Meeting:	Village Board
Meeting Date:	02/13/2012
Agenda Item:	7i

Mission Statement
Delivering quality services in a courteous, cost-effective and efficient manner.

VILLAGE BOARD MEETING STAFF REPORT

REPORT TO: Burt R. McIntyre, President
Village Board of Trustees

REPORT FROM: Christopher Clark, Park Superintendent/Forester

AGENDA ITEM: Emerald Ash Borer Readiness Plan

POLICY ISSUE

Informational - Attachment to Village of Howard Comprehensive Urban Forestry Management Plan (UFMP).

BACKGROUND INFORMATION

The Emerald Ash Borer Readiness Plan (EABRP) is an attachment document to the Comprehensive Urban Forestry Management Plan's Insect and Disease Management. This document has been prepared by the Village Park Superintendent/Forester with the guidance, review, and recommendations from the Village Tree Board as recommended in the UFMP and the Wisconsin Department of Natural Resources.

The Village of Howard EABRP is a guide for the Village to utilize in managing the inevitable infestation and destruction to the urban ash tree population. The main goal of the EABRP is to minimize the economic, aesthetic, and ecological impacts of EAB on our urban forest in the Village of Howard and neighboring communities.

The Emerald Ash Borer (EAB) is an invasive wood boring insect that kills all ash tree species. This insect was confirmed in the southeast part of the state of Wisconsin in August of 2008. Since that time, there have been many other locations of positive identification throughout the state, including the city of Green Bay. To date there has been no indication that EAB is affecting trees in the Village of Howard.

PRIOR ACTION/REVIEW

The Village of Howard Tree Board unanimously approved the Emerald Ash Borer Readiness Plan at the July 18, 2011, Tree Board meeting.

FISCAL IMPACT:

1. Is There A Fiscal Impact?	NA
2. Is it Currently Budgeted?	NA
3. If Budgeted, Which Line?	NA
4. Amount?	NA

RECOMMENDED ACTION
Village staff recommends the Village Board accept the recommendation of the Tree Board's approval of the EAB Readiness Plan and file as an attachment to the Comprehensive Urban Forestry Management Plan.

If the Village Board agreed with this action, the following motion could be used, ***"Motion to accept and file the Emerald Ash Borer Readiness Plan as an attachment to the Comprehensive Urban Forestry Management Plan".***

POLICY ALTERNATIVE(S)
The Village Board could take the following actions:

- Approve with revisions
- Deny the suggested motion
- Table the suggested motion and request additional information

ATTACHED INFORMATION
Emerald Ash Borer Readiness Plan

COPIES FORWARDED TO:
None

Emerald Ash Borer Readiness Plan

2011

April 2011
Village of Howard, Wisconsin

RISING TO NEW HEIGHTS
Duck Creek
HOWARD
WISCONSIN
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Emerald Ash Borer Readiness Plan
2011
Village of Howard
Urban Forestry Division

A Division of the Public Works Department
1336 Cornell Rd.
Green Bay, WI 54313

www.villageofhoward.com

Readiness Plan Prepared By:

Christopher H. Clark
Village of Howard Park Superintendent / Village Forester
International Society of Arboriculture Certified Arborist (WI-0520A)

Approved By Village of Howard Tree Board:

July 2011

Village of Howard Tree Board:

Ellery Gulbrand (Chair)
Don Buntman
Dan Rocheleau
Carl Zuege
Larry Francois

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Emerald Ash Borer Readiness Plan Executive Summary

The Village of Howard Emerald Ash Borer Readiness Plan (EABRP) is a guide for the Village to utilize in managing the inevitable infestation and destruction to the urban ash tree population. The main goal of the EABRP is to minimize the economic, aesthetic, and ecological impacts of EAB on our urban forest in the Village of Howard and neighboring communities.

The Emerald Ash Borer (EAB) is an invasive wood boring insect that kills all ash tree species. This insect was confirmed in the state of Wisconsin in August of 2008 in the southeast part of the state. Since that time there have been many other locations of positive identification throughout the state, including the city of Green Bay. To date there has been no indication that EAB is affecting trees in the Village of Howard.

EAB Readiness Plan Highlights

- **1239 Public Ash Trees**
  - **1000 Street Trees**
  - **239 Park & Other Village Property**
- **Estimated 12,500 Private Ash Trees**
- **Public Tree Removal Costs: $156,139**
- **Public Tree Replanting Costs: $214,375**
- **Public Tree Treatment Costs: $1.6 mil. over 20 years**
- **Current Annual Budgets**
  - **Forestry Division: $83,700**
  - **Recycling Division: $75,500**

Urban Ash Tree Findings

The Village's diverse urban forest consists of 8225 inventoried trees located along streets, in parks, and on other village properties. Of these trees, 1239 or 15% of the total are ash trees that will be affected by EAB. The following are some facts about the Village of Howard's urban public ash tree population.

- 1173 of the trees are less than 12" in diameter at breast height (DBH). There are 45 trees between 12-18" DBH; 10 that are between 18-24" DBH; eight that are between 24-30" DBH; and three trees greater than 30" DBH.
- An analysis of the condition of all ash trees shows that approximately 2/3rds are in good condition, while 31 percent are in fair conditions, and 4 percent are considered poor condition. At this time none met the criteria to be considered critical or dead.

- Estimated replacement value of the ash tree population on public properties is $627,675 and the associated annual benefits of said trees is $92,934 utilizing the *i-Tree Streets* inventory program.
- A conservative estimate of ash on private properties could be ten times those on public properties.

EAB Management Recommendations

- Monitoring for EAB using purple trapping techniques will no longer be utilized in Brown County by the State of Wisconsin; however resident reports as well as staff investigations will play an important role.
- Remove trees in poor condition initially, and then begin a pre-emptive removal strategy over a multi-year time period. An estimate to undertake this would be $37,000 annually if undertaken over 5 years. This cost would decline to approximately $21,500 if the time frame were lengthened to 10 years. An understanding in undertaking this management strategy is that other urban forestry operations may need to be suspended during this time frame.
- Replacement of all ash trees that are removed should be a priority. Replacement trees should be 2" balled & burlap stock of a diverse species selection. The approximate annual cost for utilizing this size nursery stock would be close to $43,000.
- Chemical treatments of public trees may be allowed by the private sector with proper authority and understanding. The Village should take great consideration in the determination of chemically treating trees as this could be a very costly management strategy.
- Curbside collection of debris will most likely increase and this service will need to adjust accordingly as will the funding allocation for it.
- The yard waste site will also see an increase in materials and the associated service of grinding the debris will need to be increased.
- Natural and wooded park areas should be managed for public safety and natural regeneration.
- Research and incorporation of new wood utilization and disposal opportunities will need to be undertaken. This will provide some offset on costs incurred with debris management and disposal.

Funding & Budgetary Considerations

Current staffing, equipment and budgets are adequate to manage EAB and undertake the associated management recommendation. Diverting staff time and budget dollars to these operations will be the most efficient and fiscally responsible method of managing this situation. It must be understood that some services may need to be suspended for a period of time to accomplish these tasks.

The current Forestry Division budget is $83,700 for tree maintenance, removal, and planting. Annual budgets in the Recycling Division for curbside brush collection and yard waste disposal is $75,500.

The following table illustrates potential management options over varying time frames.

Table 1

Management Years	Remove All (annual)	Replace All (annual)	Treat All (annual)
1	$ 156,139	$ 370,514	$ 54,663*
5	$ 36,787	$ 79,662	$ 54,663*
10	$ 21,409	$ 42,847	$ 54,663*
15	$ 16,243	$ 30,535	$ 54,663*
20	$ 13,596	$ 24,315	$ 54,663*

*treatment costs increase annually as tree sizes increase with age (see Appendix A).

