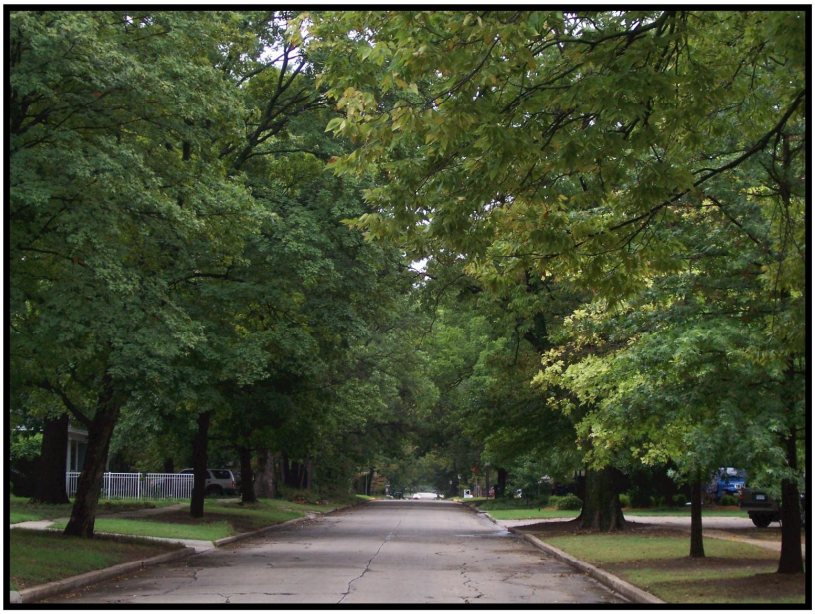

CITY OF NORMAN COMMUNITY FOREST MANAGEMENT PLAN

SEPTEMBER 2006

CITY OF NORMAN

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EXECUTIVE SUMMARY

Trees are an integral component of Norman's urban environment, and their importance to the community has long been recognized. In 1891, a Norman 'improvement society' was organized for the purpose of "beautifying said city by planting trees, shrubbery, etc". During a period from 1892-1908, David Ross Boyd, first president of the University of Oklahoma, personally planted thousands of trees. The attractiveness of the city is his living legacy.

Trees are major capital assets in the City. Like streets, sidewalks, utilities and buildings, the community forest is a critical and valuable component of the urban infrastructure. Trees provide citizens direct and indirect benefits, including increased property values, improved water quality, energy conservation, and wildlife habitat. New businesses are stimulated to locate in tree-friendly environments. Trees are good for our health, producing oxygen and removing air pollutants, and their beauty enhances the quality of life in Norman.

Citizens value the benefits provided by trees and support the protection of this investment with a comprehensive forest management program for their public trees. In 2004 the City accepted the newly-created *Urban Forest Master Pl*an. The Master Plan provides direction to manage tree-related issues in a proactive manner. Policy 3.0 states, "The City will enhance public safety and the quality of developed public land by promoting effective and cost efficient tree management". Further, Proposed Action 3.1 suggests the City "initiate a five-year maintenance cycle for all public trees".

This *Community Forest Management Plan* is intended to serve as an action plan specific to the field operations of Norman's Tree Care Program. More specifically, the Management Plan provides a five-year, comprehensive action plan for 1,654 street trees that were inventoried in 2005. Based on the data collected, the following steps are recommended for managing this valuable resource:

- Perform all recommended tree removals and Priority 1 Prunes as soon as possible beginning in 2006.

- Initiate an ongoing, five-year Routine Pruning cycle for the tree population.

- Began a Training Pruning Program for young and newly-planted trees.

Annual cost estimates are provided to accomplish the suggested steps, based on the City contracting the work. These expenditures should be considered as an investment in the City's infrastructure. Properly maintained trees will continue to provide benefits for many years.

Implementing this *Forest Management Plan* will provide several benefits to Norman including (**1**) development of adequate long-term planning to promote the sustainability of the community forest, (**2**) optimized use of limited financial and personnel resources, (**3**) increased training and education for tree program employees to ensure high quality tree care, and (**4**) coordination of tree-related activities among municipal departments. The reward from this investment will be a more beautiful, healthy and livable community.

INTRODUCTION

Importance of the Urban Forest

Trees are an important component of Norman's urban environment. From an accounting standpoint, trees are major capital assets in the City. Like streets, sidewalks, utilities and buildings, the community forest is a critical and valuable component of the urban infrastructure.

Trees in Norman provide citizens with direct and indirect benefits.

- **Trees increase property values.**
  Real estate with trees can command up to 20% higher values than real estate without trees. Office and industrial sites that include mature trees are in greater demand and earn higher sales and rental values. Houses on tree-lined streets can command higher prices than houses in more barren areas.

