



**Village of Shorewood
Emerald Ash Borer Readiness Plan**

Department of Public Works
Forestry Division

*The mission of the Department of Public Works is to provide
The highest level of public service possible to Shorewood
Residents and to keep all Village property, pertinents,
infrastructure and vehicles in proper maintenance and repair.
This mission is accomplished through the judicious use of
department personnel and equipment.*

*It is the mission of the Shorewood Department of Public Works
forestry and parks department to maintain and enhance the
urban forest and green spaces within the Village of Shorewood
to ensure maximum long term benefits to the community.*



EXECUTIVE SUMMARY

Goal

The goal of a relevant Emerald Ash Borer program is to recognize and make every attempt to minimize the economic, aesthetic and ecological impacts of the Emerald Ash Borer (EAB) on the Village of Shorewood.

EAB

EAB is an invasive wood boring beetle that feeds exclusively on tissue under the bark of ash trees. EAB is 100% fatal to native ash trees of any variety, size, age or condition. It is believed to have been transported to the United States from China and was discovered in Michigan in 2002. The pest has spread to other Midwestern states and Canada and was discovered in Newburg, Wisconsin in 2008. In 2009, its presence was confirmed in western Wisconsin and Minnesota.

Experts agree that it is almost certain EAB is present in Milwaukee County but a finding of the insect has yet to be confirmed.

Street Tree Inventory

In 2007, the Shorewood DPW utilized a WDNR Urban Forestry grant to complete an in-house inventory of all street trees within the Village. In summary:

- The Village of Shorewood owns and maintains 6,226 street, boulevard and other public trees.
- Of this total, 1,814 (28%) trees are European ash, green ash or white ash.
- Based upon accepted urban forestry valuation methods, the estimated dollar value of ash resources in the Village of Shorewood is over \$5.1 million.
- Three dozen public ash trees within the Village have individual landscape values of \$10,000 or greater. Of these, 35 are green ash varieties with a DBH of greater than 27 inches and heights in the 60 foot range. Shorewood’s most valuable ash tree is valued at nearly \$18,000. The white ash has a diameter breast height (DBH) of 42 inches.
- The number of residential ash trees has been estimated to approach or equal the number of public ash trees in Shorewood.

DBH (in.)	All Ash Varieties			Total
	Condition Rating			
	0-50	55-65	70+	
< 8	6	218	122	346
8 - 12	17	193	85	295
12 - 18	101	400	75	576
18 - 24	36	282	141	459
> 24	0	22	116	138
Total	160	1,115	539	1,814

Ecological Concerns

Staff is evaluating the impact of an EAB infestation on Shorewood's combined sewer system. Preliminary estimates indicate that current 1,106 ash street trees in the combined system may intercept as much as 500,000 gallons of rainwater annually. A rapid loss of these trees may negatively impact the function of the combined system.

Assessment of Existing Resources

The Shorewood Forestry division is currently comprised of three employees, two of which are categorized as foresters. Employees from other divisions are assigned to provide assistance with removal and planting operations.

The Village currently replaces approximately 100 street trees each year due to disease, attrition or hazardous conditions. If all existing ash trees were assumed to be replaced over a six year period, approximately 300 additional trees would be required to be removed and replaced each year. For liability reasons, it is not feasible to assume that removals could be delayed beyond six years after a tree succumbs to EAB.

Given current staffing and anticipated tax levy scenarios, the Shorewood DPW could not absorb the additional workload created by EAB without either additional funding or a significant reduction in the services offered to Shorewood residents.

Operational/Cost Implications

Recommended options to address EAB include the treatment of selected trees and the planned pre-emptive removal and replacement of others. It is Village staff's intent to utilize chemical treatment to manage the ash population's decline over a longer time period in order to minimize, to the extent possible, the effect of an infestation on Village resources.

Under any scenario, the costs – either material or opportunity - to the Village will not be insignificant.

Public Education and Communication

An outreach plan will be developed with assistance from WDNR Forestry staff to inform the residents of Shorewood on EAB. Existing communication mechanisms, including the Village website and *Shorewood Today*, will be utilized.



TABLE OF CONTENTS

Mission Statements 1

Executive Summary 2

1.0 Purpose and Scope..... 5

2.0 EAB Background 5

3.0 Municipal Authority to Control EAB and Designation of Responsibility 6

4.0 Public Tree Assessment 6
Table 4.1 Shorewood Street Trees
Table 4.2 Ash Tree Condition Ratings (All Varieties)

5.0 Community Impacts 9
5.1 Quality of Life
5.2 Economic
5.3 Ecological
Table 5.1 Ash Trees by Municipal Sewer Collection System

6.0 Assessment of Existing Resources 10
6.1 Existing Staffing Resources
6.2 Equipment Resources

7.0 Ash Management Recommendations 11
7.1 Priorities
7.2 Removals: Pre-emptive and Reactive
Table 7.1 Ash Trees Recommended for Removal and Replacement
7.3 Chemical Treatment
Table 7.2 Ash Trees Recommended for Treatment
7.4 Wood Waste Disposal
7.5 Contracting Options

8.0 Costs and Financing 14
Table 8.1 Estimated Ash Tree Removal Costs (all trees)
Table 8.2 Estimated Ash Tree Removal Costs (selected trees)
Table 8.3 Estimated Ash Tree Replacement Costs
Table 8.4 Estimated Ash Tree Trunk Injection Costs
Table 8.5 Estimated Cost of EAB Infestation

9.0 Public Education and Communication 15

1.0 PURPOSE AND SCOPE

This Emerald Ash Borer (EAB) readiness plan has been drafted to outline the impacts of an EAB infestation in the Village of Shorewood and identify the essential personnel, procedures and resources, both human and fiscal, to combat the Emerald Ash Borer.