Public education and pre-emptive tree removal and replacement strategies over a multi-year time frame will help the Village of Howard weather this upcoming storm. By utilizing these management recommendations, the Village's urban forest will more quickly return to the value and benefit for the community and will not become a liability to the public. In addition, researching new avenues for wood utilization and debris disposal/uses is an opportunity for the village to offset costs and possibly even benefit financially.

Introduction

The Emerald Ash Borer (EAB) is an invasive wood boring beetle that feeds on the tissues under the bark of ash trees (*Fraxinus spp.*) killing them. This insect was confirmed in the state of Wisconsin in August of 2008 in the southeast part of the state. Since that time there have been many other locations of positive identification throughout the state, including the city of Green Bay. To date there has been no indication that EAB is affecting trees in the Village of Howard.

The Emerald Ash Borer Readiness Plan (EABRP) is a supplement to the Village of Howard's Comprehensive Urban Forestry Management Plan and Arboricultural Specifications Manual. This plan will provide guidance to the Village in preparations and following a confirmed detection of the insect, summarize management options, and provide potential utilization options for wood products and debris affected by EAB. Although this plan will provide management guidelines, this is not a mandate, it is flexible, and may be adjusted and updated as new scientific research and best management practices dictate so. A well-planned response can minimize the impact, reduce liability, spread out costs and lessen the overall cost of EAB.

The Village of Howard has shown its commitment to the proper management of its urban forest in the last two decades by the creation of an urban forestry program, inclusion of tree care ordinances in the municipal code, having an active tree board, employing a qualified urban forester on staff, and budgeting dollars to manage the program. This commitment is also shown by the acknowledgment of being named Tree City USA every year since 1992 by the National Arbor Day Foundation.

The components of an urban or community forest include street and park trees, green spaces, forested areas, as well as vegetation on residential, commercial, and other public and private properties within the community. Trees are managed to provide a continuing level of economic, environmental, and social benefits at the present as well as into the future.

By taking a proactive approach to this issue, the Village of Howard will be addressing the public and private needs of the community's urban forest in an efficient and fiscally responsible manner.

Purpose:

The purpose of the Emerald Ash Borer Readiness Plan is to be used as a guide to provide direction to Village officials, staff, and residents of Howard to manage the effects caused by the infestation of the EAB beetle. The main goal of the EABRP is to minimize the economic, aesthetic, and ecological impacts of EAB on the urban forest in the Village of Howard and neighboring communities.

Scope:

This plan will make recommendations for the management of the Village's tree resource and woody debris, public and private, from this time henceforth. This is a dynamic document and should be revised as needed as management recommendations and research dictate.

Definition of Terms

Arboricultural Specifications Manual: A document that enables the village to maintain and manage public trees and specifies the proper care and treatment of these trees.

Condition Class: A rating given to a tree that evaluates the overall health and structure of a tree. The Village uses six different classes: Excellent, Good, Fair, Poor, Critical, and Dead.

Conservancy/Natural Area: A village owned property that is left in a natural state and receives little or no maintenance.

Diameter Breast Height (dbh): The diameter of a tree's trunk measured at 4 ½' above ground. This is the standard measurement in the forest industry.

EAB: The emerald ash borer insect; as an adult it measures approximately ½" in length by 1/8" wide, is metallic green in color and somewhat bullet shaped. The larvae can reach a length of a little more than 1" in length, are white to cream colored, have a 10 segmented abdomen with a pair of brown, pincer-like appendages on the last segment.

EAB Cost Calculator: A cost management computer program developed by Purdue University to determine projected costs for various management schemes over multi-year management periods.

EAB Readiness Plan: A document delineating local EAB readiness activities and processes; includes scope & purpose, authority, responsibility, policies & procedures, actions/tasks, available resources, technical references & support information and similar content.

Hazard Tree: A tree with a structural defect that may cause said tree, or tree part, to fail and strike a target. A target is typically a person or something of value. Trees are not considered hazardous if no target is present.

***i-Tree Streets*:** An urban forestry analysis and benefit computer software program developed by the USDA Forest Service. This program focuses on the ecosystem services and structure of a municipality's tree population. It makes use of a tree inventory to quantify and put dollar value to trees' annual environmental and aesthetic benefits, including energy conservation, air quality, carbon dioxide reduction, stormwater control, and property value increases.

Live Crown Ratio (LCR): The relative proportion of the green crown of a tree to its overall height. Generally, healthy trees will have a LCR of 50% or greater.

Management Unit: The village is divided into seventeen management units to provide for management, maintenance, and efficiency of urban forestry operations.

Marshalling Yard: A storage location for woody debris until processing, utilization, or disposal can be undertaken. A marshalling site should to be large enough to accommodate large volumes of wood debris, typically several acres in size. It is recommended to fence the area to prevent unauthorized dumping and to protect the public from accessing potential dangerous equipment.

Other Village Property Tree: A tree located on other village property with the exclusion of a park, street, or Village Green Golf Course.

Park Tree: A tree located within a village's park boundary. Typically only trees within manicured areas of a park are included in the tree inventory and do not include trees in natural and wooded areas of a park.

Quarantine Area: A defined geographic area from which goods may not be transported; ***quarantines*** will be established by federal and state agencies to restrict ash wood movement out of infested areas to avoid emerald ash borer infestation of new areas; ***quarantines*** are usually applied to a county or an entire state.

Street Tree: A public tree that located within the street or road right-of-way. Typically street trees are located in the street terrace or boulevard. Some street trees have been planted on private property through written agreement where insufficient room was available in the right-of-way or outside of the right-of-way on village property.

Terrace: The lawn area in the road right-of-way between the street curb and the sidewalk, or where the sidewalk would be if none exists.

Tree Inventory: A collection of various data about the trees located on public properties. This data includes tree species, location, size, age, and condition.

Tree Maintenance Permit: A permit issued by the Forestry Division to any non-village employee or contractor hired by the village to perform any work on public trees.

Tree Value: The value of a tree at present time as calculated utilizing the *i-Tree Streets* software program which utilizes the Council of Tree and Landscape Appraisers (CTLA) plant appraisal formulas.

Urban Forestry Management Plan: A multi-year (usually five years) plan that directs the management and operations of the Urban Forestry program.

Village Green Golf Course: The village owned nine-hole golf course.