- **Trees increase economic development.**
  Trees contribute to a community's image of being livable, and are important elements in building a positive image. People linger and shop longer along tree-lined streets. Planting and caring for trees provides jobs.

- **Trees reduce surface water runoff rates and volume.**
  Trees intercept rainfall and reduce runoff, thereby supplementing retention/detention basins essential to the community. Trees reduce soil erosion and sedimentation of storms, thus improving water quality.

- **Trees increase energy-conservation benefits.**

  Proper tree plantings around buildings can slow winter winds and reduce annual energy use for house heating. Tree shading can significantly reduce cooling energy use. Tress cool the urban environment by shading asphalt, concrete and metal surfaces thus extending their useful life.

- **Trees are oxygen producers and clean the air.**

  Trees remove impurities from the air, such as airborne dirt, dust, pollen, smoke, odors and fumes. Trees absorb CO_2 and other "greenhouse gases" and, in turn, replenish the atmosphere with oxygen.

- **Trees reduce noise pollution.**

  Trees absorb sound and modify humidity resulting in lower transmission of sound. Rustling tree leaves mask urban noise.

- **Trees provide wildlife habitat and diversity.**

  Trees are a critical part of the urban ecosystem that provides shelter and food for birds and animals. Trees create shade and protection for plant life that would not exist in an urban setting.

- **Trees provide a buffer between different land uses.**

  Trees can define different land use areas and buffer parks and residential uses from high traffic areas.

- **Trees provide aesthetic screening.**

  Trees provide screens to reduce noise, glare and reflection of harsh urban traffic design. Trees provide visual control in the landscape through view direction and by hiding undesirable views.

- **Trees are good for our health.**
  Trees give a sense of being at home, in place; trees create feelings of relaxation and well-being. Trees absorb and soften irritating (stress building) noise from the urban environment.

Citizens of Norman have recognized these benefits provided by trees and support the protection of this investment with a comprehensive urban forest management program for their public trees.

BACKGROUND

The Norman Park Foundation, Inc. has been at the forefront in providing leadership in developing a program for the care of Norman's tree population. Grant funding obtained by NPF provided for three street tree inventories that were conducted in various areas within the City (Years 2000, 2001 and 2003). These inventories were undertaken to update the composition and condition of the community forest as a basis for developing a forest master plan and a tree management plan. Data from these inventories has been entered into Norman's Geographic Information System (GIS).

On April 9, 2002 the City Council created the Norman Tree Board. The Board advises the City Council and staff on matters related to trees. Its efforts focus on raising public and city government awareness of the benefits of trees. The Board believes that a comprehensive approach is needed to provide for a coordinated and cost-effective tree care program in Norman.

In March 2003, a City Forester was hired to provide a variety of professional and technical services associated with the community forestry program. These included meeting the objectives of the Community Forest Master Plan; assisting with urban forestry related activities among various City departments; and promoting the urban forest to the general public.

In 2004 the City accepted the newly-created Urban Forest Master Plan. The Master Plan provides direction to manage tree-related issues in a proactive manner. The plan addresses trees on both public and private property. It also discusses planting, maintenance and removal of trees along streets and other public properties, such as parks; the retention and addition of trees on private property; and the preservation and maintenance of historic trees that are links to Norman's past.

One of the Goals in the Master Plan is to develop a *tree management plan* for trees on public property in Norman. Policy 3.0 states, "The City will enhance public safety and the quality of developed public land by promoting effective and cost efficient tree management." Further, Proposed Action 3.1 in the Plan suggested the City "initiate a five-year maintenance cycle for all public trees."

PURPOSE AND SCOPE

The purpose of this document is to provide a five-year, comprehensive action plan for the inventoried tree population in Norman. Implementation of this Tree Management Plan will allow the City to:

- Understand the overall condition of the inventoried population.
- Establish a tree safety pruning and removal program to eliminate identified hazardous trees by the end of 2006.
- Identify action steps for trees with structural defects that left untreated, could pose risks to citizens and/or property.
- Create a Training Prune program for small and newly planted trees.

METHODS

As previously stated, three street tree inventories were conducted in Norman (Figure 1). These areas formed the basis for developing the Tree Management Plan.

From May to September 2005 every tree within the public right-of-way in these four areas was re-examined. In total, 1,654 trees were examined. Individual tree identification numbers, as assigned at the time of the original inventories, were maintained. In other words, each tree number is the same as it exists in the Norman GIS. Inventory areas were designated as Areas A, B or C as shown in Figure 1.

Field data collected in the present study included remeasurement of tree diameter at breast height. In addition, each tree was examined and assigned a code number indicating removal or pruning needs, as described below.

