal and replacement of all young ash trees (those most recently planted; Figure 2, Appendix ‘A’) with other suitable species at a rate of approximately 210 trees per year for 10 years (2012-2021).

c) Implement a proactive tree planting program that will aim to replace tree canopy ahead of infestation, particularly where ash trees form a large part of the existing tree population.

d) Provide information to the public in order to raise awareness of the EAB and advise the public of the options for treating privately-owned trees and encourage replanting of trees on private lands to replace lost tree canopy.

Post-EAB Discovery in Barrie (anticipated in 2016). Note items b), c) and d) above would continue, along with the implementation of the following actions:

e) Begin the bi-annual treatment of specimen ash trees with TreeAzin™ (identified in item a) or another equivalent product. Ideally, this would commence 1 year prior to EAB infestation and continue for the natural lifespan of the treated tree (i.e. beyond 2026).

f) Begin a systematic removal and replacement of all mature ash street trees that are not being treated as per item e). Removals would be integrated into the street tree maintenance and replacement program (Block Pruning) for efficiency. Ash trees on streets scheduled for block tree pruning will be identified and scheduled for removal and replacement as part of the program. This is anticipated to commence in 2016 and be completed by 2026 and would result in the removal and replacement of approximately 125 mature ash trees per year.

g) Upon discovery of EAB in a location (street or park), all ash trees within the infested area (street or park) would be removed and replaced in a systematic, cost-effective process (2016-2026). This would include the approximately 1,600 ash trees within open space parks as well as ash trees on the edges of natural area (EP) woodlots.

21. Implementation of this program is intended to spread the economic, environmental and social costs of the future infestation over a 15 year period, with the peak economic impact between 2017 and 2021 when the anticipated removal of infested trees will coincide with the systematic replacement of ash trees as part of the existing maintenance programs (block pruning).

22. It is anticipated that forestry operations will experience a significant increase in requests for tree removals required to maintain healthy public spaces post EAB infestation. Property Standards staff will similarly receive an increased number of calls for inspection of hazardous trees on private lands.
ENVIRONMENTAL MATTERS

23. Trees are a vital component of the urban landscape. They provide many important roles within the City of Barrie, including:

- Water conservation;
- Energy conservation;
  - Reducing summer air temperature by providing shade
  - Reducing cold winter winds by acting as a wind break
- Economic benefits;
  - Increasing tourism values
  - Increasing property values
  - Increasing community profile (e.g. Communities in Bloom)
- Improving community health;
  - Reducing air pollution
  - Reducing noise pollution
  - Reducing greenhouse gases
- Reducing soil erosion;
- Providing wildlife habitat; and
- Increasing the beauty of the urban landscape.

24. The environmental value of a healthy urban forest cannot be under-stated. Imported pests, such as the ALHB and EAB can have a potentially devastating impact on a significant proportion of the trees within the City of Barrie and surrounding municipalities. In the past, Dutch Elm Disease (another imported pest) nearly wiped out all of the American elm in Canada. Early detection and treatment of any new pests within the City is paramount to protect our urban forests.

25. Identification of candidate trees and use of TreeAzin™ to protect specimen quality trees will result in environmental concerns regarding the use of pesticides. Direct injection of TreeAzin™ into ash trees provides effective protection from EAB and is permitted under the Pesticides Act.

ALTERNATIVES

26. There are three alternatives available for consideration by General Committee:

**Alternative #1**

- General Committee could maintain the existing levels of ash tree maintenance (i.e. Status Quo) and only remove ash trees as they become infested with EAB.

  This alternative is not recommended as over the long-term (15 years) the cost of removal and replacement of ash trees post-infestation will cost the City an additional $700,000 (+25%) above the estimated costs of the recommended program.

**Alternative #2**

- General Committee could alter the proposed recommendation by increasing the aggressiveness of the program and decreasing the time to remove the existing ash trees on City-owned lands.

  Although this alternative is available, decreasing the timeframe to remove the existing City owned ash trees pre-infestation of EAB would result in significantly higher annual operating costs resulting in program change requests as much as 3 years earlier than in the recommended program.
Alternative #3

General Committee could alter the proposed recommendation by directing staff to treat all of the City-owned ash trees with TreeAzin™.

This alternative is not recommended as the cost of treatment of all ash trees would have a significantly higher (approx. 34%) average annual cost than the proposed program, and would result in the need to continue to treat all ash trees for their entire lifespan (50+ years).

27. There is not a true “do nothing” option for addressing the EAB issue. Once EAB becomes established within the City, there would be costs associated with the removal of trees that become infested and if the removals are delayed, there would be a significant risk to the public associated with dead and dying ash causing hazards (e.g. falling branches). The 30 (current average annual) requests to remove ash trees would be projected to be in excess of 600 per year in parks, on streets and along the edge of City woodlots once EAB is established in the City.

FINANCIAL

28. Funds to support the EAB Program (removal and replacement as detailed in Paragraph 20) for 2012 are proposed to be utilized from the Street Tree and Park Planting Operating Account #01-16-2311-0000-4201 ($190,000 annual budget). Staff recommend to use up to $50,000 of the annual Street Tree and Park Planting budget in 2012 to support the cost of the program. It is anticipated that this redirection of planting will reduce the ability to complete infill planting projects (e.g. Blake Street, Yonge Street, Big Bay Point Road), but will maintain the current minimum standard of replacing all street and park trees on a 1:1 ratio (trees removed: trees planted).

29. The existing maintenance program (street tree pruning and removals) completed by Operations Staff will also support this program in 2012 by integrating the Block Pruning Program with the ash removal and replacement program. Integration means that where a street with ash trees are scheduled for block pruning, the ash trees would be removed and replaced (instead of pruned). This would minimize staff time and costs associated with pruning a tree that will eventually require removal. It was estimated that the Block Pruning Program could support the EAB program through the allocation of staff time only in an equivalent amount of up to $15,000 in 2012 (approximately 20% of the program).

30. No additional staff or financial resources are needed to implement the recommendation for 2012. Future budget increases to implement the program outlined in Paragraph 20 including additional resources for tree inspection, treatment of specimen trees, tree pruning and removal and replacement of all other ash trees on streets and within parks and EP areas will be subject to the routine review and approval each year by EMT and Council. The anticipated costs to support the EAB program are summarized in Table 1.
Table 1. EAB Program Cost Summary

<table>
<thead>
<tr>
<th>Year</th>
<th>Street Trees</th>
<th>Park &amp; EP Trees</th>
<th>Total Cost</th>
<th>Tree Planting Account</th>
<th>Existing Maintenance Program</th>
<th>Future Program Change Requests</th>
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31. Annual review and adjustment of these estimates (based on the progression of EAB) will be made in keeping with the proposed action plan. Staff will investigate and prepare applications for funding through federal and provincial sources (e.g. Tree Canada, Trees Ontario) upon discovery of EAB within the City. These funding sources would be able to offset costs for replanting trees post-infestation of EAB.

LINKAGE TO 2010-2014 COUNCIL STRATEGIC PLAN

32. The recommendation included in this Staff Report supports the following goals identified in the 2010-2014 City Council Strategic Plan:

- Manage Growth and Protect the Environment
- Improve and Expand Community Involvement and City Interactions

33. This recommendation supports an overall objective of long-term protection of the environment and its implementation will involve and educate the public on our efforts to protect the City’s urban forest from destructive pests.
APPENDIX “A”

Figure 1. Canadian Food Inspection Agency Emerald Ash Borer Regulated Areas Map