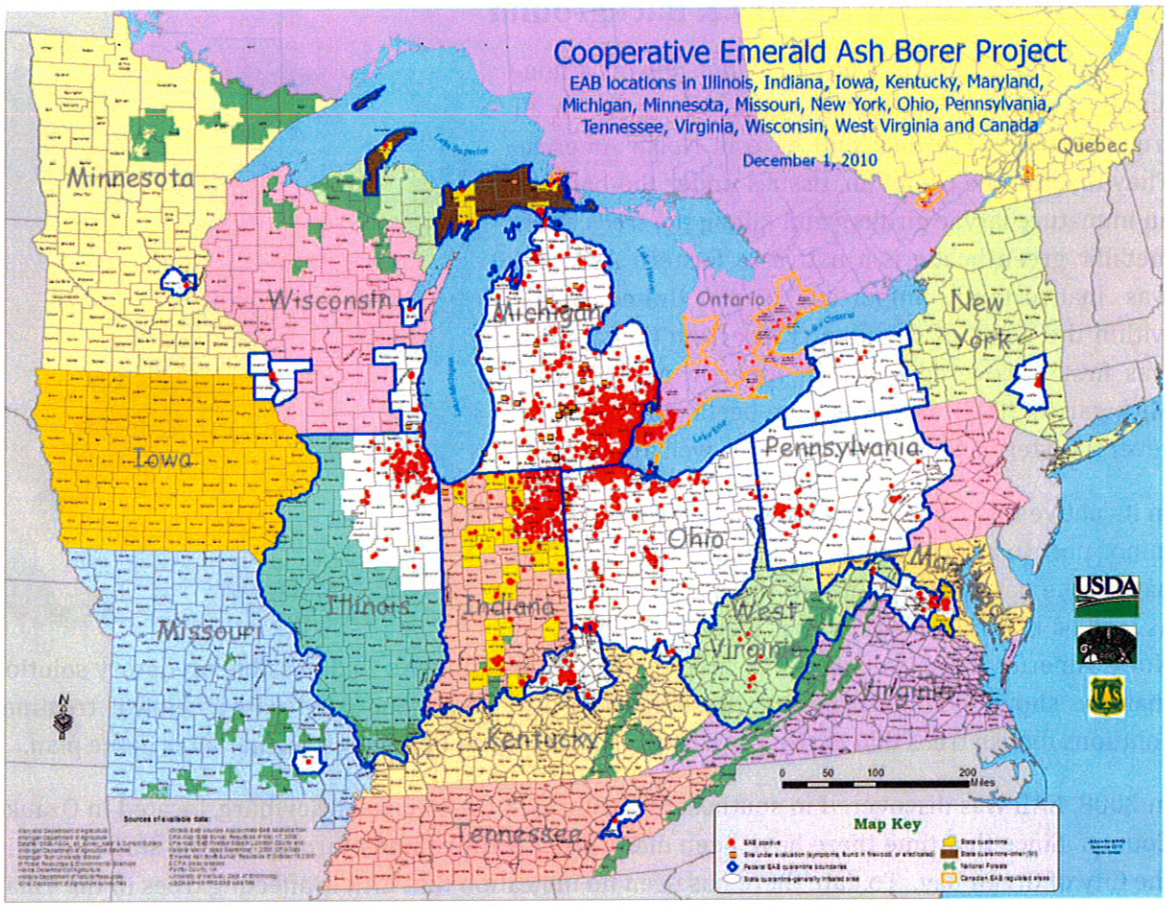
Emerald Ash Borer History & Background

The Emerald Ash Borer *(Agrilus planipennis)* is a non-native invasive wood boring beetle that feeds on all true ash trees *(Fraxinus spp)* here in North America. They feed on the cambium, tissues under the bark, as an immature larvae girdling and killing the trees. This metallic green beetle is a native to Eastern Asia and was inadvertently imported to the United States within the wood of shipping crates from China. EAB was first discovered in North America near Detroit, Michigan in 2002. Since then the beetle has spread to several eastern and Midwest states as well as Canada.

In its native range of Eastern Asia, EAB is considered a minor pest to a variety of plant species. This is due in part to the natural resistance of the native ash in Asia as well as natural predators that feed on the EAB. In North America there is ongoing research that is just beginning to find possible predatory solutions that are showing some promise. Research has also been conducted with chemical treatment solutions for ash trees that is also promising. This topic will be covered further later in the plan.

In 2008, EAB was discovered in southeast Wisconsin in the Village of Newburg, located in Ozaukee County. Since that time there have been many other positive finds throughout the state, including the City of Green Bay. To date there has been no indication that EAB is affecting trees in the Village of Howard. Because EAB locations are ever-changing as new infestations are located, up-to-date maps can be viewed at https://onlineservices.datcp.wi.gov/eab/article.jsp?topicid=25 .

Figure 1: Adult Emerald Ash Borer



Wisconsin forests contain more than 770 million ash trees, nearly 7 percent of the state's tree population. It is estimated that the ash population within Wisconsin's urban forests is approximately 5.2 million trees; 20 percent of the overall urban forest population on public and private lands. According to Wisconsin's EAB Information Source the loss of the ash in the urban forests would cost property owners and taxpayers:

- $1.5 billion for tree replacement.
- $776 million for tree removal and disposal.
- $13 million per year to reduce pollution, absorb storm water runoff, and lower heating and cooling costs due to lost tree canopy functions.

Historical evidence has proven that EAB is fatal to our native ash trees regardless of size, age, and health of tree, and can kill the host tree within 2-4 years. In the Midwest more than 50 million ash are dead or dying to date due to EAB.

Description and Lifecycle of EAB

The Emerald Ash Borer adult is dark metallic green in color and belongs to a group of wood boring beetles known as Buprestidae. Adults are approximately 1/2" long and 1/8" wide with very short antennae. The larvae are white in color with flattened segmented bodies and may grow to a length of one inch.

Adults emerge through the bark of ash trees in early summer, creating a D-shaped exit hole in the process. Adults live approximately 3 weeks and have been observed into August. Adults are most active during the daytime under warm, sunny conditions and have been seen feeding on the ash tree leaves. Mating occurs soon after emergence and females will begin to lay eggs about 2 weeks after emergence. A single female can produce between 60 and 90 eggs within that 3 week time frame.

Figure 2: EAB D-Shape Exit Hole

Eggs hatch in 1-2 weeks, and the tiny larvae bore through the bark and into the cambium - the area between the bark and wood where nutrient levels are high. As the larvae feed they wind back and forth, creating characteristic serpentine galleries in phloem and outer sapwood. The larvae feed under the bark for several weeks, usually from August through October. As mature larvae complete feeding they create a pre-pupal chamber in the outer bark or in the outer inch of wood and overwinter in this small chamber. Pupation occurs in spring and the new generation of adults will emerge in May or early June, to begin the cycle again on uninfested trees.

Figure 3: EAB Larvae

Unaided, the beetle moves relatively slowly across the landscape via flight, approximately one mile annually. However, humans greatly accelerate the spread of the insect by moving infested nursery stock, firewood and logs to un-infested areas.

Ash Tree Identification, Signs, and Symptoms

Ash trees are most easily identified by their compound leafs (leafs are composed of 5-11 leaflets) and opposite branching pattern where branches, buds, and leaves grow directly across from each other. The bark on mature ash trees is tight with a distinct pattern of diamond-shaped ridges. On young trees, the bark is relatively smooth.

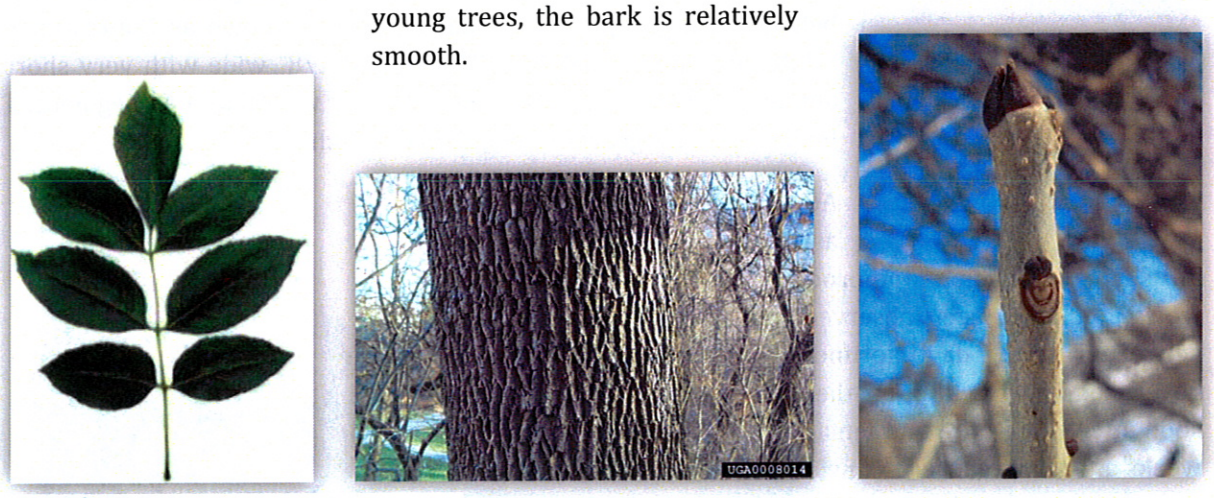


Figure 4 a,b,c: Ash Leaves, Bark, & Twig

It is important to remember that since EAB is a wood-boring insect and spends most of its life under the bark of the tree, it is difficult to detect in ash trees. It is also difficult to detect because the decline of infected trees is usually gradual. Looking for visible signs and symptoms is one method for detecting EAB. Symptoms of an infestation might include dead branches near the top of a tree; leafy shoots growing out from its lower trunk; or bark with a mottled appearance caused by woodpeckers looking for larvae.