A designated Tree City USA by the National Arbor Foundation for 13 years, Shorewood – by its very name – is defined by its urban forest. Trees contribute significantly to the mature, developed nature of the community. In addition to their innumerable quality of life contributions, they provide more tangible benefits which include quantifiable contributions to property values, positive impacts to the lifespan of surrounding infrastructure and a considerable impact on stormwater retention. The ash species make up approximately 28% of the public street trees in the Village, contributing significantly to these positive impacts.

Like its water, sewer or road systems, Shorewood's urban forest is an asset that must be carefully managed to maximize both its lifespan and its economic and ecological benefit to the community. Unlike other capital infrastructure, the urban forest appreciates in value over time.

Approximately four decades ago, the Village of Shorewood faced a similar challenge when Dutch elm disease threatened. Though devastating to the aesthetics of the community, Shorewood's urban forest today is stronger because of the continuing diversification of species. While the aesthetic impacts would be significant, of greater concern are the economic and stormwater impacts which will result from an EAB infestation. Each of these impact areas are discussed in greater detail in Section 5.

The goal of a relevant Emerald Ash Borer program is to minimize the economic, aesthetic and ecological impacts of the Emerald Ash Borer on the Village of Shorewood and surrounding communities.

2.0 EAB BACKGROUND

The emerald ash borer (*Agrilus planipennis*) is an invasive wood-boring beetle native to East Asia. It is believed the pest was transported to the United States from China. It was discovered in southeastern Michigan in 2002 and has since spread to several eastern and Midwestern states and Canada.

Unlike most borers, the emerald ash borer attacks both stressed and healthy trees. The pest is 100% fatal to native ash trees and typically kills the host tree within 2-4 years. It is estimated that more than 50 million ash trees are dead or dying throughout the Midwest due to the emerald ash borer.

EAB larva feed on the inner bark of ash trees and cause extensive damage to the host tree's vascular system, starving the tree of water and nutrients. The adult beetle is metallic green in color and emerges through the bark of the ash tree in early summer, leaving a D-shaped exit hole. The beetle lives only about three weeks and will fly no more than a few miles. The pest is easily and quickly spread when people inadvertently move firewood, ash nursery stock or other ash items infested with the emerald ash borer larvae.

Symptoms of EAB infestation are almost identical to those of other common ash diseases and pest.

3.0 MUNICIPAL AUTHORITY TO CONTROL EAB AND DESIGNATION OF RESPONSIBILITY

All authority which the Village of Shorewood has currently to control EAB is granted through federal regulations and state statutes. The Village has a comprehensive ordinance to control and prevent the spread of Dutch elm disease (Appendix 1). That ordinance also declares the elm bark beetle which carries the disease to be a public nuisance.

It is recommended that the ordinance be broadened to include EAB and any other tree diseases or pest which may be of concern.

It will be responsibility of the Director of Public Works or her/his designee to carry out the provisions of applicable ordinances and plans.

4.0 PUBLIC TREE ASSESSMENT

With financial assistance from a Wisconsin Department of Natural Resources Urban Forestry Grant, Shorewood DPW forestry personnel performed a complete inventory of all street trees within the Village in 2007. Table 4.1 summarizes Shorewood street trees by species (see Appendix 2 for complete street tree data report). Ash tree (all varieties) condition ratings are illustrated in Table 4.2

Table 4.1 Shorewood Street Trees

<i>Species</i>	<i>Number</i>	<i>Percent of Total</i>
Ash Varieties	1814	29%
Beech	1	0%
Elm Varieties	219	4%
Fir	1	0%
Basswood Varieties	3	0%
Birch Varieties	9	0%
Black Locust	3	0%
Crab Apple Varieties	26	0%
Maple Varieties	2417	39%
Ginkgo	106	2%
Hackberry	59	1%
Hawthorn Varieties	9	0%
Hickory Varieties	2	0%
Honeylocust Varieties	788	13%
Japanese Tree Lilac	9	0%
Juniper	2	0%
Kentucky Coffee	12	0%
Linden Varieties	662	11%
Oak Varieties	41	1%
Pine Varieties	19	0%
Poplar	1	0%
Birch	1	0%
Serviceberry	5	0%
Spruce	7	0%
Other	18	0%
TOTAL	6226	100%

Current urban forestry standards recommend that no single species comprise more than 10% of a public tree inventory. Like many communities, the Village of Shorewood heavily utilized maple and ash varieties when replacing trees lost to Dutch elm disease decades ago.

