

Long Lake Township
Grand Traverse County, Michigan

A plan for the development of a

Roadside Tree Planting Program

Adopted August 25, 2009

Long Lake Township
8870 North Long Lake Road
Traverse City, Michigan 49684

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Prepared by Township staff under the direction of the Long Lake Township Planning Commission
Adopted by the Planning Commission on August 25, 2009

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With assistance from Daniel Schillinger, Schillinger Forestry, LLC

Made possible through a grant from the Michigan Department of Natural Resources Urban and Community Forestry Program



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Purpose & Approach

The Township's Community Forestry Plan adopted in January of 2000 included a goal to "preserve, protect and restore primary tree lined corridors in the Township". Actions identified in the plan to achieve this goal include:

- Conduct a street tree inventory along primary transportation corridors to determine location, species, age, size, health and condition
- Establish a cooperative roadside tree program with the Grand Traverse County Road Commission, utility companies and private landowners
- Develop policies for maintenance, removal, and planting of roadside trees in conjunction with cooperating agencies
- Adopt standards for tree planting and lists of preferred shrubs and trees for planting on a variety of sites
- Establish a roadside tree planting program, whereby the Township and landowners share in the cost of purchasing trees. Local agencies such as the Grand Traverse Conservation District can provide technical assistance for the program.

This goal is reinforced in the Township's Comprehensive Plan, adopted in 2005, with an objective to "develop and implement a street tree planting and preservation plan for roadside woodland corridors defined in the Community Forestry Plan".

In August of 2008, the Township applied for and received a grant from the Michigan Department of Natural Resources Urban and Community Forestry Program to undertake the planning for a Roadside Tree Replacement and Planting Program.

The following is a summary of the steps that were undertaken in the planning for this program and are documented more thoroughly in the text of this document.

1. **Inventory Existing Conditions** In December of 2008, the Township contracted with forester Daniel Schillinger. In January, the Township provided on-site GPS training for both the forester and township planner. In February, the forester conducted a township-wide survey of roadside trees on major county roads. This did not include areas with roadside woodlots or interior subdivision roads or private roads. The inventory was presented to the Planning Commission in March. The forester inventoried stretches of roadway with detailed notes and photos along with GPS locations. The following were inventoried:

- Areas of existing roadside trees and their health;
- Areas with open stretches that may be candidates for roadside tree planting.

2. **Establish Program Criteria** In April, the Planning Commission was presented with a condensed summary of the inventory, and a proposed set of criteria to evaluate general stretches of roadway. The proposed criteria were weighted based on their relative importance and each stretch of roadway was scored. The Planning Commission suggested refinements and revised scoring was presented at the May meeting of the Planning Commission.

Based on input from the Planning Commission, overall program phasing and priorities were established. These were refined by the Planning Commission and finalized in July.

3. **Landowner Contact** In June, the forester returned to the field and inventoried individual roadside trees that were dead or dying. These property owners were contacted by letter notifying them of the tree replacement program; that the property may be a candidate for tree replacement; and that they would be contacted by the forester by telephone. Follow up calls were made in July. Properties with open stretches identified as good candidates for tree planting were also sent letters and received telephone calls from the forester in July. The forester determined which property owners were willing to participate in the program and met the criteria.
4. **Easement Agreements** The Township attorney prepared a standardized easement agreement for those who qualify and wish to participate in the program. This standardized agreement is included in Appendix A.
5. **Program Details** Over the course of the plan development and upon recommendation from the forester, recommended tree species, general locational recommendations, and a program budget were developed. Based on the telephone survey results and further evaluation of particular road stretches, phasing was evaluated.

Objectives & Proposed Phasing

Below are the objectives of this roadside tree planting program and phasing as developed by the Township's Planning Commission.

Objective 1: Tree Removal and Replacement Originally, the primary concern prompting pursuit of this program was the incidence of dying roadside trees. This is a tree replacement and planting program and, as such, it was expected that the initial phase of the program would include the removal of diseased or dying roadside trees and their replacement, regardless of the scoring for the adjacent stretch of road. These locations were identified by the forester, are scattered around the Township and are shown Inventory of Existing Conditions. Because of the following factors, tree removal and replacement remains a high priority, but will be phased over a longer period of time:

- The Grand Traverse County Road Commission has limited funding available for tree removal within their rights-of-way;
- Property owners surveyed largely did not wish to financially support the removal of trees within the county road right-of-way;
- The Planning Commission felt that it is not equitable to use Township funds and funds generated through this program to remove trees that are ultimately the responsibility of the Grand Traverse County Road Commission.

Phasing for this objective will be incremental on an ongoing basis as the Grand Traverse County Road Commission is able to remove trees. As dead and dying trees are removed, the property owners will be contacted regarding replanting of roadside trees for the next available round of tree plantings. The list of locations and field notes for these dead and dying trees will be turned over to the Grand Traverse County Road Commission.

The Planning Commission has determined that the following two objectives, 2A and 2B, have equal weight. Those property owners meeting either of these objectives and willing to participate in the program will be equally evaluated. Every attempt will be taken to plant in high scoring stretches of roadway before low planting along lower scoring stretches. Also, individual properties that have physical restrictions such as the presence of overhead utility lines, steep slopes, fences, known easements posing a restriction, or wider road rights-of-way will generally be eliminated from eligibility. The available program funding and the number of willing participants each year will also impact phasing.

Objective2A: Agricultural Fields & Reestablishment of Historic Roadside Trees Large agricultural fields are historically the location of large roadside trees. In some cases these served as wind blocks or shade for farmhouses. The Township has an agrarian tradition and there is a new interest in preserving this character wherever possible. For this reason, areas planned for agricultural use and that are currently being farmed are a focus to this program. Of course, these agricultural fields are also the location of several of the important viewsheds valued by the community, plantings should be carefully planned to avoid or enhance the viewsheds.

Although it is of lower priority because it is not interior to the Township, this objective includes stretches along M-72 as this road historically had roadside trees prior to road widening and because this is a part of the planned and existing agricultural area of the Township. Considering that this is a high visibility corridor, this could help to communicate to the region Long Lake Township's commitment to this program.

Objective 2B: Areas with Few Constraints and High to Medium Scoring Areas where there are no physical constraints, where there are not long views that may be blocked and where there are small lots fronting on the high to medium scoring stretches of roadway is of equal priority as agricultural properties discussed in Objective 2A. These individual small property owners may be more interested in beautifying their property and more able to maintain the trees than some of the large property owners. These areas could potentially have a large impact on the driving public because of the lack of long views and the large amount of traffic on these stretches. Roads with these characteristics include Cedar Run Road, Strait Road, Tilton Road and West Long Lake Road.

In addition, there are some ongoing objectives identified under this program.

Ongoing Objective 1: Planting and Replacement at Public Places The Township controls several properties in the Township that are symbols of the community. These especially include the Township hall and the cemetery. The Township should provide an example of the commitment to this program by budgeting funding to replace and plant roadside trees at Township controlled properties where appropriate. Several other public entities own properties within the Township including schools and county parks. The Township should work with these entities to provide roadside tree planting on these properties as appropriate. The timing of this should be ongoing throughout the length of this program.

Ongoing Objective 2: New Developments New developments (including commercial projects and large residential projects) should be required through future zoning requirements to comply with the standards for roadside tree planting wherever feasible.

Ongoing Objective 3: Existing Subdivisions / Site Condominiums There are several existing residential developments with significant road frontages that are appropriate for roadside tree plantings. The Township should work with the homeowners associations of these developments and the Road Commission to coordinate roadside tree planting where feasible.

Ongoing Objective 4: Work with Road Commission and Property Owners to Remove Dead and Dying Roadside Trees The Township will remain in communication with the Road Commission regarding known dead and dying trees. The Township will work with the Road Commission and adjacent property owners to explore granting opportunities, cost-share programs, and other means to remove and subsequently replace dying roadside trees, especially where they pose a general danger to the public.

