

Emerald Ash Borer *Mitigation Plan*



Village of Fairport, New York



VILLAGE OF FAIRPORT

September, 2011

Prepared for:

**Village of Fairport Tree Board
&
Department of Public Works
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pupal cells, pupate, and transform into the adult beetle. The adult chews its way out of the bark in late-May and peaks in June, creating the “D” shaped exit holes in the bark (See Figure 4). The adults feed on leaves, mate and repeat the life cycle, infecting more ash trees. The best time to observe these adults is the late day and early evening on warm days from mid-June through mid-July.



Figure 2 - Emerald green adult EAB

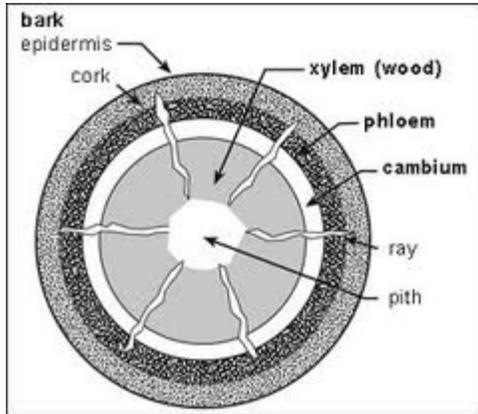


Figure 3 – Tree Wood Structure



Figure 4 - Adult beetle emerging from "D" shape exit hole



Figure 5 – EAB larvae in “S” shaped galleries.

Signs & Symptoms

The best indicator of an infested tree is the presence of woodpecker feeding on the upper and main branches of ash trees and the D-shaped exit holes. Other signs, although difficult to differentiate from other problems with ash trees include, yellowing leaves, thinning crowns, sprouting on the trunk and branches (See Figures 6 & 7). Eventually EAB will kill the host tree.



Figure 6. Declining green ash infested with EAB.



Figure 7. Trunk sprouting is an indicator of stress and possible EAB infestation.

What is Fairport's Exposure to EAB?

The Village must deal with the loss of public trees and potential risk to citizens from declining or dead ash trees. Property owners will have to respond to infested ash trees on their property as they become infested, die, become safety risks and require removal and disposal. Fairport Electric will be forced to deal with infested and dead ash trees located in proximity to their power distribution lines on public and private property to maintain power delivery reliability. The larger the number of ash trees in the Village the greater the cost exposure and loss of the trees from EAB.

Fairport's Public Ash Tree Inventory

The Village maintains a complete inventory of street trees and trees on public property. Street trees are trees located within the street right-of-way. The right-of-way varies with each street; however, the vast majority of the trees are located between the sidewalk and street curb. Trees located on parkland and other Village facilities complete the inventory. The inventory includes a wealth of management information including but not limited to: tree location, tree species, condition and management need. It also catalogues the management need of each tree. The inventory is computerized and one-fifth of the Village trees are re-inventoried each year to help keep the management data accurate.

As of March of 2011, there are 226 Fraxinus (ash) species of tree in the Village tree inventory. Ash comprises approximately 10% of all the species of trees in the Village tree inventory. The majority of ash are white ash (52%) and the remainder are green ash (Table 1).

Table 1. Species of Ash Trees	% of Trees
Fraxinus americana - White Ash	52%
Fraxinus pennsylvanica - Green Ash	48%
Total	100%

White ash is a large shade tree that grows 50 to 80 feet in height with a spread of similar proportions. Its wood is used to make baseball bats and several varieties have a purple fall color. It is susceptible to many disease and pest problems most notably “ash yellows” that causes a slow decline of the tree.

Green ash is a medium sized shade tree that grows 50 to 60 feet in height and a spread about one-half the height. It is tolerant of urban conditions and has a dull yellow fall color. It is susceptible to the same pests as white ash but is more prone to storm damage due to its dense and poor branching structure.

Geographic Distribution of Ash Trees

The Village is divided into five (5) forestry management areas for street trees and park and facility trees (See Figure 8). Forty-nine percent of the ash trees are in management areas 1 and 3 (Table 2). Thirty-three white ash are small, young trees located in the Williamsburg Drive neighborhood.

