



Department of
Parks/Forestry & Recreation

Urban Forestry Policy Issues
&
Dutch Elm Disease Report
January 31, 2005

EXECUTIVE SUMMARY

There was a higher than average number of incidents of Dutch Elm Disease in 2004. The high volume was largely related to several weather related factors. For the five years prior to 2004, the average parkway elm losses were just under 3.5% annually. In 2004, the percentage of parkway elms lost jumped to just over 6.3%.

The increase in Dutch Elm Disease has led the City to review its current management plan. The plan states that its primary goal is to bring the City's urban street tree population to a "Fully Planted" status within 10 years (by 2012). The "Fully Planted" status equals a street tree population of 28,850 street trees. The total parkway tree population in Evanston currently stands at 26,729 trees. In addition, the policy states that a primary goal is to improve species diversity, long-term aesthetics and reduced risks from exotic pests. The proposed program would alter the current management plan.

Prior to the initiation of a new program, the City Council needs to determine which of the following policy options they will support:

1. **Prevent the spread of Dutch Elm Disease on public property.** The current policy is to remove trees infected with Dutch Elm Disease, and to replace infected trees per certain criteria listed in this report. The shift to injecting trees would involve a major policy shift to protect existing trees in addition to removing and replacing infected trees.
2. **Prevent the spread of Dutch Elm Disease on public property and on private property when they threaten public trees.** Currently, the City policy is to prevent the spread of Dutch Elm Disease on public property. The City does require private owners to remove trees that are infected with the disease. However, the City does not generally participate in the removal of the trees (with the exception of situations in which the owner has Dutch Elm Disease insurance). The decision to inject trees on private property would be another major shift in policy.
3. **Prevent the spread of Dutch Elm Disease to "signature" and stand-alone trees.** Many of the universities that were contacted mentioned that the general policy is to inject only "signature" trees, rather than a blanket injection program due to cost restraints. "Signature" trees have commonly been referred to as highly valuable trees that affect a property's value based on the tree size and location (proximity to main building). A recommended definition of a "signature" tree is proposed in this report. This potential objective would only address the spread of the disease to selected elms.
4. **Prevent the spread of all potential threats to tree species (including the Emerald Ash Borer and the Asian Long Horn Beetle).** In addition to Dutch Elm Disease, there are a variety of threats to tree species, including the Emerald Ash Borer and the Asian Long Horn Beetle. The Emerald Ash Borer has already been identified as a serious threat to ash trees in Illinois. It has killed over 16 million ash trees in Michigan within an approximate two-year timeframe. Another threat is the Asian Long Horn Beetle, which has been quarantined in Chicago and some isolated suburban locations. The City needs to make a policy decision as to whether or not all threats to the urban forest will be addressed. This could involve an extensive increase from our current resources.
5. **Utilize a cost-effective program that is within budget resources of the City of Evanston.** Develop a prevention program that effectively utilizes City funds to minimize the current threat of Dutch Elm Disease, as well as possible future threats outlined in this report.

Staff's recommendation is to implement an injection program that addresses the signature and stand-alone public elm trees, combined with the continuation of our sanitation program. This will achieve the most cost-effective program by balancing the financial resources available with the expert's most frequently recommended approach to managing our urban forest.

Financing

The proposed signature tree recommendation will require an expenditure of approximately \$360,000. The second cycle in year four will require an expenditure of approximately \$260,000. To finance this expenditure staff recommends several steps. First, either a separate special revenue fund or reserve account in the General Fund be established with an initial infusion of \$400,000 in one-time excess FY 2006 building permit revenues. As was pointed out in the budget, staff estimates that \$3 million in building permit revenues will occur in FY 2006 but only \$2 million has been budgeted because it is not believed this level of building permit revenues can be sustained in future budget years.

In the first year, \$360,000 of the \$400,000 will be expended and the remaining \$40,000 will establish a starting reserve. Over the next two years a \$110,000 transfer or expenditure in the General Fund will continue to be made, thereby accumulating another \$260,000 by the time the second application is needed three years later. To summarize, once the initial \$400,000 of building permit monies is used, an annual expenditure or transfer of \$90,000 from the General Fund will be adequate to fund this program beginning in the fourth year.

BACKGROUND

- 1) **Annual Overall Tree Losses.** The total parkway tree population in Evanston currently stands at 26,729 trees. During an average year, approximately 150 trees are removed due to reasons other than Dutch Elm Disease (DED). There are several reasons for these removals, and include general decline of the tree to a hazardous condition, vandalism, storm damage, vehicular accidents, old age, root disturbances, and other insect or disease problems. These losses represent approximately 0.5% of the total population.
- 2) **Current American Elm Population Data.** American Elms represent 12.72% of the overall parkway tree population, or 3,401 trees. If the total number of elm removals due to DED (listed in the table below) were added to the other additional 150 tree removals, the overall percentage of parkway trees lost averages 1.14% annually.
- 3) **Higher than Average Incidents of Dutch Elm Disease in 2004.** There was an extremely high incidence of Dutch Elm Disease in 2004. Citywide, approximately 800 American Elms showed signs of the disease in 2004. Of these, about 150 trees received “cut-outs” of the affected areas to attempt to save the trees and about 400 were on private property. The table below shows the losses of parkway elms for the past five years, both in number of trees and as a percentage of the overall parkway elm population.

Year	# Parkway Elms Removed	% Overall Population	Remaining Parkway Elms
2000	90	2.07%	4099
2001	179	4.37%	3920
2002	150	3.83%	3770
2003	139	3.69%	3631
2004	230	6.33%	3401

The high volume of parkway elm losses is largely related to these weather-related factors:

- a) Winters with several consecutive weeks of temperatures below 10 degrees Fahrenheit reduce the Elm Bark Beetle population. With the past succession of mild winters, a significant reduction in the beetle population did not occur.
- b) The early fall colors in 2003 masked the ability to recognize the visible symptoms of Dutch Elm Disease.
- c) The wet and slightly warmer weather in spring 2004 increased the moisture content in the vascular system of trees, which enabled the disease to move through trees rapidly.
- d) A new strain of the fungus (although unconfirmed at this point) that is far more aggressive may be present.