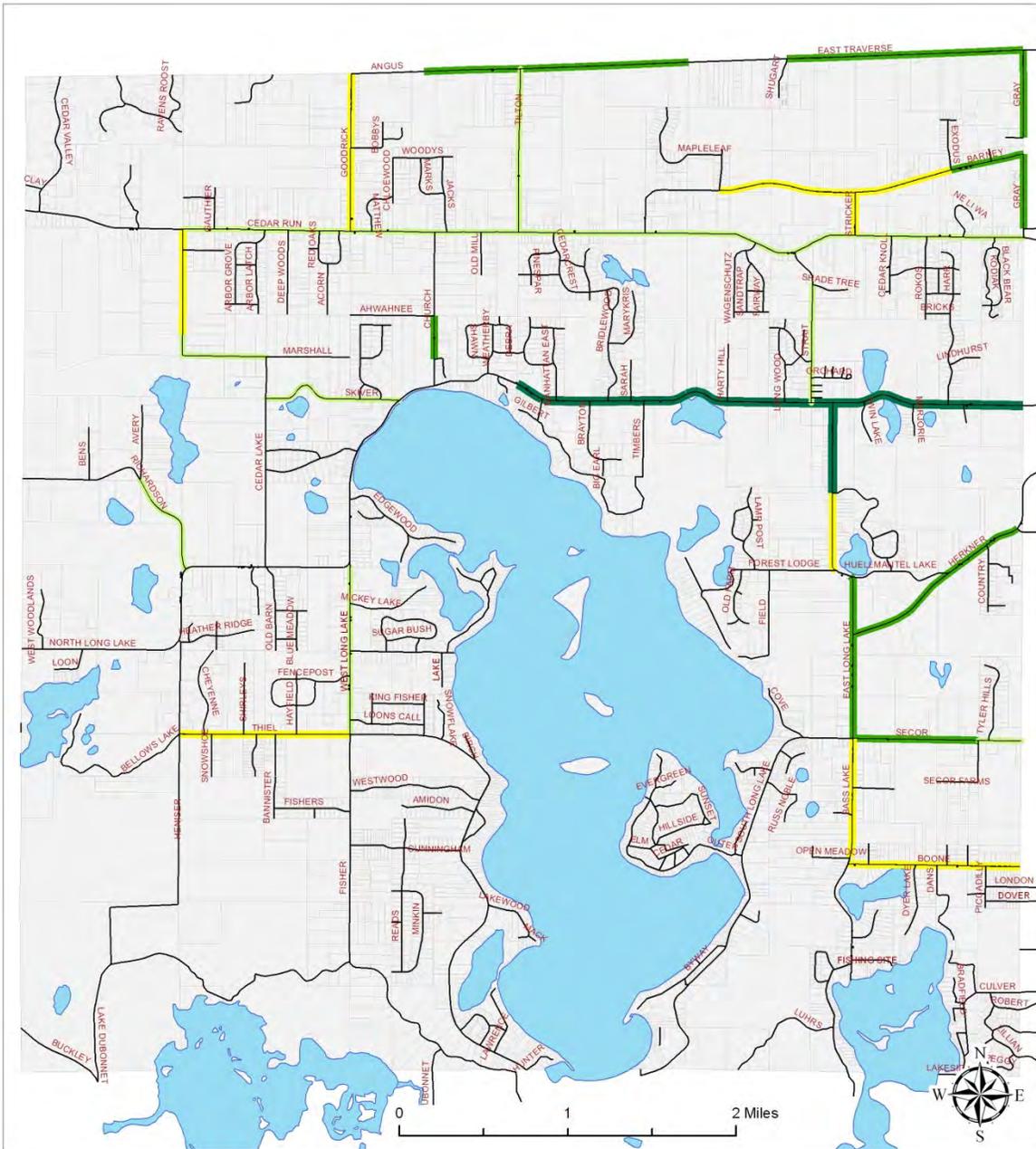
Priority Scoring of Road Stretches

The Planning Commission worked with staff to develop a list of priority-setting criteria and scoring for each stretch of roadway covered in the existing tree survey. The criteria includes such objective characteristics as parcel frontage and whether the road is a scenic road as identified in the Natural Features Inventory and some more subjective criteria such as the potential to enhance a scenic view. Each score then was weighted by a factor of between 1 and 3. These scorings and weight factors are based on township priorities as documented in Township planning documents and through priority setting with by the Planning Commission.

Table 1: Priority Scoring

Consideration	Score (High score positive)	Weight
Use/zoning	Agricultural = 5	3
	Parkland = 5	
	Other public land = 4	
	Vacant = 3	
	Residential = 3	
	Commercial = -1	
Potential for development	Zoned/known to be planned for high intensity use = -2	3
	Potential for development = -1	
Other considerations	Stretch of good quality trees with infill potential=3	2
	Potential to create a “corridor experience” = 3	
	Stretch of poor quality trees with replacement potential = 3	
	Stretch of poor quality trees with infill potential = 2	
	Open stretch with potential for planting = 3	
Key landmark property	Includes schools, township hall, cemetery, county park, historic = 5	3
Well traveled road	Over 10,000 DVT = 3	2
	5,000-10,000 DVT = 2	
	2,000 – 5,000 DVT = 1	
	Under 2,000 = 0	
	M-72 = -1	
Road leads to Cedar Run recreation area	Heisner, Marshall, Cedar Run w/in 1 mile of parkland = 2	1
Scenic road	2	1
Scenic view	Potential to enhance scenic view = 2	2
	Potential to block scenic view = -2	
Length of Frontage	1,000'+ = 3	3
	600' – 1,000'= 2	
	300' – 600' = 1	
Physical barriers	Topography = -2	3
	Overhead lines = -2	

The composite scoring of the target roadways is shown on the following map. The highest priority roads include parts of North Long Lake Road and a small stretch of East Long Lake Road; this is due largely to the high level of traffic on this roadway, because it is a scenic road, a large number of larger agricultural properties, and because several public destinations (including Long Lake Elementary School, Long Lake



Long Lake Township Roadside Tree Plan Scoring of Roadsides

- 0
- 1 - 18
- 19 - 28
- 29 - 42
- 43 - 56

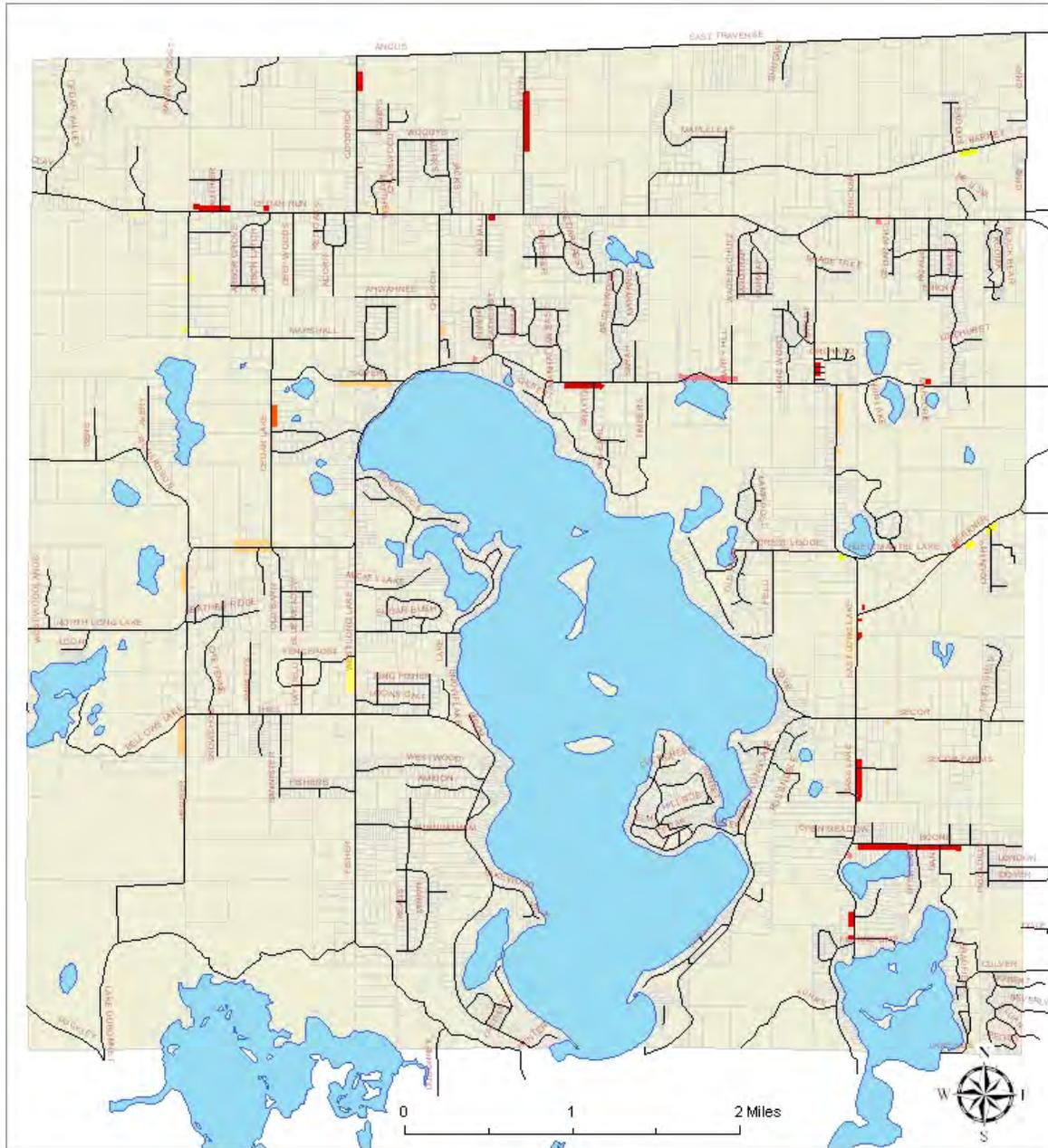
Township Hall and Taylor Park, and Twin Lakes County Park) front on this roadway. However, due to several factors, this stretch is not proposed for the first phase of implementation of this plan. This is due to lack of a significant number of property owners surveyed in this area that were interested in participating, and to the planned redevelopment of a large amount of frontage in the area of North Long Lake Road and Strait Road. Three general areas of the Township scored second highest: these included large stretches of M-72, Grey Road and the easternmost section of Barney Road, and lastly the Herkner Road/ East Long Lake Road/ Boone Road area. These areas scored well due to the large amount of traffic carried on some of the road (especially M-72), because some stretches are scenic roadways (including M-72 and East Long Lake Road) and includes many large frontage parcels in agricultural use.

Inventory of Existing Conditions

Significant Features As a first step, the significant features in the Township were mapped. Long Lake Township is favored with abundant natural features including large areas of woodlots, recreational and scenic lakes, and roadways that travel through rolling hills with scenic pasturelands and cropland. The eastern portion of the Township is characterized by more open agricultural lands, and western and southern parts of the Township are more heavily wooded with woodlots extending to the roadsides. These features are shown on the Significant Features map in Appendix B. Most of this data comes from the Township's Natural Features Inventory, completed in late 2006.

Also mapped were a profile of existing coniferous woodlots and soils suitable for planting of coniferous trees; and a profile of existing hardwood woodlots and soils suitable for planting of hardwood trees. Generally speaking, the Township's soils are rated good to fair for planting of both hardwood and coniferous trees, especially in the northern two tiers of the Township. The only areas with some limitations are areas around some lakes and some lowlands in the southern part of the Township. No significant areas along major roadways have these restrictions. These profile maps can be found in Appendix B.