Table 2. Distribution of Ash Trees	
Mgmt Unit	% of Ash Trees
1	25%
2	18%
3	24%
4	19%
5	5%
Parks/Facility	9%

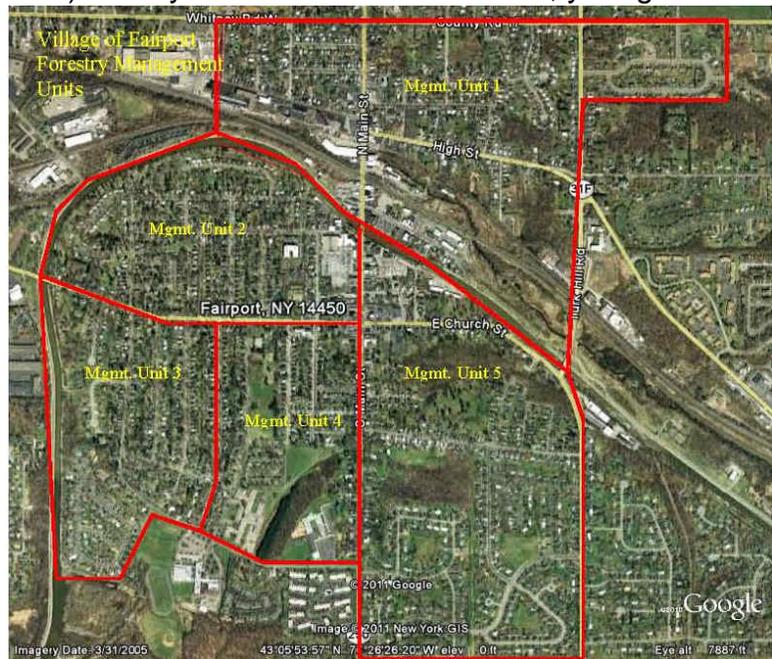
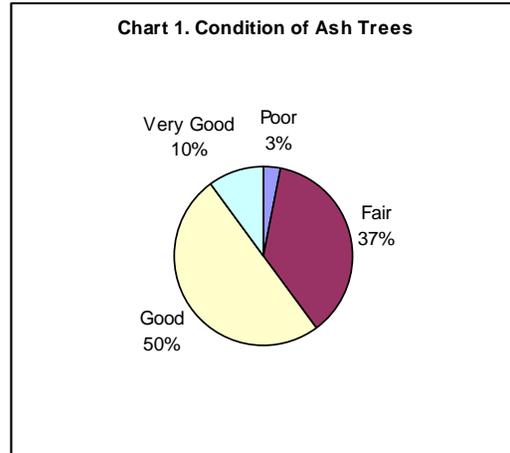


Figure 8. Fairport Forestry Management Units

Condition of Ash Trees

The condition of each Village tree is inspected periodically. The condition is a quantification of an evaluation of the health and structure of the tree.

Sixty-percent of the ash trees are in good or very good condition (Chart 1). Research has shown that trees that are in a stressed condition are more susceptible to infestation by EAB.



Age of Ash Trees

The diameter of a tree is an indicator of the age of a tree, the larger the diameter of the tree, the older the tree. Larger, mature trees provide most environmental and aesthetic benefits and represent the realization of an investment the Village has made to improve the quality of living in the Village.

The cost to remove or treat a tree is also a function of the tree's size. The larger the tree the more expensive it is to remove or treat.

Fifty-five percent of the ash trees are classified as young or semi-mature as represented by the number of trees 12 inches in diameter or less (Table 3). Sixteen trees are 25 inches in diameter or larger. Based solely on their size, many of these trees may be worthy of preservation.

Diameter Range	% of Trees
1-5	27.93%
6-12	27.48%
13-18	22.07%
19-24	15.32%
25-30	4.95%
31-36	1.35%
37	0.45%
46	0.45%

Tree Location

The placement of a tree in the landscape has an impact on tree health as well as a potential impact on Village infrastructure. White ash trees can grow 80 feet in height and over 40 inches in diameter (See Figure 9). As a result, they need sufficient physical space to grow without conflicting with Village infrastructure and require sufficient soil volume to grow and remain healthy. The Village tree inventory includes a qualitative evaluation of the location a tree occupies.

