City of Baraboo
Urban Forestry Plan & Tree Inventory Summary

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Cover photo: Fall leaves of maple

EXECUTIVE SUMMARY

The City of Baraboo recognizes that trees provide important economic, social and environmental benefits that significantly improve the quality of urban life. Bluestem Forestry Consulting Inc. was contracted to complete a street and park tree inventory and prepare a management plan in 2010. This management plan and tree inventory marks a sincere commitment to Baraboo's urban forestry program. This document reports the findings of the inventory and makes specific, prioritized recommendations for managing the urban forest resource for 2011-2015 based on inventory findings, current staffing, budgets and tree circumstances.

Important points of the inventory and current tree management program include:

- A total of 6,281 trees, 45 stumps and 801 planting sites were inventoried.

- 1,302 trees (20.7%) are ash and are susceptible to Emerald Ash Borer. *The City stands to loose one in every five of its public trees due to EAB.*

- The forestry budget was $57,000 in 2010. This includes professional services, training/dues, trees/seed/sod and rents/leases. Recommended budgets for the next three years range from a low of $51,000 to $154,000. The recommended budget for 2011 is $154,796.

- There are 542 trees in need of immediate removal due to a high risk condition such as trunk cavity or severe dieback. This is 7.9% of total inventoried population. A typical first-time inventory averages removals between 5-10%. It will cost $130,900 over the course of two years to eliminate these hazards.

- 302 trees need to be pruned for safety reasons (5.9% of total inventoried population). A typical inventory averages 3-7% safety prune. It will cost $71,664 over the course of two years to eliminate these hazards.

- The estimated cost to manage emerald ash borer totals $621,379 (5+ year time frame). EAB activities are scheduled to begin following removals and priority prunes.

- Maple represent 38.5% of the total population. Recommended rates are not more than 5% of any one species and 10% of any one family. No maple of any kind should be planted excepting special circumstances.

STATEMENT OF PURPOSE AND SCOPE

The purpose of Baraboo's urban forest management plan is to recommend specific activities and designate responsibilities to properly manage the street and park tree urban forest. This plan includes specific, prioritized, inventory-based recommendations for managing the urban forest. It includes a multi-year budget outline and a directive for responsibilities and support needs. The Parks & Recreation Director and City administration will be responsible for implementation of this plan.

TREE INVENTORY

During the summer and fall of 2010, Bluestem Forestry Consulting Inc. conducted a street and park tree inventory. Areas that received an individual tree inventory included maintained (mowed) areas of parks and street rights-of-ways. Parks that were inventoried include: City View Park, Steinhorst Park, Langer Park, Deppe Park, Pierce Park, Weber Park, Campbell Park, Kiwani's Park, Broadway Park, Mary Roundtree Park, Attridge Park, Oschner Park & Zoo, Mary Hoppe Felts Park & Ritzenthaler Park. Wooded areas were not inventoried.

The following data was collected: address, street, genus/species, common name, clearance, condition, DBH, maintenance needs, overhead utility, priority rating and miscellaneous comments. The inventory did not include hazard tree inspections, but did note general health condition. To further aid in understanding the terminology associated with the inventory findings, a Glossary of Inventory Terminology can be found as attachment 2. A discussion of some of the overall inventory findings is below.

Diversity. Seventy-nine different species were inventoried within Baraboo's urban forest. This is a very diverse number of species; however, only two families represent 59.2% of the total population. Maple constitutes 38.5% of the forest and ash 20.7%. Ideally, the forest should be comprised of not more than 5% of any one species and 10% of any one family/genus. For illustration, maple is considered a family/genus and includes every different type of maple. Each individual maple such as sugar maple is considered a species. Limited species distribution could result in a population crash if an insect or disease were to attack any one particular species. In Baraboo, Norway maple is the most heavily represented of the maples with 1,391 trees or 22.1% of the total population.

Just such a scenario is being presented with the emerald ash borer. The State of Wisconsin has confirmed multiple infestation sites of Emerald Ash Borer (EAB), which attacks and is fatal to ash trees. Green ash is the most commonly found tree within Baraboo's urban forest and it represents 16.9% of the overall population. Green ash, white ash and black ash were identified thru the inventory and combined there are 1,302 ash (20.7%). **At present, *as a result of emerald ash borer (EAB) Baraboo will lose one in every five of its trees!*** The closest EAB infestation is in Victory, Wisconsin (Vernon County) approximately 100 miles from Baraboo. Once infested, ash trees die within a few years. It is not safe for communities to leave dead or dying ash on public property. Baraboo will be removing many ash trees within the next several years.

While this plan does discuss ash and the emerald ash borer, another document "City of Baraboo Emerald Ash Borer Readiness Plan" has been developed that specifically discusses that issue.

Tree Condition. Inventoried trees were classified as excellent, good, fair, poor, very poor and dead. Baraboo has 542 trees that need to be removed immediately for safety reasons (7.6%), the majority of which are in dead, very poor or poor condition. Ideally, no street or park tree should be in a condition of less than fair. Typically, when an inventory is completed a municipality can expect a removal rate of 5-10%. Most of the trees identified as removals are experiencing safety issues such as trunk cavity, trunk decay or major dieback. It is important to recognize that trees have a finite life span and they will eventually die. Baraboo's primary forestry goal is to provide a safe urban forest. To assure a safe forest for residents and visitors it is necessary to remove trees.

While it is impossible to determine if a tree will or will not fail, if a tree has been labeled a removal, it is exhibiting a significant defect that likely affects the structural integrity of the tree. Removals and priority prune (where a portion of the tree has significant defect that is correctable) need to be completed before any other forestry activity is undertaken.

While Baraboo does have tree removal needs, 16.4% of the population is in excellent condition, 37.4% is in good condition and 28.1% of the population is in fair condition. Overall, 81.9% of the population is in one of these three categories. This is an outstanding condition percentage and is attributed to the great care trees have received in the past. It was abundantly clear during the inventory that trees in Baraboo have been a priority in the past and special care has been taken to prune them properly. As a result, there are many large trees in exceptional condition. Baraboo can serve as an example of the benefits of proper pruning including increased tree health and longevity.

Tree Activity Priority. This inventory provides a clear overall look at Baraboo's urban forest and many items are recommended for completion. Many activities are recommended for completion and EAB adds additional layers of activities. To simplify the pecking order of activities, the following summary has been provided by year. A further description of activities and their associated costs can be located in Attachment 1: Schedule of Activities and in the accompanying 'City of Baraboo Emerald Ash Borer Readiness Plan.'

Activities to be Completed in 2011*:

Complete removals 0-15% (397 trees)
Complete priority prune 1 (203 trees)
Monitor/training prunes/staff training

Activities to be Completed in 2012:

Complete removals* ≥20% condition (145 trees)
Complete priority prune 2 (280 trees)
Remove/replant ash in poor/very poor condition (128 trees)

Monitor/training prunes/staff training/grind stumps

Activities to be Completed in 2013:
Remove/replant ash 1-6" dbh (132 trees)
Complete routine removals/prunes
Monitor/training prunes/staff training/plant trees

Activities to be Completed in 2014:
Remove/replant ash with overhead utilities (405 trees)
Complete routine removals/prunes
Monitor/training prunes/staff training/plant trees

Activities to be Completed in 2015:
Remove/replant 'fair' ash (252 trees)
Complete routine removals/prunes
Monitor/training prunes/staff training/plant trees

Remaining EAB Activities to be Completed in 2015-2018:
Remove/replant 'good' ash (594 trees)
or
Treat 'good' ash temporarily (594 trees)

*treat dash in excellent conditon when EAB in Sauk Co. (43 trees)

Construction Impacts on Trees. At the time of the inventory, some streets in Baraboo were undergoing street improvement. The roots and trunks of trees have been severely pruned and compromised, particularly trees along Wood Street.