Figure 5: Crown Decline Due to EAB

Figure 6: Epicormic Sprouts on Ash

Figure 7: Woodpecker Damage

D-shaped exit holes and bark splits exposing S-shaped tunnels are significant signs of EAB. The tunnels caused by feeding larvae interrupt the transport of nutrients and water within the tree during the summer causing thinning and die back in the tree's canopy.

Figure 8: S-Shaped Larval Galleries

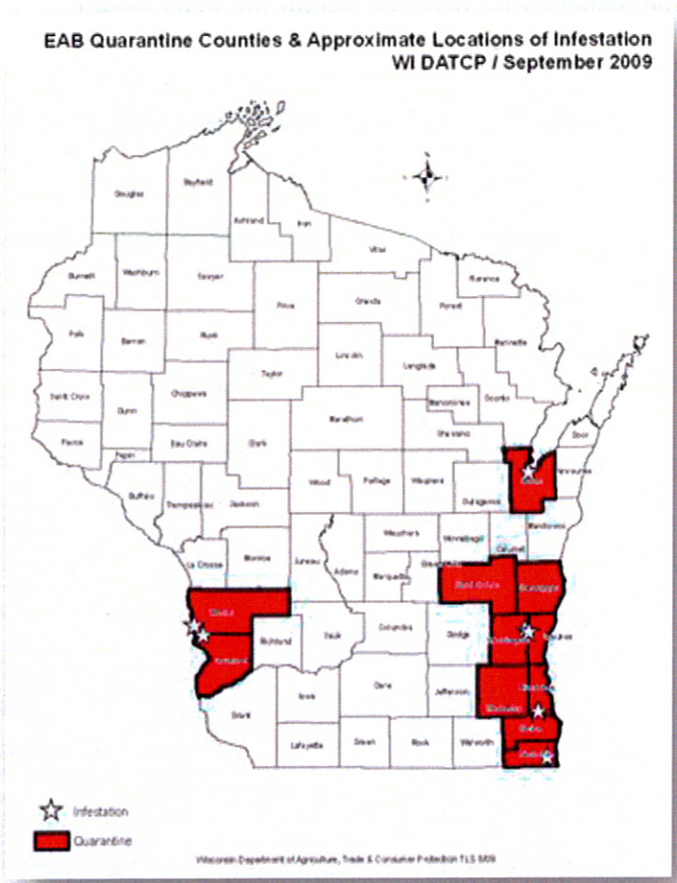
Authority, Confirmation, and Designation of Responsibility

The State of Wisconsin has developed an Emerald Ash Borer Response Plan that will govern the state and local government's roll in managing EAB. In addition, Village of Howard municipal code, Chapter 38: Vegetation, allows the village to monitor, locate, remove, and dispose of any nuisance, dangerous, and/or infested tree, whether on public or private properties.

The Village of Howard Forestry Division has been and will continue to work with communities throughout Brown County on regional EAB management recommendations. The focus of these recommendations is to provide common policies, current information, continued monitoring, and research of regional woody debris utilization options for residents of our communities.

Confirmation of EAB

An outbreak of EAB has impact at the local, state, and national level. A discovery of EAB in the Village of Howard or neighboring communities will require a cooperative effort between local, state, and federal departments and agencies. When EAB is found in an area, all three entities will play a role in the prevention and regulation of its movement. In addition, the statewide EAB Operations Group will provide coordination, support, and resources to these units.



When EAB is confirmed in the Village, the Wisconsin EAB Response Plan's modified Incident Command System (ICS) structure will be employed to meet immediate response needs. USDA Animal and Plant Health Inspection Service (USDA-APHIS) and the Department of Agriculture, Trade, and Consumer Protection (DATCP) will first notify any affected individuals, such as local officials, property owners, and key stakeholders, prior to the public release of information. Secondly, they will place the local county and possibly surrounding counties under quarantine. Because of an EAB find in the City of Green Bay in 2009, Brown County is currently in a quarantine status.

Quarantines & Regulations

Currently DATCP has issued quarantines for 11 counties within the state, however as new infestations are located additional counties will be quarantined. A quarantine is a system of rules administered through the USDA-APHIS and DATCP. These rules are intended to reduce or eliminate the spread of EAB to new locations through the inadvertent spread of infested wood products.

Wisconsin EAB regulations make it illegal to move or transport all ash materials, the emerald ash borer insect, and any hardwood firewood from an EAB quarantined area to a non-quarantined area without first obtaining a compliance agreement from DATCP. Regulated items include all hardwood firewood, ash logs, ash nursery stock, and all ash mulch, wood, or bark chips that are greater than 1" in diameter. For additional information on regulated products visit https://onlineservices.datcp.wi.gov/eab/articleassets/EasyGuideEABRegulations.pdf .

The Wisconsin Department of Natural Resources (DNR) further restricts firewood movement onto any DNR managed properties, forests, and recreation areas. DNR rule 45.045 prohibits the bringing of firewood onto any DNR properties from more than 25 miles away from that property or from outside of Wisconsin unless the wood is from a WI certified firewood dealer. See the Wisconsin Emerald Ash Borer Information Source website for more information on firewood regulations at https://onlineservices.datcp.wi.gov/eab/article.jsp?topicid=23 .

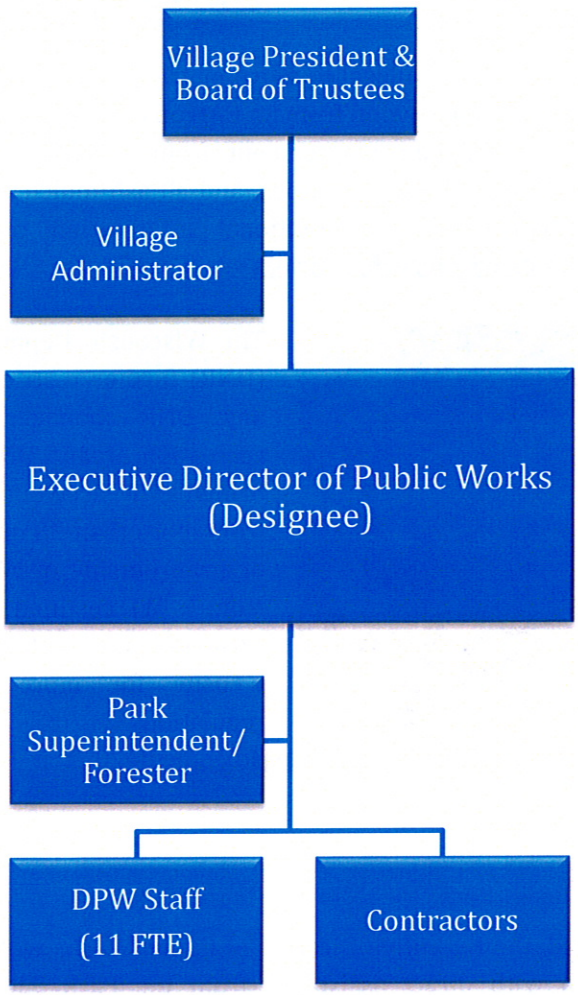
Local Responsibility Designee & Operational Structure