The Wisconsin Department of Natural Resources estimates that ash trees make up, on average, 20 percent of trees in urban areas. Nurseries are only starting to have the ability to provide the requested volume of the less common street tree species necessary for such diversification. Shorewood forestry personnel will continue to select

replacement trees from available species to maximize the diversity of the community's urban forest.

Table 4.2 Ash Tree Condition Ratings (All Varieties)

DBH (in.)	<i>All Ash Varieties</i>			<i>Total</i>
	<i>Condition Rating</i>			
	0-50	55-65	70+	
< 8	6	218	122	346
8 - 12	17	193	85	295
12 - 18	101	400	75	576
18 - 24	36	282	141	459
> 24	0	22	116	138
Total	160	1,115	539	1,814

In summary:

- The Village of Shorewood owns and maintains 6,226 public trees. These include street trees (located with the public right-of-way between the sidewalk and curb), boulevard trees and those on municipal parcels. Park trees and those on trails or school parcels were not inventoried and are not included in this figure. It is interesting to note that during the course of the inventory only fourteen locations were identified as unoccupied suitable locations for street trees.
- Of the total, 1,814 (28%) trees are one of three ash varieties: European ash, green ash or white ash.
- Based upon accepted urban forestry valuation methods, the estimated dollar value of ash resources in the Village of Shorewood is over \$5.1 million.
- Three dozen public ash trees within the Village have individual landscape values of \$10,000 or greater. Of these, 35 are green ash varieties with a DBH of greater than 27 inches and heights in the 60 foot range. Shorewood's most valuable ash tree has an estimated worth of nearly \$18,000. The white ash has a DBH of 42 inches and is located at 1116 E. Glendale Avenue.
- While no formal estimate of the number of residentially-owned ash trees has been conducted, it would be safe to assume that the number of private ash trees in the Village is approaching or similar to the total of public ash trees in the Village.

5.0 COMMUNITY IMPACTS

The impacts of the urban forest are significant. Properly managed, the urban forest can contribute positively and quantifiably to daily life.

Quality of Life

Oftentimes, quality of life impacts are considered intangible. However, attempts have been made to quantify the effects of urban trees:

- Studies by researchers at the University of Illinois Champaign-Urbana indicate that people living near trees have significantly better relations with and stronger ties to their neighbors. ¹
- A U.S. Department of Energy study reports that trees reduce noise pollution by acting as a buffer and absorbing as much as 50% of urban noise. ²
- Urban trees improve traffic safety both by serving as a buffer between cars and pedestrians and by giving the perception of a narrower street, slowing traffic.

Economic

Aside from their actual monetary landscape value, urban trees contribute other positive economic aspects. Studies have shown that urban forests can improve economic sustainability:

- A Michigan State University study found that apartments and offices in wooded areas rent more quickly and have higher occupancy rates. ³
- According to a University of Washington study, well-shaded retail centers attract customers willing to travel farther, shop longer, visit more frequently and pay up to 11% more for products. ⁴
- Property values increase 5-15% when compared to properties without trees. ⁵

Urban trees also positively impact the capital infrastructure of a community.

- Extensive tree canopy cover can extend the life of paved surfaces (petroleum components of asphalt do not deteriorate as quickly in shade).

Ecological

Trees play an essential role in balancing ecological impacts in an urban environment:

- According to the National Arbor Day Foundation, one urban tree can reduce carbon dioxide build up as much as 15 forest trees. ⁶
- Trees reduce building energy use and cooling costs by lowering air temperatures through water transpiration and shading surfaces.
- Trees reduce stormwater run-off and act as natural pollution filters.

As noted earlier in this document, of particular concern are the effects of widespread loss of mature ash trees on the Shorewood sewer systems. According to recent studies of rainfall interception, a mature deciduous tree can capture between 500 and 760

gallons of water annually. While the impact of a rapid loss of just over 700 trees on Shorewood's municipal separate storm sewer system would not be insignificant, the possible addition of up to 500,000 gallons of clear water to the regional combined sewer system during wet weather events could have even greater negative consequences. The related economic costs should also be considered as the additional runoff will be treated and billed to the Shorewood Sewer Utility and its customers.

Table 5.1 includes an inventory summary of all ash varieties, categorized by system location (combined sewer vs. separate sewer system).

TABLE 5.1 Ash Trees by Municipal Sewer Collection System

DBH (in.)	Combined Sewer Area				Separate Sewer Area			
	<i>All Ash Varieties</i>				<i>All Ash Varieties</i>			
	<i>Condition Rating</i>			<i>Total</i>	<i>Condition Rating</i>			<i>Total</i>
	0-50	55-65	70+		0-50	55-65	70+	
< 8	3	128	64	195	3	90	58	151
8 - 12	8	106	43	157	9	87	42	138
12 - 18	57	260	48	365	44	140	27	211
18 - 24	18	165	117	300	18	117	24	159
> 24	0	37	52	89	0	31	18	49
Total	86	696	324	1,106	74	465	169	708

6.0 ASSESSMENT OF EXISTING RESOURCES

Existing Staffing Resources

Under the Public Works Department's current organizational structure, the forestry division is staffed by three full-time employees. Two of these employees are categorized as foresters while the third functions primarily as a horticulturalist with occasional assistance offered in forestry functions. During larger scale operations, including tree removals, two additional staff are assigned to forestry. Currently, these staffers are most often employed from the collections division on non-route days (Thursdays and Fridays). In some instances, utility personnel are also utilized.