This activity has adversely affected the health, stability and longevity of the trees. These trees will begin to decline rapidly in the next several years and can be expected to fail. Of most significance is the decline of structural integrity in the tree. Roots essentially serve two purposes. They act as a conduit for water and nutrition uptake for the tree and they serve to anchor the tree in the ground. The tree health will decline because of the limited water and nutrient uptake, but most importantly, these trees have very little rooting structure remaining to hold them upright in the ground. Even a minor windstorm event may cause these trees to uproot. Baraboo needs to evaluate which trees received the most extensive root pruning on construction projects and make removal decisions from this information. On future projects, it is essential that a forester be involved at the beginning planning stages and throughout street construction to assist with removal decisions and tree monitoring. Be sure that the construction specifications are clear and enforceable so that trees can be preserved.

Park Trees. Baraboo has fourteen parks property that were inventoried. There are 712 trees in maintained areas of parks. A breakdown of trees per park is:

Park Name	# of Trees
Attridge Park	59
Broadway Park	29
Campbell Park	28
City View Park	29
Deppe Park	11
Kiwanis Park	20
Langer Park	8
Mary Hoppe Felts Park	45
Mary Roundtree Park	70
Oschner Park & Zoo	338
Pierce Park	28
Ritzenthaler Park	11
Steinhorst Park	71
Weber Park	3

The Benefit of Trees. Much talk is made of the benefits of trees and recent research has been able to quantify the benefits. A few of the many benefits of urban forests include:

"The net cooling effect of a young, healthy tree is equivalent to ten room-size air conditioners operating 20 hours a day."—*U.S. Department of Agriculture*

"Landscaping can reduce air conditioning costs by up to 50 percent, by shading the windows and walls of a home." —*American Public Power Association*

"If you plant a tree today on the west side of your home, in 5 years your energy bills should be 3% less. In 15 years the savings will be nearly 12%." —*Dr. E. Greg McPherson, Center for Urban Forest Research*

"A mature tree can often have an appraised value of between $1,000 and $10,000." —*Council of Tree and Landscape Appraisers*

"In one study, 83% of realtors believe that mature trees have a "strong or moderate impact" on the salability of homes listed for under $150,000; on homes over $250,000, this perception increases to 98%." —*Arbor National Mortgage & American Forests*

"Landscaping, especially with trees, can increase property values as much as 20 percent."—*Management Information Services/ICMA*

"One acre of forest absorbs six tons of carbon dioxide and puts out four tons of oxygen. This is enough to meet the annual needs of 18 people."—*U.S. Department of Agriculture*

"Trees properly placed around buildings can reduce air conditioning needs by 30 percent and can save 20 - 50 percent in energy used for heating."—*USDA Forest Service*

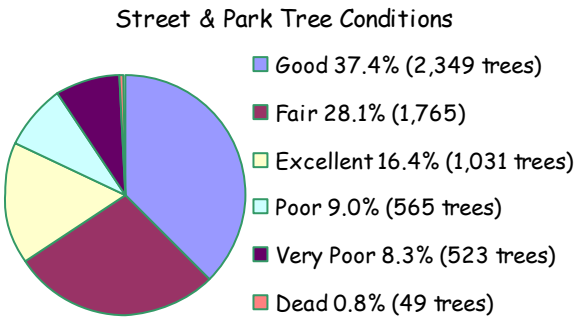
"Trees can be a stimulus to economic development, attracting new business and tourism. Commercial retail areas are more attractive to shoppers, apartments rent more quickly, tenants stay longer, and space in a wooded setting is more valuable to sell or rent."—*The National Arbor Day Foundation*

"Healthy, mature trees add an average of 10 percent to a property's value."—*USDA Forest Service*

"The planting of trees means improved water quality, resulting in less runoff and erosion. This allows more recharging of the ground water supply. Wooded areas help prevent the transport of sediment and chemicals into streams."—*USDA Forest Service*

"In laboratory research, visual exposure to settings with trees has produced significant recovery from stress within five minutes, as indicated by changes in blood pressure and muscle tension."—*Dr. Roger S. Ulrich Texas A&M University*

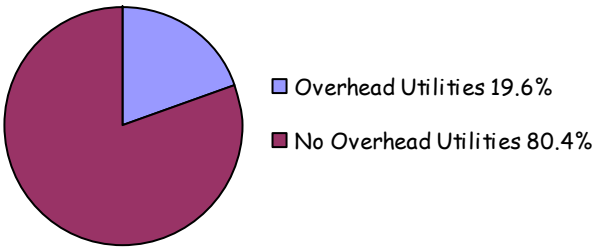
The following graphs give a visual representation of the inventory results:



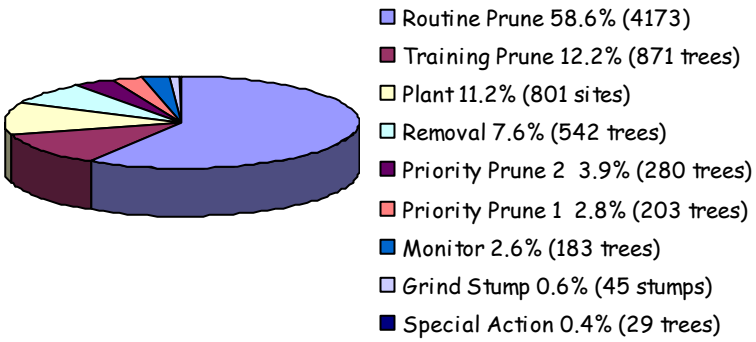
TOP TEN SPECIES SUMMARY TABLE

Species	Count	Percentage of Total Population
Norway Maple	1,391	22.1%
Green Ash	1,064	16.9%
Silver Maple	428	6.8%
Honeylocust	315	5.0%
Crabapple	279	4.4%
Red Maple	224	3.6%
Sugar Maple	205	3.3%
White Ash	192	3.1%
American Linden	168	2.7%
Other	2,015	32.1%

Overhead Utility



Street & Park Tree Maintenance Needs



STAFFING & EQUIPMENT

The Parks & Recreation Department is responsible for all tree maintenance. Parks & Recreation's existing equipment includes:

Prentice truck
Chipper
Chainsaws
Pole saws, loppers, shears, hand saws
Safety equipment (hard hats, chaps, vests, etc.)
Stump grinder is rented as necessary

The most significant piece of equipment that is missing from this list is an aerial lift truck. It is unusual to see a community the size of Baraboo and with a tree population of roughly 7,000 without a bucket truck. A new bucket truck costs from $100,000 - $160,000 (plus maintenance and training costs) depending on several variables such as the reach of the lift. Used bucket trucks are considerably less expensive. Without this truck, in-house crews are unable to complete removals or pruning of trees 7" diameter and over. The cost to contract work (2011-2015) identified thru the inventory that in-house crews are unable to manage without an aerial lift truck is:

Ash removals 7+" diameter:	$306,880
Removals identified thru inventory:	$128,200
Pruning identified thru inventory:	$ 71,664
Routine removals & pruning:	$ 54,528 (annual expense)
TOTAL	**$571,512**

The city could pay for a bucket truck many times over for the price of contract work. The purchase of a bucket truck would enable staff to complete removals in a more timely fashion and it is anticipated that when EAB arrives there will be a shortage of qualified firms to complete tree work. The cost and time of labor would increase if a bucket truck were to be purchased, but the benefits far exceed these costs.

City officials should begin the budget process for purchase of a new aerial lift truck. It is important to note that it often takes 12-18 months from order of an aerial truck until delivery. Advance planning is critical when purchasing this large piece of equipment.