In the Village of Howard, the Executive Director of Public Works will be charged with the role of Designee for this plan with direct assistance from the Park Superintendent/Forester. This individual will function as the director for all village management, coordination, and operations with relation to EAB related activities. Some of these activities/duties will include:

- Coordinate with federal, state, and local officials
- Coordinate marshalling yard/disposal site(s) and utilization options
- Coordinate & prioritize work operations
- Designate & prioritize budgets/funding

- Education of residents
- Enforcement of ordinances
- Inform and update local press, residents, administration and elected officials

Field operations will be undertaken by the Department of Public Works (DPW) staff as these individuals currently perform urban forestry operations. Private contractors may also be needed to complete some field operations as they arise.



Staffing, Operations, and Equipment Assessment

The Village of Howard Department of Public Works (DPW) operations is staffed by the Executive Director of Public Works, the Park Superintendent/Forester, eleven (11) Streets/Parks Division employees, two (2) mechanics, and four (4) employees in the Water Division. In addition, fourteen (14) summer seasonal employees are employed during the summer months.

Urban forestry operations are currently directed by the Park Superintendent/Forester and undertaken by the Streets/Parks Division staff, with assistance from summer seasonal employees during those times.

Operations & Equipment

All urban forestry operations, including tree planting, pruning and maintenance, and removal, are performed with village staff. The Streets/Parks Division staff have received training in all aspects of urban forestry operations. Additionally they have been trained in the associated equipment use and safety, including aerial bucket truck, chipper, and chainsaw usage. Furthermore 16 of the 17 full time union employees hold a Commercial Drivers License. A few of the staff members have been trained in rope and saddle tree climbing operations, however they are not fluent with large tree climbing, thus limiting the effectiveness of this operation.

Stump grinding, digging of tree planting holes, and large tree climbing operations are currently contracted out due to lack of equipment, cost savings, and limited training respectively.

DPW currently provides curbside collection of woody debris (brush up to 6" diameter) to all Howard residents. This service is provided on a weekly basis from April through November annually. Curbside collection of Christmas trees is also done in January of each year. Wood chip debris generated from these operations is available to residents at no fee. There is also a yard waste collection site at the Public Works Facility where residents are allowed to drop off debris. At this time there are no issues with an over-abundance of wood chips or other woody material annually.

A debris grinding service is contracted up to three times annually to chip and grind the yard waste debris into a compostable material. This compost is made available to Howard residents at no fee as well as utilized for various landscaping operations within the village. Currently the amount of compost generated from this operation max's out the village's ability to use or dispose of it.

The DPW is appropriately prepared to undertake removal and disposal operations with regards to operational equipment. A listing of available equipment and recommendations is listed below.

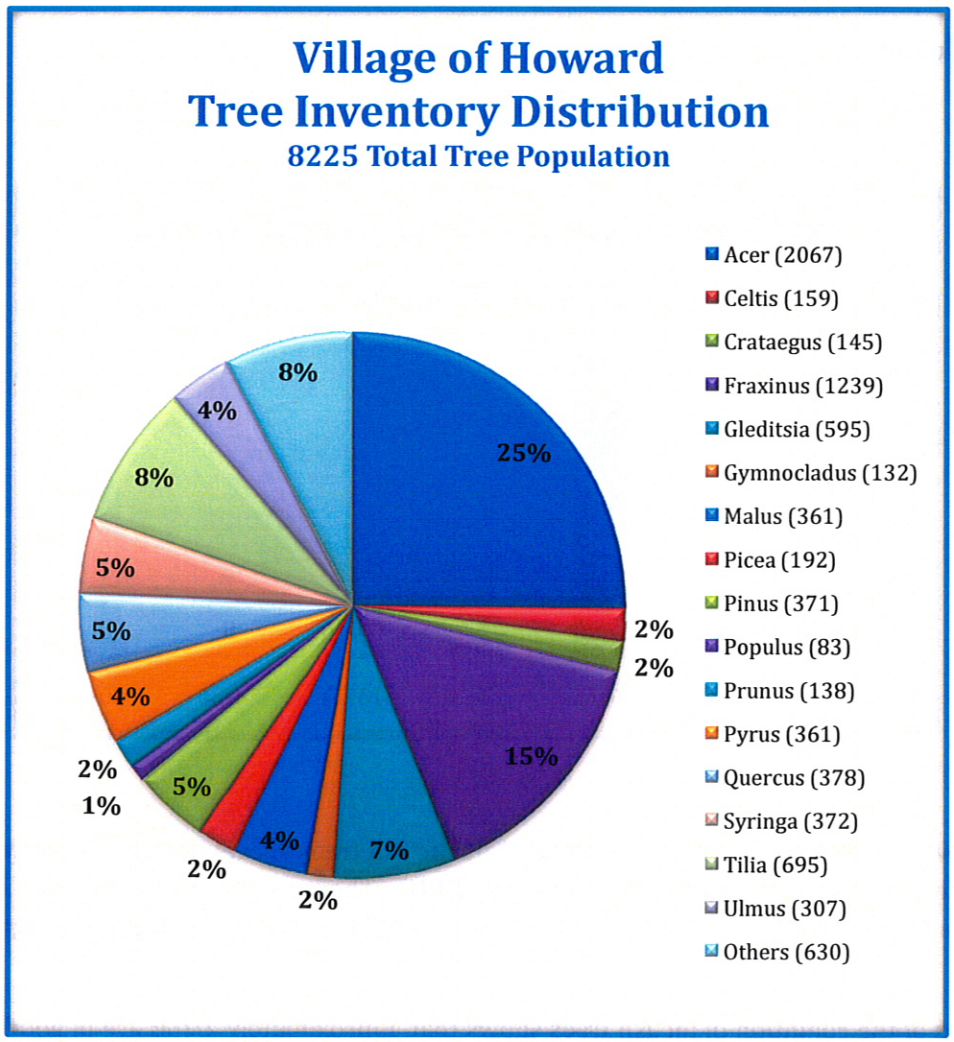
Table 2

Equipment	Description	Recommendation
Aerial truck	40' Hi-Ranger with 12' chip box	Rent/lease taller aerial truck as needs arise
Chipper trucks	(1) 8 yard landscape dump; (1) ten yard dump	
Dump trucks	(5) one ton; (2) five yard; (3) ten yard; (1) 19 yard	
Tractor loader	(3) articulated loaders w/ buckets, forks, and grapple forks.	
Toolcat / skid steer	One each with buckets, forks, grapple forks, and tree spade	
Chippers	(1) Conehead – 18" capacity; (1) Morbark – 12" capacity	
Chainsaws	(2) 020 Stihl; (1) 026 Stihl; (4) 034 Stihl ; (1) 362 Stihl ; (1) 660 Stihl	Upgrade the four 034 (medium size) chainsaws as these are outdated and utilize 40:1 gas mix (vs. 50:1)
Power pole saw	HT 75 Stihl	
Personal Protective Equipment	6 hard hats/helmets; 4 pairs of chainsaw resistant chaps; 2 pairs of chainsaw resistant pants	Purchase and update additional PPE as needed
Climbing equipment	(2) tree climbing saddles with associated ropes; climbing spurs	
Rigging equipment	Lowering device, ropes, and straps	Purchase additional equipment as needed

Ash Tree Inventory Assessment

The Village of Howard public tree inventory currently consists of a total of 8225 trees. These trees are located within the street right-of-way, in parks, on other village facility properties, and the Village Green Golf Course. Of these trees, there are 1239 that are of the ash (*Fraxinus*) genus. An analysis of the location data of all ash in the tree inventory shows that 1003 (81%) are street trees, 175 (14.1%) are located in the parks, 58 (4.7%) are on the Village Green Golf Course, and three (0.2%) are located on other village properties.

