

5 –YEAR EMERALD ASH BORER IMPLEMENTATION PLAN

FOR THE

CITY OF BURLINGTON, WI



Emerald Ash Borer Adult



D-shaped Exit Hole



S-shaped Tunnels



Treatments Do Work

**PREPARED BY: WACHTEL TREE
SCIENCE, INC. OCTOBER 2013**



Ash trees before EAB devastation – Belvedere Dr. – Toledo, Ohio – June 2006



Untreated Ash trees after EAB Peak – Belvedere Dr. – Toledo, Ohio – June 2009



Dead Ash at the first detection area near Newburg, WI
Detection Date July 2008 Photo taken July 31, 2012



Aerial view of the same area one year later (August 2013)

This is the outcome in heavy ash population forested areas where treatment options are not feasible.



**Woodpecker Activity
Town of Burlington**

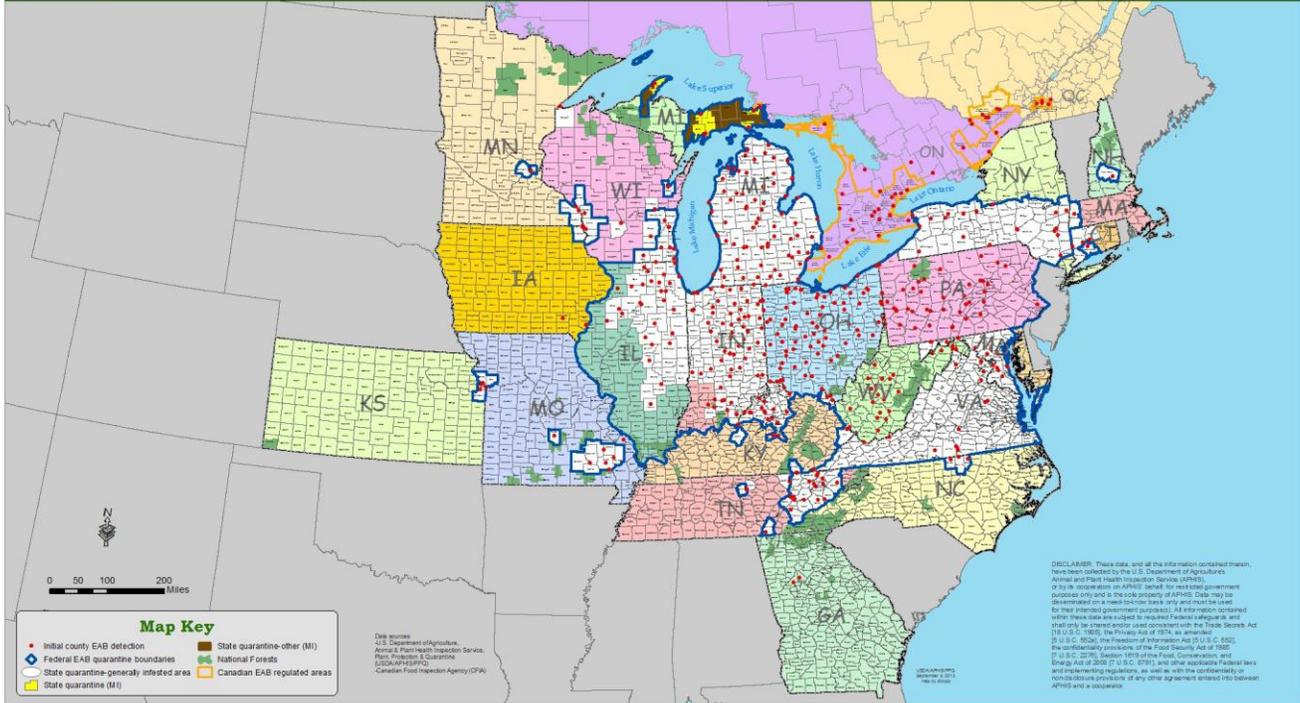


**Close-up of larval galleries
City of Burlington – July 2013**

**Emerald Ash Borer Quarantined Counties
August 2013**



Wisconsin counties quarantined as of August 15, 2013.