It is unknown whether this higher incidence of DED will continue, or if 2004 was an anomaly. However, if this type of high percentage incidence persists, Evanston could lose all of its parkway elms within the next 20 years.

- 4) **August 12, 2004 Administration & Public Works Committee Meeting.** A proposal to enhance Dutch Elm Disease Control through a fungicidal injection program was discussed.
- 5) **September 1, 2004 City Council Meeting.** The City Council reviewed a proposed fungicidal injection program for FY 04-05, a proposed tree inventory, and associated policy issues (including addressing elms on private property and rights of way). The City Council authorized staff to take the following actions during the current fiscal year:
 - a) Inject up to 100 elms at a cost not to exceed \$30,000 (88 trees were injected) and conduct a tree inventory at a cost not to exceed \$75,000.
 - b) Develop a Request for Proposals for a tree inventory of elms on alley right of ways, parks, and private property.
 - c) Develop alternatives for consideration which address elms on private property or rights of way, and 10” in diameter or smaller elm trees.

6) November 22, 2004 City Council Meeting. Staff developed a Request for Proposals to inventory trees within Evanston. The RFP 05-58 for Tree Inventory Services was sent out on December 9, 2004. The proposal was due on January 4, 2005. The potential of other tree problems, including an immediate threat to maple, oak, and others (Asian Long Horn Beetle) and ash trees (Emerald Ash Borer) led staff to develop a number of potential options for vendors. After careful consideration, the RFP requested costs for seven specific inventory options including:

- a) Locate, assess, and inventory all elm trees in parks and associated elm trees within a 50' radius of each Elm tree within City of Evanston parks.
- b) Locate, assess, and inventory all elm (and elm trees within a 50' radius) and ash trees within City of Evanston parks.
- c) Locate, assess, and inventory all elm trees in City of Evanston parks and parkways and elm trees within a 50' radius.
- d) Locate, assess, and inventory all elm and ash trees in City of Evanston parks and parkways and all elm trees within a 50' radius of elm trees on City property (including private property)
- e) Locate, assess, and inventory all trees located on City of Evanston parks and parkways
- f) Locate, assess, and inventory all elm trees within the City of Evanston (including private property.)
- g) Locate, assess, and inventory all trees within the City of Evanston (including private property.)

Each option was also to include a cost to provide the information in a Geographic Information System (GIS) format.

OBJECTIVES

Current City Policy

The City of Evanston's current urban forestry plan, which was written in 1999, states that its primary goal is to bring the City's urban street tree population to a "Fully Planted" status within 10 years. The "Fully Planted" status equals a population of 28,850 street trees. In addition, the plan states that a primary goal is to improve species diversity and long-term aesthetics, and reduce the risk of damage from exotic pests. In order to achieve the goal of a fully-planted status, staff has submitted a FY 2005-06 budget request for an additional \$97,000 for tree planting as directed by the City Council in May 2004. These additional funds will allow us to double the number of new trees planted each year from 325 to 650.

Current Objectives.

- To achieve species diversity in which no single species represents more than 10% of our urban street tree population on a block by block as well as a citywide level.
- To formulate, implement and continually evaluate both a general (citywide) approved species list as well as an approved species list on a block-by-block basis. The block-by-block approved species list would take into consideration both site and soil conditions, tolerances to environmental factors, and tolerances to other urban pressures specific to the block. Additionally, the block-by-block list will change as species diversity is achieved.
- To incorporate, within the boundaries of sound urban forestry practices, an element of choice for our citizens regarding the type of tree to be planted.
- The systematic replacement of trees lost to disease, storm or other reasons if there is sufficient room for new planting.

The current "Approved Species List" is attached and labeled Appendix A.

Potential Additional Objectives.

- **Revitalize and protect current public elm trees.** The current policy is to remove trees infected with Dutch Elm Disease, and to replace infected trees per the criteria listed above. The shift to injecting trees would involve a major policy shift to protect existing trees in addition to removing infected trees.
- **Prevent the spread of Dutch Elm Disease on public property and on private property.** Currently, the City policy is to prevent the spread of Dutch Elm Disease on all property. The City does require private owners to remove trees that are infected with the disease. However, the City does not generally participate in the removal of the trees (with the exception of situations in which the owner has Dutch Elm Disease insurance). The decision to inject trees on private property would, again, be a major shift in policy.
- **Prevent the spread of Dutch Elm Disease to “signature” and stand-alone trees.** Many of the universities that were contacted mentioned that the general policy is to inject only “signature” trees, rather than implement a blanket injection program, due to cost restraints. “Signature” trees have commonly been referred to as highly valuable trees that affect a property’s value based on the tree size and location (proximity to main building). The designation of a “signature” tree is very subjective in nature, but based on staff’s research, the following criteria could be used in defining this policy:
 1. The size of the tree equaling 30” or greater in diameter
 2. The location of the tree providing no threat from any root grafts*
 3. Trees adjacent to historic sites or structures
 4. Groupings of trees, regardless of size, that have a high aesthetic value*(Potential signature trees that have a minimal threat from a root graft may be addressed on an individual basis)