Graph 1



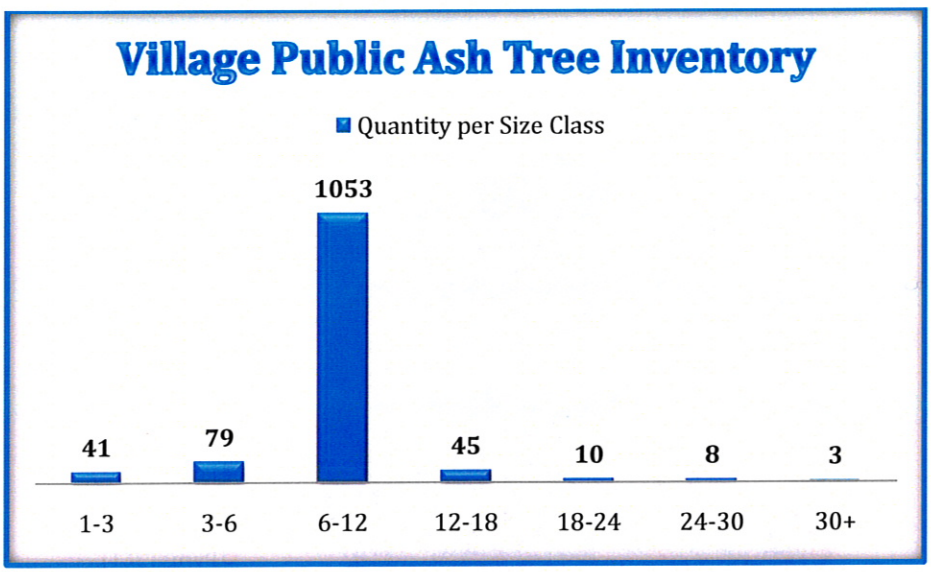
The optimal distribution percentages for a healthy urban forest inventory are 5-10-20 percent of any species, genus, and family respectively. As shown in the diagram above, the village's tree inventory is high in the *Acer* (maple) and *Fraxinus* (ash) genera.

In addition to the inventoried ash trees, a conservative estimate within the Village's conservancies, natural areas, and non-maintained park areas could be ten times that amount. These numbers could be looked at as insignificant though because of the Village's current management policy for these properties. At this point the Village manages these properties as native natural areas with little to no maintenance. In practice the only vegetation management has been hazard tree removal adjoining private properties and pedestrian trails on an as needed basis.

According to research, the quantity of ash on private properties can be estimated close to ten times that of those on public properties. This will have great significance with relation to woody debris disposal and utilization with both the curbside collection program as well as the yard waste site.

Size and Condition

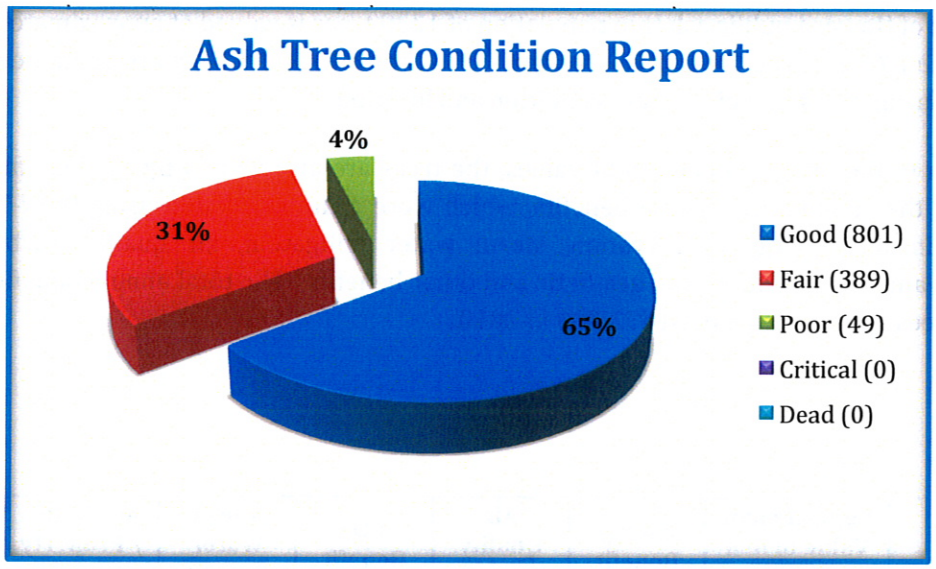
Graph 2



A breakdown of the diameter size classes of all public ash trees shows that the majority (1173) of them are less than 12" in diameter breast height (DBH). There are 45 trees between 12-18" DBH; 10 that are between 18-24" DBH; eight that are between 24-30" DBH; and three trees greater than 30" DBH.

An analysis of the condition of all ash trees shows that approximately 2/3rds are in good condition, while 31 percent are in fair conditions, and 4 percent are considered poor condition. At this time none met the criteria to be considered critical or dead.

Graph 3



Tree condition is a rating of the health and structure of an individual tree based on field observations. Five condition classes are used to rate trees within the inventory; good, fair, poor, critical, and dead.

Good: The tree is in good health and form for the species. This tree may have minor structural issues that can be corrected with proper maintenance.

Fair: The tree shows signs of some poor health issues and may have limited structural defects. This tree would benefit from proper maintenance and care.

Poor: The tree has some major structural issues and health problems. This tree will typically decline further and be susceptible to storm damage.

Critical: The tree is in very poor condition and has major structural or health issues. This tree is typically at the end of its life cycle and could be a liability.

Dead: This tree is dead.

Ash Tree Valuation Summary and Analysis:

The Village of Howard public ash tree population of 1239 trees is valued at approximately $627,675 utilizing the *i-Tree Streets* inventory program. The replacement values are estimates of the full cost of replacing trees in their current condition and location.

In addition to the overall replacement values, the trees are also valued by the benefits that they provide to the community. These benefits, which were again calculated using the *i-Tree Streets* program, include energy conservation, storm water mitigation, air quality, carbon dioxide reductions and sequestration, and aesthetic and other benefits. The total annual benefits provided by these trees approached almost $93,000 in 2010.

Table 3

Ash Inventory	Replacement Value of Ash Trees	Energy Benefit	Air Quality Benefit	CO_2 Benefit	Storm Water Benefit	Aesthetics / Property Benefit	Total Annual Benefit
1239	$ 627,675	$ 26,202	$ 3,867	$ 3,370	$ 22,270	$37,226	$ 92,934

Figure 9: Crown Decline Due to EAB

Management Recommendations

The following management recommendations are based on current scientific research and past management considerations undertaken by other communities already affected by EAB. These recommendations are for guidance purposes and should be evaluated and adjusted annually to achieve the desired results for the Village of Howard and the public.