Data were entered into a spreadsheet and saved on a CD that was provided to the GIS office. Data are organized such that by using 'sort' commands, information for an individual tree can be recovered or, for example, a printout of all Priority 1 Removals within a selected inventory area can be produced.

Tree maintenance information is categorized by (1) *tree removal requirements* or (2) *tree pruning requirements*. Details are provided below.

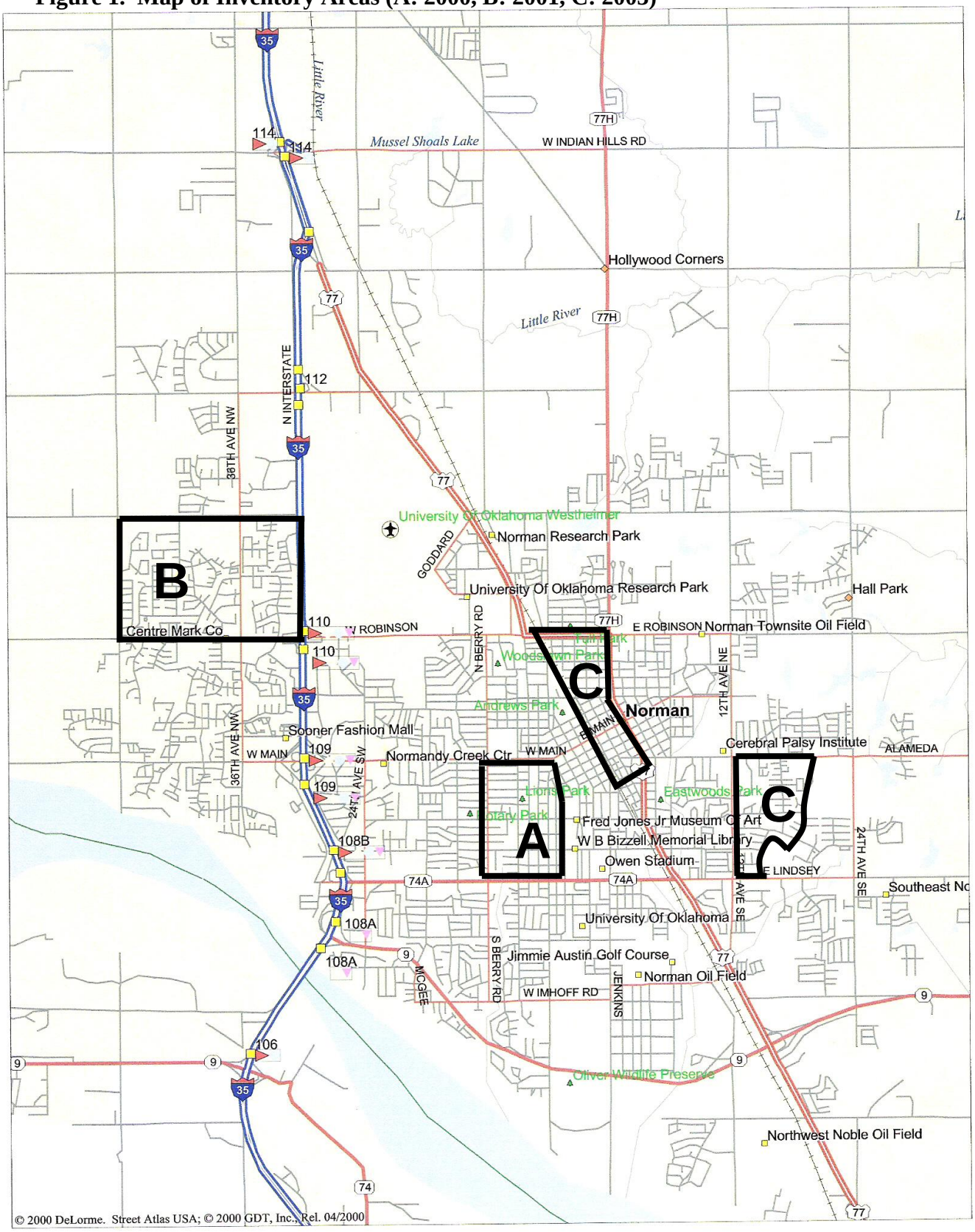
- **Tree Removal Requirements**

  Removals are categorized by the risk for tree failure (i.e., hazard potential). The categories are Priority 1 Removal, Priority 2 Removal, and Priority 3 Removal.

  Priority 1 Removal

  These trees are dead or have critical structural defects putting the public and/or property at potentially significant risk. These trees may exhibit severe trunk decay or weakened structure. These trees are an immediate hazard and should be removed as soon as possible.

Figure 1. Map of Inventory Areas (A: 2000, B: 2001, C: 2003)



Priority 2 Removal

These trees are dead or have serious defects, but have reduced hazard potential to the public because of their size or location. These trees should be removed after trees in the Priority 1 Removal category have been removed.