September 5, 2013 EAB Detections in North America



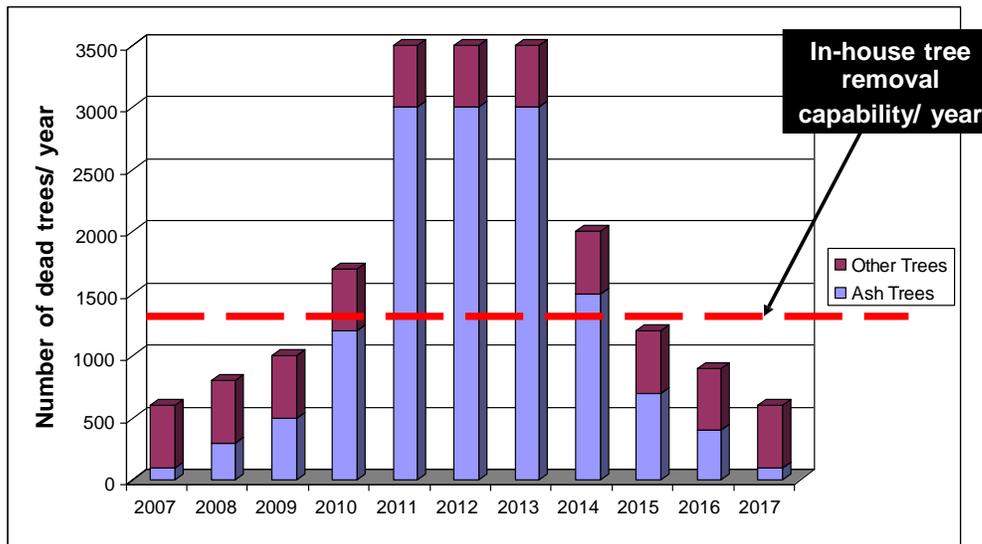
Actual Size of Adult Emerald Ash Borer in Relationship to a Penny

Graph Depicting How Community Resources Can Be Overwhelmed When EAB Population Explodes

No Treatment Option

Ash Tree Death Projection (2010)

Fort Wayne, IN



Courtesy Chad Tinkel - City Forester Fort Wayne, IN

The above graph shows that 3 to 4 years after EAB was discovered in the City of Fort Wayne, there is an exponential cost increase to the city as more contractors had to be hired above and beyond what the city could remove.

Below is another perspective from a City Forester in eastern Michigan, approximately 30 miles from the original discovery of EAB in Detroit.

“We had to use staff from other departments because we didn’t have the money upfront to contract out tree removals or to hire extra staff.” Tom Wilson, from Westland, Michigan, stressed how important and challenging it was to assign enough personnel to the task of facing EAB. He reassigned 4 people from his 18-person streets department and sent them over to work on tree removals full-time. It was only when these additionally-staffed city crews fell behind that contracting was used to keep up with the work. A word of warning from his experience: “When contracting, keep in mind sudden, urgent, high-volume demand for service can make contracted removals more expensive and less available. Disreputable firms commonly appear.” Other municipalities shared an experience similar to Westland’s. These and other communities affected by EAB were left with many tasks and services undone and major purchases deferred.

The City of Burlington needs to take the lead on managing the public ash population and cannot simply let EAB run its course. The long term affects are too costly, and the short term affects without treatment and removal detract from the City's credibility.

EAB in and around Burlington

EAB was identified in Burlington during the Geographic Information System (GIS) inventory of the public trees in late July 2013. Below is a listing of confirmed municipalities in the region:

<u>Municipality</u>	<u>Municipality Type</u>	<u>Date Confirmed</u>
Brighton	Town	6/21/2012
Bristol	Village	4/10/2013
Burlington	City	7/30/2013
Burlington	Town	4/10/2013
Caledonia	Village	7/26/2011
Delavan	City	6/13/2013
Fontana	Village	6/25/2012
East Troy	Town	7/16/2013
Elkhorn	City	7/15/2013
Genoa City	Village	7/16/2013
Kenosha	City	7/23/2009
Lake Geneva	City	6/11/2012
Linn	Town	8/8/2012
Lyons	Town	4/10/2013
Pleasant Prairie	Village	6/28/2012
Randall	Town	7/16/2013
Salem	Town	5/29/2013
Sharon	Village	6/13/2013
Somers	Town	7/26/2013
Twin Lakes	Village	7/10/2012
Walworth	Town	6/7/2012
Walworth	Village	4/18/2013
Wheatland	Town	6/27/2012
Whitewater	City	6/26/2013
Williams Bay	Village	4/19/2013

What Communities in SE Wisconsin are Currently Treating Public Ash Trees?