This objective would only address the spread of the disease to those elms selected as “signature”. Using the criteria listed, staff’s preliminary estimate of the number of public elms that would qualify as signature trees is between 1,100 and 1,300. The exact number can be determined once the survey of all public elms is completed.
- **Attempt to prevent the spread of all potential threats to tree species (including the Emerald Ash Borer and the Asian Long Horn Beetle).** In addition to Dutch Elm Disease, there are a variety of threats to tree species. The Emerald Ash Borer has been identified as a serious threat to ash trees in Illinois. It has already killed over 16 million ash trees in Michigan within about a two-year time frame. Another threat to several tree species (maples, elms, oaks, and others) is the Asian Long Horn Beetle, which has been quarantined in Chicago and some isolated suburban locations. There are currently approximately 26,700 trees on the parkway plus another estimated 5,000 trees in public parks. The City needs to decide whether or not all threats to the urban forest will be addressed.
- **Adopt a cost-effective program that balances the budget resources of the City of Evanston with a reasonable program to prevent all threats to the urban forest.**

Staff’s recommendation is to implement an injection program that addresses the signature and stand-alone public elm trees, combined with the continuation of our sanitation program. This will achieve the most cost-effective program by balancing the financial resources available with experts’ most frequently recommended approach to managing our urban forest.

DUTCH ELM DISEASE PREVENTION OPTIONS

- 1) **Existing Program: Sanitation Method.** The City of Evanston's policy regarding the control of Dutch Elm Disease (DED) has always concentrated on methods of sanitation. Historically, annual elm losses using only the sanitation method have averaged below 5% of the total parkway elm population each year.
 - a) **Steps.** This method involves three distinct steps to minimize the spread of the disease:
 - i) The first step involves intense scouting during the growing season to locate trees that are exhibiting early symptoms of the disease. The current procedure for DED scouting is to send two scouts into the field (one north and one south). Each scout has set routes to follow that allow them to inspect their entire area in two weeks. Once a tree is discovered with the symptoms, a sample is cut from a small branch exhibiting the typical yellowing and/or wilting leaves.
 - ii) The second step involves promptly testing the sample in a laboratory environment to determine if the DED fungus, *Ceratocystis ulmi*, is present. This pathogen causes DED. The testing process takes three to seven days. Once growth is observed, the laboratory technician reports the findings to the Evanston Forestry office.
 - iii) The third step involves the prompt removal of the tree after the presence of DED is confirmed. City of Evanston crews remove a diseased tree if the tree is on public property. If the tree is on private property, a certified letter is sent immediately to the resident. The letter includes a copy of the laboratory report and a copy of the City ordinance informing them that the infected tree must be removed within 30 days.

Typically, for an infected private tree, the entire process described above may actually result in a six- to seven-week time span from when staff tags the tree to when it is actually removed. For public trees, the typical time span between actually tagging the tree and the removal of the tree is approximately three to four weeks.
 - b) **Cut-Outs.** The only exception to the above process occurs when staff discovers a tree exhibiting symptoms in 5% or less of the tree canopy. Although a sample is taken and cultured, staff does not wait for the results from the laboratory. If the tree is on public property, a City of Evanston crew is dispatched within forty-eight hours of discovering the symptoms, and removes only the section of the tree exhibiting symptoms of DED. If the tree is on private property, staff attempts to contact the resident while at the property. If the resident is unavailable, staff leaves informational material that explains what they can do to attempt to save the tree. These "cut-outs" have proved to be successful nearly 70% of the time.
 - c) **Dutch Elm Disease Insurance Program.** To ease the financial burden of removing a diseased elm tree on private property, the City of Evanston instituted an annual Dutch Elm Disease Insurance program in 1984. The homeowner bears significant costs for removal when Dutch Elm Disease infects a tree on private property. Removal costs for diseased elms depend largely on exact tree location on an individual property. Prices can range from less than \$1,000 for a small- to medium-sized tree to over \$3,000 for very large trees. The insurance is for a one-year period and must be renewed annually prior to the Dutch Elm Disease season. As part of the insurance, the City provides free testing of an insured elm tree if DED symptoms appear. If symptoms are evident in 5% or less of the tree, the private owner may choose to try to save the insured tree by having a tree company cut out the diseased portions. Because of liability issues, City workers may not trim private trees. If the insured tree is too infected to save and requires removal, the City handles all aspects and costs of the removal. Removal is to "ground level" by a highly qualified, insured Tree Company. Removal of the in-ground stump is left up to the private owner.
- 2) **Proposed Fungicide Injection Program.** In recent years, a preventative technique has emerged in controlling the spread of Dutch Elm Disease. This treatment involves the injection

of a fungicide directly into the base of a healthy elm tree. The treatment prevents infection for a 2- to 3-year period. The injection treatment only prevents the tree from becoming infected via feeding by the Elm Bark Beetle, and does not “cure” a tree that has already been infected. Elm trees that are equal to or less than 10” in diameter cannot be injected. In addition, the injection treatment does not prevent infection via root grafts. Treated public trees could be infected by untreated trees on private property via root grafts, which are commingled roots. The effectiveness of any injection program is dependent on how many and exactly which trees are injected.