Priority 3 Removal

These trees are small, dead, or poorly formed trees that should be removed, but are not a public hazard. Thee trees should be removed only after all Priority 1 and Priority 2 Removals have been completed.

- **Tree Pruning Requirements**

Pruning categories separated into *Safety Pruning Recommendations* and *Cyclical Pruning Recommendations.*

Safety Pruning Recommendations

Trees in these two safety categories have potentially hazardous conditions in the tree canopies that can be remedied through pruning.

Priority 1 Prune

These trees require pruning to remove deadwood and/or broken branches that could cause injury to citizens or damage property. Trees in this category have broken, hanging or dead limbs greater than four inches in diameter which are in danger of falling.

Priority 2 Prune

These trees have characteristics similar to those in the previous category, but the potentially hazardous branches are between two to four inches in diameter.

Cyclical Pruning Recommendations

Trees in these three categories are not currently hazardous, but their structure, appearance and longevity will be improved from regular cyclical pruning. This means the trees will be periodically inspected and pruned on a fixed-year basis. These categories are *Large Routine Prune, Small Routine Prune, and Training Prune*.

Large Routine Prune

These trees are large in stature with minor amounts of deadwood less than two inches in diameter and/or with structural problems that will be improved when pruned. Also included in this category are trees that left unpruned may obstruct vehicular clearance, lines of sight, or traffic signage. Accessing the canopies of trees in this category will require large equipment such as a bucket truck, or tree climbing.

Small Routine Prune

These trees have small growth habit (less than 25 feet height when mature). These trees will require pruning on a fixed interval to correct structural defects and/or to direct branch growth away from potential interference with vehicles, buildings or utility wires. These trees can be pruned from the ground using extension pole pruners, etc.

Training Prune

This includes newly planted trees or small trees that will benefit from structural pruning to minimize the need for future, more costly pruning. These trees may have small amounts of deadwood, rubbing branches, narrow v-crotches, or multiple leaders.

- **Stump Removal**

  Tree stumps are designated for removal because they (1) may be occupying space that could be converted to a newly planted tree or (2) their removal will improve the appearance of the streetscape. Stump removal is a low priority activity, and resources should first be directed towards the aforementioned categories.

TREE MAINTENANCE RECOMMENDATIONS

The overall maintenance requirements for trees growing in the right-of-way in the three inventory areas is shown in Table 1. Approximately 39% of the maintenance work needed in Norman is 'hazardous' tree removal or tree pruning, whereas approximately 61% is routine pruning, training prune, or stump removal.

Table 1. Tree Maintenance Requirements

Maintenance Required	Number of Trees	Percentage of Trees
Priority 1 Removal	24	1.4
Priority 2 Removal	24	1.4
Priority 3 Removal	51	3.1
Priority 1 Prune	280	16.9
Priority 2 Prune	269	16.3
Large Routine Prune	656	39.6
Small Routine Prune	244	14.9
Training Prune	64	3.9
Stump Removal	42	2.5
Totals	1654	100.0

Tree Removals

As previously stated, trees recommended for removal are those that may be potential safety risks and/or are in poor condition. Of the street trees inventoried, 24 (1.4%) are recommended for Priority 1 Removal and 24 (1.4%) are recommended for Priority 2 Removal. The number of tree removals by diameter class is shown in Table 2. Prompt removal of these trees will reduce the hazard potential in the City.

Table 2. Priority Tree Maintenance Requirements by Activity and Tree Size

Tree Diameter Size Class (inches)	Priority 1 Removal	Priority 2 Removal	Priority 3 Removal	Priority 1 Prune	Priority 2 Prune
1-3	0	0	6	0	1
4-6	0	0	7	0	2
7-12	0	3	8	4	32
13-18	6	1	4	18	67
19-24	5	10	14	43	63
25-30	4	4	9	91	52
31-36	5	4	3	83	33
37-42	3	1	0	33	13
43+	1	1	0	8	6
Totals	24	24	51	280	269

Priority Pruning

Priority 1 Prune is the removal of dead or hazardous branches that are greater than four inches in diameter. The inventory classified 280 trees (16.9%) in this category. Removal of these branches will reduce potential damage to people and/or property.

Priority 2 Prune is the removal of dead or hazardous branches that are between two and four inches in diameter. A total of 269 trees (16.3%) require this maintenance. All trees in these two pruning categories should be examined during pruning activities for severe decay and, if found, any afflicted tree should be removed. The number of Priority 1 and 2 Prune trees by diameter class is shown in Table 2.

Routine Pruning

Routine pruning is the removal of dead, dying, diseased, interfering or weak branches. Overall, 900 inventoried trees (54.5%) are in need of routine pruning to decrease the presence of potentially hazardous branches.