Oak Creek, Franklin, Milwaukee, West Allis, Wauwatosa, Shorewood, Whitefish Bay, Glendale, Fox Point, Racine, Kenosha, Janesville

Benefits of Emamectin benzoate (TREE-äge) Trunk Injection

- 2-year control for Emerald Ash Borer

- Affects only insects that are targeted and will not harm beneficial insects
- Can be applied in a wide variety of weather conditions
- No drift or runoff
- Can be used on larger trees that maybe difficult to spray
- Safe to use, mix and apply
- A wide time frame in which to make effective applications (late-May to mid-September in most seasons)

The City currently has two licensed applicators, once properly trained in the use of Emamectin benzoate (TREE-äge) they will be able to treat various other tree species for a myriad of insect problems. Some pests include: Bagworm, Birch Leafminer, Bronze Birch Borer, Clearwing Borers, Eastern Tent Caterpillar, Flatheaded Borers, Gypsy Moth, Leafminers, Pine Bark Beetles, Sawfly Larvae, and Two Lined Chestnut Borer.

Outdated Messages About EAB

Courtesy of J. Bradford Bonham, Certified Arborist from SW Ohio. Dr. Bonham has been a major public education spokesperson about EAB throughout the Midwest.

The following is a run-down of the most entrenched and problematic of the outdated messages that are still out there. If one or more of these points of conventional wisdom form the foundation of your management strategy, it's time for an update.

"Treatment doesn't work," or "Treatment is not 100%."

Leaving aside federal management of isolated infestations (like Maryland), federal funds for attempting eradication of this pest were pulled early in 2006. Prior to that, if you wanted to treat a tree to spare it from the eradication chainsaws, you would have had to prove that treatment consistently resulted in 100% larval kill in the treated tree (i. e., zero potential for adult emergence from the treated tree). The chance of re-infestation could not be tolerated.

"Treatment will lead to an insecticide-resistant population."

The population dynamics of EAB will not support resistance development. The vast numbers of insecticide-naive beetles emerging from natural areas and breeding with any insecticide-exposed-but-not-dead beetles will over-ride any trend toward resistance.

"Treatment isn't guaranteed!"

Neither are the antibiotics prescribed to treat pneumonia. University testing of products currently available has established that street-side ash up to 25" diameter at breast height (dbh) can be reliably brought through peak infestation. Testing is underway and is showing positive results on ash up to 55 inches dbh.

"Treatment is not environmentally sound."

Usually sourced to the internet, this claim sometimes alleges specific danger, while other times it is a moving target of vague, amorphous allegations. This recently released document should inject some well-tempered wisdom and reason into these discussions to dispel persistent myths.

http://www.emeraldashborer.info/files/Potential_Side_Effects_of_EAB_Insecticides_FAQ.pdf

"You will have to treat forever!"

Frankly in a municipal setting, you're simply talking service life. Pre-EAB, the average service life for ash in the Midwest was 25 - 40 years. Reliability of currently-available treatments suggests this service life can be preserved with confidence.

"Treatment is not cost-effective"

Early in the history of EAB, with what little was known about short or long-term reliability of treatment, this was true. Annual cost to treat in the commercial arena was in the range of \$12 - \$15 per inch dbh, and confidence in success was reserved for smaller trees. Even on a municipal scale, treatment could not be justified at the time.

However, research has progressed and market forces have caused annual treatment cost per inch dbh to drop drastically. Some communities are beginning to say, "Wait a minute, the budget consideration for this is not just the cost to remove ash trees, you have to add in stump grinding + cost of replacement trees + cost of installations, over a 6 to 10 year time frame. Not only will we be creating an even-aged stand of replacement trees with the attendant burden of first-decade care, we will lose property value, infrastructure value, ecosystem value, and in many neighborhoods, a sense of place."