DUTCH ELM DISEASE INJECTION PROGRAM ISSUES

- 1) **Implementation Issues.** The injection program would significantly reduce the chance of infection. However, it will not cure a tree that is already infected. Therefore, if the City institutes an injection program there would be a period of time where previously infected trees will still need to be removed using the sanitation method. In addition, there would be a gradual transfer of job responsibilities in the Forestry Division from tree removal to tree injection plus tree removal.
 - a) **Unprecedented Program.** The proposed scale of a 100% parkway elm injection program in Evanston is unprecedented, according to research conducted from multiple universities and municipalities. (See attached spreadsheets for more information.) Fungicidal injections (Arbortect 20s) are generally recommended for stand-alone, “signature” trees. Some Universities recommend only treating trees of “high value.” Historically, the limiting factors have been the high cost per tree and the inability to trench to sever existing root grafts to stop root graft infection. The root graft zone for most trees will include roots which grow in a radius away from the tree one and a half times the distance between the trunk of the tree and its outer branch ends (drip line).
 - b) **Alternative Programs**
 - i) **Trenching.** Trenching can be accomplished either chemically or mechanically. Through the years the products used for chemical trenching were found to persist in the soil. This caused ground water contamination and these products have since been removed from the market. Mechanical trenching is performed with a machine which physically cuts a six inch wide trench to a depth of about three to five feet. Trenching is typically recommended on residential properties to stop the spread of infection via root graft from an infected tree to a healthy treated tree. This is practical when the trees root zones are unrestricted and have been able to develop to their full potential. Consequently, if trenching is needed to save a tree, enough of the root zone will be left to provide structural stability for the remaining tree and not create a potentially hazardous situation. Trenching has not been practical in a municipal setting due to the restricted growing conditions in the parkways. In most cases, 40%-50% of the root zone is under the street or sidewalk. Also, a majority of the city’s utilities are located in the parkways underneath City of Evanston public trees. As a result, mechanical trenching on municipal parkways is not practical due to the location of the existing underground utilities, limited root zones, and creating potentially hazardous situations.
 - ii) **Introduction of Resistant Varieties of Hybrid Elms.** Introducing resistant varieties of hybrid elms and other species of trees has shown to be the best way to manage the urban forest in the ever changing environment, especially as unforeseen insect and disease concerns evolve or are introduced.
 - c) **Span of Effectiveness of Injections.** The injections have been found to be effective for

two to three years. Therefore, in order to maximize effectiveness, the trees will need to be re-injected within this time frame.

- d) **Previously Injected Trees.** As stated previously, private property owners are currently permitted to inject their own trees. It is estimated that at least 160 trees in 2004 and approximately 30 trees in 2003 have already been injected. The previously injected trees should not be injected prior to two to three years from their first injection.
 - e) **Vulnerability from Untreatable Elms 10" or Less.** Elm trees 10" in diameter or smaller on private or public property are untreatable and are a potential infection source to treated trees through root graft infection. In order to minimize this potential threat, increased scouting will be required for 10" in diameter or smaller elm trees on public and private property within the root graft zone of elms treated on public property so they can be addressed in a timely manner.
- 2) **Elms on Public versus Private Property.** The potential injection program is complicated by the interconnection of trees on public and private property. In order to maximize the effectiveness of the injection program, all elms within a 50' radius (or within the root graft area) that are larger than 10" in diameter must be injected, whether they are on public or private property. A policy decision needs to be made as to whether elm trees on private property should be surveyed and/or injected. One method to help address the issue of private trees would be to have the fixed bid price the City of Evanston receives to inject public trees passed along to residents wishing to inject their own private trees. Another option would entail passing an ordinance to allow for the City's contractor(s) to enter private property. Please see the attached legal opinion (labeled Appendix B) for further information.
- 3) **Effectiveness of Injections.** Universities across the country recommend that fungicidal injections should be limited to treating "signature" and/or stand-alone trees because of the expense and the ability to restrict root graft infection from adjacent elm trees. In addition, researchers are determining if there are long-term effects from repeated injections. The sanitation method of control has shown to be the most effective management technique in this environment. Select trees can be managed in the right circumstances, but the generally accepted practice has been to continue to diversify the street tree population by maintaining any one species at 10% or less of the total street tree population. Also, introducing resistant varieties of hybrid elms and other species of trees has shown to be the best way to manage the urban forest in the ever-changing environment (i.e., future insect and disease concerns may evolve or be introduced). As painful as it may seem, some times it is better to let nature take its course. Please see the attached spreadsheet with research conducted on the effectiveness of the injection programs.
- 4) **Legal Issues.** In order to enter private property for the inventory and/or injections, an ordinance or resolution will need to be passed to provide the City with this authority. Please see the attached legal opinion for further information. Legal questions that need to be answered:
- a) **Will the City inject Elms on Public and Private Property?** The potential injection program is complicated by the interconnection of trees on public and private property. In order to maximize the effectiveness of the injection program, all elms within a 50' radius (or within the root graft area) that are larger than 10" in diameter must be injected, whether they are on public or private property. A policy decision needs to be made as to whether elm trees on private property should be surveyed and/or injected (including Chicago Transit Authority (CTA), Metropolitan Water Reclamation District of Greater Chicago (MWRDGC), METRA, and Northwestern University properties). An ordinance will need to be passed in order for the City's contractor(s) to enter the private property. Please see the attached legal opinion for further information (Appendix B).
 - b) **What are the Private Owners' Responsibilities?** What will the City require the private owner to pay for? Will the owner be responsible to inject within a certain number of days?
 - c) **Will the City permit the owner to initially have the tree girdled?** To help reduce the chance of DED spreading to the roots of a tree which has become infected by beetle

feeding, its vascular system can be girdled. This is accomplished by removing a 4"- 5" width of bark and cambium from the circumference of the tree above the root flare. As the disease is transmitted through the vascular system of the tree this will effectively halt the spread of the disease and kill the tree almost instantly. Girdling is generally about 75% effective. The reduced effectiveness is due to two reasons. The disease will travel faster through the vascular system of a tree during wet weather conditions. Also there are different strains of DED, some of which travel faster through the vascular system of the tree than others. Consequently the effectiveness of girdling depends on when symptoms are identified, how quickly the disease is moving through the tree, and when the tree is girdled. In summary, girdling kills the infected tree but helps prevent the spread of the disease to nearby elm trees.

- d) **If the City limits the number of trees that the City injects, how will the City define "signature" trees?** Most municipalities are currently limiting the number of trees that they inject to a few larger trees, defined as "signature" trees. If the City limits the number of trees that will be injected, the exact criteria must be agreed upon to define signature trees. The criteria listed on page 5 can be adopted as is, or altered based on further discussion.