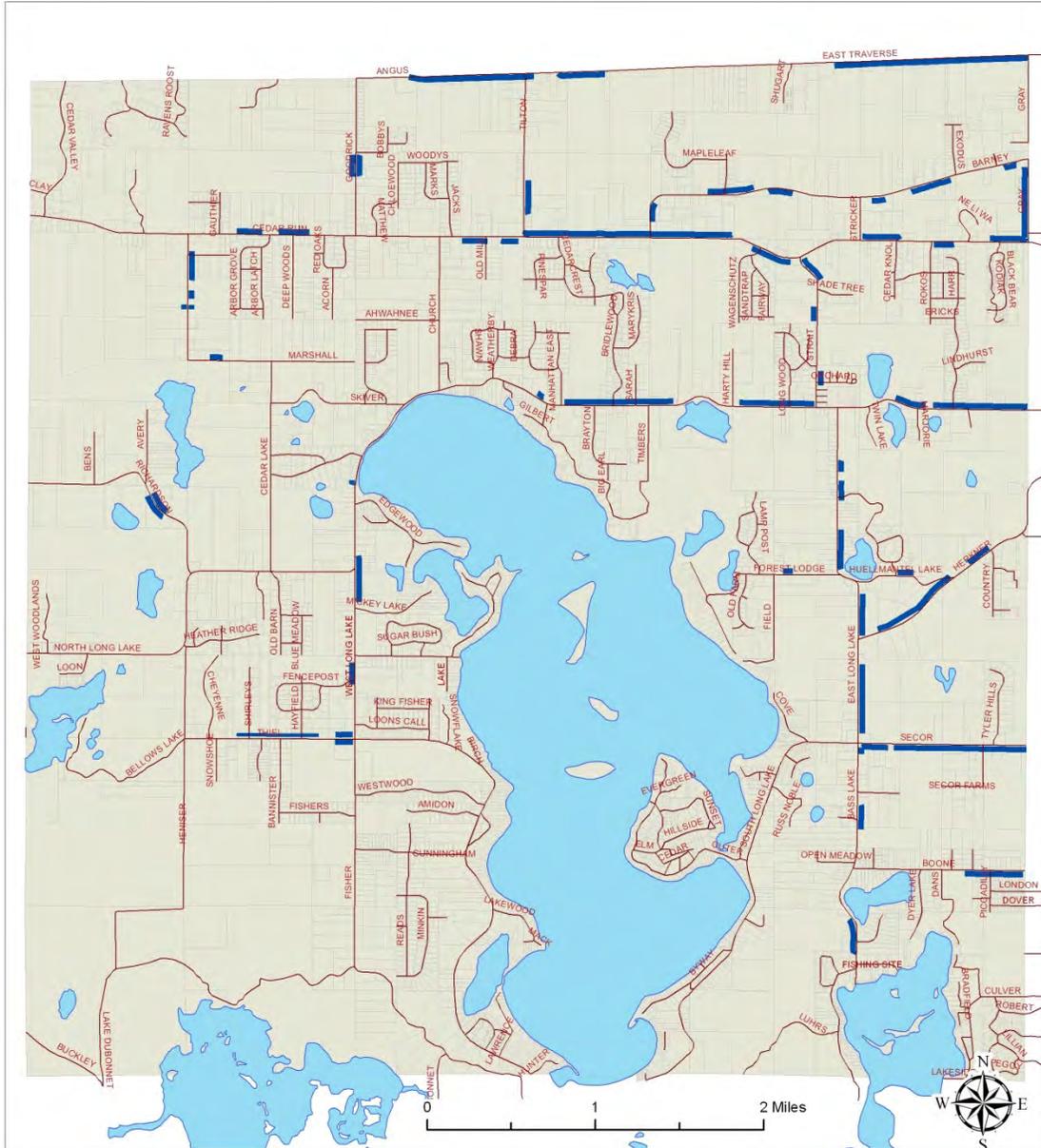
Existing Roadside Tree Survey Based on the information shown in the Significant Features Map, it was determined that a survey of existing roadside trees would be performed on County roads, not interior to subdivisions, and not in areas where existing large woodlots extend to the roadside.



**Long Lake Township
Roadside Tree Plan
Existing Tree Survey Summary**

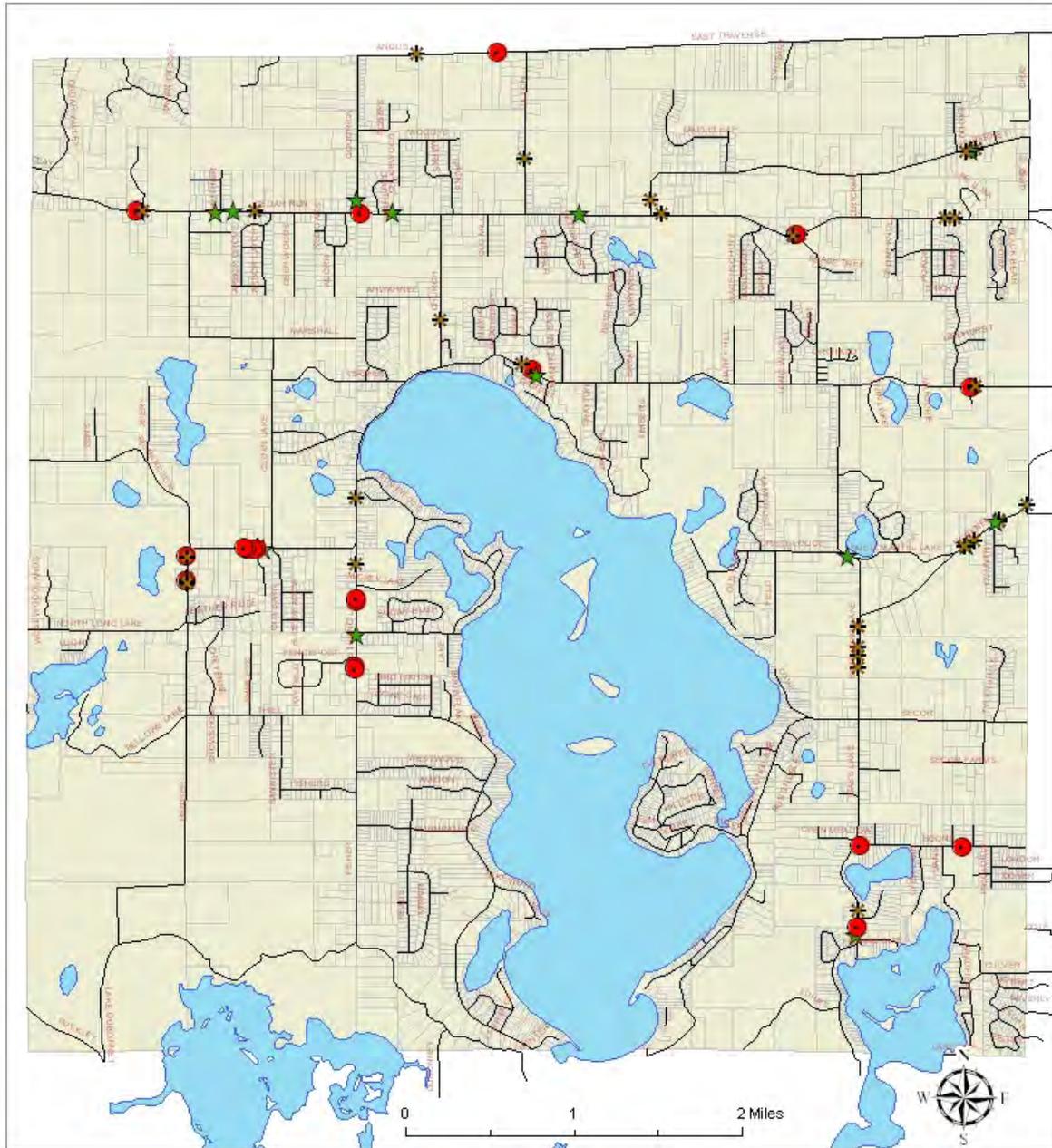
- General Health of Roadstretch
- █ Good
 - █ Good/Fair
 - █ Fair
 - █ Fair/Poor
 - █ Poor

The existing tree survey documents the location of stretches of roadside trees, their general health, the species of trees present, a photo of each stretch and specific field notes related to that location. A general map of the existing tree survey is shown above. More complete documentation of the full existing conditions survey, notes, and photos are included in Appendix B. Open stretches along roadways that may be suitable for planting was also mapped as seen below.



Long Lake Township Roadside Tree Plan Open Roadside Stretches

The existing tree survey also includes documentation of individual roadside trees that were found by the Township's forester to be dead or dying. This inventory includes detailed notes and photos of each of the noted trees. This is at a more detailed level of information than the survey of stretches of roadway.



Long Lake Township Roadside Tree Plan Inventory of Dead & Dying Trees

- Tree Health
- Dead
 - * Poor
 - ★ Fair

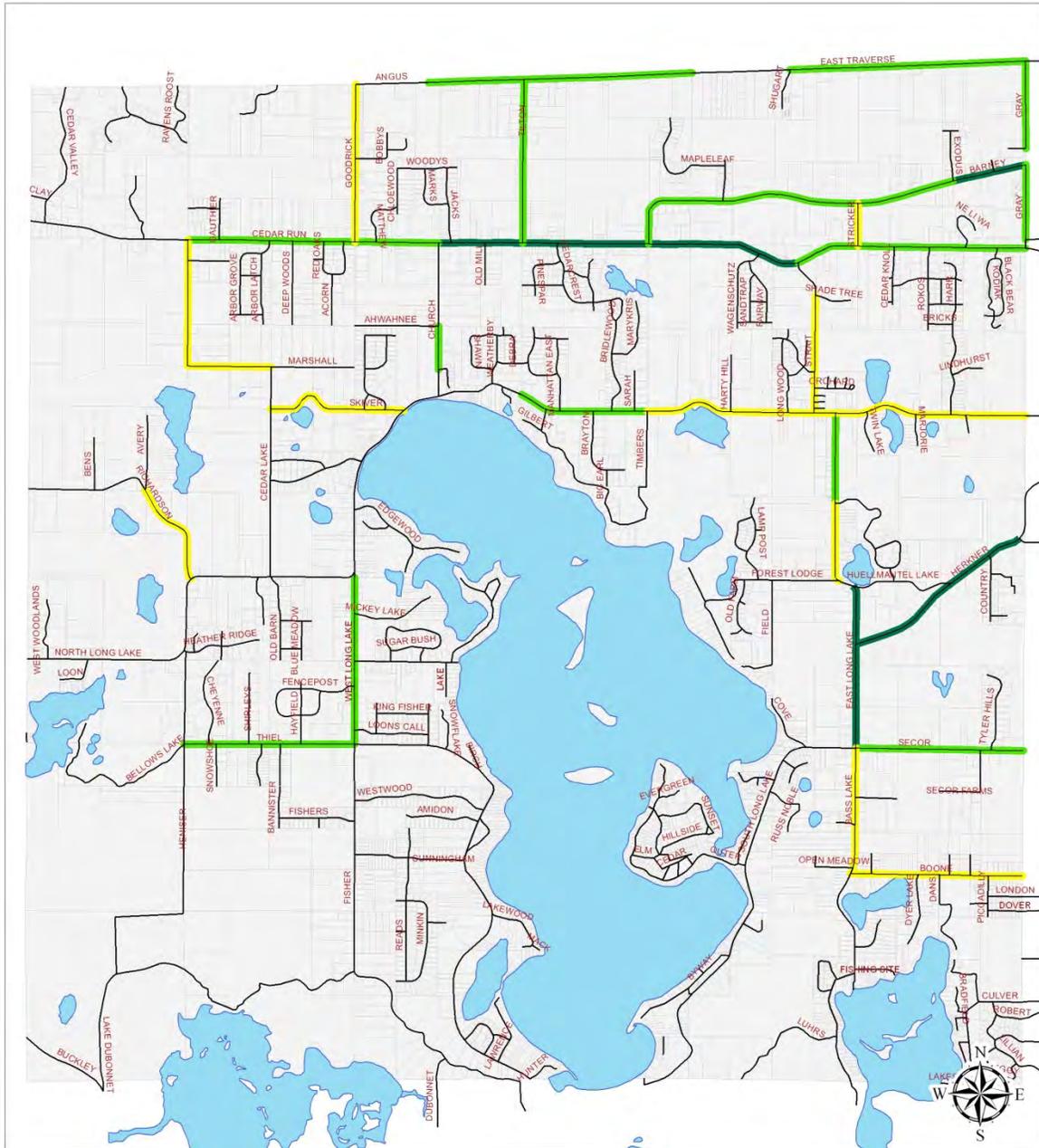
Proposed Phasing of Tree Planting

The priority scoring shown earlier in this report represents the long range importance of planting roadside trees on the target roadways. The priority scoring does not reflect the proposed phasing of roadside tree planting.