Forestry responsibilities include the care and maintenance of Shorewood's urban forest: planting, pruning, tree removals, stump grinding and planting. In addition, forestry personnel are responsible for annual diseased and hazardous tree assessments, identification and ordering of all planting stock, the maintenance of the GIS tree inventory and maintenance of all equipment. Non-forestry related responsibilities of these employees include operation of the beach cleaner, winter maintenance operations, and maintenance of all park/open space and boulevard irrigation systems. Other tasks are assigned dependent upon workload and staffing in other divisions.

In 2009, the forestry division was funded at \$94,890 (including equipment, supplies and wages without benefits), approximately 4% of the total DPW budget. The division's average annual budget since 2005 is \$103,892.

Forestry staff currently removes and replaces approximately 100 trees diseased and hazardous trees annually. If all ash trees were assumed to be replaced over a six year period, approximately 300 additional trees would be required to be removed and replaced each year. For liability reasons, it is not feasible to assume that removals could be delayed beyond six years once a tree has a known infestation.

Given current staffing, the Shorewood DPW could not absorb the additional workload created by EAB without either additional funding/staffing or a significant reduction in the services offered to Shorewood residents.

Equipment Resources

The Forestry Department currently has primary use of the following vehicles in the DPW fleet.

- 2006 Ford F750XL with Versalift aerial bucket
- 2007 Chevrolet Dump Truck #57 (GVW 26,000 lbs)
- 1998 Chevrolet 1500 pickup truck
- 2002 JCB
- Vermeer chipper

Additional vehicles may be re-assigned from other division as workload requires. The department has, in the past, rented equipment for pruning programs and other special project.

7.0 ASH MANAGEMENT RECOMMENDATIONS

Experts agree that the question of an EAB infestation is not if, but rather when. The Village must either prepare for the eventual removal and replacement of 1,814 ash trees or treatment of all or a selected portion of these trees.

A combination of removal and replacement and the treatment of trees with a combined diameter breast height of greater than eight inches and a condition rating of greater than 50% is recommended for the Village of Shorewood.

Figures illustrating the quantities of these trees may be found below.

Priorities

As noted earlier, an EAB infestation will have quality of life, economic and ecological impacts. A carefully managed program can minimize these effects. Of primary concern



is the impact on the combined sewer system. For this reason, applicable illustrations will include a breakdown of conditions and recommendation by collection system type.

When condition ratings warrant, treatment priority will be given to the largest trees. Prioritizing treatment application in the combined system area to minimize stormwater volume increases to the extent possible must also be evaluated. Consideration should also be given to areas or blocks where ash is the predominant tree species.

Removals: Pre-emptive and Reactive

Removals of ash trees may be conducted as an infestation is discovered or in a systematic fashion prior to the known presence of the borer. Some area communities, including the Village of Brown Deer, have chosen to proactively remove all or a portion of their ash population prior to infestation. This decision is made to reduce costs associated with removal as a structurally compromised tree can cost as much as twice as much to remove than one which is simply in decline. The removal of a hazardous tree also significantly increases safety concerns for staff, surrounding property and the general public.

Other communities have chosen a reactive approach, with plans to address removals where and when necessary. This strategy allows a community to maximize the life of its existing trees; however there is little opportunity to manage the volume of removals which might be required within a very short time frame with possible negative implications to safety, staffing and budget.

Based upon current data, it is most cost effective to remove and replace trees with a diameter breast height of less than eight inches. It is also recommended that trees with condition ratings of 50% or less be identified for removal and replacement. Table 7.1 illustrates these trees by sewer system location.

TABLE 7.1 Ash Trees Recommended for Removal and Replacement

DBH (in.)	Removal Recommended		
	<i>All Ash Varieties</i>		
	Combined Area	Separate Area	Total
< 8	195	151	346
8 - 12	8	14	22
12 - 18	57	39	96
18 - 24	18	18	36
> 24	1	0	1
Total	279	222	501

It is assumed that each ash tree removed will be replaced with an appropriate urban tree of a different species. As noted previously, trees will be selected to maximize diversification.



Chemical Treatment (Trunk injection)

Treatment of ash trees with a systemic insecticide has been shown to be effective in both research and field studies (please see Appendix 3). The trunk injection method applies the produce directly into the tree’s vascular system and provides the longest residual (2-3 year) treatment. The City of Milwaukee is currently treating its 32,000 ash trees using trunk injection of a systemic insecticide.

Ash with DBH of eight inches or greater and condition rating of greater than 50% are recommended for treatment in Shorewood. It is suggested that treatment be utilized with the ultimate goal of managing the ash population within current manpower and budget constraints. Treatment of selected ash would allow for the replacement of the ash population in the Village over a period of 20-30 years rather than five to ten.