Large Routine Prune includes large-stature trees needing pruning to improve tree structure and direct branch growth away from vehicular or pedestrian traffic, utility wires, or structures. Pruning in this category will require large equipment or tree climbing. A total of 656 (39.6% are in this category).

Small Routine Prune includes small-stature trees requiring pruning to improve structure and direct branch growth away from obstructions. A total of 244 trees (14.9%) are in this category, and can be pruned from the ground.

Training Pruning

Training is pruning of small and/or newly planted trees to improve structure so as to reduce the need for more costly corrective pruning after the tree has matured. The inventory found 64 trees (3.9%) that would benefit from training pruning. However, as new trees are planted, this total will increase.

Stump Removal

A total of 42 stumps (2.5%) were recorded for removal. The most efficient way to accomplish this task is to use a commercial grade stump grinder.

➢ Developing a Routine Pruning Program

Routine pruning is an activity that should take place on a cyclical basis for the entire tree population. In other words, each tree is revisited on a regular predetermined interval and pruned as necessary. Establishment of a pruning cycle in Norman will improve tree health and public safety, reduce the occurrence of hazardous limbs and minimize conflicts with utility lines.

Small routine pruning is recommended for mature, small-stature trees such as redbuds, Callery pears (e.g. cv. 'Bradford'), etc. in the City. Although these species are usually only 25-30 feet tall, their health and structure can be improved by the removal of dead, diseased and/or rubbing branches, and canopy storm damage. Further, branches blocking traffic signs can be removed.

Five-Year Cycle

It is suggested that Norman implement a five-year pruning cycle as recommended in the Urban Forest Master Plan. Data from the tree inventory indicates 900 street trees should initially be included in a cyclical pruning program (approximately 180 trees per year) (Table 3). An additional 549 trees were recommended for Priority 1 or Priority 2 Prune. Once the priority requirements of these trees are met, they will be added to the total of mature trees in the Routine Prune category. Thus, the total number of mature trees requiring Routine Prune will increase to 1,499.

Table 3. Routine Pruning Program by Tree Size Classification

Diameter Size Class (Inches)	Large/Small Routine Prune (Total Trees)	Large/Small Routine Prune (Approximate Trees/Year)*
1-3	34	7
4-6	162	34
7-12	262	52
13-18	198	40
19-24	98	20
25-30	68	14
31-36	50	10
37-42	23	5
43+	5	1
Totals	900	183

*Based on 5-year cycle

- **Developing a Training Pruning Program**

As previously described, training pruning is targeted toward trees less than 20 feet in height. The objective is to improve the branch structure of the tree at an early age, thus reducing the need for more costly pruning when the tree has matured.

Three-Year Cycle

The Training Pruning Program should be scheduled on a three-year cycle, rather than the five-year cycle suggested for mature trees. The inventory identified 64 trees needing training pruning (Table 4). Because this type of pruning can be done from the ground, the work can proceed quite efficiently. Therefore, absent the planting of new trees, it is suggested the entire group of 64 trees be pruned once every three years.

Table 4. Training Pruning Program by Tree Size Classification

Size Class (inches)	Training Prune (number of trees)
1-3	12
4-6	31
7-12	21
Totals	64

- **Training Management Budget**

  Pruning and removal costs for trees in this management plan (Table 5) are based on information compiled by the Davey Tree Expert Company, and are "based on quotes from a large number of reputable North American tree care companies." The figures should be regarded as *estimates*. It is possible the numbers will vary depending on whether the work is conducted by in-house City employees or contracted to local arborists. Nonetheless, the estimates provided are examples of the relative costs of the recommended activities.

Table 5. Cost Estimates for Tree Removals, Pruning and Stump Removals

Diameter Size Class (Inches)	Estimated Removal Cost/Tree	Estimated Pruning Cost/Tree	Estimated Stump Removal Cost/tree
1-3	$20	$15	$20
4-6	$85	$25	$20
7-12	$180	$60	$20
13-18	$290	$100	$30
19-24	$430	$140	$50
25-30	$690	$185	$70
31-36	$930	$250	$90
37-42	$1200	$310	$110
43+	$1500	$480	$130

The budget for a five-year time-frame for accomplishing the required work is presented in Table 6. The first and second year program is intended to reduce potential hazards to the public and property. The City is strongly encouraged to schedule these activities in a timely manner. A five-year Routine Pruning cycle is also established the first year and continues through year five. The Training Pruning cycle is scheduled for years two and five (e.g. a three-year cycle).