The target roadways were all scored for phasing consideration. Phasing scores reflect consideration of additional factors such as level of participation in an area based on telephone surveys, amount of open stretches that could be easily planted, lack of proposed new development and other limiting factors. This score was then added to the priority score.

The results of the phase scoring are shown on the following map. A stretch of Cedar Run Road, a small section of Barney Road, all of Herkner Road, and a part of East Long Lake Road all scored high for phasing consideration. Of these stretches, Herkner and East Long Lake Roads are proposed as a first phase because they include several property owners who expressed interest in involvement in the program, several open stretches that could be easily planted, and no significant viewsheds that may be compromised. In addition, in compliance with an on-going goal of planting in public locations, the Township hall property is also proposed for tree planting in the first phase of planting.

While priority scoring will not change over the lifetime of this roadside tree planting program, phasing scores may change. The level of participation by property owners may change over time. Some limiting factors such as proposed redevelopment will also change over time. Phasing will continue to be re-evaluated with each phase of tree planting.



**Long Lake Township
Roadside Tree Plan
Phase Scoring**

- 0 - 1
- 2 - 3
- 4 - 6
- 7 - 8

Proposed Program Outline

Recommended Tree Species

This roadside tree planting program will include a variety of trees to guard against the spread of disease, fungus, and pests. The forester has recommended use of the following species based on their tolerance for roadside conditions, because they are native to the area, and due to their tall canopies. Certain species will do better in some locations due to specific site standards including the soil types, the topography, the amount of planting room, and the desired effect.

Desired effect will vary depending on the location. For instance, in some locations, tall tree canopies and wide spacings will be preferred in order to enhance a view beyond the roadside trees; in other locations, tree spacings and species may be designed to balance existing trees across the road or to fill in the gaps in an historic pattern of tree planting along a particular roadway.

White Birch: Also known as paper birch, grows 50 to 70 feet in height and has a 30 foot wide spread. It often has multiple trunks and a pyramid-like shape. It is a moderately fast-growing tree.

Honey Locust: Grows to between 30 and 70 feet at full height with a 30 to 50 foot wide spread. The tree generally grows in a spread-out fashion. These prefer full sun and are tolerant to a wide variety of conditions.



White Birch



Honey Locust



Aspen



Black Cherry



Pin Oak

Aspen: Are a fast growing, short lived tree with a 20-60 foot height at maturity. These trees have a narrow spread and are somewhat rounded at the top. Aspens are sometimes called popples or poplars. Aspen may be sparingly used as they are short lived trees.

Black Cherry: Is the tallest of the cherry trees. It grows to a height of 60 to 100 feet with a 30 foot wide spread and an oval shape.

Pin Oak: Grows from 60 to 70 feet in height with a 25 to 40 foot wide spread. It is very disease and pest resistant. Often, the lower branches grow downward, but there are cultivars without this characteristic allowing for visual openings between roadside trees.



Red Oak



White Oak (immature)



Sycamore



Sugar Maple

Red Oak: Grows to between 60-75 feet in height, or sometimes up to 100 feet, with a 40 to 50 foot spread. Red Oak grows quickly and is tolerant of roadside conditions.

White Oak: Reaches 100 feet in height with a 50 to 80 foot spread. White Oaks require a large area to grow and provide a substantial shade. White Oak are long lived and salt tolerant.

Sycamore: 60 to 100 feet in height at maturity with a 40 to 60 foot wide spread. This fast growing tree has a wide open canopy and provides significant shade.

Sugar Maple: Historically commonly used in the region along roadways. Grows to between 100 and 120 feet tall with an 70 to 80 foot spread and provides ample shade with a wide canopy. Sugar maples are not salt tolerant and not very pollution tolerant. Locations for this tree should be carefully chosen.

Tree Spacings & Locations

In most situations, it is recommended that trees be evenly spaced (30 to 50 feet apart depending on conditions and tree species) and within the first ten feet outside of the road right of way line.

Locations of overhead utility lines are a serious concern. Generally, this plan does not advocate for the planting of the large species with wide spreads (such as the species recommended in the earlier section) as roadside trees where power lines are present. The utility companies recommend that medium sized trees be planted a minimum of 30 feet outside of the powerline corridor, and large sized trees 70 feet outside of the powerline corridor due to the potential for canopy spread into the powerlines.

Upon consultation with the Director of the Grand Traverse County Road Commission, it was determined that the Road Commission has no current policy or particular concern regarding large tree canopies overhanging the right-of-way as long as the tree is planted outside of the right-of-way. The Road Commission suggests that when determining locations for plantings under this program, visual clearance at corners be considered as well as horizontal clearance along curves in roadways.

The ideal locations for roadside tree planting are those locations without existing trees, without significant viewsheds through the property from the roadway, with minimal slopes, and without utility corridors. These areas were coarsley identified in the tree survey. These are the locations where trees will be planted under this program.

Other locational concerns will be reviewed on each site. These concerns include the possibility for frost in low areas, the need for extra watering in high areas, site specific soil types, amount and type of traffic on the adjacent road, visibilty for driveways, potential locations for future driveways, and locations of underground utilities.

Tree Costs

The costs associated with tree planting vary greatly depending on the species and size of the tree at the time of planting. For this purpose, potted or “balled and burlap” or bare root trees are most commonly planted because these trees have a better success rate than spaded (transplanted) trees. Pricing for potted or balled and burlap trees varies between \$150 and \$350. Bare root trees average less than \$40 installed. Spaded trees can cost as much as \$2,000 to install.

Table 3: Summary of Tree Costs

Species	Bare Root			Potted		Balled and Burlap		Spaded Trees	
	Size	Wholesale Cost	Cost Install	Size-Pot	Cost Install	Size	Cost Install	Size	Cost Install
White Birch	48-56"	\$2.75	\$41.97	#20	\$251.40	10'	\$356.40		
White Birch	5-6'	\$4.75							
Honey Locust	18-24"	\$0.55		#10	\$157.80	2" caliper	\$354.20		
Honey Locust	5-6'	\$5.50	\$43.60	#25	\$282.80				
Aspen (spp)	5-6'	\$5.00	\$38.33	#25	\$271.80	1.75"	\$278.08		
Black Cherry	36-48"	\$0.66	\$10.93			5-6'	\$74.00		
Black Cherry	5-6'	\$6.50							
Pin Oak	24-36"	\$0.66	\$45.15	#10	\$157.80	2.5"	\$399.28	3-4" - 17'	\$1,200.00
Pin Oak	5-6'	\$8.50		#25	\$282.80				
Red Oak	36-48"	\$0.73	\$40.50			2"	\$393.40	5"	\$1,200.00
Red Oak	5-6'	\$8.50		#10	\$157.80				
Red Oak	7-8'	\$12.50		#25	\$282.80				
White Oak	18-24"	\$0.55							
White Oak	5-6'	\$9.00							
Sycamore	5-6'	\$6.50	\$47.78	#25	\$289.40				
Sugar Maple	3-4'	\$1.70						5" - 25'	\$1,000.00
Sugar Maple	6-7'	\$10.50						10-12" - 40'	\$2,000.00
AVERAGES	2-4'	\$1.09	\$38.32		\$237.16		\$309.23		\$1,350.00
AVERAGES	5-6'	\$7.19							

Source: current local prices obtained by Daniel Schillinger

Based on initial estimates, it is expected that tree removal would cost an average of \$500 per tree without stump removal. As noted earlier, telephone surveys of individual property owners indicated limited support to pay for the removal of trees within the County controlled road right-of-way.

Program Budget

It is anticipated that the Township will plant and maintain a total of approximately 400-600 roadside trees over between 8 -12 years. The following budget for Phase One anticipates a total of 77 potted trees to be planted in this phase. Total direct costs (out-of-pocket cash expenses) are estimated to be roughly \$8,500. This includes tree stock, maintenance costs (not including watering), and materials. After an expected \$3,465 in grant assistance through the MDNR, net direct costs are expected to be \$66 per tree. Property owners will be asked to contribute \$66 per tree. Total expected indirect costs (including staff time for watering and program administration and volunteer time) are \$7,964 for Phase One.

As the program continues, it is expected that this level of costs and revenues will continue for each phase. In addition, the Township will continue to seek additional donations from private sources and funds from other organizations and granting organizations.