Depending on the local removal and nursery market, the total cost for a remove/replace program (without considering the burden of creating an even-aged stand) may be somewhat more or less than the total cost of removing the decrepit stock and treating the remaining healthy inventory until they age out naturally. You must run your own numbers to assess this, but the prospect of spreading what would otherwise be short-term catastrophic costs out over several decades (and shifting removals back under normal management costs) has great appeal to finance committees, even if they don't understand the "conservation of services" which treatment ensures.

Resetting the Message

Conservation of healthy ash canopy is not only achievable, it is cost-effective. As such, it should be part of integrated forestry management plans. If your plan is outdated, give it an overhaul, and when you do, send out a press release to help reset the message. Many homeowners with ash trees will follow your lead for sensible decision-making.

"Reset" the information posted at your city website. Anything related to treatment options which is more than 2 years old should be pulled because it's freshness-dating has expired. Convey to your readers that anything they see touted on the internet as a "best" or effective treatment, but relying on old Extension fact sheets should be considered suspect. Currently, "old" is pre-2011.

Research on the reliability of treatment continues to improve. New products are under investigation and the work on bio-controls is very active. Take a moment every 6 - 12 months to seek out research updates, and "reset" your own professional knowledge base.

Quick Facts about Burlington's Public Ash Population

The City of Burlington is responsible for the management of all trees on its property. These trees include the following breakdown of the ash component:

- 821 total ash trees were identified and placed on the City GIS database.
- Of the 821 Ash there are 486 Green Ash; 322 White Ash; and 12 are European Ash
- 665 are located in the street ROW (right-of-way) and 156 are located in parks and other public properties.
- The ash trees make up 18.4% of the public tree species mix; 19.6% of street trees and 14.5% of park/public property trees

BURLINGTON ACTION PLAN (Five Year Projection)

Plan Components

1. Over the five year period, begin by removing and replacing, with a diversity of species, all public ash trees with diameters less than or equal to 5" dbh. The total trees in this grouping are 104 (8 parks/public property and 96 streets). These trees should be able to be removed by in-house staff. This work should be completed by spring 2014.

Option: If the public sentiment is there, an abutting property owner with ash trees in the terrace that are 5" dbh or less could have the option to have the trees treated by the City at their expense. The property owner would pay the City for the material cost and the City would cover the cost of the labor.
2. After Item #1 is completed, there are 213 ash trees with a condition rating of 65% or less that are 6" and greater dbh.. These trees should be removed by poorest condition and largest diameters first. The recommended schedule is:
 - 54 trees by spring of 2015 (all 60% or less condition rating)
 - 53 trees for each of the following years 2016, 2017, and 2018.
3. Replanting is an important component of the overall plan. Increasing species diversity is the desired goal. All 317 planned removals (all diameters, 65% condition or less) may not produce appropriate replanting sites. Some sites may be under overhead utilities, too close to driveway approaches or intersections or conflict with a mature yard tree. A realistic number of appropriate replanting sites are set at 250. Based on available funding, the planting of replacement trees may have to be spread out over multiple years beyond the five year plan. It will need to be determined if replanting can be accomplished with city forces, or because of time constraints, contract planting will be required.
4. Selectively, chemically treat with Emamectin benzoate (TREE-äge) 210 trees having a condition rating of 75% or greater based on size, location and significance. Treatment of these trees should begin no later than the 2014 growing season. In 2015, treat 294 trees having a condition rating of 70%. Trees require alternate year treatments so the trees treated in 2014 will be re-treated in 2016 and 2018. The trees treated in 2015 will be retreated in 2017.