Table 6. Estimated Costs for Norman's Five-Year Tree Management Program

Estimated Costs for Each Activity			2006		2007		2008		2009		2010		Five Year Cost
Activity	Diameter Class	Cost/Tree (in dollars)	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	
Priority 1 Removal	1-3"	$20	0	$0									
	4-6"	$85	0	$0									
	7-12"	$180	0	$0									
	13-18"	$290	6	$1740									
	19-24"	$430	5	$2150									
	25-30"	$690	4	$2760									
	31-36"	$930	5	$4650									
	37-42"	$1,200	3	$3600									
	43"+	$1,500	1	$1500									
Activity Total(s)			24	$16,400.00	0	$0	0	$0	0	$0	0	$0	$16,400
Priority 2 Removal	1-3"	$20	0	$0									
	4-6"	$85	0	$0									
	7-12"	$180	3	$540									
	13-18"	$290	1	$290									
	19-24"	$430	10	$4,300									
	25-30"	$690	4	$2,760									
	31-36"	$930	4	$3,720									
	37-42"	$1,200	1	$1,200									
	43"+	$1,500	1	$1,500									
Activity Total(s)			24	$14,310.00	0	$0	0	$0	0	$0	0	$0	$14,310
Priority 3 Removal	1-3"	$20			6	$120							
	4-6"	$85			7	$595							
	7-12"	$180			8	$1,440							
	13-18"	$290			4	$1,160							
	19-24"	$430			14	$6,020							
	25-30"	$690			9	$6,210							
	31-36"	$930			3	$2,790							
	37-42"	$1,200			0	$0							
	43"+	$1,500			0	$0							
Activity Total(s)			0	$0	51	$18,335	0	$0	0	$0	0	$0	$18,335
Priority 1 Prune	1-3"	$15	1	$15									
	4-6"	$25	0	$0									
	7-12"	$60	4	$240									
	13-18"	$100	18	$1,800									
	19-24"	$140	43	$6,020									
	25-30"	$185	91	$16,835									
	31-36"	$250	83	$20,750									
	37-42"	$310	33	$10,230									
	43"+	$480	8	$3,840									
Activity Total(s)			281	$59,730	0	$0	0	$0	0	$0	0	$0	$59,730
Priority 2 Prune	1-3"	$15			0	$0							
	4-6"	$25			2	$50							
	7-12"	$60			32	$1,920							
	13-18"	$100			67	$6,700							
	19-24"	$140			63	$8,820							
	25-30"	$185			52	$9,360							
	31-36"	$250			33	$8,250							
	37-42"	$310			13	$4,030							
	43"+	$480			6	$2,880							
Activity Total(s)			0	$0	268	$42,010	0	$0	0	$0	0	$0	$42,010

Table 6. Estimated Costs for Norman's Five-Year Tree Management Program (Continued)

Estimated Costs for Each Activity			2006		2007		2008		2009		2010		Five Year Cost
Activity	Diameter Class	Cost/Tree (in dollars)	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	# of Trees	Total Cost	
Stump Removal	1-3"	$20	4	$80									
	4-6"	$20	6	$120									
	7-12"	$20	11	$220									
	13-18"	$30	11	$330									
	19-24"	$50	5	$250									
	25-30"	$70	4	$280									
	31-36"	$90	1	$90									
	37-42"	$110	0	$0									
	43"+	$130	0	$0									
Activity Total(s)			42	$1,370	0	$0	0	$0	0	$0	0	$0	$1,370
Routine Pruning Program	1-3"	$15	7	$105	7	$105	7	$105	7	$105	6	$90	$510
	4-6"	$25	33	$825	33	$825	33	$825	33	$825	30	$750	$4,050
	7-12"	$60	52	$3,120	52	$3,120	52	$3,120	52	$3,120	54	$3,240	$15,720
	13-18"	$100	39	$3,900	40	$4,000	39	$3,900	40	$4,000	40	$4,000	$19,800
	19-24"	$140	19	$2,660	20	$2,800	19	$2,660	20	$2,800	20	$2,800	$13,720
	25-30"	$185	13	$2,405	14	$2,590	13	$2,405	14	$2,590	14	$2,590	$12,580
	31-36"	$250	10	$2,500	10	$2,500	10	$2,500	10	$2,500	10	$2,500	$12,500
	37-42"	$310	4	$1,240	5	$1,550	4	$1,240	5	$1,550	5	$1,550	$7,130
	43"+	$480	1	$480	1	$480	1	$480	1	$480	1	$480	$2,400
Activity Total(s)			178	$17,235	182	$17,970	178	17,235	182	$17,970	180	$18,000	$88,410
Training Pruning Program	1-3"	$15			12	$180							
	4-6"	$25			31	$775							
	7-12"	$60			21	$1,260							
Activity Total(s)			0	$0	64	$2,215	0	$0	0	$0	0	$0	$2,215
Activity Grand Total			**549**		**565**		**178**		**182**		**180**		
Cost Grand Total				$109,045		$80,530		$17,235		$17,970		$18,000	**$242,780**

SUMMARY AND CONCLUSIONS

The City of Norman has made great strides toward developing a comprehensive approach to the care and management of its urban forest. In just a few short years, the City has conducted three street tree inventories, hired an Urban Forester, and adopted a Forestry Master Plan. Norman is a TreeCity USA and has an active Neighborwoods Program. A key element in driving these accomplishments has been the work of committed volunteers with the Norman Park Foundation, Inc. and the Norman Tree Board.