Table 3: Phase One Three Year Budget

Phase 1 - Direct and Indirect Costs over 3 years	Direct Costs				Indirect Costs				Total Costs
	Units	Forester	Materials & Equipment	Subtotal Direct	Twp Staff	Twp Planner	Volunteer	Subtotal Indirect	
Unit Costs		\$80/hr			\$12/hr	\$35/hr	\$17/hr		
Program Administration	30	--	--	0	--	1,050	--	1,050	1,050
Tree stock	77	--	3,927	3,927	--	--	--	0	3,927
Installation	16.5	--	--	0			272	272	272
Mulch & other materials	--	--	500	500	--	--	198	198	698
Watering Equipment (amortized over 10 years)	--	--	250	250	--	--	--	0	250
Planting Supervision	4	320	--	320	--	--	--	0	320
Upfront Costs Subtotal	128	320	4,677	4,997	0	1,050	470	1,520	6,517
Inspection #1	5	400	--	400	--	--	--	0	400
Inspection #2	5	400	--	400	--	--	--	0	400
Watering	--	--	--	168	2,016	--	--	2,016	2,184
Year 1 Maintenance Costs Subtotal	10	800	0	968	2,016	0	0	2,016	2,984
Re-Mulching	--	--	--	0	--	--	198	198	198
Inspection #1	5	400	--	400	--	--	--	0	400
Inspection #2	5	400	--	400	--	--	--	0	400
Insect Control	--	125	--	125	--	--	--	0	125
Pruning	7	560	--	560	--	--	--	0	560
Watering	--			168	2,016			2,016	2,184
Year 2 Maintenance Costs Subtotal	17	1,485	0	1,653	2,016	0	198	2,214	3,867
Re-Mulching	--	--	--	0	--	--	198	198	198
Inspection #1	5	400	--	400	--	--	--	0	400
Inspection #2	5	400	--	400	--	--	--	0	400
Insect Control	--	125	--	125	--	--	--	0	125
Watering	168	--	--	0	2,016	--	--	2,016	2,016
Year 3 Maintenance Costs Subtotal	178	925	0	925	2,016	0	198	2,214	3,139
Total Costs 3 Years	333	\$3,530	\$4,677	\$8,543	\$6,048	\$1,050	\$866	\$7,964	\$16,507
Grant assistance				(\$3,465)					(\$3,465)
Adjusted Total Costs (net of grant assistance)				\$5,078					
Direct Costs per tree				\$66					
Property Owner Match (\$66/tree)									\$5,082

Maintenance

Each land owner that agrees to participate in the roadside tree program will be required to sign an agreement to allow performance of regular prescribed maintenance. Such maintenance will primarily include regular watering by the planting contractor during the first three years, inspection for and performance of additional needs such as pruning or pest control.

It is recommended that the Township arrange for the collective pruning of roadside trees planted under this program. This will allow better pricing and pruning to be done as recommended by the Township's forester. Proper pruning will ensure a healthier tree and can help to direct growth as desired. For purposes of this program, it is recommended that tree species be chosen for a high canopy (longer trunk) to allow visibility through the trees. Proper pruning can help to establish a higher canopy.

Program Signage

It is recommended that the Township install roadside trees on Township-owned property and construct a sign on the property explaining that these trees and other roadside trees in the Township were planted under this program in cooperation with private property owners and the Michigan Department of Natural Resources.

Recommended Regulations

In addition to the easement restrictions recommended above, the Planning Commission has recommended that the Township adopt an ordinance regulating the removal of roadside trees planted through this tree planting program. This may include a requirement that prior to the removal of any healthy tree originally planted under this program, the owner contact the Township to arrange for the tree(s) to be transplanted to another location where feasible or that a certain amount of money be returned to the revolving tree planting fund for the planting of roadside trees elsewhere in the Township.

Also, it is recommended that the zoning ordinance be amended to include a requirement for planting of roadside trees in compliance with this plan whenever land is developed for a commercial use, an institutional use, or any residential development requiring Planning Commission review.

Roadside Tree Planting Alternatives

Where roadside ditches, soil types, overhead utility lines or nonparticipation by landowners do not allow the planting of roadside trees, prescribed plantings of low vegetation including native wildflowers and grasses may be feasible. The Township is currently updating the Long Lake Watershed Plan. This plan calls for the use of vegetative strips along roadsides within the watershed to filter stormwater and constructed bio-swales to absorb elements potentially harmful to the watershed in certain locations. It is recommended that the Township develop a roadside vegetation plan that coordinates with the roadside tree planting plan.

As noted above, areas near utility corridors will generally not be part of the roadside tree planting program. In locations where trees are recommended near overhead utility corridors, a maximum mature tree height of 15 to 20 is recommended. This should be considered in development of the roadside vegetation planning effort.

Appendix A

- 1. Standard Tree Planting Easement Agreement**
- 2. 3 Year Tree Planting and Maintenance Plan for Phase One of Tree Planting**
- 3. Sample Property Owner Information Packet and Cover Letter**

TREE PLANTING PROGRAM EASEMENT AGREEMENT

WHEREAS, the parties desire to enter into an agreement providing for the planting, maintenance and removal of trees on certain property and the parties further desire that the terms and conditions of this easement and the related rights and obligations of the parties be set forth in writing, NOW, THEREFORE, in consideration of the mutual promises contained in this agreement, the parties agree as follows:

1. AAA and BBB, husband and wife, (collectively, the Grantors) own Parcel A which is described as follows:

***** legal description of Parcel A *****

2. Grantors convey to Long Lake Township (the Grantee) an easement, as specified below, across Parcel A for the benefit of Grantee for the purposes described in this agreement. The easement is described as follows:

*****legal description of easement*****

3. This easement is granted for the purpose of allowing Grantee to exercise all rights described in Paragraph 4 and to take such additional actions which are reasonable necessary to exercise those rights.
4. Grantee's exercise of its rights shall be in its sole discretion except when the exercise of such right requires the approval of Grantor as provided in this agreement. Those rights are to:
 - A. Plant or have planted such trees within the easement as shall be mutually agreeable by the parties.
 - B. Have any or all of the planted trees inspected.
 - C. Water the trees subject to the primary obligation of the Grantor to water the trees as described in this agreement.
 - D. Prune the planted trees.
 - E. Engage in pest control measures upon the recommendation of a forester.
 - F. Remove injured diseased or dead trees upon the recommendation of a forester.

5. The Grantor shall have the following rights and obligations:
 - A. To pay Grantor's share of the cost of tree purchase and planting in an amount and at a time mutually agreed between the parties.
 - B. Not remove any planted trees, regardless of whether the tree is injured, diseased or dead, without the prior written consent of Grantee.
 - C. Remove any tree approved for removal by Grantee consistent with any applicable ordinance of Grantee.
 - D. Refrain from any act or omission which damages any planted tree.
 - E. Not interfere with Grantee or any representative of Grantee or independent contractor of Grantee in the exercise of Grantee's rights pursuant to this agreement.
 - F. To reimburse Grantee for damages related to any tree injured or killed by any act or omission of Grantor. Damages shall include the cost of any repair or treatment to an injured or damaged tree and the cost of purchase, installation and removal of a tree which is dead or in the opinion of a forester selected by Grantee must be removed. In all circumstances, damages shall include fees charged by a forester or other costs incurred by Grantee in exercising its rights pursuant to this provision.
6. The easement shall continue until such time as Grantee removes or approves removal of the last tree on Parcel A. The failure of Grantee to exercise its rights under this agreement shall not constitute an abandonment of the easement or release of any of the rights and obligation of the parties under this agreement. If Grantee elects to abandon or terminate this easement at an earlier date, its Township Board shall authorize the execution of a release of easement and its recording with the Grand Traverse County Register of Deeds.
7. Nothing in this agreement alters Grantee's governmental immunity as provided by law. However, nothing in this agreement shall alter obligations of independent contractors act as provided by law.
8. This easement shall run with Parcel A, bind the successors and assigns of Grantee and inure to the benefit of Grantee.

IN WITNESS WHEREOF, the parties have executed this document and this document shall become effective upon its execution by both of the parties.

IN THE PRESENCE OF:

SIGNED:

AAA

BBB

CCC on behalf of the Township

Its: _____

STATE OF MICHIGAN
COUNTY OF GRAND TRAVERSE

The foregoing instrument was acknowledged before me this *** day of ***, 20__ by AAA , BBB, and Grantee.

, Notary Public
Traverse City, Michigan
My commission expires:

Prepared by:
James G. Young (P22645)
Young, Graham, Elsenheimer & Wendling, P.C.
Attorneys at Law
P.O. Box 398
Bellaire, Michigan 49615
(231) 533-8635

Long Lake Township - Roadside Tree Planting Project 3 Year Tree Planting and Maintenance Plan - Summer 2009

Each year Long Lake Township intends to follow the schedule below to plant and care for its roadside trees. Starting in the spring of 2010, Long Lake Township intends to plant trees annually until priority areas described within the "Roadside Tree Planting Plan" are as filled as owners allow. Once these areas are filled the Township intends to do all scheduled maintenance described below for each set of trees. After 3 years, trees will be considered established and may only be monitored semi-annually for catastrophic insect/disease problems or significant pruning needs. Additional inspections from storm or landowner's damage (lawn mower, weed whips) will be assessed on an as needed basis.

The first group of planted trees along Herkner and East Long Lake Roads will have the following planting and maintenance schedule:

Summer 2009 – Long Lake Township identified priority areas in need of roadside tree plantings and selected one area to test the first set of plantings.

Summer 2009 – Schillinger Forestry contacted owners and set flags where trees will go with owner's approval of location and specie. Tree flags were located just outside of the road right of way. View-sheds, power lines, and steep slopes were avoided during the flagging.

Summer 2009 – Schillinger Forestry verified flagged locations for trees with Grand Traverse County Road Commission for safe intersection site-lines, and will verify planting locations with local utility companies under 800-MISS-DIG, adjusting as needed at planting time.

Summer 2009 – Schillinger Forestry/Long Lake Township solicited bids from local contractors for planting trees at marked flags, and watering the planted trees as described below. Contractors must guarantee their planted tree's survival for a year. (See "Tree Planting RFP" for all requirements) Bids for watering trees per specifications below were also collected.

August 2009 – Long Lake Township applies for "Tree Planting Grant" through the Urban Community Forestry Program with specified local matches.

December 2009 – After Community Forestry Grant recipients are announced, Long Lake Township quantifies the exact dollar amount each owner is required to pay after contributing monies are known; Community Forestry Granted funds, private donations, volunteer/donated labor and Township provided monies, etc.

December 2009 – Owners are contacted regarding their share of payment and asked to verify their willingness to participate based on the exact installation and care costs. If they agree, the owners sign an agreement allowing the planting on their land and an easement allowing the detailed inspections. Long Lake Township purchases trees from a local nursery based on bid, quality of past work and any other qualities deemed prudent for each planting area. It is expected that volunteers will plant the trees under the supervision of the Township's contracted forester meeting all planting standards detailed in this plan.

April 2010 – Trees are planted by tree planting contractor, along with mulching (2-4” deep, at least four times the size of root ball and not touching the trunk) and first watering. Contracted forester will supervise planting, will review planting objectives, desired planting style as described in “IC4108 Tree Planting Detail, MDNR” and answer questions. Contracted forester will periodically inspect work as needed during and after planting.

April-November 2010 – Township staff or contractor will water trees with at least 5 gallons of water twice a week during the growing season. The trees will be monitored by contract forester for inadequate watering or drought stress by checking soil moisture a few inches below the soil surface in the root ball. If it is determined watering is inadequate watering will increase in frequency to 3-4 times per week. The Township ensures the trees will be watered as described above throughout the growing season.