ADDITIONAL THREATS TO THE URBAN FOREST

In addition to Dutch Elm Disease, there are a variety of threats to tree species, including the Emerald Ash Borer and the Asian Long Horn Beetle. The Emerald Ash Borer has been identified as a serious threat to ash trees in Illinois. It has killed over 16 million ash trees in Michigan within about a two-year time frame. A response team has already been developed for the Emerald Ash Borer in Illinois. As part of the response in Illinois, it is likely that municipalities will be required to identify all ash trees within their jurisdiction. Please see information attached. Another threat is the Asian Long Horn Beetle, which has been quarantined in Chicago and some isolated suburban locations. These beetles feed on hardwood tree tissue. Once the beetle has sufficiently bored through tissue that carries water from the tree roots and nutrients to the tree canopy, the tree dies. The City could be more proactive in protecting our urban forest against these threats by inventorying all tree species, rather than just elm trees.

Both of these exotic insect pests illustrate why species diversification should be maximized. Should either of these insects make their way into Evanston, the implications could be devastating to our tree population. Immediately following the last parkway tree inventory in 1999, staff developed an approved tree species list for parkway planting. At that time, it was discovered that maples, lindens, and ash trees already individually made up more than 10% of the overall population, so all three of these tree species were removed from the planting list. Additionally, since 1999, staff has been planting many different disease-resistant varieties of elms whenever they are available from area nurseries.

IMPLEMENTATION OPTIONS

If the City Council decides to inject elm trees, it needs to set an injection cycle. Please see the proposed options below. These options do not address the root graft issue, and do not include costs for private trees or the costs associated with diseased tree removals and replacements. Regardless of whether or not one of these options is pursued, the current policy regarding the sanitation method of disease control will remain in effect.

OPTIONS

Options 1, 2, and 3 are the most effective options based on private elms being injected.

1) Option 1: 100% City-Funded Program for Elms on City Parks and Parkways in One Year.

- a) Description: The City would fund 100% of the costs to inject all of the public elms once every 3 years. **This would provide the most protection.**
- b) Issues: Does not address root graft infection from trees on private property. Approximately \$1,029,600.00 would be needed for the program in the first year. In addition, trees that have already been injected (estimated at around 200 trees) would need to be brought into the injection cycle, which would require an annual additional budget allocation.
- c) Potential losses: Due to the length of time it will take to inject all the public elms, and the rapid spread of the disease early in the season, staff estimates that as many as 100 trees may still be lost due to DED in 2005.
- d) Estimated injection costs over 3 years: \$1,091,600

2) Option 2: City-Funded Program for One-Half of Elms in Parks/Parkways Each Year.

- a) Description: The City would fund 100% of the costs to inject one-half of all public elms each year within a two-year period.
- b) Issues: Does not address root graft infection from trees on private property or trees already injected on the parkways/parks. Approximately \$514,800.00 would be needed for this program in the first year. The first year requires a higher level of costs for removal and replacement of trees before injections are effective. In addition, trees that have already been injected (estimated at around 200 trees) would need to be brought into the injection cycle.
- c) Potential losses: Using the average annual losses over the past 3 years (4.6%), staff estimates losses will be 155 trees in 2005. Losses should be reduced to less than 50 trees in 2006.
- d) Estimated costs over 3 years: \$1,092,044

3) Option 3: 100% City-Funded Program for the Injection of One-Third of Elms in Parks/Parkways each year within a Three Year Period.

- a) Description: The City would fund 100% of the costs to inject one-third of all public elms each year for three years.
- b) Issues: Does not address root graft infection from trees on private property and those that have not been injected on the parks/parkways. Approximately \$343,200.00 would be needed for this program in the first year. The first year requires a higher level of costs for removal and replacement of trees before injections are effective. In addition, trees that have already been injected (estimated at around 200 trees) would need to be brought into the injection cycle.
- c) Potential losses: Using the average annual losses over the past 3 years (4.6%), staff estimates losses will be 175 trees in 2005 and 100 trees in 2006. Losses should be reduced to fewer than 50 trees in 2007.
- d) Estimated costs over 3 years: \$1,060,797

4) Option 4: Inject Signature and Stand-Alone Trees.

- a) Description: The criteria used to define “signature” trees have been proposed, but have not been agreed upon and approved. Stand-alone are defined as an elm that does not have another elm tree within its root graft zone.
- b) Issues: Does not address root graft infection from trees on private property in some instances. This option will exclude a significant number of elm trees.
- c) Estimated costs: Approximately \$360,000 in 2005. Costs to re-inject the trees using City of Evanston staff in 2008 is estimated at \$260,000.

5) Option 5: 50/50 Program for Parkway Trees and/or Private Trees.

- a) Description: A 50/50 cost share program for parkway and/or private trees could be generated for interested residents. Elms would be injected on a first come-first served basis.
- b) Issues: Does not address root graft infection from trees on private property. While this option would potentially cost less than options 1-3 listed above, it does not fully address all of the issues. Payment methods would need to be addressed. In addition, a policy would need to be developed to address low/moderate income residents in order for them to participate in the program. This plan also does not fully address the issue of elm trees within 50’ of injected trees, whether they are public or private.
- c) Costs: Costs to be determined based on the number of trees designated per year.

6) Option 6: Existing Sanitation Program.

- a) Description: Continue existing sanitation program with no tree injections.
- b) Issues: Does not address the increased number of trees being infected by the disease.
- c) Costs: Current annual forestry budget includes the cost for the sanitation program.