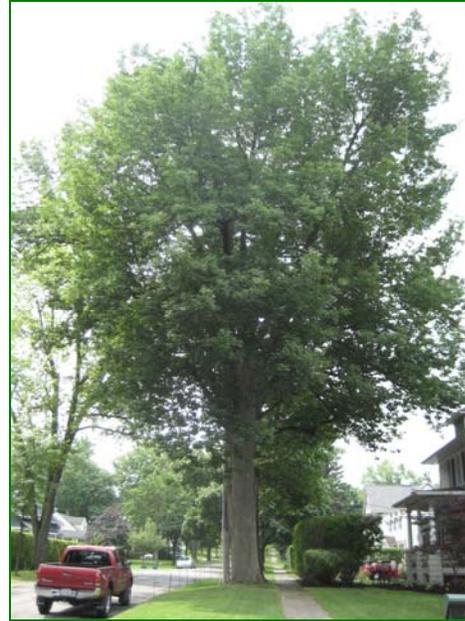
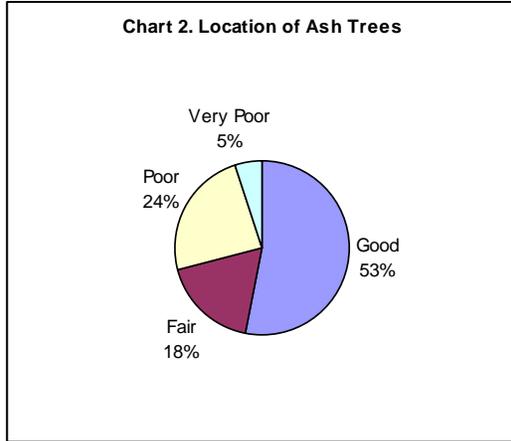


Figure 9. 44 inch white ash at 105 West Church Street

Twenty-nine percent of the ash trees are located in sites that are classified poor or very poor (Chart 2). These trees would not be good candidates for preservation for the reasons discussed above.

Fairport’s EAB Cost Exposure

The Village presently has tree work contracts in place to prune and remove trees. Those contracts provide fees to remove trees based on an individual request unit price (request) throughout the year and on a pre-determined specific list of trees basis (scheduled). The cost to remove a tree and stump on a request basis is \$46.60 to \$65.55 per inch in diameter and \$35.61 per inch on a scheduled basis. Overhead is calculated as 25% of the contract cost for contract preparation, monitoring, compliance and administration. Based on these rates, the estimated cost to remove all of the Village ash trees would range from a low of \$119,800 to a high of \$163,000 (Table 4).

Item	Cost per Diameter Inch	Total Diameter Inches	Overhead 25%	Total Cost
Request Street	\$46.60	2431	\$28,321	\$141,606
Request Park	\$65.55	261	\$4,277	\$21,386
Total		2692		\$162,991
Scheduled All Trees	\$35.61	2692	\$23,966	\$119,828
Replacement Planting	\$216	222	\$11,988	\$59,940

The average cost to retain and plant a tree in the Village is \$216 per tree. The estimated cost to replace all of the ash trees is approximately \$59,900. The total

estimated cost to remove and replace all of the public ash trees in the Village is between \$179,800 and \$222,900.

The present Village annual tree maintenance and planting budget is approximately \$15,000. Assuming all the ash trees would become infested and require removal within five years of the arrival of an EAB infestation in the Village, it would require a 200% to 300% increase in the annual tree maintenance and planting budget.

EAB Mitigation Options

There are four management options for the Village to respond to EAB:

1. Response - remove trees as they die
2. Preventative Treatment - using annual or biannual insecticide treatments
3. Pre-emptive Removal - Planned tree removal prior to infestation based on predetermined time frames and specifications
4. Combination - combination of these three strategies.

Each of these strategies is discussed below.

Response

The Village could wait for EAB to arrive in Fairport and remove and replace the trees as they become infested. Infestation rates estimate that all ash trees will become infested and require removal within 5 years. In this scenario, the Village would be required to use request tree removal contract rates. As a result, the estimated annual cost to remove and replace these trees would be approximately \$44,600.

Preventative Treatment

There are insecticidal treatments available that have proven effective in protecting ash trees from EAB. These include systemic insecticides that are applied through direct injection into the tree trunk or drenching around the base of the tree trunk. Each of these methods result in the insecticide being drawn into the tree and killing the feeding larvae of EAB. The efficiency of the treatments is limited by a number of variables.