Staffing includes the Parks & Recreation Director and four crew members. The Director spends approximately 15% of his time on forestry related issues. Crew members spend approximately 5%. It is important to acknowledge that when EAB arrives work duties will shift significantly. The City will not be able to leave dead standing trees because they pose a large risk to residents and property. Baraboo should anticipate that the Director and his four employees will be devoting nearly 100% of their time to forestry-related issues when EAB arrives. Other duties will become less of a priority and it is very likely that additional staff will be necessary to manage all duties.

Based on current staffing and equipment, a cut off of 6" has been established for tree work in Baraboo. Meaning, trees 1-6" dbh will be completed in-house and trees greater than or equal to 7" will be contracted out. Tree planting will be completed in-house. As always, each tree should be individually evaluated for its suitability and safety for removal in-house.

It is recommended that certain activities (tree inspection, monitoring) be completed by an International Society of Arboriculture (ISA) Certified Arborist (http://www.isa-arbor.com/). This certification is an urban forestry industry standard and requires a solid framework of forestry knowledge and continuing education is required to maintain status as a certified arborist. The Parks & Recreation Director recently achieved this certification which is a significant benefit to the City. Bluestem encourages other crew members completing forestry work to attain this certification. The schedule of activities (Attachment 1) indicates when a certified arborist should be utilized.

Any employee that will be completing forestry work should receive consistent training on proper procedures. As well as equipment training these employees should receive training on: removals, proper pruning procedures, construction damage and proper tree planting techniques so that they can supervise contracted tree planting and construction crews. Sources of training include: WAA (Wisconsin Arborist Association) workshops (held annually in fall), WAA annual conference (held annually in late January), WI DNR annual workshops (held annual in late summer) or thru private instruction by an experienced consulting forester.

URBAN FORESTRY GOALS

This inventory was the first step towards establishing a defined, efficient forestry program for the City of Baraboo. The next step is to identify goals and begin the process of implementation. The primary goals and objectives that have been identified to establish a management program in order of priority are:

GOAL 1: ELIMINATE HIGH RISK SITUATIONS.

Objective A: Remove high-risk trees.
Objective B: Prune high risk branches.
Objective C: Remove and manage EAB/ash trees

GOAL 2: ESTABLISH A ROUTINE, COMPREHENSIVE URBAN FORESTRY PROGRAM FOR A HEALTHY FOREST

Objective A: Perform yearly tree inspections/Evaluate Risk Management Program.
Objective B: Perform training prunes.
Objective C: Perform routine pruning and removals.
Objective D: Plant high quality trees with low maintenance requirements.
Objective E: Ensure an adequate budget.
Objective F: Inventory updating.
Objective G: Community Education
Objective H: Wood Residue

GOAL 1: Eliminate high-risk situations.

The first and foremost objective of any municipality entrusted with the responsibility of an urban forest is the safety of its residents and visitors. Until a safe environment has been attained, no other objectives can be tackled. The following is a prioritized list of actions that need to be taken to eliminate the high-risk situations identified during the inventory:

1. Remove trees identified as Removals.
2. Prune trees identified as Prune Priority 1.
3. Prune trees identified as Prune Priority 2.
4. Complete ash removal activities.

Objective A: Remove High Risk Trees.

Tree removals are an integral part of a good forest management program. Removals are as necessary to the urban forest's life cycle as are tree plantings and maintenance. Removals do, at times, stimulate a public reaction because people grow attached to the trees in the vicinity of their homes. Nevertheless, a successful urban forestry program demands that a removal policy be adopted and applied uniformly throughout the City. A clear policy provides coherent guidelines to enable City officials and crews to make informed removal decisions. Furthermore, such a policy can help allay public concerns about tree removals. The City's potential losses from liability claims are also greatly reduced due to healthier and lower risk trees.

The goal of a removal plan is to develop a comprehensive risk reduction program that will guarantee the timely removal of high risk or potentially high risk trees as well as to heighten staff awareness of hazard abatement procedures.

There are three important reasons for establishing a strong removal policy. The first is to maintain safe public areas by reducing potentially high-risk trees and the liability associated with them. Secondly, the removal of dead and declining trees allows the urban forest manager to make room for new diverse planting which in turn increases the overall health of the community forest. Thirdly, it is more reasonable to maintain healthy trees rather than decadent, senescing, over mature trees.

In Wisconsin, municipal governments have a legal duty to exercise reasonable care to protect the general public from foreseeable hazards. To minimize the liability associated with trees in high use areas, such as urban streets and parks, land managers must demonstrate that they are exhibiting reasonable care in maintaining these trees. Not removing unsafe trees due to political pressure is unacceptable and may potentially leave the City liable should there be no designated risk tree removal program showing the effort to reduce the number of these trees.

Based on the inventory data, Bluestem estimates that 542 trees should be removed from the existing tree population. Once this initial group of trees is removed, the City's removal program should stabilize at approximately 68 removals per year (1.5% of the total population).

Each tree was given a condition rating when it was inventoried. This number is used to calculate the appraised dollar value of each tree, but is also used to prioritize removals. Ratings range from a low of 0% to a high of 100%. For example, a specimen tree in perfect condition received a 100%. A dead standing tree received a 0%. Most removals fall between 0-30%. The schedule of activities (Attachment 1) has broken the removals into two categories. Category one includes trees with a rating of 0-15% and these need to be removed in 2011. These are large trees with very significant targets and serious defects such as cavities and decay. Category two are removals greater than or equal to 20% and these need to be removed no later than 2012, sooner if possible. These removals tend to be smaller and the target is less immediate.

It is important to stress that trees can become a safety issue and potentially affect the health and

safety of residents in Baraboo. Several factors can be considered when choosing which trees to remove first within the removal lists and ways to reduce the costs associated with these activities.

1. Utilize the Risk Management Guide (attachment 3). This guide is a step-by-step system for evaluating risk within the population. This guide was utilized during the inventory fieldwork and is a good guide for the City to use for day-to-day duties. For example, several steps are listed for tree evaluation. One step is to 'Identify Problematic Conditions'. The inventory identified a condition rating for each tree inventoried. A tree was assigned one of six ratings: excellent, good, fair, poor, very poor or dead. Trees in the last two categories are in the worst health and need to be prioritized for removal. Other steps include identifying problematic species, diameters and defects. Some problematic species include willow and boxelder. These trees are typically weak wooded and tend to fail more often than other species such as oak. Problematic diameters include larger diameter trees. A 2" dbh dead tree poses minimal risk, while a 30" dead or very poor condition tree poses a very high risk. Additionally, certain defects should be red-flagged for action. Cavities, decay and excessive dieback are some of the more severe defects noted during the inventory. All of this data can be found within the inventory database. Target and location are also important factors to consider when prioritizing removals. Playgrounds and busy streets where pedestrians and vehicles frequent should receive higher priority than streets with wooded/naturalized rights-of-way. The combination of these factors should be used to determine the order in which trees need to be removed.

2. Prioritizing Staff Duties and Time. The safety risk of failing trees cannot be over-stressed. Staff time needs to be prioritized to maximize public safety and reduce tree-related liability. The frequency of other non-safety tasks should be reduced so that staff can dedicate more time to pruning and removals? Will a reduced mowing schedule endanger residents? Will a 32" silver maple with a trunk cavity endanger residents?

One of the primary purposes of the inventory was to identify risks. The City can reduce these risks and increase safety for its residents through prompt implementation of the inventory-based pruning and removal recommendations in this plan.

A "high risk" is any tree or tree part that demonstrates a high risk of failure or fractures which would result in damage or injury to people or property. Usually, high-risk trees demonstrate visible defects.