INJECTION COSTS/BUDGET ISSUES

Estimated Injection Option Costs (Over 3 Years)

Option	Year 1	Year 2	Year 3	3 Year Total	Year 4 Cost
1	\$1,029,600	\$15,000*	\$47,000*	\$1,091,600	\$610,000
2	\$514,800	\$530,244	\$47,000*	\$1,092,044	\$305,000
3	\$343,200	\$353,496	\$364,101	\$1,060,797	\$203,500
4	\$360,000	\$15,000*	\$47,000*	\$422,000	\$260,000
5	TBD	TBD	TBD	TBD	TBD
6	\$0	\$0	\$0	\$0	\$0

*Previously injected trees in 2003 and 2004

Notes:

1. Estimates for options 1-3 are based on 3,300 projected elm trees in parks and parkways, and are also based on an average tree size of 26" diameter.
2. Estimates for option 4 are based on 1,200 projected signature and stand-alone elm trees on public property with an average tree size of 30" diameter.
3. All projected tree injection costs for the first 3 years are \$12 per inch for year 1, with a 3% increase for each of the following years.
4. **Year 4 costs are based on all injections being performed by City of Evanston staff using the same projections of the number and size of trees.**
5. Once this procedure is implemented, it must continue, unless it becomes ineffective or the City chooses not to continue the program due to financial constraints.

Issues

- 1) **Injection Costs.** The average size diameter of parkway elms is just over 26". The average cost to have a tree contractor perform an injection is approximately \$12.00 per diameter inch. Therefore, the average per tree injection cost would be about \$312.00. However, in order to remain effective the trees would need to be re-injected every two to three years.
- 2) **Cost.**
 - a) **Injecting all Elm Trees within 1 year.** Injecting elm trees within 1 year would maximize the effectiveness, but would require a large up-front expenditure.
 - b) **2- or 3-Year Cycle for Injections.** Maintaining injections on a 2- or 3-year cycle would put a small percent of elms in jeopardy of infection in the first years, but would spread the costs out over two or three years.
 - c) **Injecting only signature and stand-alone trees.** Does not address a significant number of public elms, but substantially reduces the costs for the program.
- 3) **Budget.** There is currently no funding for a tree injection program. This funding will need to be added to the budget. In the first year, contractors would implement the injection program. In that year, our staff would also be trained on injections. During the first season of the program there would be a gradual transfer of primary and secondary job responsibilities in the Forestry Division from tree removal to tree injection.
- 4) **Responsibility for Payment.**
 - a) **Private property.** A policy decision needs to be made as to whether private property owners will be required to inject their elms.
 - b) **Injection Costs.** In addition, a decision needs to be made as to whether the City or private property owner will be required to pay for injections. Injection options include:
 - i) City to inject public trees and no private trees.
 - ii) City to inject public trees. Private property owners would have the option to pay for injections on their own property.

iii) City to inject public trees. Private property owners required to pay for injections on their own property.

In addition, some type of financial incentive could be developed to promote private property owner compliance. For example, private property owners could be required to pay a certain percentage of the injection costs.

5) Reimbursements for Previously-Injected Public Elms. Private property owners are permitted to have elms injected on their own property and adjacent parkway, at their own expense. Staff has already received requests to reimburse private property owners for previously injected trees. A policy decision will need to be made as to whether or not these fees should be reimbursed. A possible solution to this issue would be to offer reimbursements to those residents who paid for the injection of their parkway elm only between September 1 and October 15, 2004, and if the same tree was scheduled to be injected by the City of Evanston. If residents could meet these conditions and provide the documentation to prove their tree qualifies, then the City of Evanston would offer reimbursement only at the \$9.91 rate paid per inch last fall.

TREE INVENTORY ISSUES/OPTIONS

Issues related to the tree inventory include the following:

- 1) **Need for Inventory.** Currently, the City does not have an accurate count of the number of elms in parks, alley right of ways, and private property (including Chicago Transit Authority (CTA), Metropolitan Water Reclamation District of Greater Chicago (MWRDGC), METRA, and Northwestern University properties). Prior to initiating an injection program, an accurate count needs to be conducted to indicate the geographical location and size of elm trees that will be injected. In addition, elms trees within a 50' proximity to potential injected trees must be identified.
- 2) **Other Tree Diseases.** In addition to Dutch Elm Disease, there are a variety of threats to tree species, including the Emerald Ash Borer and the Asian Long Horn Beetle. Please see additional information attached regarding both of these insects. The City could be more proactive in protecting our urban forest against these threats by inventorying all tree species, rather than just Elm trees. A policy decision needs to be made as to how far the City is willing to extend its resources to protect all trees.

One of the following inventory options needs to be selected. Options include whether to inventory elms and/or other tree species, and the location of trees to be inventoried (including trees on both public and private property).

#	Description	Est. # of Trees to be inventoried	Location of Trees	Other Tree Species
1	Locate, assess, and inventory all elm trees in parks and associated elm trees within a 50' radius of each elm tree within City of Evanston parks.	1,200	Parks and associated trees within 50' radius.	Not addressed
2	Locate, assess, and inventory all elm (and elm trees within a 50' radius) and ash trees within City of Evanston parks.	2,200	Parks and associated trees within 50' radius.	Ash trees
3	Locate, assess, and inventory all elm trees in City of Evanston parks and parkways and elm trees within a 50' radius.	6,200	Parks, parkways, and associated trees within 50' radius.	Not addressed
4	Locate, assess, and inventory all elm and ash trees in City of Evanston parks and parkways and all elm trees within a 50' radius of elm trees on City property (including Private Property)	12,600	Parks, parkways, and associated trees within 50' radius.	Ash trees
5	Locate, assess, and inventory all trees located on City of Evanston parks and parkways	30,800	All trees on parks and parkways	All tree species on public property in Evanston.
6	Locate, assess, and inventory all elm trees within the City of Evanston (including Private Property.)	12,200	All elm trees in Evanston	Not addressed.
7	Locate, assess, and inventory all trees within the City of Evanston (including Private Property.)	333,000	All trees in Evanston.	All tree species located in Evanston.