TABLE 7.2 Ash Trees Recommended for Treatment

DBH (in.)	Treatment Recommended		
	<i>All Ash Varieties</i>		
	Combined Area	Separate Area	Total
8 - 12	149	129	278
12 - 18	47	167	475
18 - 24	282	141	423
> 24	88	49	138
Total	566	486	1,314

As noted previously, it is not cost effective to chemically treat trees with a DBH of less than eight inches.

Wood Waste Disposal

Given the volume of ash trees in Shorewood, it is both extremely important and extremely difficult to prepare for the volume of wood waste which could be generated once an EAB infestation is established. Currently, no large scale debris handling locations (marshalling yards) have been identified. Given its compact development, the Village of Shorewood does not have an area suitable for long-term quarantine storage of infested ash wood within its municipal boundaries.

Contracting Options

Current staffing levels will require the use of private contractors and/or outside assistance in the fight against EAB. Staff injury rehabilitation schedules, budgetary constraints and other time-sensitive issues will likely require the shift of resources and priorities from year-to-year. Contracting and/or the use of outside assistance, including forestry student interns or work-study students, will be carefully evaluated throughout the implementation of the management plan.



Outside assistance could be utilized for the following tasks:

- Tree removals
- Hauling and disposal of infested wood products
- Chemical treatment of selected ash trees
- Periodic assessments and inventory updates

8.0 COSTS AND FINANCING

Costs associated with the fight against EAB may include:

- The removal of trees, including labor, equipment and fuel.
- Wood disposal. If removal occurs after infestation, costs will increase as special precautions must be taken to quarantine and dispose of infested wood material. As noted previously, costs for the removal of decaying, structurally compromised trees can increase substantially. This cost cannot be estimated at this time.
- Labor, equipment and material costs for the installation of replacement trees.
- Chemical treatment of ash trees over the life of the tree.

Table 8.1 Estimated Ash Tree Removal Costs (all trees)

DBH (in.)	Number Trees	Estimated Tree Removal Cost	Stump Removal Cost \$5/inch	Total
< 8	346	\$95.00	\$1,730.00	\$34,600
8 - 12	295	\$150.00	\$1,475.00	\$45,725
12 - 18	576	\$225.00	\$2,880.00	\$132,480
18 - 24	459	\$400.00	\$2,295.00	\$185,895
> 24	138	\$625.00	\$690.00	\$86,940
Total	1814			\$485,640

Table 8.2 Estimated Ash Tree Removal Costs (selected trees)

DBH (in.)	Number Trees	Estimated Tree Removal Cost	Stump Removal Cost \$5/inch	Total
< 8	346	\$95.00	\$1,730.00	\$34,600
8 - 12	22	\$150.00	\$110.00	\$3,410
12 - 18	96	\$225.00	\$480.00	\$22,080
18 - 24	36	\$400.00	\$180.00	\$14,580
> 24	0	\$625.00	\$5.00	0
Total				\$75,300



Table 8.3 Estimated Ash Tree Replacement Costs

	Replacement Trees	Cost per Tree*	Total
Unilateral Removal	1814	\$250	\$453,500
Selected Removal	500	\$250	\$125,000

* includes tree, labor, equipment and fuel

Table 8.4 Estimated Ash Tree Trunk Injection Costs

	Material Cost per DBH	Labor Cost per DBH	Equipment Fuel/Cost per DBH	Total Cost per DBH	Total Cost	Annual Cost
Contractor	\$14.00	-	-	\$14.00	\$302,876.00	\$100,958.67
Staff	\$3.05	\$2.19	\$0.05	\$5.29	\$114,443.86	\$38,147.95

21634 total ash DBH

Table 8.5 Estimated Cost of EAB Infestation

Scenarios	Estimated Annual Cost		Total Cost Over 18 years
	Years 1-6	Years 7 - 18	
Do Nothing	\$237,463	0	\$1,424,780
Pre-Emptive Unilateral Removal/Replacement	\$156,523	0	\$939,140
Treatment with Selective Removal (contractor)	\$121,834	\$100,958.67	\$1,942,506.00
Treatment with Selective Removal (in-house)	\$59,023	\$38,147.95	\$811,913.16

* in 2009 dollars

9.0 PUBLIC EDUCATION AND COMMUNICATION

The Village will use existing communication channels, including web site and Shorewood Today to educate residents and property owner on the impacts of EAB and the strategy to manage the infestation.

The Department of Public Works will commit to an increased presence at community events, including National Night Out and the annual Ten Gardens Tour to provide educational displays and answer questions. Staff will continue to explore opportunities to promote relationships with the Shorewood Conservation Committee and other community groups to promote awareness of EAB and support for its management.