April-November 2010 – Contract forester will inspect all planted trees at least two times a growing season or more as needed to detect and manage any problems (insect/disease/excessive weeds/people). Exact inspection timing may be based on current year’s common insect/disease outbreaks but will still be at least two times a year. For instance in a year of heavy forest tent caterpillar, or gypsy moth infestation, inspection will be done in mid-late May to catch the larvae before they get through too many instars and control will be completed if the infestation is heavy enough to warrant active treatment. Contract forester will use the “Field Ready Inspection Checklist” at each owners parcel during growing season inspections to ensure nothing described in this document is forgotten at inspection. This checklist will be turned after each inspection.

January-February 2011 – Contract forester will inspect and as needed, sparingly prune (or recommend pruning to qualified contractor) planted trees to encourage a higher canopy. Pruning will be done according to ANSI standards and will never remove more than 20% of the living canopy in any year. The company who will prune will need to be in compliance with Michigan Workman’s Compensation Statutes and will have the proper insurance; general business and professional liability insurance, if applicable.

April-November 2011, 2012 – Tree planting contractor, or Township’s staff, waters each tree twice a week, with 5 gallons per watering, or more if inspections deem it necessary.

April-November 2011, 2012 – Contract forester will inspect all planted trees at least two times a growing season or more as needed to detect and manage any problems as fully described above. At a minimum the first inspection of the year will monitor mulch depth and if mulching is less than 3” deep mulch will be added to 4” deep as described fully above. At each inspection soil moisture will be checked as described above to ensure watering schedule is adequate.

January-February 2012, 2013 – Contract forester will inspect and as needed, prune (or recommend pruning to qualified contractor) planted trees to encourage a higher canopy as fully described above.

After 3 growing seasons trees will be considered established at their location and watering will no longer be on a regular schedule. Owners will already be educated on how to water their trees properly and allowed to water as they have time. Additional contractual watering may be considered if there is a significant drought following the 3 initial years. Future pruning and insect/disease inspections will be done on an as needed basis as time and funding allows.

Tree Care Instructions for Roadside Planted Trees Long Lake Township

Dear Owner,

Thank you for participating in the Long Lake Township, Roadside Tree Planting Project. This project would not be possible without the cooperation of owners like you.

This packet is given to owners as a courtesy and to inform you of the scheduled maintenance planned for your trees. The packet also provides educational information on your tree's care after the Township establishes them in the first 3 years. In this packet you will find:

- 1) The "3-Year Planting and Maintenance Plan" planned for your trees by the Township
- 2) The "Field Ready Inspection Checklist" used by Schillinger Forestry at each inspection
- 3) "Watering Your Tree"
- 4) "HOW To Prune Trees"
- 5) "Oak Wilt" Fact sheet

The "3-Year Planting and Maintenance Plan" and "Field Ready Inspection Checklist" are for your reference detailing the maintenance the Township and Schillinger Forestry plan to use for the first 3 years. After 3 years the trees will be considered established and owners will take over any additional care from then on.

The "Watering Your Tree" bulletin details watering strategies for your trees after our 3 year maintenance and watering is complete. This bulletin has good suggestions about where and how to water. A local suggestion; the $\frac{1}{4}$ " per hour soil absorption rate is not accurate for our area. Our sandy soils rarely can be watered enough, by human means, to have significant run-off. A hose running in the drip line for 15-30 minutes would suffice for deep watering. If you use a sprinkler it should run for an hour or more and not during the heat of the day. We encourage you to water your trees as described for many years beyond the first three, particularly during droughts.

The "HOW To Prune Trees" bulletin details the pruning strategies we plan to use to raise the canopy of the trees making more of a taller canopy to eventually shade the roadway .We encourage you to use these strategies after our 3-year maintenance plan yourself or your contractor's pruning. We are happy to guide your pruning needs or direct you to company's who can accurately complete the recommended pruning techniques.

Lastly, the "Oak Wilt" fact sheet details the devastating disease of oak wilt. This disease can kill a mature red oak tree within 2 weeks if it becomes infected. This disease is easy to prevent simply by **not injuring or pruning your oak trees during the growing season** (when the leaves are on or about to come out). Oak wilt is present in the Township already making this advice critical to the health and longevity of your oak trees. We are happy to educate you further on this disease if necessary.

We hope you will enjoy your trees and feel good about playing your part in beatifying Long Lake Township. If you have further questions or would like additional advice please contact Long Lake Township or our contracted forester, we are happy to assist you.

Long Lake Township - Roadside Tree Planting Project
Field Ready Inspection Checklist, from the
3 Year Tree Planting and Maintenance Plan

Date _____

Owner/Location _____

____ Yes ____ No - Check soil moisture 3" into root zone, adequate? _____

____ Yes ____ No - Mulch depth less than 3"? Add? _____

____ Yes ____ No - Animal Damage? Action? _____

____ Yes ____ No - Insects present? Which _____

____ Yes ____ No - Insect damage beyond threshold? Recommendation _____

____ Yes ____ No - Disease(s) present? Which/Recommendation _____

____ Yes ____ No - Owner/Vandal Damage? Action? _____

____ Yes ____ No - Too much weed competition? Action? _____

____ Yes ____ No - Nutrient deficient/herbicide injury? _____

____ Yes ____ No - Pruning needs? Marked for winter? _____

Any insect/disease not present yet that need to be planned for? _____

Comments: _____



FactSheet

Extension

Ohio State University Extension Fact Sheet

Plant Pathology

2021 Coffey Road, Columbus, Ohio 43210

Oak Wilt

HYG-3306-01

Pierluigi (Enrico) Bonello

Oak wilt is a serious and often deadly vascular disease of oaks. The fungal pathogen, *Ceratocystis fagacearum*, is believed to be native to the United States and is distributed throughout the Midwest and Texas. In Ohio it has been reported from the majority of eighty-eight counties.

What the Pathogen Does

The fungus grows into and throughout the water conductive tissues (that is, the sapwood) of the host. The fungus plugs the vessels with its own body (mycelium) and spores, but it also causes a defensive reaction by the tree to stop the fungal spread by actively plugging its own vessels. These processes interfere with water uptake and cause a wilting syndrome which often results in death of the tree.

Susceptible Oaks

All oaks are susceptible. Those in the red-black oak group (black, blackjack, pin, northern and southern red, scarlet, shingle and shumard oak) (Fig. 1A) are extremely susceptible and can die within a few weeks of infection. Oaks in the white group (bur, chinquapin, post, swamp white, and white oak) (Fig. 1B) are more tolerant of the disease and may survive infection for one or more years while displaying decline symptoms.



Figure 1

Diagnostic Symptoms

Symptoms are typical of wilts (Fig. 2). Leaves usually begin withering in the upper canopy, producing "flags," that is, whole branches or crown portions turning red-brown. Leaves of red oaks typically show yellowing and browning of the leaf margins (Fig. 3). White oak leaves usually show rather non-descript symptoms. Conversely, live oaks in the southern United States produce characteristic dead areas along the leaf veins. These dead areas generally expand until the whole leaf becomes brown. Eventually the leaves fall from the tree. If infections occur in late spring, trees usually begin wilting in mid-summer to late summer, when the plants often are subjected to water deficit due to increased transpiration demand and decreased rainfall.



Figure 2 .



Figure 3 . (David French, with permission.)

A specific and sufficient diagnostic character is the appearance on dead and dying red oaks (but not white oaks) of spore-bearing fungal mats under the desiccating bark (Fig. 4). These fungal mats crack the bark open with pressure pads (Fig. 4) to facilitate dissemination of the pathogen (see below). Sapwood streaking (Fig. 5) is also a good, but insufficient, diagnostic character. In all cases, however, conclusive diagnosis can only be made in specialized laboratories, such as The Ohio State University C. Wayne Ellett Plant & Pest Diagnostic Clinic (<http://www.ag.ohio-state.edu/~plantdoc/cweppdc/cweppdc.html>).



Figure 4. (David French, with permission.)



Figure 5. (David French, with permission.)

Factors other than *C. fagacearum* can cause similar symptoms, so proper disease diagnosis is critical. Among these factors are drought, construction damage, and insect attack. Other diseases, such as some wood decays and anthracnose (<http://ohioline.ag.ohio-state.edu/hyg-fact/3000/3048.html>), might be confused with oak wilt symptoms.

Disease Cycle and Conditions Favoring Disease

In order to properly manage oak wilt it is essential to understand its cycle. The pathogen spreads from diseased to healthy trees in two ways: overland and underground. Overland spread is mediated mainly by sap feeding (a.k.a. picnic) beetles (Coleoptera: Nitidulidae). However, there is some evidence that oak bark beetles (Coleoptera: Scolytidae) may also be involved. Nitidulids are attracted by chemicals emanating from the fungal mats described above. Once on the mats (Fig. 6), the beetles pick up fungal spores and can carry them, sometimes over distances of a few miles, to freshly wounded healthy trees (attracted by the smell of fresh sap). This results in new infections, thus closing the overland cycle. While insect spread is an important medium to long range dispersal mechanism for this fungus, it is estimated that 90 percent of new infections occur between neighboring trees through root grafts (Fig. 7). In this case, the fungus grows down the trunk, into the roots of diseased trees, and then into healthy trees via the common root system. Once in the new tree the pathogen grows throughout the vascular system and spreads to other trees via the root system or the beetles. In this way, spread through root systems often results in disease centers that expand outward from the initially infected tree.



Figure 6. (David French, with permission.)



Figure 7. (David French, with permission.)

From the above, it follows that conditions favoring disease include the availability of susceptible oak species, trees growing close to each other, and the availability of fresh wounds for beetle-mediated infection. Pruning wounds are obvious culprits, but any fresh wound will function as

potential infection gateway. The word fresh is emphasized because it is believed that wounds are attractive to Nitidulid beetles only for up to three days.

As with many plant diseases, other stresses (for example drought) can predispose trees to faster symptom development, and thus worsen the syndrome.

Control and Management of the Disease

The best control for oak wilt is through preventative measures that interrupt the disease cycle.

Prevention of Overland Spread

Overland spread can be hindered or interrupted by ensuring that trees are never wounded between April 15 and July 1. This is when most Nitidulid beetles fly to locate fresh sap and/or fungal mats. A more stringent approach is to avoid wounding the trees throughout the growing season (April 15-Oct.1), since additional summer flights of the beetles are possible. If pruning is absolutely necessary during the growing season, it is imperative to dress the wounds. This can be done with latex paint. Although this will slow wound healing, it will also deter beetles from landing on the wounds.