Either application method requires treatment of a tree every 2 years to retain protection of the tree. Trunk injection is the most environmentally “friendly” application method because all of the insecticide is injected directly into the tree and will not expose people and animals to the insecticide. A tree must be 6 inches in diameter or greater for trunk injection, therefore this method cannot be used on very young trees.

The cost to treat a tree is a function of the size of the tree and the number of trees to be treated. Larger numbers of trees to be treated will generally return more favorable unit prices. The larger the tree to be treated the more insecticide required to treat the tree and therefore the higher the cost to treat the tree. The cost to treat a tree ranges from \$8 to \$13 per inch of trunk diameter.

For the purposes of developing a cost estimate to treat the Village ash trees \$10 per inch in diameter will be used. The estimated cost to treat all of the ash trees every two years would be approximately \$26,900 (Table 5). A schedule could be developed to spread these costs over a number of years, for example treating half of the trees each year.

Trees	Inches	\$ per Inch	Total Cost per Year
All	2692	\$10	\$26,920
1/2 trees	1346	\$10	\$13,460

The duration ash trees will need to be treated to protect them from EAB and the long-term effectiveness is presently unknown. Therefore, the Village must plan to treat trees to be preserved for the foreseeable future until more is learned about EAB and its persistence as a threat in North America. In addition, the long-term impact of frequent tree injection on tree health is unknown. Tree injection requires drilling into the tree and this permanently damages trunk tissues.

Preserving all the Village ash trees would require treating on a two year rotating basis is estimated to be approximately \$13,500 per year for an unknown number of years. This scenario does not include the cost to remove trees where treatment is ineffective.

Pre-Emptive Tree Removal

The pre-emptive removal strategy employs removing all of the ash trees over a pre-determined project duration prior to an EAB infestation in the Village. This strategy provides for work planning and realizing the most favorable contract rates for completing the tree removal work.

Combination Strategy

A combination strategy employs treating and preserving a select number of trees for an unknown number of years and pre-emptive removal of a select number of trees per year for a predetermined duration. This strategy, like pre-emptive removal provides for work planning and realizing the most favorable contract rates for completing the tree removal and tree injection work.

Fairport's EAB Mitigation Plan

The Village Tree Board weighed the potential environmental and aesthetic impacts, as well as the cost of the management options. The mitigation plan chosen will focus the Villages efforts and funding on public ash trees utilizing the combination management strategy. In addition, the Village Tree Board will work to educate the Village residents regarding EAB and the Village's Plan. Urban Forestry LLC was directed to evaluate the Village's ash trees to determine which trees are the best candidates for preservation. Young trees less than six-inches in diameter will be monitored. The remaining ash trees will be placed on a 12 year removal and replacement schedule beginning with those trees in poor condition or located in poor locations. When EAB arrives in the Village a more accelerated removal schedule may be required.

Ash Trees to be Treated

Each ash tree was evaluated to determine the merits of preservation. Trees in good health, with good branching structure, and located in good locations, as well as a few large specimens will be put on a rotating two (2) year treatment program.

Tree Health

Three variables were used to evaluate tree health: annual growth, presence of disease, and the percentage of live crown. Research has shown that a tree in poor health is more likely to become infested with EAB.

Tree Structure

An ideal branching structure for a shade tree such as ash includes a single central stem throughout the height of the tree and evenly spaced branches with good branch attachments. Good branching structure reduces the probability of catastrophic branch failures from storm events common in our area. White ash is more likely to have good branching structure while green ash rarely has this ideal structure.

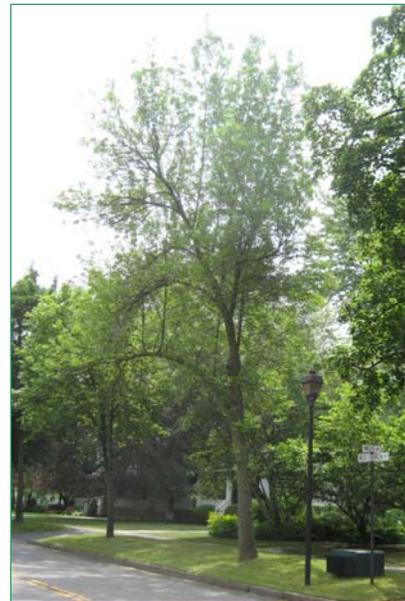


Figure 9. Green ash in poor health, thin crown, poor structure.