REFERENCES

- ¹ Kuo, Frances E. and W.C. Sullivan. 2001. *Environment and crime in the inner city: Does vegetation reduce crime?* Environment & Behavior. 33(3): 343-367.
- ² Michigan State University Extension, Urban Forestry #07269501, "Benefits of Urban Trees"
- ³ Wolf, Kathleen L. 1998. *Trees in Business Districts: Positive Effects on Consumer Behavior!* Center for Urban Horticulture, University of Washington, College of Forest Resources, Fact Sheet #5.
- ⁴ Colorado Tree Coalition. 2009. "Benefits of Trees in Urban Areas"
- ⁵ National Arbor Day Foundation pamphlet #90980005



APPENDIX 1
Village of Shorewood Dutch elm disease ordinance

§ 466-25 Dutch Elm Disease

A. Intent and purpose. The Village Board has determined that there are many elm trees growing on public and private premises within the Village of Shorewood, the loss of which would substantially depreciate the value of public and private property, impair the use and enjoyment of public and private premises, and erode the tax base of the Village, and that the health and life of such trees are threatened by a fatal disease known as "Dutch elm disease," which is spread by root graft and elm bark beetles. The Village Board hereby declares its intention to control and prevent the spread of said disease and the insect pests and vectors which carry such disease and declares Dutch elm disease and the elm bark beetles which carry such disease to be public nuisances.

B. Responsibility of Director of Public Works. The Director of Public Works shall have the responsibility of carrying out the provisions of this section. He may designate Village employees to perform the duties of foresters under Ch. 27, Wis. Stats., and may authorize such employees to perform the duties and exercise the powers imposed on him by this section, or if such work is let under Village contract, then the provisions of said contract shall govern.

C. Definitions. As used in this section, unless otherwise clearly indicated by the context, the following words shall have the meanings indicated:

DIRECTOR

The Director of Public Works of the Village or his designee.

PERSON

Person, firm or corporation.

PUBLIC NUISANCE

- (1) Dutch elm disease.
- (2) Elm bark beetles *Scolytus multistriatus* (Eichb.) or *Hylurgopinus rufipes* (Marsh.).
- (3) Any living or standing elm tree or part thereof infected with the Dutch elm disease fungus or in a weakened condition which harbors any of the elm bark beetles *Scolytus multistriatus* (Eichb.) or *Hylurgopinus rufipes* (Marsh.).
- (4) Any dead elm tree or part thereof, including logs, branches, stumps, firewood, or other elm material from which the bark has not been removed and burned or sprayed with an effective elm bark beetle-destroying concentrate.

PUBLIC PROPERTY

The premises owned or controlled by the Village, including, without limitation because of enumeration, public sites, parks, playgrounds, streets, alleys, sidewalks, boulevards and the terrace strip between the lot line and the curb, or the improved portion of any public way.

D. Inspection.

- (1) The Director shall inspect or cause to be inspected at least twice each year all premises and places within the Village to determine whether any public nuisance exists thereon. He shall also inspect or cause the inspection of any elm tree reported or suspected to be

infected with Dutch elm disease or any elm-bark-bearing material reported or suspected to be infested with elm bark beetles.

(2) Whenever necessary to determine the existence of Dutch elm disease or elm bark beetles in any tree, the person inspecting such tree shall remove or cut specimens from the tree in such manner as to avoid permanent injury thereto and deliver such specimens to the Director of Public Works who shall forward them to the Wisconsin Department of Agriculture, Trade and Consumer Protection at Madison for analysis to determine the presence of such nuisances.

(3) The Director of Public Works and his agents and the employees under him shall have authority to enter upon private premises at reasonable times for the purpose of carrying out any of the provisions of this section.

E. Abatement of nuisances.

(1) The Director shall order, direct, supervise and control the abatement of public nuisances as defined in this section by spraying, injecting, removing, burning or by other approved and recommended means which he determines to be necessary to prevent as fully as possible the spread of Dutch elm disease fungus or the insect pests or vectors known to carry such disease fungus.

(2) Whenever the Director, after inspection or examination, shall determine that a public nuisance as herein defined exists on public property in the Village, he shall immediately abate or cause the abatement of such nuisance in such manner as to destroy or prevent as fully as possible the spread of Dutch elm disease fungus or the insect pests or vectors known to carry such disease fungus.

(3) Notice.

(a) When the Director determines with reasonable certainty that a public nuisance exists upon private premises, he shall immediately serve or cause to be served, personally or by certified mail, upon the owner of such property, if he can be found, or upon the occupant thereof, written notice of the existence of such nuisance and of a time and place for a review of the Director's findings before the Village Manager, not less than 14 days after service of such notice, on the abatement action to be taken. Such notice shall describe the nuisance and recommended procedures for its abatement and shall further state that unless the owner shall abate the nuisance in the manner specified in the notice or shall appear at the review hearing before the Village Manager to show that such nuisance does not exist or does not endanger the health of elm trees in the Village, the Director shall cause the abatement thereof at the expense of the property served. If the owner cannot be found, such notice shall be given by publication in a newspaper of general circulation in the Village.

(b) If, after review held pursuant to this subsection, it shall be determined by the Village Manager that a public nuisance exists, he shall forthwith order the immediate abatement thereof. Unless the property owner abates the nuisance as directed within 30 days after such hearing or files an appeal before the Shorewood Board of Appeals within said time, the Director shall proceed to abate the nuisance and cause the costs thereof to be assessed against the property in accordance with the procedures provided in this section. The Village Manager may extend the time allowed to the property owner for the abatement work but not to exceed 30 additional days.

(c) If the property owner wishes to appeal the order of the Village Manager referred to in Subsection E(3)(b) hereof, he shall file a notice of appeal with the Shorewood Board of Appeals in accordance with the provisions of § 535-56 of the Shorewood Village Code. In addition, the provisions of § 7-3 of the Shorewood Village Code related to due process shall be applicable to such proceedings.