There are two distinct factors to the definition of a high risk tree: 1) a physical defect within a tree that increases its potential for failure, and 2) the proximity of the tree to people or property that increases the likelihood of personal injury or property damage. A decaying tree in the middle of the Chequamegon National Forest may have a potential for failure, but the chance that tree will cause personal injury is remote. However, that same tree located in Ritzenthaler Park or anywhere in Baraboo, should be considered a high risk because of its urban location.

One task of the urban forest manager is to anticipate tree failures before they occur. There are no absolutes in determining risks - only sound judgment based on experience and training. Status as

and ISA Certified Arborist and practical experience are methods to forward this task.

The number of trees marked for removal within a given year further describes a forest system's health, although in some instances trees need to be removed for reasons unrelated to health. The objective is to eventually have no City trees with a condition rating lower than fair.

The risk assessment that Baraboo should use to evaluate trees was created by the International Society of Arboriculture. It is titled A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas, 2nd Edition by Nelda Matheny and James R. Clark. This can be purchased for $45.00 at 1-888-472-8733. Additional resources include the US Forest Service's "Urban Tree Risk Management" guide. This is available at no charge from the WI DNR regional urban forester.

Again, during the inventory 542 trees were identified as a 'removal' (found in the inventory database). These trees have large areas of decay in the trunk, extensive splitting, root damage, extensive dieback or other such problems.

When a tree has been labeled as in need of removal or priority pruning, it may indicate an underlying deficiency. For this reason, all trees scheduled for removal along with trees in need of priority pruning need to receive a thorough hazard inspection twice a year (once with the leaves on and once without the leaves) until the tree has been removed or the hazard has been eliminated. Likewise, all trees identified as in need of monitoring, poor or very poor or dead should also receive a similar inspection. A schedule of all activities including removals can be found as attachment 1.

Trees that need to be regularly and frequently inspected were identified as 'Monitors.' These trees may have a problem developing such as dieback or may have old storm damage that warrants attention. A list of these trees can be found in the inventory database.

City policy should require tree pruning and removal in accordance with national industry standards. Standards-based specification are commonly used when municipalities hire a contractor or purchases materials, but should also be applied to all work completed by staff. Industry standards and specifications include current editions of:

~ American National Standard for Safety in Tree Care Operations, ANSI Z133 (current revision)

~ American National Standard for Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices, ANSI A300 (current revision)

A copy of these should be available in the foresters office and one (appropriate to work with) available with the crews.

A notification procedure should be enacted to alert nearby residents of the impending removal. Not only does this alert them to the high risk situation, it helps residents feel involved in the decision and gives them time to adjust to the loss of the adjacent tree. The tree can "marked" and give the nearby homeowner written notification explaining why the tree is being removed, how the removal

will be performed, when the removal will begin and if replanting will occur. Include a phone number to be contacted for any additional questions or concerns.

Objective B: Prune high-risk branches.

A total of 483 trees were identified as in need of priority pruning. These trees were broken into two categories, Prune Priority 1 and Prune Priority 2.

Prune Priority 1 are trees with obvious risks such as branch cavities, hangers or significantly sized deadwood. These trees should be pruned immediately as they present the greatest danger. Two hundred and three trees were identified as Prune Priority 1. These should be pruned in conjunction with the initial removals in 2011.

Prune Priority 2 are trees with structural deficiencies or with a potentially dangerous situation developing. For example, a tree with crossed or congested limbs or a tree in the initial stages of dieback would be classified as a Prune Priority 2. Two hundred and eighty trees were identified as Prune Priority 2. These prunings should be performed with the second batch of removals in 2012 or sooner.

The tree inventory was a ground visual only survey and was not intended to substitute for a thorough hazard tree survey and as such the trees have not been aerially inspected. Additional defects may be noted from an aerial inspection. It is important that while trees are being pruned from an aerial bucket truck that their condition be re-evaluated. If the pruner feels they would not benefit from being pruned, they should be removed.

Prune ash *only* if they are receiving chemical treatment for preservation or have been identified as a priority prune. It is not necessary to perform routine prunes on ash trees as they will likely die within the next several years due to EAB.

Objective C: Remove and Manage Ash Trees for EAB

One in every five trees in Baraboo is an ash. Without chemical treatment, these trees will die from EAB. The 'City of Baraboo Emerald Ash Borer Readiness Plan' prioritizes ash removals in advance of EAB and identifies 84 trees that are significant enough to receive chemical treatment for preservation. Please see this accompanying document for further details.

GOAL 2: Establish a routine, comprehensive urban forestry program for a healthy forest.

Systematic maintenance of existing trees is important for three reasons: safety, cost savings and aesthetics. Maintained trees have a greater lifespan, experience less storm damage and provide greater canopy benefits than trees that are not maintained. Proper maintenance can also reduce removal and replanting costs. On a limited budget, it is necessary to prioritize actions. High-risk tree situations should always be eliminated first (Goal 1) and then routine maintenance should proceed. The following routine objectives are listed from highest to lowest priority.

Objective A: Perform Yearly Tree Inspections & Evaluate the Risk Management Program.

It is important that *all* of the street and park trees in the City get a yearly hazard inspection. Trees that have been identified during the inventory as needing priority pruning, monitoring or removal need a hazard inspection *twice* yearly. Complete this inspection once with leaf cover and once without until the hazard has been eliminated or the situation resolved. Additionally, all large diameter trees need an extra inspection after storms. If any hazards are identified, the situations need to be corrected immediately, and then continue with the list of routine maintenance.

It is important that an ISA Certified Arborist complete the larger tree inspections (greater than 6" in diameter).

Seven factors should be considered when evaluating trees. The factors along with positive and negative considerations are:

1. Crown development
   - ~ characteristic of species and well balanced
   - ~ branching throughout entire upper 2/3 of trunk area
   - ~ lacking full crown
2. Trunk
   - ~ one central leader is desired
   - ~ no defects
   - ~ missing sections of bark
   - ~ extensive decay or hollow
3. Major branch structure
   - ~ evenly distributed branches
   - ~ structurally important branches not dead or broken
4. Twig growth rate
   - ~ typical for species and age
   - ~ growth rate reduced
5. Foliage
   - ~ normal size and color
   - ~ small leaves with deficiencies
6. Insects and disease

~ no apparent problems
~ severe infestation

7. Roots
   ~ extensive root loss
   ~ stem girdling roots present
   ~trunk flare present indicating proper planting depth

To eliminate high-risk situations within Baraboo, the Parks & Recreation Director should evaluate the risk management program annually. The evaluation can be accomplished by following the Risk Management Guide (attachment 3). This inventory and management plan represents the first comprehensive inventory but is not a substitute for a hazard tree evaluation. This management plan is the first phase of the risk management program.

Objective B: Perform Training Prunes.

Training pruning is the structural pruning of all trees 10 years of age or younger. Some benefits of training pruning include:

- *Pruning 2-3 times in the first ten years of a tree's life will reduce 90% of the structural problems the tree will ever have.*
- *This is the easiest pruning to perform due to the small size of the trees.*
- *Training pruning is the most cost effective pruning because it reduces long-term routine pruning costs.*
- *It is the most economical pruning because an in-house crew can complete it quickly and efficiently.*

Trees that are structurally pruned at this stage require much less care as they mature. It is not necessary that they be pruned every year but an every-third year pruning is a good objective. This equates to 290 training prunes per year. The staff and Parks & Recreation Director can complete this task. All of the training prunes can be completed in-house until they are unable to be reached from the ground or are older than 10 years planted, and then they will be scheduled for routine pruning.

Prune ash *only* if they are receiving chemical treatment.

Objective C: Perform routine pruning & removals.