Results, Costs and Discussion Points

- Following this 5-year plan will reduce the public ash tree population to 504 trees under treatment from the starting inventory of 821ash trees. This plan reduces the ash component to 11.3% of the total public tree population. It also keeps a significant proportion of the urban street tree canopy that currently exists. As trees are removed, treated trees continue to grow and replacement trees begin putting on new growth.
- Cost of implementation of the 5 year Action Plan - **\$382,850 or approximately \$76,570 per year (Option 1 - Contract); \$180,000 or approximately \$36,000 per year (Option 2 - Hybrid)**. The cost will vary from year to year due to the number and size of trees removed; the number of replacements and alternating years for treatment.
- Overall projected costs can be reduced if city forces are able to perform half the removals for trees over 6" dbh; carry out the treatments; and perform the replanting. (Option 2) These are discussions that will need to be held between staff and the City Council. There are (2) 5-year proposed budgets at the end of this section; the first is primarily contracted services, while the second is a hybrid of contracted services and in-house staff.
- After 5 years there will still be approximately 500 treated public ash. At that point it should be determined, based on the level of EAB activity, if these trees should continue to be treated indefinitely on an every other year basis (1/2 of remaining ash population per year) or removed and replaced. The cost of continuing treatment would average \$25,700 every year (contracted) or \$11,200 (in-house).
- City staff needs to access availability of qualified outside tree care firms for contractual work, additional training and equipment needs for removals and treatment, plus determine which programs may need to be reduced or curtailed if the EAB infestation becomes dramatic.

Condition of Ash Trees Sorted by Diameter Ranges

CITY OF BURLINGTON - ALL PUBLIC ASH INVENTORY - AUGUST 2013							
Condition Rating by Diameter (DBH)							
Condition %	Tree Count	1 - 5"	6 - 12"	13 - 18"	19 - 24"	25 - 30"	31"+
0%	1	1	0	0	0	0	0
35%	1	1	0	0	0	0	0
40%	1	0	1	0	0	0	0
45%	20	4	8	2	3	2	1
50%	2	0	0	1	0	1	0
55%	11	0	4	4	2	1	0
60%	27	2	14	4	4	0	3
65%	160	2	45	57	36	16	4
70%	331	37	168	94	26	5	1
75%	267	57	151	43	13	3	0
TOTALS	821	104	391	205	84	28	9

CITY OF BURLINGTON - STREET ASH INVENTORY - AUGUST 2013							
Condition Rating by Diameter (DBH)							
Condition %	Tree Count	1 - 5"	6 - 12"	13 - 18"	19 - 24"	25 - 30"	31"+
35%	1	1	0	0	0	0	0
40%	1	0	1	0	0	0	0
45%	14	3	6	0	3	1	1
50%	1	0	0	0	0	1	0
55%	9	0	4	3	1	1	0
60%	22	1	12	3	3	0	3
65%	143	2	41	53	29	15	3
70%	253	34	135	59	21	4	0
75%	221	55	122	32	9	3	0
TOTALS	665	96	321	150	66	25	7

CITY OF BURLINGTON - PARK/PUBLIC PROPERTY ASH INVENTORY - AUGUST 2013							
Condition Rating by Diameter (DBH)							
Condition %	Tree Count	1 - 5"	6 - 12"	13 - 18"	19 - 24"	25 - 30"	31"+
0%	1	1	0	0	0	0	0
45%	6	1	2	2	0	1	0
50%	1	0	0	1	0	0	0
55%	2	0	0	1	1	0	0
60%	5	1	2	1	1	0	0
65%	17	0	4	4	7	1	1
70%	78	3	33	35	5	1	1
75%	46	2	29	11	4	0	0
TOTALS	156	8	70	55	18	3	2

TREE REMOVAL CONTRACT COSTING			
(includes stump removal and restoration)			
DIAMETER CLASS	EST. DIAMETER INCHES	UNIT PRICE PER INCH	EXTENDED TOTAL
6-12"	688	\$20.00	\$13,760.00
13-18"	1034	\$24.00	\$24,816.00
19-24"	945	\$29.00	\$27,405.00
25-30"	539	\$34.00	\$18,326.00
31"+	279	\$40.00	\$11,160.00
TOTAL TREE REMOVAL			\$95,467.00

TREE REPLACEMENT

Contract replacement tree planting costs for a 2" caliper B&B (balled and burlaped) tree with a 1-year guarantee can vary from \$300 to \$450 per tree based on contract pricing reviewed over the past three-year period. For budgeting purposes, **an average of \$375 per tree** is being recommended. The City should consider contracting with the tree installer to provide supplement watering's of at least three times during the growing season if the City is not equipped to perform this task. If City forces are used to perform the planting and purchases trees directly from wholesale nurseries, the average cost per tree would be \$175. Labor cost from General Operating budget.