This Forest Management Plan is intended to serve as an action plan specific to the field operations of the Community Tree Care Program. It is based on data updated from the three inventories as well as policies and goals contained in the Forest Master Plan.

The Management Program discussed in this Plan is designed to remove identified potentially hazardous trees within two years, establish a Training Pruning Program for young trees, and create a five-year Routine Pruning Program. In other words, the focus initially is directed at reducing public hazards and improving public safety. A longer term, secondary objective is to improve the health and appearance of the community forest.

Implementing this Plan will provide several benefits to the City of Norman, including (1) development of adequate long-term planning to guarantee the sustainability of the urban forest, (2) optimized use of limited financial and personnel resources, (3) increased training and education for tree program employees to ensure high quality tree care, and (4) coordination of tree-related activities among municipal departments.

In addition, this plan addresses community needs (i.e., those that relate to how the public perceives and interacts with Norman's Forest Management Program). It is anticipated the Plan will (1) increase public awareness of values and benefits associated with trees, (2) foster community support for the City urban forest management program and, (3) promote better private tree care through improved public understanding of the biological needs of trees.

If this plan is to be an effective tool for managing Norman's forest resources, it must be dynamic. Accurate records must be kept of tree maintenance activities, tree planting and tree removals. Coordination with the City's GIS office will be very important.

Lastly, the Forestry Management Plan builds upon the momentum of the City's past tree-related accomplishments. Mobilizing the plan will move Norman toward having a well-managed urban forest that enhances public safety and contributes to the vitality of community.

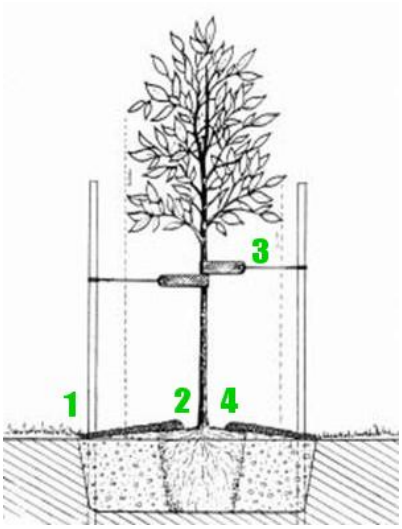
APPENDIX I

TREE PLANTING GUIDELINES

APPENDIX I
Tree Planting Guidelines

Tree Planting

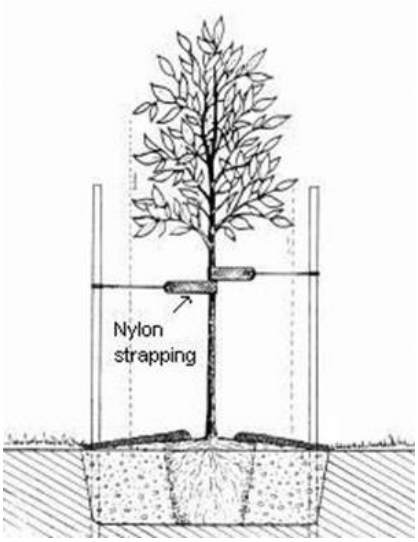
- Planting a tree in the proper location is always a good idea. The following steps will ensure the planting is a success:
  1. Select a good site – check for overhead and underground utilities, adjacent buildings, sidewalks and plants; and sufficient space for the tree to grow.
  2. Purchase a healthy, structurally sound tree.
  3. Plant it properly.
  4. Provide proper maintenance.
- The following drawing shows the basics of proper planting.



  1. Dig the hole 2-3 times the diameter of the root ball.
  2. Place the root ball at or above ground level.
  3. Use nylon strapping or webbing for staking (see staking below).
  4. Mulch over the hole, but leave a bare area immediately next to the trunk.
- The International Society of Arboriculture has a series of publications available on the web in the category of "Before Tree Buying and Planting" at *www.TreesareGood.com*. These publications provide information on selecting and purchasing trees and planting them properly.

Staking

- Recommended for small trees that have exposed roots from partial root failure or erosion.
- Stabilizes a tree and encourages root growth.
- Use 3-5 foot tall posts and nylon strapping or webbing whenever possible – avoid the "hose and wire" method of staking.