One of the most beneficial and noticeable activities performed in the urban forest is routine pruning. Routine pruning is the cycle of pruning all trees on a rotating basis. Once all of the safety issues have been addressed, all trees 10 years of age or over (approximately 6" or over) need to be placed on a routine pruning cycle. Some benefits of routine pruning include:

- Increased health and viability of trees.
- Fewer tree mortalities and fewer structural deficiencies resulting in less storm damage.
- Reduced liability from potential tree-related injuries or damages to property.
- Increased property values.
- Enhanced aesthetic value.
- Fewer complaints/requests.
- Increased longevity of tree.
- Reduced future costs associated with hazardous limbs and decay.
- Improved cost effectiveness of tree maintenance reducing the need for on-demand pruning and henceforth staff overtime.

A feasible routine pruning cycle needs to be established. Industry guidelines are to prune each tree over 6" dbh once every 5-7 years. To save cost and time, a seven year cycle is recommended. Essentially, the City can be broken into seven zones and a different zone has work completed in a particular year. For example, routine pruning in 2013 will occur in zone 1, zone 2 in 2014, etc. The City is currently developing a system for this activity.

Completing one cycle, combined with increased emphasis on training prunes, should greatly reduce the cost and time associated with future routine pruning. If a tree is pruned properly and is on a routine pruning cycle, no limb over 4" in diameter should need to be removed. The best time of year to prune is when the leaves are off the trees. If pruning does occur while the trees have their leaves on, it should be after the leaves have fully expanded and not when they are in the process of forming. Pruning should also be avoided when the leaves are turning colors in the fall and in the process of dropping. All American elms and oaks should be pruned during dormancy.

Oak wilt is an increasing problem throughout the state. Oaks occur frequently both in the street tree population and in private yards. *Do not cut, prune or otherwise wound oaks in the spring and early summer, generally from April 1-August 30*. To be very cautious, avoid wounding oaks from April 1st-October 1st. An excellent source of oak wilt information can be found at: http://wi.gov/forestry/FH/oakWilt/.

Taking into consideration Baraboo's current level of stocking, the above mentioned routine pruning cycle of seven years is feasible. This cycle will result in approximately 459 trees pruned annually.

Another facet of routine maintenance includes 'routine' tree removals. Any given City can expect approximately 1-2% of trees will need to be removed per year due to high-risk situations. This is in addition to the initial safety removals. In Baraboo this calculates into a total of 68 removals per year. This has also been figured into the schedule of activities that can be found as attachment 1.

A tree removal policy similar to the one listed below is in place in the event a resident requests that a terrace tree be removed. This policy should be applied equally to all residents. The purpose of the tree management program is to maintain trees on public property as long as they are healthy and safe. If an individual would like to remove a tree on public property, he or she should provide

the following information to the Parks & Recreation Director:

1. Name of person requesting removal.

2. Description and location of tree.

3. Reason for wanting removal.

Upon receiving such request, the Parks & Recreation Director will take these steps:

1. Evaluate the tree and make a recommendation.

2. Notify the person requesting removal of the decision.

The person requesting removal may hire, at his or her own expense, a forester or arborist to evaluate the tree and submit a report. The Parks & Recreation Director needs to acknowledge and approve the qualifications of this forester or arborist hired by the homeowner. The Parks & Recreation Director should assess the health and safety of the tree and appraise its monetary value.

The final decision rests with the Parks & Recreation Director. If permission is granted to remove a tree that is not diseased, high risk or dead, the property owner pays the full cost of contracting out the removal, including stump grinding, and makes a contribution to the City tree program equal to the appraised value of the tree. The City may wish to plant a tree in a nearby vacant space according to the planting program.

Objective D: Mulching.

There are trees within the City that are becoming over-mature and declining. Mulching and regular fertilizing may help increase the longevity and maintain the health of these older trees. A foliar and soil analysis should be completed prior to fertilizing so that the exact type and amount of fertilizer needed can be determined.

Mulching is currently used on trees Planted in Baraboo. This is an excellent policy and should continue. Mulching may be the single best advantage a young tree can have. Some benefits of mulching include:

~ Eliminates lawnmower and weed-whip damage.
~ Discourages weed growth.
~ Helps to retain moisture in soil.
~ Adds nutrients to soil as the mulch decomposes.
~ Facilitates increased root growth due to less compacted soil.

Oftentimes mulch is described as “messy.” Lawnmowers scatter it around. Slowing down while mowing around mulch will eliminate this situation. Adding mulch as necessary to maintain a 2-4” depth and spread as widely as possible aids the tree itself and helps the mulch retain a “fresh”

color. Mulch 'volcano'" should be avoided and mulch kept 6" from the trunk to help fungal problems within the trunk flare region.

Objective E: Plant high quality trees with low maintenance needs.

There were 801 planting sites identified on street rights-of-way during the inventory. Of these 550 are suitable for larger growing trees, 36 are suitable for medium growing trees and 215 are suitable for small growing trees under power lines. Certain planting policies can be applied to any community. As always, no planting should take place until all of the high risk safety situations identified have been alleviated. Then, the order of priority for tree planting should be:

1. Trees lost within the past year.
2. Homeowner requests.
3. Trees lost within the past three years.
4. Appropriate sites within the current work zone.

A cycle of planting should be initiated. The easiest and most logical method of planting is to use the same zones identified for routine pruning. To determine the number of trees to be planted each year, the following equation was used:

100% stocking in 14 years (2 rotations) + replacements = 163 trees/year
(801 planting sites + 542 removals)/14 years + 68 routine removals/year = 163 plantings annually

This equation includes the current number of sites and removals and factors in future tree mortality. The only variable is the number of years to full stocking. Fourteen years was selected because it represents two zone rotations. Due to the long time frame involved, the actual number of years may vary depending on maintenance, insect and disease factors.

Beginning in Year 2013, these 163 plantings have been included in the budget. They should be 1.5-2.0" dbh and planted by the in-house crew. The City should select and plant a tree at no cost to the adjacent property owner according to the above priority order, the homeowner request replacement policy and funds available. The following is a suggested guideline concerning homeowner requests.

The City will select and plant a tree at no cost to the adjacent property owner according to the above priority order, the homeowner request replacement policy and funds available. The following is a sample guideline concerning homeowner planting requests.

HOMEOWNER REQUEST PLANTING POLICY

To request a replacement tree, individuals should provide the following information to the Parks & Recreation Director:

1. Name, address and phone number of person requesting tree planting.

2. If the tree was removed in the past, the location of tree that was removed and the year it was removed.

3. If not due to a removal, the reason for requesting a tree.

Upon receiving such a request, the Parks & Recreation Director should take these steps:

1. Evaluate the site for suitability.

2. If the site is to be planted, make a recommendation about species and location.

3. Notify the person requesting planting of the decision.

The final decision about tree planting on public property lies with the Parks & Recreation Director. If the homeowner's site wasn't chosen for planting within the next few years, he or she may, at their own cost hire a City approved contractor to plant a tree or they may plant their own tree with City approval. The City must approve the site and species.

Current policy regarding new sites (in developments, etc.) is to plant a tree if the homeowner requests. The homeowner pays a $25 fee and agrees to water the tree for the next 3 years.

The following are general design guidelines for selecting species for planting:

1. Plant trees to define spaces and select species appropriate for the purposes served by each space.

2. Select trees for the community with desirable forms, colors and textures.

3. Use plantings to emphasize major community pattern elements, particularly major streets.

4. Evaluate soil conditions to determine the best species choice.

5. Match tree size to street width and the available space in the terrace.

6. Space trees an appropriate distance apart:

Small trees (up to 30' tall)	planted at 25' offcenters	planting width min. 5'
Medium trees (30 - 45' tall)	planted at 35 - 40' offcenters	planting width min. 5-8'
Large trees (>45' tall)	planted at 45' - 50' offcenters	planting width min. >8'

7. Complement existing vegetation.

8. Match planting concept, tree size and spacing with the adjacent land use.

9. Do not plant coniferous (spruce, cedar, pine, etc.) trees within terrace areas, regardless if there are sidewalks and curbs or not.