RECOMMENDED FUNDING NEEDS

Five Year Total = \$382,850 (Option 1) Average Yearly Allocation = \$76,570

Five Year Total = \$180,000 (Option 2) Average Yearly Allocation = \$36,000

Treatments (Contract) –

Trunk Injection; 210 trees (currently 2,300 DBH inches) @ \$9.00/DBH inch beginning Spring 2014 for trees with a condition rating of **75%** and continuing every other year for a minimum of three cycles = \$20,700 in 2014, 2016 and 2018. Alternate year trunk injection; 294 trees (currently 3,665 DBH inches) @ \$9.00/DBH inch beginning Spring 2015 for trees with a condition rating of **70%** and continuing every other year for a minimum of two cycles = \$33,000 in 2015, and 2017.

Total 5-years = \$128,100

Treatments (In-House) –

Spring 2014 - 210 trees (2,300 DBH inches) @ 7 ml/dbh inch = 16,100 ml.
Chemical cost per milliliter = \$0.56 or \$3.92/dbh inch
Total chemical cost = \$9,020 times three cycles = \$27,060

Spring 2015 - 294 trees (3,665 DBH inches) @ 7 ml/dbh inch = 25,665 ml.
Chemical cost per milliliter = \$0.56 or \$3.92/dbh inch
Total chemical cost = \$14,370 times two cycles = \$28,740

Total 5-year chemical cost = \$55,800 (doesn't include in-house labor cost)

Removals (Contract) –

(6" and greater DBH poor condition trees that are not recommended for treatment) – 213 trees = \$95,600

Removals (In-House) –

If one half of the 213 removals are performed using City forces, then the overall contract removal total cost would be reduced to approximately \$48,000

Note: Ash that are less than 6" in diameter (104 trees) are proposed to be removed by DPW staff under the General Operating budget.

Replacement Tree Planting (Contract) – 250 trees @ \$375/tree = \$93,750

Replacement Tree Planting (In-House) – 250 trees @ \$175/tree = \$43,750

Project Administration = \$32,000 (Contract); \$17,500 (In-house); if outside consultant is required

Contingency = \$33,100 (Contract); \$15,000 (In-house)

ASH TREE MITIGATION PLAN COST

CITY OF BURLINGTON - EAB INITIATIVE						
5-YEAR PROPOSED BUDGET - Contract Services						
Maintenance Activity						
YEAR	REMOVALS	PLANTING	TREATMENT	ADMINISTRATION	CONTINGENCY	BUDGET/YEAR
2014	in-house	\$18,750.00	\$20,700.00	\$4,500.00	\$4,000.00	\$47,950.00
2015	\$23,900.00	\$18,750.00	\$33,000.00	\$7,750.00	\$7,550.00	\$90,950.00
2016	\$24,000.00	\$18,750.00	\$20,700.00	\$6,550.00	\$6,450.00	\$76,450.00
2017	\$24,000.00	\$18,750.00	\$33,000.00	\$7,750.00	\$7,550.00	\$91,050.00
2018	\$24,000.00	\$18,750.00	\$20,700.00	\$6,550.00	\$6,450.00	\$76,450.00
TOTALS	\$95,900.00	\$93,750.00	\$128,100.00	\$33,100.00	\$32,000.00	\$382,850.00

Assumptions:

2014 (104) ash, 5" or less DBH removed by in-house staff; funding through general operation budget
 2015 (55) ash, 6" or greater DBH and 60% or less condition removed by contract
 2016, 2017, 2018 (53) ash per year, 6" or greater DBH and 60% or less condition removed by contract
 2014 (210) ash, 6" or greater and 75% condition treated by contract; retreat in 2016 and 2018
 2015 (294) ash, 6" or greater and 70% condition treated by contract; retreat in 2017
 Replacement planting (\$375/tree); will vary from year to year based on appropriate replanting sites; 50 trees/year