F. Treatment of infected trees.

(1) Whenever the Director shall determine that any elm tree or part thereof is infected with Dutch elm disease fungus, or is in a weakened condition and harbors elm bark beetles, he may cause all elm trees within a one-thousand-foot radius thereof to be treated by a means or method approved by the Village Board as being effective against the elm bark beetle and Dutch elm disease fungus.

(2) If spraying is the method to be used in an effort to control the spread of the Dutch elm disease fungus or of the elm bark beetle, the Director shall cause to be given advance public notice of such operations by newspaper, radio, television, public service announcements, or other effective means and shall also cause the posting of appropriate warning notices in the areas and along the streets where trees are to be sprayed at least 12 hours in advance of spraying. When any residue or concentrate from municipal spraying operations can be expected to be deposited on any public streets, the Director shall also notify the Chief of Police, who shall take all necessary steps to make and enforce temporary parking and traffic regulations on such streets as conditions require. Temporary "No Parking" notices shall be posted in each block of any affected street at least four hours in advance of spraying operations.

(3) When appropriate warning notices and temporary "No Parking" notices have been given and posted in accordance with Subsection E(2) of this section, the Village shall not allow any claim for damages to any vehicle caused by such spraying operations.

(4) When trees on private property are to be sprayed, the Director shall notify the owner of such property and proceed in accordance with the requirements of Subsection E(3) of this section.

G. Cost of tree care.

(1) The cost of abatement of a public nuisance or treatment of elm trees or elm wood at the direction of the Director, if the nuisance tree or wood is located on public property, shall be borne by the Village.

(2) The cost of abating a public nuisance or treating elm trees or elm wood located on private premises, when done at the direction and under the supervision of the Director, shall be assessed to the property on which such nuisance tree or wood is located, as follows:

(a) The Director shall keep a strict account of the cost of such work or treatment and the amount chargeable to each lot and/or parcel and shall report such work, charges, description of lands to which charged, and names and addresses of the owners of such lands to the Village Board on or before the 15th day of October each year.

(b) Upon receiving the Director's report, the Village Board shall hold a public hearing on such proposed charges, giving at least 14 days' advance notice of the time, place and purpose of such hearing to interested persons by publication in a newspaper of general circulation in the Village and by mail to the owner of each property proposed to be

charged. Each property owner shall be notified of the amount proposed to be assessed against his premises and the work for which such charge is being made.

(c) After the hearing, the Village Board shall affirm, modify and affirm, or disapprove such assessments by resolution and shall cause a copy thereof to be published. Upon the adoption and publication of such resolution, assessments made thereby shall be deemed final.

(d) The Village Clerk shall mail notice of the amount of such final assessment to each owner of the property assessed at his last known address, stating that, unless paid within 30 days of the date of the notice, such assessment shall bear interest at the rate of 6% per annum and will be entered on the tax roll as a delinquent tax against the property, and all proceedings in relation to the collection, return and sale of the property for delinquent real estate taxes shall apply to such assessment.

(e) The Village hereby declares that, in making assessments under this section, it is acting under its police power, and no damages shall be awarded to any owner for the destruction of any diseased or infested elm tree or elm wood or part thereof.

(f) The amount chargeable against any parcel or lot in any year under this section shall not exceed 10% of the assessed value of the premises exclusive of improvements as shown on that year's tax roll. The portion of any assessment in excess of such percentage amount shall be charged to the Village and paid out of general funds.

H. Prohibited acts and penalties.

(1) Any person who does any of the following acts within the Village of Shorewood shall, upon conviction thereof, forfeit not less than \$10 nor more than \$500, together with the costs of prosecution, and in default of payment thereof shall be imprisoned in the county jail or house of correction until such costs and forfeitures are paid, but not exceeding 60 days:

(a) Transports any bark-bearing elm wood, bark or material on public streets or highways or other public premises without first securing the written permission of the Director.

(b) Interferes with or prevents any acts of the Director or his agents, representatives or employees while they are engaged in the performance of duties imposed by this section.

(c) Refuses to permit the Director or his duly authorized representative, agent or employee to enter upon his premises at reasonable times to exercise the duties imposed by this section.

(d) Permits any public nuisance to remain on any premises owned or controlled by him when ordered by the Director to abate such nuisance.

(2) Each day a violation continues hereunder shall constitute a separate offense.