Staff's preliminary recommendation would be to negotiate with potential inventory contractors to perform option 5 with the additional request to identify all elm trees within a 50' radius of elm trees on City property (including Private Property). The estimated number of trees under this recommendation is approximately 33,000.

University Recommendations- Full Descriptions
Available Upon Request

Contact:

Parks/Forestry & Recreation Department
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Email: pdagostino@cityofevanston.org

DUTCH ELM DISEASE- UNIVERSITY RECOMMENDATIONS

University	General DED Control Recommendations	Recommendation Regarding Fungicide Injections
Cornell University	Management of DED requires a number of strategies including sanitation, control of the insect vectors, removal of root grafts, preventative fungicides, and use of resistant varieties.	Even though certain fungicides are capable of protecting elm trees from infection, this method should be carefully considered. The fungicide is very expensive and the tree is only protected up to 3 years. In addition, researchers question whether the creation of large wounds by drilling holes into the tree for the injection of the fungicide causes more damage.
Kansas State University	The key to controlling DED is sanitation. Pruning and trenching are other methods to preventing the spread of DED.	Tree injection is expensive, so only specimen elms should be considered for treatment. Furthermore, routine injections may cause permanent injury to the trunk and lead to discoloration and decay problems.
Michigan State University	Control of DED may involve the following steps: sanitation, root graft prevention and destruction, tree maintenance, insect sprays for beetles, and systemic fungicides. Sanitation is the most important and effective step in preventing the buildup of elm bark beetles. Studies show that over 50% of trees lost, particularly in communities with good sanitation and bark beetle control, become diseased via root grafts. Two recent studies on pruning have shown that 30% to 60% of the diseased tree can be saved, at least temporarily. Pruning must be done promptly within 1 to 3 days of first symptoms. Insecticide sprays may add little to DED protection because the difficulties in adequately covering all bark surfaces.	Arbortect 20-S and other closely related materials are an aid in DED control. Although there is still disagreement among researchers concerning the effectiveness of fungicides, they are clearly the least effective and most expensive method of DED control. In addition, presently registered methods of injection can cause severe physical injury to the tree. Systemic fungicides are not a cure-all and should never be used as a substitute for other control methods.
North Carolina State University	Recommends sanitation, kill root grafts, insect control, and planting resistant hybrid elms.	Fungicidal inoculation can be used in conjunction with sanitation, pruning, trenching, etc. Since the treatment must be continued every 2-3 years, and new injection wounds must be made each year, the advisability of this practice is questionable in North Carolina except for highly valued trees.

DUTCH ELM DISEASE- UNIVERSITY RECOMMENDATIONS

(Continued)

University	General DED Control Recommendations	Recommendation Regarding Fungicide Injections
Oklahoma State University	The primary emphasis in a community-wide DED control program is preventative action through sanitation. Prevention of root graft spread through trenching is another method to controlling the spread of DED. Early infections can be removed from elm trees by pruning. In addition to sanitation, the use of insecticides in late fall and in early spring can assist with control.	Fungicide injections are not recommended for trees with more than 5% DED symptoms or for trees infected via root grafts. While fungicide injections have been effective in protecting valuable, healthy elms in communities with intensive DED control programs, the injection process itself can cause irreversible damage to trees. Sanitation is the key to DED control.
Purdue University	Most important step to controlling DED is good sanitation. Recommends sanitation, insect control, preventing spread through roots, eradicant pruning, and fungicide injections on high-value trees.	The injection of fungicides can be done on a preventative basis for selected high-value trees located in high disease risk areas. Repeated injections are discouraged due to physical damage that results from the injection process.
South Dakota State University	Sanitation necessary to prevent the spread of DED.	The disease can be managed by using preventative injections of Arbortect 20S or Alamo.
University of Illinois	Sanitation is a vital part of community-wide DED management. Pruning, if DED is detected early when less than 5% of the crown is infected, can be used to eradicate DED fungus. Root graft control is important to preventing the spread of DED.	Although there are many fungicides in the market, a literature review by Stennes and Haugen (Plant Disease Quarterly 2000), points to Arbortect 20S and Alamo as being the most effective. Keep in mind that the preventative injections move upward and are not effective against infections that come from the roots grafted to nearby infected trees. The drawback to using any of the current fungicides is cost and the fact that repeated injections may risk tree health. Fungicides are suggested only when high value trees are in danger and the community has an excellent sanitation and root graft control program.
University of Minnesota	Sanitation is the best approach to DED control. An important fact is that an elm infected through its roots cannot be saved, but a beetle-inoculated tree can be, through selective pruning, if detected early enough. Many of the elms supposedly saved by injecting chemicals were probably actually saved by pruning, which is part of the recommendation in chemically treating diseased trees.	Despite the progress on the chemical front, the economics of fungicide injection are entirely against the process, except for trees of high value. At a cost of \$10 per diameter inch, injections are expensive and not logical for entire populations of trees. Injection will not work in elms infected through the roots or when the fungus has already become established in the main stem.