CITY OF BURLINGTON - EAB INITIATIVE						
5-YEAR PROPOSED BUDGET - Hybrid Contract Services/In-house Staff						
Maintenance Activity						
YEAR	REMOVALS	PLANTING	TREATMENT	ADMINISTRATION	CONTINGENCY	BUDGET/YEAR
2014	in-house	\$8,750.00	\$9,020.00	\$3,500.00	\$3,000.00	\$24,270.00
2015	\$11,950.00	\$8,750.00	\$14,370.00	\$3,500.00	\$3,000.00	\$41,570.00
2016	\$12,000.00	\$8,750.00	\$9,020.00	\$3,500.00	\$3,000.00	\$36,270.00
2017	\$12,000.00	\$8,750.00	\$14,370.00	\$3,500.00	\$3,000.00	\$41,620.00
2018	\$12,000.00	\$8,750.00	\$9,020.00	\$3,500.00	\$3,000.00	\$36,270.00
TOTALS	\$47,950.00	\$43,750.00	\$55,800.00	\$17,500.00	\$15,000.00	\$180,000.00

Assumptions:

2014 (104) ash, 5" or less DBH removed by in-house staff; funding through general operation budget
 2015 (28) ash, 6" or greater DBH and 60% or less condition removed by contract; (27) removed in-house
 2016, 2017, 2018 (22) ash per year, 6" or greater DBH and 60% or less condition removed by contract; (21) removed in-house
 2014 (210) ash, 6" or greater and 75% condition treated by in-house; retreat in 2016 and 2018
 2015 (294) ash, 6" or greater and 70% condition treated by in-house; retreat in 2017
 Replacement planting in-house (\$175/tree); will vary from year to year based on appropriate replanting sites; 50 trees/year
 Administration and Contingency costs reduced due to greater reliance on the use of City forces

RECOMMENDED REPLACEMENT SPECIES

Larger Maturing - No Overhead Utilities or Mature Overstory Trees Present			
COMMON NAME	SCIENTIFIC NAME	MATURE HEIGHT	PARKS
Ft. McNair Red Horsechestnut	Aesculus x camea 'Ft. McNair'	35-40'	X
Yellow Buckeye	Aesculus octandra	60-75'	
Bitternut Hickory	Carya cordiformis	60'	X
Northern Catalpa	Catalpa speciosa	40-60'	X
Chicagoland Hackberry	Celtis occidentalis 'Chicagoland'	40-60'	
Katsuratree	Cercidiphyllum japonicum	40-60'	
Turkish Filbert	Corylus colurna	40-50'	
Ginkgo	Ginkgo biloba cultivar (male only)	50-80'	
Skyline Honeylocust	Gleditsia triacanthos 'Skycole' PP 1619	50-60'	
Kentucky Coffeetree	Gymnocladus dioica	50-60'	
London Planetree	Platanus x acerifolia 'Ovation' or 'Morton Circle'	70-100'	
Eye Stopper Corktree	Phellodendron lavallei 'Longnecker'	45'	
Swamp White Oak	Quercus bicolor	75'	
Bur Oak	Quercus macrocarpa	60-80'	X
Hybrid Swamp x Bur Oak	Quercus x schuettei	75'	
Triumph Elm	Ulmus 'Morton Glossy'	55'	
Accolade Elm	Ulmus japonica x wilsoniana 'Morton'	70'	
Small Maturing - Overhead Utilities and/or Mature Overstory Trees Present			
COMMON NAME	SCIENTIFIC NAME	MATURE HEIGHT	PARKS
Ohio Buckeye	Aesculus glabra	35'	X
Robin Hill Serviceberry	Amelanchier x grandiflora 'Robin Hill'	20-25'	X
Cumulus Serviceberry	Amelanchier x lamarckii 'Cumulus'	20-25'	X
Musclewood	Carpinus caroliniana	25-30'	X
Amur Maackia	Maackia amurensis	20-30'	X
Adirondak Crabapple	Malus 'Adirondak'	20'	
Jackii Crabapple	Malus baccata 'Jackii'	25-30'	
Royal Raindrops Crab	Malus 'JFS-KW5'	20'	
Redbud Crabapple	Malus x zumi calocarpa	20'	
Ironwood	Ostrya virginiana	25'	
Ivory Silk Tree Lilac	Syringa reticulata 'Ivory Silk'	25'	