Monitor & Detection

The State of Wisconsin has been conducting targeted surveys of high-risk areas since 2004. Surveys have included destructive sampling of girdled ash trees and deployment of the purple prism traps throughout the state[1]. Keeping up to date on the results of the state's surveying efforts will be Howard's main method for monitoring the spread of EAB in Wisconsin and its proximity to the area. In addition to monitoring efforts by DATCP, the Village of Howard Forestry Division will conduct field monitoring during our urban forestry maintenance and removal operations. Upon removal or pruning of an ash tree, visual inspections by field staff will be done by looking for signs and symptoms of EAB.

The Park Superintendent/Forester will investigate all reports of suspect ash trees in the community and make a determination as to whether the incident warrants further investigation by state EAB officials.

Residents are encouraged to report trees that exhibit visible signs & symptoms of EAB infestation such as crown thinning, vertical bark splits, D-shaped exit holes, dead and dying branches, woodpecker damage and epicormic sprouting (Signs & Symptoms hyperlink). Cases can be reported by notifying DATCP through their toll-free hotline, 1-800-462-2803 or by notifying the Village of Howard Forestry Division.

Tree Removal

Tree removal management options can by divided into two categories: preemptive or reactive management efforts. By preemptively removing ash trees before the arrival of EAB in the community, the strains placed on a community can be minimized and provide flexibility in tree budgets and labor efforts. In addition, it can potentially diminish the movement of EAB across the landscape by making it difficult for dispersing beetles to find host trees. This option would require public education and notification to affected property owners prior to action.

In contrast, reactive management delays actions taken until EAB has arrived. It usually entails removing a tree once it is dead or infested with EAB and could possibly mean higher tree removal costs.

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[1] As of 2011, the State of Wisconsin will no longer actively monitor utilizing traps for EAB in counties where a positive find has been made.

The advantages and disadvantages of conducting preemptive vs. reactive tree removals include the following:

Preemptive Removal Management	
Advantage: • Prolong removal costs over longer time frame. • Reduce issues with a large quantity of dead/declining trees at one time. • Smaller tree sizes mean cheaper removal costs. • Opportunity to start the replanting/recovery process right away. • Flexibility in organizing removal and routine work schedules. • Greater utilization options for products or use as a local source of firewood.	Disadvantage: • Immediate impacts to tree canopy and aesthetics. • Removing healthy ash may create a negative community perception. • Does not take into account that research may find an effective control of EAB.
Reactive Removal Management	
Advantage: • Delay the impacts to tree canopy and aesthetics. • Little negative public perception with removal of dead trees. • Delayed budgetary impacts until EAB hits. • Further EAB research may offer effective control, minimizing need for removals.	Disadvantage: • Removal costs for dead trees are significantly more compared to live ones. • If no action is taken to control EAB infestations, studies have shown that the rate of spread will be much faster. • Budget impacts can be severe once EAB is in community. • As trees grow, removal costs increase. • Replanting funds may not be available due to extreme removal costs.

It is recommended that the village uses a combination of these two removal management options to lessen the impact of EAB infestations on budgets and staff time. The Forestry Division should prioritize removal of poor condition ash trees as time and budgets allow. Resident request for street tree ash removals should also be authorized regardless of tree condition. Additionally, a pre-emptive multi-year removal plan would be an efficient and cost effective option. Upon confirmation of EAB in Howard, all dead and declining ash trees should be prioritized for removal for the safety of the public.

Removal of trees on private property shall be the responsibility of the property owner. Village of Howard Municipal Code of Ordinances shall be referenced and enforced for public safety and welfare.

Treatment

Another EAB management option is preventative insecticide treatment of ash trees. Research has shown that insecticides can be an effective treatment, however, it should be noted that controlling insects that feed under the bark with insecticides has always been difficult and success is not guaranteed.

Table 4: Insecticide Options for EAB

Products for Professional Use				
Insecticide Active Ingredient	**Product Examples**	**Treatment Frequency**	**Application Method**	**Environmental Profile**
Emamectin benzoate	TREE-age Restricted Use Pesticide	Every two years	Trunk injection	• Persistent in tree tissue, relatively immobile in the environment.
Azadirachtin	TreeAzin	Once per year	Trunk injection	• Classified as a biopesticide, minimal or no exposure or risk to non-target organisms, habitats, or water.
Dinotefuran	• Safari • Transtect	1 – 2 times per year	Bark spray, soil injection, soil drench	• Strong potential to leach into groundwater. • Potential exposure to water bodies through spray drift & runoff.
Imidacloprid	• Merit • Xytect 2F • Ima-jet	1 – 2 times per year	Trunk injection, soil drench	• Highly toxic to aquatic life. • Potential to leach into groundwater.

Products for Homeowner Use				
Insecticide Active Ingredient	**Product Examples**	**Treatment Frequency**	**Application Method**	**Environmental Profile**
Dinotefuran	Green Light Tree and Shrub Insect Control with Safari	Once per year	Granular soil applied product	• Strong potential to leach into groundwater. • Potential exposure to water bodies through spray drift & runoff.
Imidacloprid	• Bayer Advanced Tree & Shrub Insect Control • Bonide Tree & Shrub Insect Control • Ferti-lome Systemic Insect Drench • Ortho Max Tree & Shrub Insect Control • Gordon's Tree & Shrub Insect Killer	Once per year	Soil drench	• Highly toxic to aquatic life. • Potential to leach into groundwater.

The trunk injection method, which applies the insecticide directly into the tree's vascular system, provides the best and longest treatment. Research has shown that Emamectin benzoate (*TREE-äge™*) can be effective for two and possibly three years in northern climates. Local cost estimates for treatment with this product can range anywhere from $8 to $12 per diameter inch as of 2010. The cost of treating a tree for its lifetime would be a significant investment and should be carefully scrutinized as this is a long term investment and if treatment is stopped the tree will once again become susceptible to EAB.

It is important to note that research on insecticide management of EAB remains a work in progress. Scientists from universities, government agencies and companies continue to conduct intensive studies to understand how and when insecticide treatments will be most effective.

Due to the projected costs of treatment and the perpetual length of time, it would not be cost affective for the village to undertake this option on a large scale management scheme at this time. The Village may wish to treat specific trees or locations as are deemed important to the community. Property owners may be allowed to treat public trees with the understanding that a fee-free tree maintenance permit must be obtained from the Forestry Division. Along with the permit, there will be an understanding that any treated ash tree will be removed due to death or infestation by EAB if deemed so by the Forestry Division.

Wood Utilization & Disposal

Woody debris utilization and disposal options will be the largest hurdle for the Village to overcome when EAB begins its decimation of the urban forest. Several questions for the community to ponder include:

- What will be done with the increase in woody debris?
- How can the debris be best utilized?
- What are the most cost effective options?
- Where will this influx of woody debris be stored (marshalling yards)?

Current Forestry Division tree maintenance and removal operation procedures require staff to chip all brush on site and remove all generated debris with the exception of non-chipable wood. This wood is offered to the adjacent homeowner for their use. If the homeowner does not want the wood then it is transported to the Public Works Facility to be used as firewood, ground for landscape chips, or incorporated into compost material. Woodchips from forestry operations are made available to residents at the Public Works Facility at no fee.

With the potential large quantities of debris that may be generated from private properties, the curbside brush collection program and yard waste disposal site will need to be adjusted to accommodate the increases. A possible fee structure may need to be installed with the yard waste disposal site to cover these expected increases. Currently it is common knowledge that contractors and non-residents alike utilize this site fee free.

Contracting of the debris grinding will most likely need to increase to accommodate the increase in debris that is projected at the yard waste site. With this operation, there will also be an increase in wood chips and compost material that will need to be stored, utilized, and/or disposed of. Cost for contracting this service is charged on a time and material basis at $475/hour. For current operations over the past two years (2009-2010), Public Works has averaged two visits per year at cost of $12,775 per visit ($25,550 / year).