Partial Source: Urban and Community Forestry, A Guide for the Interior Western United States, USDA Forest Service, 1990

Baraboo is a Zone 4 climate and types allow for some good street and park tree planting selections. Sound choices for **larger** trees include:

swamp white oak (Quercus bicolor) *in moderation
hackberry (Celtis occidentalis)
bur oak (Quercus macrocarpa) *in moderation
American linden (Tilia americana) 'Redmond', 'Fastigiata'
elm (Ulmus spp.) 'Accolade', 'New Horizon', 'Discovery'
Kentucky coffeetree (Gymnocladus dioica)
ginkgo (Ginkgo biloba)
honeylocust (Gleditsia triacanthos)

Good **medium** selections include:
flowering pear (Pyrrus spp.)
Amur cork tree (Phellodendron amurense 'macho')
river birch (Betula nigra)
amur chokecherry (Prunus maackii)
lacebark elm (Ulmus parvifolia)
horsechestnuts (Aesculus spp.)

Smaller sites can be filled with:
Japanese tree lilac (Syringa reticulata)
serviceberry (Amelanchier arborea) 'Autumn Brilliance', 'Princess Diana'
hophornbeam (Ostrya virginiana)
American hornbeam (Carpinus caroliniana)
crabapple (Malus spp.)
    white cultivars: 'Spring Snow', 'Snowdrift'
    red/pink cultivars: 'Prairiefire', 'Red Jade', Red Barron'
Hawthorn (Crateagus spp.)
Turkish filbert (Corylus colurna)
Plum & cherry varieties (Prunus spp.)

Small trees only should be planted under power lines. Do not plant wide trees, such as the hawthorn on narrow terraces. They will grow out into the street. Additionally, do not plant trees too close to traffic signs and intersections. They will eventually grow and block these areas. Try to stay at least 40' away from these areas. Lastly, be sure not to plant trees too closely together.

A complete evaluation of the site needs to be completed before selecting a species. Additionally, "Choosing the Right Landscape Plants" (publication number A3864) by Laura Jull is an excellent publication to assist with selecting species. It is available online at no cost online at http://learningstore.uwex.edu/assets/pdfs/A3864.pdf.

It is important to diversify the urban forest as much as possible. Every effort should be made to continue diversification. Planting many different species and varieties keeps the urban forest healthy and attractive. Planting a variety of species, including slow-growing and faster-growing species will help to eliminate age gaps created by large numbers of plantings.

Ideally, no more than 5% of any one species and 10% of any one family/genus should comprise the City's trees. Again, maples are over represented. These should not be planted at this time excepting special circumstances. No ash should be planted due to the emerald ash borer.

Baraboo should create a suggested list of trees not to be planted anywhere in the City (public and private property). Some examples of poor species selection include black locust (Pseudoacacia robinia), boxelder (Acer negundo) and Siberian elm (Ulmus pumila) and any coniferous trees (spruce, fir, cedar, pine, etc) on the street. These deciduous trees are weak wooded causing limbs to "break out" often, are "messy", dropping leaves and twigs continuously and are not particularly attractive. The conifers obstruct the view of pedestrians and vehicles and will grow to block off sidewalks and encroach onto the road.

Planting Techniques. Many excellent tree planting resources can be found online. A newer publication developed by the WI DNR division of forestry can be found at dnr.wi.gov/forestry/publications/newtreeplanting.pdf. Some planting techniques to utilize include:

~ Remove all burlap and the entire wire basket from balled and burlapped trees.

~ Do not use tree wrap. If it is used, remove all tree wrap after one season. Wrap left on attracts insects and may cause fungal problems due to increased moisture from wrap left on during the growing season. Plastic tubing should be avoided. It has been used often by developers and is now girdling some trees.

~ Remove stakes, or don't stake trees at all. Wire braces attached to stakes left on the tree will eventually begin to girdle the tree, thus weakening the trunk, predisposing it to wind throw or breakage.

~ Do not plant large trees under power lines. They will grow into the lines and need to be removed or trimmed in an unnatural way and become unsightly and unsafe.

~ Do not plant wide growing trees in narrow terraces. The trees will grow into streets and over sidewalks and the available resources simply will not support long-term large tree growth.

~ Inspect and reject poor form trees prior to planting. Most trees should have a main leader and be well balanced.

~ Trees are often planted too deeply. Frequently, balled & burlapped (B&B) trees are dug at the field and an additional 1-3" of soil is thrown on top. And then, they are planted too deeply.

~ Monitor trees for fatalities during the warranty period so they can quickly be replaced.

All plant quality should follow the American National Standard for Nursery Stock; ANSI Z60 (current revision) should be used when purchasing plant material.

Objective F: Ensure adequate funding for routine activities.

Routine expenses will start in 2013 after all of the initial safety removals and priority prunings have occurred. This does not include EAB related activities. The following items will be completed annually:

1. 68 routine removals
2. 290 training prunes
3. 529 routine prunes
4. 163 tree plantings
5. Training and small equipment purchases
6. 183 tree monitors
7. Parks & Recreation Director routine duties

A list of these with their associated cost can be found as 'Schedule of Activities' (Attachment 1).

This plan and inventory was completed with a grant from the WI DNR. The purpose of these grants is to help new programs become self-sufficient. It is reasonable to expect the City of Baraboo to receive more grants to initiate their program particularly as it relates to EAB. Applying for a grant annually is strongly encouraged. However, the grant program is intended as 'start up' help only. The goal of the program is that the City has initial funds for operations while it builds its own network and backing within the community and City structure.

Objective G: Inventory Maintenance and Updating.

The inventory database is a software program designed and maintained by MSA Professional Associates (http://www.msa-ps.com/). Whoever completes tree work should complete work orders (see database). One specifically designated person should input the completed work on a continuing basis. Without continual updating in this way, the inventory quickly becomes obsolete. Annually, the Parks & Recreation Director and staff should evaluate this management plan and inventory based work/goals as they are implemented to assure the goals are being met and new goals are being developed.

This management plan contains provisions for five years, beginning in 2011. Typically, a complete re-inventory should be completed every 5 years. When the inventory expires in 2015, a qualified, experienced forester should thoroughly evaluate all of the trees on an individual basis again. It is beneficial for an experienced eye outside the City perform an inventory due to changing tree conditions and factors

Objective H: Community Education.

***Community Education*:** Community education will allow for residents to know and understand what proper tree care looks like, how and when to perform it on their own trees and when to anticipate it on City-maintained trees. Some recommendations include:

~ Develop a tree planting recommendations flyer focusing on tree planting under power lines to distribute. It seems logical to distribute these with utility bills in the spring when most people plant trees.

~ Host annual tree care seminars. Having a professional or consultant host these seminars is an excellent example of a fundable grant project component.

~ Maintain a supply of educational material for distribution to the public. ISA brochures are available at a reasonable cost.

~ Use the local newspaper to promote the tree program by periodically preparing a news release on tree topics such as: tree pruning, how to enter the poster contest, and how to winterize trees.

~ Distribute flyers when working in neighborhoods. Residents will not be surprised when they hear the buzz of chainsaws and will be more aware of the value of the urban forest.

~ Initiate a "Champion Tree Contest". Enlist school children to find Baraboo's biggest trees and award the participation and largest trees.

Objective I: Wood Residue Utilization.