- Place the stakes on either side of the tree, 90 degrees from the prevailing wind. For example, if the predominant winds are north and south, place the stakes on the east and west of the tree.
- Remove staking after **1 year**.

Mulching

- Recommended for all trees but of particular importance for eroded areas. Mulching is intended to:
  1. Protect the roots from exposure and drying out.
  2. Keep water close to the roots for easy absorption – makes watering more effective.
- Use wood chips or shavings 4-6 inches deep over entire root area.
- Do NOT mound mulch against the trunk – leave 2-4 inches of exposed ground next to the trunk.

APPENDIX II

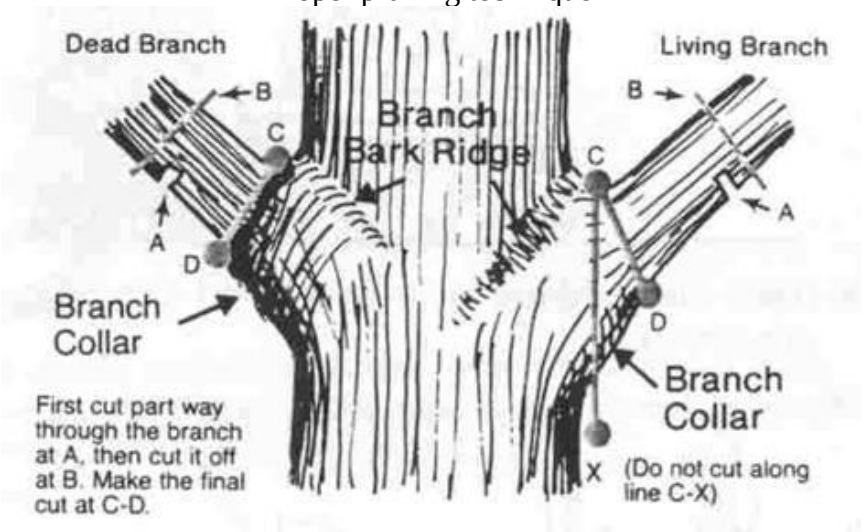
TREE MAINTENANCE GUIDELINES

APPENDIX II
Tree Maintenance Guidelines

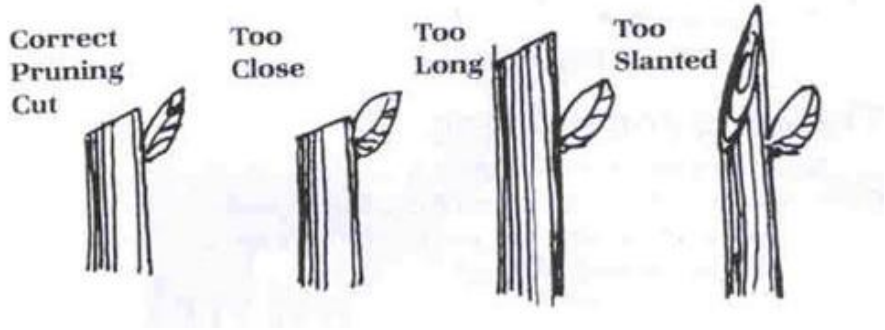
Tree Pruning

- Remove broken, twisted or cracked branches.
- Do not remove more than 25% of the crown in a single year.
- Prune during the dormant season, the winter.
- Make clean cuts with sharp tools.
- DO not cut into the branch collar (as illustrated below).
- Use the 3-cut system for large branches (as illustrated below).

Proper pruning technique



Proper pruning adjacent to a bud



- More information on pruning on the web at *www.TreesareGood.com.*

APPENDIX III

SUGGESTED PLANTING SITES IN NORMAN

APPENDIX III
Suggested Planting Sites in Norman

Various constraints will naturally limit the sizes and types of trees, shrubs, and /or grasses used to 'green up' these sites.

1. West Lindsey
2. 12the Avenue NE, between Robinson and Tecumseh Road
3. Tecumseh Road interchange off I-35 on the West and East sides; also Robinson, Main and Lindsey exits.
4. Highway 9 median
5. Reaves Park—large trees needed
6. Lions Park
7. I-35 and Tecumseh Road at Southwest Wire
8. The Mile of Cars needs a coordinated landscape plan
9. 36th and Main Street on the west side
10. Highway 77 south of Highway 9
11. School yards generally need landscaping and especially shade trees

NOTICE OF DISCLAIMER

Inventory data as described in this report are based on visual inspections of readily-apparent factors present at the time of inventory, and do not include individual testing or analysis. Trees may contain unreported internal defects which could cause them to be hazardous. Under no circumstances shall Thomas C. Hennessey, Ph.D. be liable for discovery of hidden hazards, or be held responsible for events resulting from failure to identify or report hazardous trees.