FUNGICIDAL INJECTIONS FOR DUTCH ELM DISEASE BENCHMARKS

Municipality	Injection Program	Ordinance	# of Public Elms	Average # of Pkwy Elms lost	% Injected per Year	Budget for Injection	Comments
Chicago Park District	They use Dutch Trig.(1)	No.	16,000		2%	\$60,000	The elms in Grant Park and Burnham receive injections. Their program originally began as a study with Care of Trees. They will continue to treat the same trees each year for comparison with non-treated trees.
City of Highland Park	Yes. Trees are prioritized for injection based on size and location. They use Arbortect.	Yes, for sanitation only. It does not pertain to injection.	1,600		1% or app. 23 trees	\$9,500	They use an intense sanitation program with interns scouting private trees. Residents are required to remove a tree if has D.E.D. at own expense. If not removed w/in 30 days, City removes and bills resident. City has a low-income program to assist w/ removal costs. Lowest bid received was \$11.50 per inch for Arbortect. The City reports a 97% effective rate. They do not have enforcement for injections on private elms.
City of Winnipeg	Yes. The City injects high value healthy elms in parks & boulevards. They currently use Eertavas.(2)		62,225 parkway elms (167,000 total with private)	2,900	300 trees		The major components of their DED program include: surveillance, sanitation, pruning, basal trunk treatment, injections, reforestation, and public awareness. The city has an average elm loss of 2-3% each year.
Northwestern University	Uses Arbortect.	No.	100 private elms		8-10%		The work is contracted out. Funds come out of their landscape budget. The contractor charges \$15 per inch.
Village of Homewood	Village injects public elms with Arbortect.	Yes, for sanitation only. It does not pertain to injection.	88		10%	\$4,500	Since 2001, no Elms that were treated have been lost. The Village injects app. 10% of the elms based on landscape value, condition, location and future engineering projects. They use a combination of injection, drenching w/ Cambistat (3) and sanitation.

(1) Dutch Trig is a recently introduced DED preventative product. The cost is generally one-third of Arbortect; however, annual treatments are required. Product has no long-term track record, so results are still questionable.

(2) Eertavas is being used in Canada, but its use in this country has not yet been approved. The product must be injected annually.

(3) Cambistat is a growth hormone which slows the top growth of plants and promotes root growth, thereby creating a healthier growing condition for weak or stressed trees.

FUNGICIDAL INJECTIONS FOR DUTCH ELM DISEASE BENCHMARKS

(Continued)

Municipality	Injection Program	Ordinance	# of Public Elms	Average # of Pkwy Elms lost	% Injected per Year	Budget for Injection	Comments
Village of Northbrook	Yes. Village injects public elms with Arbortect. They do not pay for private injections.	Yes, for sanitation only. It does not pertain to injection.	180		35-45%	\$20,000	Since 2000, Village has injected 243 Elms and has lost 5. The 5 were lost because they injected elms when the tree was already infected. A contractor is used. They are charged \$10 per inch.
Village of Oak Park	Yes. Voluntary program for parkway trees.	Yes, for sanitation only. It does not pertain to injection.	3,200+	150		\$5,000	This year the Village has begun to use Arbortect in capital improvement areas after the root prune process. Very little money has been budgeted for this. All costs are paid for by resident at a reduced contracted rate. If a resident wants to inject their private tree, they do not get the reduced rate from the contractor.
Village of Skokie	Yes. Voluntary for public trees. 50/50 split. Private trees are paid by resident. They use Arbortect.	Yes, for sanitation only. It does not pertain to injection.	600+		10%	\$23,000	In 1995, the Village of Skokie implemented the American Elm Fungicide treatment program designed to help prevent the spread of DED. The treatment has a success rate between 70%-80% in preventing contraction of the disease. The treatment must be reapplied every two years to be effective.
Village of Wilmette	No. Spot use only. They use Arbortect.	Yes, for sanitation only. It does not pertain to injection.	1000+	100			Stated that sanitation methods worked well for their area. They felt that injections do not have enough studies to demonstrate effectiveness and are too costly.

FUNGICIDAL INJECTIONS FOR DUTCH ELM DISEASE BENCHMARKS

(Continued)

Municipality	Injection Program	Ordinance	# of Public Elms	Average # of Pkwy Elms lost	% Injected per Year	Budget for Injection	Comments
Village of Riverside	Yes. Injected public trees are chosen based on their proximity to previously infected trees, with all costs paid for by the Village.	Yes, for sanitation only. It does not pertain to injection.	997		1 – 2%	\$5,000	Sanitation is their primary control method. This year the Village has begun to address repeating treatments, as the current program only treats a tree once. Cost sharing was considered previously, but they decided against it.
City of Park Ridge	In proposal stage to do a 50/50 program for 1/3 of public elms over the next 3 years.	Yes, for sanitation only. It does not pertain to injection.	2,000	75		Still in proposal stage	As drafted, their proposal will only inject public trees that have no potential from root grafts from a neighboring tree unless that tree is also injected.
Village of Hinsdale	Yes. By request for public trees. 50/50 split. Private trees are paid by resident. They use Arbortect.	Yes, for sanitation only. It does not pertain to injection.	2,000		4 - 5%	\$25,000	Began program in 2000 with a combination of trees staff identified and those requested by residents. Most of the trees injected in 2004 were from resident requests. Losses in 2004 for treated trees were around 2%, while untreated losses were around 9%.
City of Elmhurst	Yes. 50/50 program for public trees.	Yes, for sanitation only. It does not pertain to injection.	2,500	100 (350 in 2004)	4%	\$46,500	Concentrate on sanitation method. Previously had a subsidy program that rebated either \$100 or \$50 based on a tree's proximity to an infected tree. Replaced this with 50/50 plan due to lack of participation.

FUNGICIDAL INJECTIONS FOR DUTCH ELM DISEASE BENCHMARKS

(Continued)

Municipality	Injection Program	Ordinance	# of Public Elms	# of Pkwy Elms lost per year	% Injected per Year	Budget for Injection	Comments
City of Lake Forest	Yes.	Yes, for sanitation only. It does not pertain to injection.	500 larger than 12" (less than 12" are not inventoried)	110	Varies based on size	\$2,000	They do some trenching only when practical. City will supply labor if resident pays for actual product used.