Baraboo current wood residue policy is to:

- Chip suitable branches for landscaping activities
- Make boles/trunks available for firewood

This is an excellent policy and should continue. However, with increased wood waste due to EAB a broader policy should be planned. A discussion of wood utilization options can be found in the 'City of Baraboo Emerald Ash Borer Readiness Plan.'

ATTACHMENT 1:
2011-2015 Schedule of Activities

Schedule of Activities (Year 2011)

(one time only activities)

Activity	Responsible	# of Trees	# of Inches	Avg dbh	Cost	Work Time
Complete removals* 0-15% condition (trees over 6" dbh) with overhead utilities	**utility co.** **inhouse/stump grinder rental**	**67**	**1500**	**22.4"**	**$1,800** rent stump grinder	**5 days** 2 person crew
Complete removals* 0-15% condition (trees over 6" dbh) w/o overhead utlities	**contract**	**330**	**7319**	**22.2"**	**$117,104**	**8 days** coordination
Complete prune priority 1* (trees over 6" dbh) with overhead utilities	**utility**	**29**	**770**	**26.6"**	**n/a**	**1 day** coordination
Complete prune priority 1* (trees over 6" dbh) w/o overhead utlities	**contract**	**174**	**4299**	**24.7"**	**$34,392**	**3 days** coordination
Monitor trees	**certified arborist/ Director**	**183**	**n/a**	**n/a**	**n/a**	**5 days** coordination
Training & small equipment	**n/a**	**n/a**	**n/a**	**n/a**	**$1,500**	**varies**
Training prune (trees that are 1-6" dbh) once/3 years	**in-house**	**290**	**n/a**	**3"**	**n/a**	**11 days** 25 trees/day/person

CONTRACTED COST = $154,796 (w/o EAB costs)

STAFF TIME INVESTMENT = 38 days

Staff cost - does not include equipment cost-(based on $28/hr w/benfits) for in-house work = $8,512

Schedule of Activities (Year 2012)

(one time only activities)

Activity	Responsible	# of Trees	# of Inches	Avg dbh	Cost	Work Time
Complete removals* ≥20% condition (trees over 6" dbh) with overhead utilities	**utility co.** **inhouse/stump grinder rental**	**28**	**499**	**17.8"**	**$900** rent stump grinder	**2 days** 2 person crew
Complete removals* ≥20% condition (1- 6" dbh)	**in-house**	**34**	**120**	**3.5"**	**n/a**	**3 days** 2 person crew
Complete removals* ≥20% condition (trees over 6" dbh) w/o overhead utlities	**contract**	**83**	**1387**	**16.7"**	**$11,096**	**3 days** coordination
Complete prune priority 2* (trees over 6" dbh) with overhead utilities	**utility**	**59**	**1189**	**20.2"**	**n/a**	**2 day** coordination
Complete prune priority 2* (trees over 6" dbh) w/o overhead utlities	**contract**	**221**	**4659**	**21.1"**	**$37,272**	**5 days** coordination
Monitor trees	**certified arborist/ Director**	**183**	**n/a**	**n/a**	**n/a**	**5 days** coordination
Training & small equipment	**n/a**	**n/a**	**n/a**	**n/a**	**$1,500**	**varies**
Grind existing stumps	**in-house**	**45**	**838**	**18.6"**	**$900** rent stump grinder	**3 days**

Training prune (trees that are 1-6" dbh) once/3 years	**in-house**	**290**	**n/a**	**3"**	**n/a**	**11 days** 25 trees/day/person

EAB Related Costs (see EAB plan for further details)	**removals/replanting dead/poor/very poor**	**128**	**n/a**	**n/a**	**$59,560**	**42 days**

CONTRACTED COST = $51,668 (w/o EAB costs) $111,228 (including EAB costs)
STAFF TIME INVESTMENT = 78 days
Staff cost - does not include equipment cost-(based on $28/hr w/benfits) for in-house work = $17,472

ROUTINE Schedule of Activities (Beginning in 2013 and completed annually)

Activity	Responsible	# of Trees	# of Inches	Avg dbh	Cost	Work Time
Monitor trees	**certified arborist/ Director**	**183**	**n/a**	**n/a**	**n/a**	**5 days** coordination
Compete routine removals* (1-6" dbh)	**in-house**	**14**	**n/a**	**n/a**	**n/a**	**2 days** 3 person crew
Complete routine removals*						
(trees over 6" dbh) w/o overhead utlities	**contract**	**40**	**n/a**	**16.2"**	**$10,240**	**2 day**
(trees over 6" dbh) with overhead utilities	**utility & inhouse/stump grinder rental**	**14**	**n/a**	**16.2"**	**$900**	2 person crew
Complete routine prune*						
(trees over 6" dbh) w/o overhead utlities	**contract**	**426**	**n/a**	**16.2"**	**$54,528**	**14 days**
(trees over 6" dbh) with overhead utilities	**utility**	**103**	**n/a**	**16.2"**	**n/a**	coordination

Training prune (trees that are 1-6" dbh) once/3 years	**in-house**	**290**	**n/a**	**3"**	**n/a**	**11 days** 25 trees/day/person
Plant trees** full stocking in 14 years (2 rotations)	**in-house**	**163**	**n/a**	**1.75"**	**$28,525**	**16 days** 2 person crew
Training & small equipment	**n/a**	**n/a**	**n/a**	**n/a**	**$1,500**	**varies**
EAB Related Costs in 2013 (see EAB plan for further details)	**removals/replanting 1-6" trees**	**132**	**n/a**	**n/a**	**$23,100**	**79 days**
EAB Related Costs in 2014 (see EAB plan for further details)	**removals/replanting trees w/utilities**	**405**	**n/a**	**n/a**	**$32,175**	**76 days**
EAB Related Costs in 2015 (see EAB plan for further details)	**removals/replanting for 'fair' trees**	**252**	**n/a**	**n/a**	**$124,740**	**75 days**
EAB Related Costs when EAB in Co. (see EAB plan for further details)	**chemical treatment**	**43**	**n/a**	**n/a**	**$3,904 every third year**	**2 days** coordination
EAB Related Costs 2015-2018 (est)	**remove 'good' trees**	**594**	**n/a**	**n/a**	**$73,496 every third year**	**15 days**
(see EAB plan for further details)	**chemical treatment 'good' trees**	**594**	**n/a**	**n/a**	**$294,030**	**178 days**

CONTRACTED ROUTINE COST = $95,693 (w/o EAB costs)

ROUTINE STAFF TIME INVESTMENT = 72 days

Routine staff cost - does not include equipment cost-(based on $28/hr w/benfits) for in-house work = $16,128

All maintenance lists such as removals and prune priority can be found on the tree management database

Estimated costs are derived from contractors.

removal (includes stump) = $16/diam inch

prune = $8/diam inch

**based on 1.75" caliper b&b tree @ $175/each

ATTACHMENT 2:
Glossary of Inventory Terminology

TREE CONDITION

A condition rating helps to assess overall forest health and to evaluate a species performance. Bluestem Forestry Consulting Inc. uses criteria adapted from the International Society of Arboriculture Valuation of Landscape Trees, Shrubs and Other Plants: A Guide to the Methods and Procedures for Appraising Amenity Plants (Ninth Edition) as the basis for the field condition rating.

At least seven factors were examined and rated to determine the condition of a tree. These factors are crown development, trunk, major branch structure, twig growth rate, foliage health, insects/diseases and roots. General descriptions of the criteria used to categorize each condition are as follows:

Excellent - A tree in excellent condition has no visible defects and appears to be in perfect health. The tree will exhibit all of the characteristics typical of its species. An excellent tree can be expected to live well into the future.

Good - A tree in good condition has a sound trunk and a full canopy and has only minor mechanical injuries such as minor trunk scarring that will eventually heal. The tree will exhibit most of the characteristics associated with its species and can be expected to live for many years.