Additional options for wood utilization could be potential revenue generating operations for the Village. Revenues generated from these options would off-set some costs incurred from removal and disposal operations. Some of the options that should be researched would include selling marketable logs for lumber or portable sawmilling contractor, contracting with firewood processors and selling firewood, selling chip materials as boiler fuels or landscaping chips, selling compostable materials, as well as marketing wood products for local hobbyists and furniture builders. The Village will continue to work with neighboring communities throughout Brown County on these, and other, utilization options as well as possible marshalling yard disposal locations.

The DATCP quarantine for Brown County prohibits the movement of all ash materials, debris, and hardwood firewood across quarantine lines. This quarantine, and future quarantines, will need to be referenced when utilization/disposal options are looked at.

Reforestation & Planting

Re-planting efforts following tree removals on public properties should be of high importance in the Village. In determining species selection, nursery stock size, and planting locations, the Urban Forestry Management Plan, Arboricultural Specification Manual, and Master Planting Plan shall be referenced.

A moratorium has been instituted on the planting of any ash species on public properties within the Village of Howard. The Forestry Division instituted this policy in 2007 and will continue this practice until research dictates a change.

Current Forestry Division policy for tree replacement is to install a 2" caliper balled and burlap tree at the location where a tree is removed. If this location is not appropriate for a tree, then the planting location is adjusted or the tree is not installed. Average cost for this operation is around $175 per tree; this includes the

tree, labor, and equipment to install. If the Village replaces all 1239 inventoried ash trees on public properties, today's cost would be estimated at $217,000.

Adjustments could be made to the tree replacement policy to install a smaller caliper tree; 1 ½" bare root that will typically cut the overall tree replacement costs by almost 48%. This however, will result in smaller replacement trees that may not be viewed favorably by the residents of the community.

The current annual budget for tree planting is $5000 for tree purchasing; not including labor and equipment. With this budget figure, approximately 45 – 2" caliper balled and burlap (or 90 – 1 ½" caliper bare root) trees can be purchased per year. If the village were to stay status quo with these figures it would take 27years (or 14 years respectively) to replace all 1239 ash trees.

Natural regeneration will play a significant role in reforestation of natural areas and wooded parks.

Management Recommendation Summary

- Monitoring for EAB using purple trapping techniques will no longer be utilized in Brown County by the State of Wisconsin; however resident reports as well as staff investigations will play an important role.
- Remove trees in poor condition initially, and then begin a pre-emptive removal strategy over a multi-year time period. An estimate to undertake this would be around $37,000 annually for 5 years. An understanding in undertaking this management strategy is that other urban forestry operations may need to be suspended during this time frame.
- Replacement of all ash trees that are removed should be a priority. Replacement trees should be 2" balled & burlap stock of a diverse species selection. The approximate annual cost for utilizing this size nursery stock would be close to $43,000.
- Chemical treatments of public trees may be allowed by the private sector with proper authority and understanding. It is not recommended for the village to undertake this option on a community wide scale due to the associated costs and projected time frame. The Village may wish to treat specific trees or locations as are deemed important to the community.
- Curbside collection of debris will most likely increase and this service will need to adjust accordingly as will the funding allocation for it.
- The yard waste site will also see an increase in materials and the associated service of grinding the debris will need to be increased.
- Natural and wooded park areas should be managed for public safety and natural regeneration.
- Research and incorporation of new wood utilization and disposal opportunities will need to be undertaken. This will provide some offset on costs incurred with debris management and disposal.

Funding

With the arrival of EAB within the Village of Howard, and surrounding communities, there will be an impact to the current tree removal and disposal budgets. In order to minimize these budgetary impacts, the Village will have to utilize cost effective management practices as well as finding creative wood utilization options that may offset some of these costs.

The current Forestry Division budget is $83,700 for tree maintenance, removal, and planting. This funding can be re-directed exclusively for EAB removal and replanting efforts. By doing this, other urban forestry operations may have to be suspended until future time and funding allows.

The Recycling budget for curbside collection and contracting the grinding of yard waste and associated debris is $75,500. An increase in this operation may be necessary as additional debris and materials will increase at the yard waste site as well as require additional curbside collection.

EAB management cost reports for street and park trees were prepared using the Emerald Ash Borer Cost Calculator developed by Purdue University (Appendix A). Five different reports were calculated for management time frames of one, five, 10, 15, and 20 years respectively. Each report further provides three management options and associated costs for the current ash inventory in the Village. See the following table for a summary of these costs.

1. Remove All: Remove all ash trees with no replanting.
2. Replace All: Remove all ash trees and replace all with new trees.
3. Treat All: Treat all ash trees with insecticides.

Table 5: Management Costs

Management Years	Remove All (annual)	Replace All (annual)	Treat All (annual)
1	$ 156,139	$ 370,514	$ 54,663*
5	$ 36,787	$ 79,662	$ 54,663*
10	$ 21,409	$ 42,847	$ 54,663*
15	$ 16,243	$ 30,535	$ 54,663*
20	$ 13,596	$ 24,315	$ 54,663*

*annual treatment costs increase per year as tree sizes increase with age (see Appendix A).

By using the cost calculator, it can be determined that it would take approximately five years to remove and replace all of the public street and park ash trees utilizing the current Forestry Division budget listed above.

Adjustments can initially be done within selected Divisional budgets, Forestry (Streets) and Recycling, to cover the costs associated with removal, disposal, and replanting. Wood utilization options and user fees are avenues to explore to offset increases in service costs. It is also important to keep in mind that tree removal costs typically increase as trees grow in size as well as removing dead versus live trees.

Public Education & Community Outreach

Public education and awareness is a vital tool in response to Emerald Ash Borer both before and after an infestation is discovered. The Village newsletter and website will be the key implement to keep the public informed on the most up to date information available. Pre-infestation information will be focused on informing the public on the existence of the problem and how spreading EAB can be prevented (i.e. moving firewood).

Once an infestation is discovered in the area additional educational materials will be made available to the public. This information will focus on policies and procedures related to wood disposal, hazardous trees and preventing further spread. The dissemination of this material will be done via the website, newsletter, press releases and signage at the yard waste site.

Summary

The Village of Howard is proactively preparing for the inevitable destruction of its urban ash tree forests by the emerald ash borer beetle. Through foresight and pre-planning, including the creation of this readiness plan, the Village will be better prepared financially and operationally when the need arises.

Because of a relatively young and properly managed Urban Forestry Program, the Village's public tree populations are quite diverse meaning that there is very little issues with monoculture plantings on public properties. The public ash tree population of 1239 trees is approximately 15% of the overall tree population and is a manageable quantity for the current budgets and staffing to control over a relatively short time frame. By following the recommendations outlined within this plan, there should be little impact or great surprises when EAB is found in Howard and begins to decimate the ash trees.

Public education and pre-emptive tree removal and replacement strategies over a multi-year time frame will help the village weather this upcoming storm. In addition, researching new avenues for wood utilization and debris disposal or uses is an opportunity for the village to offset costs and possibly even benefit financially.

For additional information and references on EAB, visit the following websites:

https://onlineservices.datcp.wi.gov/eab/

www.emeraldashborer.info

www.dnr.wi.gov/forestry/fh/ash/

www.aphis.usda.gov/hungrypests/EAB.shtml

www.stopthebeetle.info/

Appendices

A. Purdue University Emerald Ash Borer Cost Calculator – Assessment of EAB Management Options

B. Village of Howard Ash Tree Location Map

C. Village of Howard Public Properties Location Map

Appendices are available upon request; they were omitted to save space and resources.