Prevention of Underground Spread

Given the higher significance of underground spread, control of direct tree-to-tree transmission is much more important. Here, interruption of the disease cycle is accomplished by physically severing actual or potential root contacts between diseased and healthy trees. This is done by trenching or cutting through the soil with a trencher or vibratory plow. The latter is the preferred tool. Given the depth of oak root systems, it is advisable to use a 5 ft blade (Fig. 8). Trenching must always be done before the diseased or dead trees are cut for removal (see below), to avoid sudden water tension imbalances that might "suck" fungal material from the infected trees into the healthy trees through the common root system. Trenching should be conducted by advice of specialists. This is due to the importance of locating the trenches appropriately between diseased and healthy trees. When possible, a double trench defining a buffer band of apparently healthy trees between diseased and uninfected trees should be used (Fig. 9).



Figure 8. (Fred Baker, with permission.)



Figure 9

On residential or commercial properties, always determine the location of buried utility lines which may affect the ability to completely sever the graft. Furthermore, walkways, paths, and roads must also be considered appropriately, as tree roots commonly grow under them. Due to all of these potential obstacles to proper trenching, it is advisable to undertake such operations under the supervision of tree care professionals with expertise in the management of oak wilt.

There is currently no evidence that the blade will spread the pathogen. However, it is good precautionary practice to spray the blade to runoff, between trenches and between plots, with an antiseptic such as Lysol or a 20% bleach solution.

Disposal of Dead and Dying Trees

Once the trenches are in place, diseased and dead trees should be removed as soon as possible by cutting them down to leave a 2-4 inch high stump. Because diseased trees with bark tightly attached may produce or harbor fungal mats, they should be disposed of promptly. Once the bark becomes loose or sloughs off, no mats can be produced and movement of the infected wood out of the diseased area is no longer a concern in an urban context. (However, strict restrictions apply for movement of diseased wood out of state and internationally.) Thus, either the trees are debarked mechanically, or the timber can be sold to a sawmill for cutting or chipping. Although no studies are known on the transmissibility of *C. fagacearum* via wood chips, the pathogen does not survive when exposed to desiccation and is very temperature sensitive. Composting the chips would further reduce or eliminate the pathogen. Thus, it is highly unlikely that wood chips will spread the disease. However, good precautionary practice suggests to avoid using infested chip mulch around healthy oaks.

If the wood cannot be disposed of as described above, it can be cut and split for firewood. Because this process does not involve debarking, firewood can still potentially harbor fungal mats and thus attract Nitidulids during the summer in which the trees died. The wood must be arranged in stacks and covered with 4 mil plastic tarp through the winter (if the wood is used then) or the end of the next season (Oct. 1 of the year following the death of the trees). By producing a greenhouse effect, tarping will kill the temperature-sensitive pathogen and prevent the beetles from accessing potential fungal mats. Tarping should be done with transparent plastic to produce the desired greenhouse effect. However, black plastic will also work, by concentrating the sun's heat. In both cases, the best results are achieved by placing the tarped pile in an un-shaded, possibly sunny area. When covering the pile, the tarp should be sealed to the ground to prevent beetles from accessing the pile. For this reason, all punctures in the tarp should be mended with duct tape. At the end of the second season the wood can be safely uncovered and disposed of as preferred, since it no longer constitutes a threat.

Chemical Treatments

Chemical treatments are usually not warranted, due to the high cost of intervention. However, application of systemic fungicides is an option when highly valuable trees are threatened by infected neighboring trees, or whenever a high risk of infection exists. High value may be attributed to individual trees or groups of trees in communities, or it may apply to individual trees in a homeowner's yard. Systemic fungicides have been demonstrated to be effective,

particularly when applied as a preventative treatment. The only scientifically tested systemic fungicide showing any efficacy and labeled for use against oak wilt is propiconazole, available under the trade name Alamo.

If a decision is made to apply propiconazole, it must be done strictly according to label and should be carried out by experienced, professional tree service personnel. The product is injected directly into the sapwood on root flares just under the soil line. This is the best guarantee that the fungicide will be translocated throughout a tree, thus affording the maximum possible protection. In consideration of the disease cycle, the best time of the year to inject trees is early spring. However, application should occur as soon as the risk to a tree is realized, even if it is later in the growing season. Depending on the tree size and value, treatments should be applied every 12-36 months, with annual assessments. This treatment has virtually no hope of succeeding in infected red oaks, even in early infection stages. Chemical treatment has a higher chance of success, but only as a palliative measure, with the more tolerant white oaks. In this group, application of the fungicide to trees in early infection stages can result in delay of symptoms and eventual death. It will not, however, rid an infected tree of the pathogen.

Click [here](#) to view the PDF version of this fact sheet.

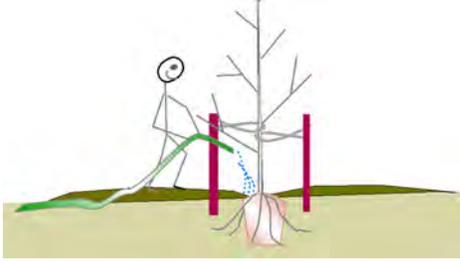
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Keith L. Smith, Associate Vice President for Ag. Adm. and Director, OSU Extension.

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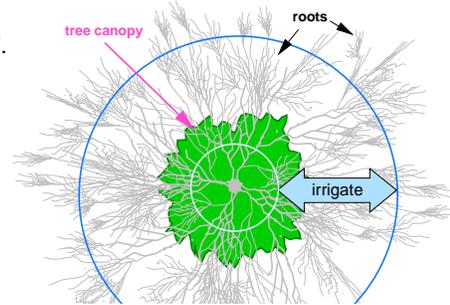
Where to irrigate



or drip line. Water in the outer half of the area under the canopy and beyond the edge of the canopy. ⇨

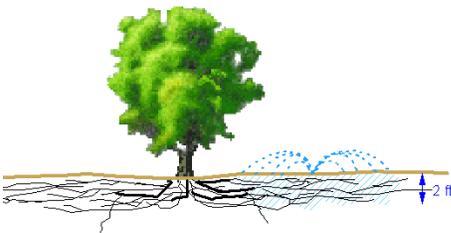
☛ **Newly planted trees:** Until new roots grow into the soil of the planting site, water the original root ball area and just beyond this area. The root ball area may dry out faster than the surrounding soil. A newly planted tree may take 1-2 years to become established. Larger container stock trees may take longer to become established than smaller stock.

☛ **Established trees:** Don't irrigate the area directly adjacent to the trunk - this can increase the risk of disease. Roots extend far beyond the edge of canopy



How to irrigate

You can apply water effectively using sprinklers, drip irrigation, or a hose running on the soil surface. Regardless of how you apply the water, follow these basic rules.



◆ **Water deeply rather than frequently.** Because most tree roots are found in the upper 18 - 24 inches of the soil, this is the zone that should be wetted up in each irrigation cycle. Each deep irrigation will meet a tree's water needs for between 10 days to 4 weeks during the hottest part of the summer, depending on the tree species and soil type.

◆ **Stop watering when runoff starts.** Soils high in clay accept water slowly, often as little as 1/4 inch per hour. Water infiltration is especially slow in compacted soils. If water starts to pool or run off, stop irrigating, let the water

soak in, and start watering again. Repeat on/off cycles until you apply enough water to wet the soil to 18-24 inches. This may take a number of cycles over several consecutive days.

◆ **Don't saturate the soil for long periods.** Water displaces air in the soil, so long periods of soil saturation can suffocate growing roots. Take a long enough break between irrigation cycles to allow the free water to be absorbed. If in doubt, probe or dig to make sure that the soil isn't soggy below the surface.

How much water does my tree need?

Tree irrigation needs change over time. The amount of irrigation your tree will need can be affected by:

◆ **Tree age** - A newly planted tree will need more frequent irrigation than an established tree because its root system is more limited.

◆ **Root damage** - An established tree that suffers root loss or damage (for instance, due to trenching within the root zone) may need additional irrigation until new roots grow to replace those that are destroyed.

◆ **Time of the year** - The need for irrigation is greatest in mid to late summer, when temperatures are the highest and most of the moisture stored in the soil over the winter has been depleted.

◆ **Weather conditions** - In drought years, soil moisture is used up earlier in the season, so the period of peak water need is longer. Some trees that do not normally need irrigation may benefit from irrigation in drought years. In very wet years, irrigation may not be needed until early summer.

◆ **Soil conditions** - Water used by trees is stored in the soil. Soil type, depth, and condition influence how much water can be stored in the soil, and consequently how often you may need to water. Soils that have more clay hold more water and can be irrigated less frequently. Sandy soils hold relatively little water and need more frequent irrigation.

◆ **Species** - Some tree species require no additional irrigation once established, whereas others will do poorly without consistent irrigation throughout the summer.

Water requirements of established trees under and typical Vacaville weather conditions and soils

Category	Summer watering interval*	Tree species	
Low	once per month	☛ Chinese pistache (<i>Pistachia chinensis</i>)** ☛ Crape myrtle (<i>Lagerstroemia indica</i>)** ♣ Deodar cedar (<i>Cedrus deodara</i>)**	☛ Hackberry - (<i>Celtis</i> species) ☛ Japanese pagoda tree (<i>Sophora japonica</i>)**
Moderate	twice per month	☛ Chinese flame tree (<i>Koelreuteria bipinnata</i>) ☛ Hedge maple (<i>Acer campestre</i>) ☛ Flowering Pear (<i>Pyrus calleryana</i> cultivars including 'Aristocrat'**)	♣ Incense cedar (<i>Calocedrus decurrens</i>) ☛ London Plane tree (<i>Platanus acerifolia</i>)** ☛ Stone fruits - apricot, cherry, peach, plum, nectarine (<i>Prunus</i> species)
High	three times per month	♣ Coast redwood (<i>Sequoia sempervirens</i>)**	☛ Birch (<i>Betula</i> species)

* assumes that soil in the root zone is wetted to a depth of 18 to 24 inches at each irrigation

** species included in the Vacaville Trees 2000 residential tree giveaway program



HOW to Prune Trees

Peter J. Bedker, Joseph G. O'Brien, and Manfred M. Mielke

Illustrations by Julie Martinez, Afton, MN

Introduction

The objective of pruning is to produce strong, healthy, attractive plants. By understanding how, when and why to prune, and by following a few simple principles, this objective can be achieved.