Fair - A tree in fair condition will be exhibiting minor to moderate defects. Some situations that would warrant a fair rating include: a thinning canopy, twigs growth may only be 1/2 the expected rate, significant mechanical injury such as scarring on the trunk, insects or disease may be present but are controllable and the crown may be lacking the natural or desired symmetry characteristic to the species. If given routine maintenance such as pruning and mulching a tree that is graded fair will contribute to the forest for many years.

Poor - A poor tree will be expressing low vigor and significant decline as evidenced by branch dieback, abnormal leaf size, early fall coloration, trunk decay due to injury or canker or the production of new branches on the main stem. A tree in poor condition will most likely require removal, but may be improved with priority pruning.

Very Poor - A tree in very poor condition is on the verge of dying. Dieback will be severe or it may be lacking a full crown. Trunk/crown cavities or decay, severe cracks and seams or severe root problems may also be present. Removal for safety will be required.

Dead - A tree in dead condition is simply a dead standing tree. These will most likely occur in wooded or unmaintained areas, but may also occur with smaller new plantings that have failed. These trees will require removal.

TREE MAINTENANCE NEEDS

Each tree inventoried was assigned a maintenance category. Field judgments were made from the ground based on observation and hazard estimation. Criteria was adapted from two sources: A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas (Second Edition) by Nelda Matheny & James Clark and from a Minnesota Department of Natural Resources Publication How to Detect, Assess and Correct Hazard Trees in Recreational Areas.

The following are the definitions of the maintenance categories:

Removal - Trees designated as a removal are either dead or have one or more defects that cannot be remedied. These trees will most likely have a severe trunk defect such as a cavity or extensive decay, have severe cracks associated with weak unions or have a large percentage of crown death and are potential safety hazards. Most of the trees in this category will rate a very poor or dead condition rating.

Special Action - Trees that should be removed, but that pose minimal liability to persons or property will be listed in this category. Examples include new tree planting failures or undesirable species that are beginning to decline and cannot be improved with pruning. The majority of these trees will rate a poor condition.

Prune Priority 1 - These trees have severe deadwood, hangers or broken branches that need to be remedied as soon as possible. Trees with unattached hanging branches or dead attached branches that are over 2 inches in diameter will be listed in this maintenance category. Overall re-evaluation of the tree while pruning may result in removal of the tree if more extensive problems are noted.

Prune Priority 2 - These trees need pruning more quickly than a routine pruning cycle will allow and have dead, dying or weakened branches that are over less than 2 inches in diameter. The majority of these defects can be corrected with pruning and the tree can be expected to live for many years.

Routine Prune - All trees need to be placed on a cycle of trimming to correct small structural problems or growth patterns that will eventually affect the tree adversely. Routine pruning will result in a healthier, more vigorous tree and will extend the life of most trees. A routine pruning cycle of once every 5-8 years is idea.

Training Prune - Training pruning is the structural pruning of all trees 10 years of age or younger. Removing poorly attached co-dominant, crossing and competing limbs while the tree is young, resulting in small cuts and wounds will produce a well-balanced mature crown. This is the most cost-effective form of all maintenance.

GROWSPACE DESCRIPTIONS

The size and type of terrace is noted during the inventory. The following are the categories used to classify the terraces:

0-4' - This is a terrace framed by a sidewalk and curb/street and is 0-4' in width. These sites are typically not suited for tree planting or growing due to the limited resources available to the tree.

4-6' - This describes a terrace that is framed by a sidewalk and street or curb and is at least 4.5' and up to 6' in width. These terraces are typically ideal for medium sized trees.

6'+ - These terraces are framed by a sidewalk and street or curb and are over 6' in width. Larger trees are typically planted here.

Unrestricted - These are terraces that do not have a sidewalk present. These terraces occur most frequently in "yard" type settings where there is a right-of-way, but there is no sidewalk. They can also occur in wooded or park settings.

Attached sidewalk – The sidewalk is attached to the curb with a tree on the right-of-way growing behind the sidewalk.

Cutout - A tree growing in a concrete cut-out has a terrace listed a 'well'. These growing situations usually occur in downtown areas.

Median - Medians occur when a growing strip occurs between opposite directions of traffic on a single street.

Park – Trees growing in or along parks will be given this designation

Behind Walk – This describes a formal terrace, but with the right-of-way extending beyond the sidewalk area.

Island – An island can often be found in cul de sacs and describes the circular area at the end of the street.

ATTACHMENT 3:
Risk Management Guide

RISK MANAGEMENT

Risk: is the potential for suffering harm or loss
Risk Management: is the ability to minimize the potential for harm or loss from occurring by implementing a sound risk reduction strategy.

Types of Risk
- Financial
- Physical harm

A Risk-Reduction Strategy for Trees
- Evaluate the natural resource being managed
- Evaluate the resources available to you (fiscal, staff, equipment, etc.)
- Develop a policy statement
- Develop an action plan
- Periodic review of all four components

EVALUATE THE NATURAL RESOURCES BEING MANAGED

Evaluate the Entire Population
An understanding of the entire population allows you to identify the key problem areas within the population.
- Species distribution
- Diameter distribution
- Condition distribution
- Defects
- Locations and targets

Identify Problematic Species
Identify the species that, based on your knowledge and experience, pose the greatest physical threat.
- High history of failure
- High storm damage potential
- Prone to high-risk structural defects

Identify Problematic Diameters
Identify the diameters that, based on your knowledge and experience, pose the greatest problem in your population.

- Large diameter trees

Identify Problematic Conditions

Identify the conditions that, based on your knowledge and experience, pose the greatest problem in your population.

- Very poor trees
- Poor trees

Identify Problematic Defects

Identify the defects that, based on your knowledge and experience, pose the greatest problem in your population.

- Basal decay and cavities
- Major dieback
- Poor branch attachments

Identify Locations and Targets

Identify the locations and targets that, based on your knowledge and experience, pose the greatest physical threat in your population.

- Busy streets
- Playground areas

EVALUATE THE RESOURCES AVAILABLE TO MANAGE

Staffing

- Number
- Training
- Work load

Equipment

- Diagnostic
- Capabilities/limitations
- Availability

Fiscal

CREATE A TREE RISK MANAGEMENT POLICY STATEMENT

Components of a Policy Statement

- State your agency's understanding of its responsibility to maintain a safe public area.
- Identify the manager of the risk reduction program.
- List any general constraints on managing hazard trees such as financial or personnel.

The following is an example of a Hazard Tree Policy Statement:

The City of Metropolis has an active policy to maintain the safety of public lands from potentially hazardous trees. The City will strive to eliminate, in a timely fashion, any tree deemed hazardous. When available fiscal and human resources limit the ability of the City to remove high-risk trees, priority shall be placed on trees deemed to carry the highest risk. The standard for rating the potential risk of a tree will be the International Society of Arboriculture's twelve point hazard evaluation system. The Director of Parks, Recreation and Forestry will administer this program and have final judgment in all matters concerning the mitigation measures taken for any tree deemed hazardous.

Benefits of a Policy Statement

- It defines for staff the overall mission of the company or agency as it relates to high-risk trees.
- Minimizes political influence
- Allows staff to do their job

DEVELOP AND IMPLEMENT AN ACTION PLAN

Goal

After evaluating your resources, define problem areas and broad solutions to those problems. View this as a wish list.

Objectives

Define clear objectives that address the general goals you have established. The details should be more specific. A good objective defines what is going to be done and in what timeline.

Actions

A series of actions should be identified that address each objective defined

PERIODIC REVIEW OF ALL FOUR COMPONENTS

Review all four components of your risk management plan frequently.