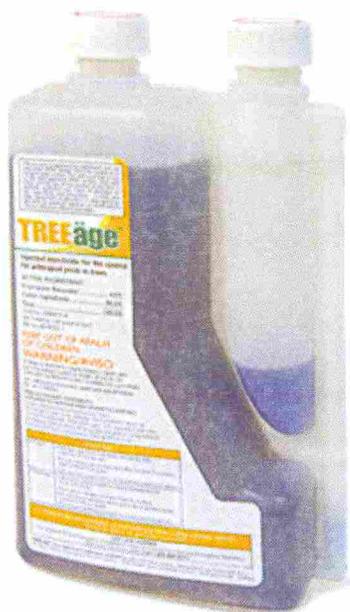
APPENDIX 2
Shorewood Street Trees

CommonName in Street Trees	
6240 Total Records	
Value	Count
American Beech	1
American Elm	78
Ash Spp.	2
Balsam Fir	1
Basswood Spp.	3
Birch Spp.	9
Black Locust	3
Callery Pear Spp.	9
Crab Apple Spp.	1
Crab Apple Var.	25
Eastern Redbud	4
Elm Spp. (Hybrid)	140
European Ash	235
Freeman Maple	94
Ginkgo	106
Green Ash	44
Green Ash Var.	828
Hackberry	59
Hawthorn Spp.	9
Hickory Spp.	2
Honeylocust (Thornless)	5
Honeylocust Var.	783
Horsechestnut	2
Japanese Tree Lilac	9
Juniper Spp.	2
Katsura Tree	1
Kentucky Coffeetree	12
Littleleaf Linden	561
Maple Spp	22
Norway Maple	31
Norway Maple Var.	2161
Oak Spp.	17
Ohio Buckeye	1
Pine Spp.	13
Poplar Spp.	1
Red Maple	13
Redmond Linden	50
River Birch	1
Scotch Pine	6
Serviceberry	5
Siberian Elm	1
Silver Linden	51
Silver Maple	11
Spruce Spp.	7
Sugar Maple	85
Swamp White Oak	24
Turkish Filbert	1
Vacant	14
White Ash	61
White Ash Var.	636



APPENDIX 3
Systemic Insecticide Research Data

Emamectin Benzoate / TREE-äge™



- Emamectin benzoate was discovered by researchers in 1984. (www.syngentacropprotection.com)
- Emamectin benzoate is synthetically derived from naturally occurring avermectin, which is derived from the antibiotic-producing actinomycetes, the source of all of the antibiotic fungicides. (EPA Federal Register – www.epa.gov)
- Emamectin benzoate has been formulated to be used to protect ash trees (*Fraxinus spp.*) from emerald ash borer under the trade name TREE-äge™.
- A special 24(c) registration request for TREE-äge™ has been approved in Illinois, Indiana, Kentucky, Maryland, Michigan, Minnesota, Missouri, Pennsylvania, Ohio, Virginia, West Virginia, and Wisconsin.
- Prior to TREE-äge™, emamectin benzoate has not previously been used to protect ornamental trees. A similar product has been used in salmon farming and in California for some fruit and vegetable crops. A related product is used in veterinary medicine. (www.emeraldashborer.info)
- Emamectin benzoate is currently used on over 30 crop plants in California, with over 160,000 treated acres in 2007. Commonly used on tomatoes for processing, head lettuce, tomatoes, broccoli, cabbage, leaf lettuce, celery, and bell peppers. (PAN Pesticide Database – www.pesticideinfo.org)
- TREE-äge™ is applied directly into a tree as a trunk injection at the base of an ash tree. Application method provides a closed system with no aerial spraying or application of pesticides into the soil. The trunk injection application method significantly reduces the likelihood of pesticide exposure to public, applicators, pets or potential for surface or groundwater contamination. (www.arborjet.com)
- TREE-äge™ It is not sprayed on the bark or leaves. Animals (e.g. birds, chipmunks) and other insects (e.g. butterflies) that simply land on a treated tree but do not feed on the tree will not be affected by the insecticide. (www.emeraldashborer.info)

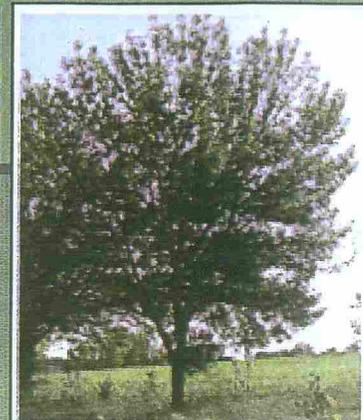
Ash protection in Adrian, Michigan

2006 – 2008

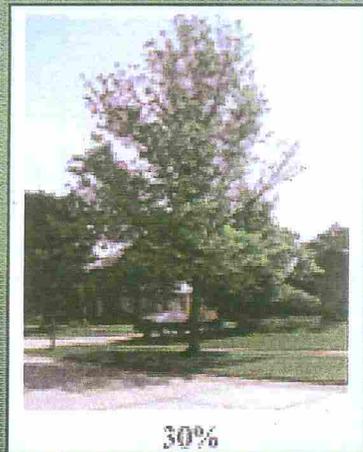
Dr. D. Smitley, MSU

(Mean dbh = 15")

Treatment	Date	Number of Treatments	Canopy thinning August 2008
Tree-age	June 2006	1	12.3
Tree-age	June 2006	1	13.0
Ima-jet 0.4 + Merit soil	June 2007 + June 2008	2	13.5
Ima-jet 0.4	June 2007	1	29.7
Merit drench	June 2006 + 2007 + 2008	3	33.0
Merit Tree 0.4	June 2007	1	34.2
Ima-jet 0.4	June 2006	1	45.0
Xytect soil drench	Fall 2006 + Spring 2007 + Spring 2008	3	52.0
Control	No Treatments		64.0



10%



30%

Applications made after infestation detected