Figure 10. White ash with double forked trunk (poor structure) in good health.

Tree Location

Trees require adequate physical space and soil volume to grow, remain healthy and attain their longevity, as well as have minimal impact on the infrastructure of an urban area. In the case of street trees, tree lawn width and placement of the tree on the tree lawn are the critical factors. Crown clearance from infrastructure and other trees is also a factor.



Figure 11. Ideal location for an ash tree, wide tree lawn.



Figure 12. Poor location for an ash tree, too narrow a tree lawn will cause damage to the sidewalk and the curb and shorten the lifespan of the tree.

Schedule & Cost

There are a total of 226 public ash trees in the Village. The re-inspection and evaluation of the ash trees identified 52 trees for treatment (Table 6), 47 trees to be monitored and 127 trees to be placed on a pre-emptive removal schedule.

Management	# of Trees	Estimated Annual Cost
Treat	52	\$4,350
Remove	127	\$4,500
Monitor	47	\$200
Total		\$9,050

Treatment of Trees

The re-inspection and evaluation of the ash trees resulted in 52 trees that will be placed on a two-year rotating treatment schedule. These trees are in good health and are located in good locations. The annual cost to treat these trees is detailed in Table 7. Treatment of these trees may begin upon funding authorization by the Village Board.

Year	# of Trees	Cost per Year
1	26	\$4,500
2	26	\$4,200

Monitor Trees

Ash trees 6 inches in diameter or less and in good locations will be monitored. The benefit of treating this group of trees is questionable given costs of maintenance versus the long-term unknowns regarding EABs persistence as a pest and preventative treatments.

Pre-emptive Tree Removal

The tree removal plan has two implementation scenarios; pre-EAB infestation and post EAB infestation.

The pre-EAB infestation plan schedules trees larger than 6 inches in diameter on a 15 year pre-emptive removal plan. Removals will start with trees in the poorest health and in the poorest locations and proceed in the order of the results of their evaluation (worst to better). Scheduled removals can begin upon funding authorization by the Village Board at an annual cost of approximately \$4,500 not including overhead (Table 8).

Table 8. Pre-EAB Tree Removal Plan		
Year	# of Trees	Cost per Year
2012	7	\$5,200
2013	7	\$4,400
2014	7	\$4,700
2015	9	\$4,300
2016	10	\$4,200
2017	11	\$5,300
2018	13	\$4,800
2019	12	\$4,800
2020	9	\$5,100
2021	9	\$5,100
2022	8	\$4,700
2023	8	\$4,800
2024	8	\$5,200
2025	9	\$5,300
Total	127	\$67,900

The tree removal schedule may need to be accelerated when EAB arrives in the Village. The rate of infestation and tree death appears to be approximately 5 years in a localized area. The pre-emptive removal schedule may need to be accelerated and, if so, will require additional funding. Decisions in this regard can be deferred until a later date.

Tree Planting

The Village will consider the addition of \$1,000 per year of Village funding for replacement of ash trees removed. The Village will also seek alternative funding sources to help replace the losses to EAB. A Tree Planting Trust Fund will be considered to accept donations from individuals and other private sources for replacement tree planting.

Closing

It is unfortunate that the Village is faced with the potential (and likely) losses caused by EAB. This pest will create an additional challenge given the Village's limited resources as well as the impact on the Village's urban forest. The Village Tree Board has worked diligently to develop a plan that balances the benefits of ash trees present in the community with the costs associated with preserving some or many of them. This mitigation plan was developed with the best scientific knowledge and arboricultural expertise available, by volunteer Tree

Board members working in the best interest of the citizens of Fairport to manage valuable tree resources and improve the quality of life in Fairport.

References & Resources

Information regarding EAB and some photographs from the following websites where used in developing this plan and preparing this report.

- 1) Emerald Ash Borer. <http://www.emeraldashborer.info/>, July 2011.
- 2) US Forest Service, Northeast Area, Forest Health Protection – Emerald Ash Borer, <http://www.na.fs.fed.us/fhp/eab/>, July 2011.