Why Prune

The main reasons for pruning ornamental and shade trees include safety, health, and aesthetics. In addition, pruning can be used to stimulate fruit production and increase the value of timber. Pruning for *safety* (Fig. 1A) involves removing branches that could fall and cause injury or property damage, trimming branches that interfere with lines of sight on streets or driveways, and removing branches that grow into utility lines. Safety pruning can be largely avoided by carefully choosing species that will not grow beyond the space available to them, and have strength and form characteristics that are suited to the site.

Pruning for *health* (Fig. 1B) involves removing diseased or insect-infested wood, thinning the crown to increase airflow and reduce some pest problems, and removing

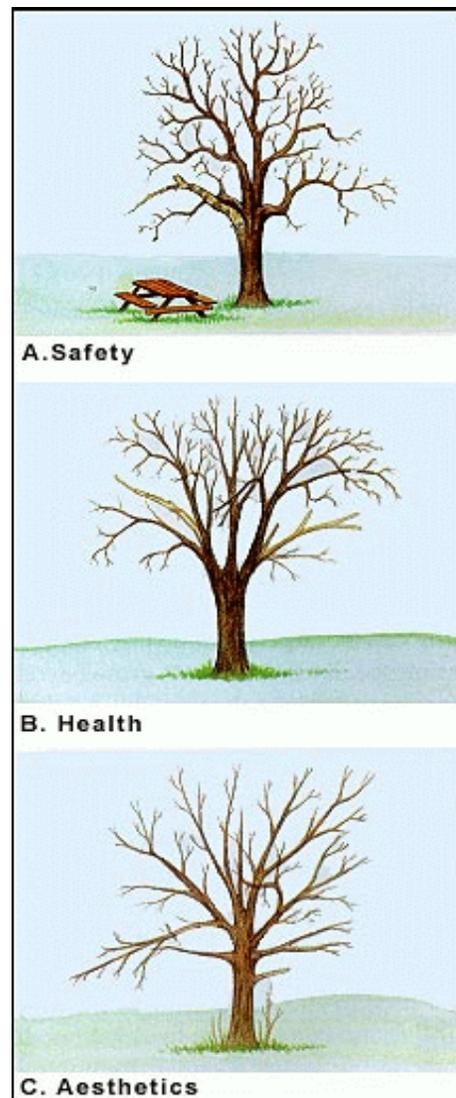


Figure 1. Reasons for pruning.

crossing and rubbing branches. Pruning can best be used to encourage trees to develop a strong structure and reduce the likelihood of damage during severe weather. Removing broken or damaged limbs encourage wound closure.

Pruning for *aesthetics* (Fig. 1C) involves enhancing the natural form and character of trees or stimulating flower production. Pruning for form can be especially important on open-grown trees that do very little self-pruning.

All woody plants shed branches in response to shading and competition. Branches that do not produce enough carbohydrates from photosynthesis to sustain themselves die and are eventually shed; the resulting wounds are sealed by **woundwood** (callus). Branches that are poorly attached may be broken off by wind and accumulation of snow and ice. Branches removed by such natural forces often result in large, ragged wounds that rarely seal. Pruning as a cultural practice can be used to supplement or replace these natural processes and increase the strength and longevity of plants.

Trees have many forms, but the most common types are pyramidal (**excurrent**) or spherical (**decurrent**). Trees with pyramidal crowns, e.g., most conifers, have a strong central stem and lateral branches that are more or less horizontal and do not compete with the central stem for dominance. Trees with spherical crowns, e.g., most hardwoods, have many lateral branches that may compete for dominance.

To reduce the need for pruning it is best to consider a tree's natural form. It is very difficult

to impose an unnatural form on a tree without a commitment to constant maintenance.

Pollarding and **topiary** are extreme examples of pruning to create a desired, unnatural effect. Pollarding is the practice of pruning trees annually to remove all new growth. The following year, a profusion of new branches is produced at the ends of the branches. Topiary involves pruning trees and shrubs into geometric or animal shapes. Both pollarding and topiary are specialized applications that involve pruning to change the natural form of trees. As topiary demonstrates, given enough care and attention plants can be pruned into nearly any form. Yet just as proper pruning can enhance the form or character of plants, improper pruning can destroy it.

Pruning Approaches

Producing strong structure should be the emphasis when pruning young trees. As trees mature, the aim of pruning will shift to maintaining tree structure, form, health and appearance.

Proper pruning cuts are made at a node, the point at which one branch or twig attaches to another. In the spring of the year growth begins at buds, and twigs grow until a new node is formed. The length of a branch between nodes is called an internode.

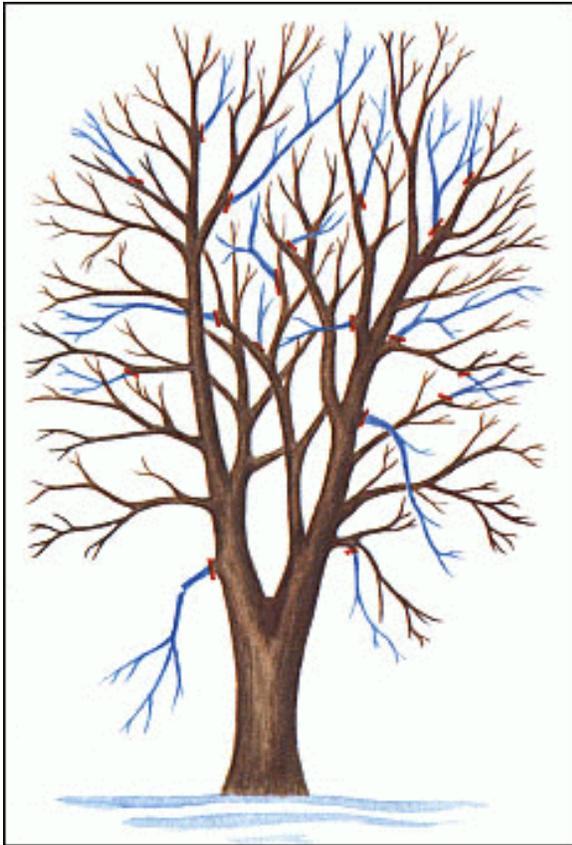
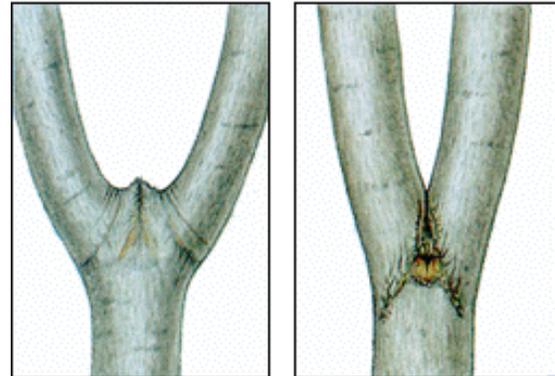


Figure 2. Crown thinning - branches to be removed are shaded in blue; pruning cuts should be made at the red lines. No more than one-fourth of the living branches should be removed at one time.

The most common types of pruning are:

1. *Crown Thinning* (Fig. 2)

Crown thinning, primarily for hardwoods, is the selective removal of branches to increase light penetration and air movement throughout the crown of a tree. The intent is to maintain or develop a tree's structure and form. To avoid unnecessary stress and prevent excessive production of epicormic sprouts, no more than one-quarter of the living crown should be removed at a time. If it is necessary to remove more, it should be done over successive years.



A. U-shaped strong union **B. V-shaped weak union**

Figure 3. Types of branch unions.

Branches with strong U-shaped angles of attachment should be retained (Fig 3A). Branches with narrow, V-shaped angles of attachment often form **included bark** and should be removed (Fig. 3B). Included bark forms when two branches grow at sharply acute angles to one another, producing a wedge of inward-rolled bark between them. Included bark prevents strong attachment of branches, often causing a crack at the point below where the branches meet. Codominant stems that are approximately the same size and arise from the same position often form included bark. Removing some of the lateral branches from a codominant stem can reduce its growth enough to allow the other stem to become dominant.

Lateral branches should be no more than one-half to three-quarters of the diameter of the stem at the point of attachment. Avoid producing "lion's tails," tufts of branches and foliage at the ends of branches, caused by removing all inner lateral branches and foliage. Lion's tails can result in sunscalding, abundant **epicormic sprouts**, and weak branch structure and breakage. Branches that rub or cross

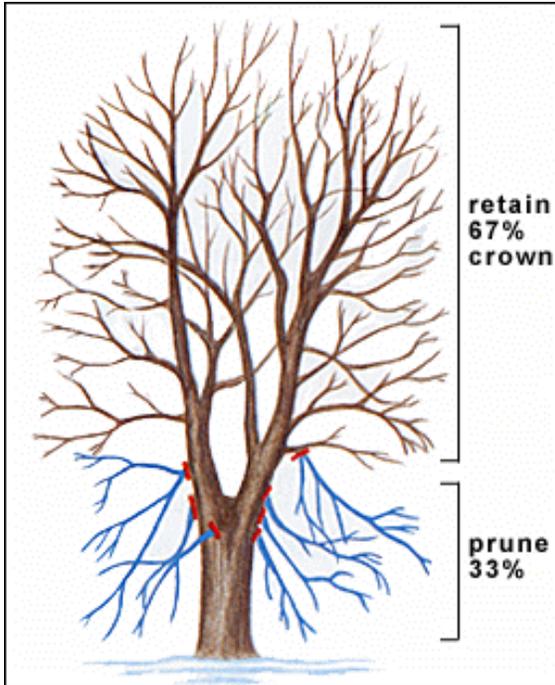


Figure 4. Crown raising - branches to be removed are shaded in blue; pruning cuts should be made where indicated with red lines. The ratio of live crown to total tree height should be at least two-thirds.

another branch should be removed.

Conifers that have branches in whorls and pyramidal crowns rarely need crown thinning except to restore a dominant leader.

Occasionally, the leader of a tree may be damaged and multiple branches may become codominant. Select the strongest leader and remove competing branches to prevent the development of codominant stems.

2. *Crown Raising* (Fig. 4)

Crown raising is the practice of removing branches from the bottom of the crown of a tree to provide clearance for pedestrians, vehicles, buildings, lines of site, or to develop a clear stem for timber production. Also, removing lower branches on white pines can prevent blister rust. For street trees the minimum clearance is often specified by municipal ordinance. After pruning, the ratio of the living crown to total tree height should be at least two-thirds (e.g., a 12 m tree should have living branches on at least the upper 8 m).

On young trees "temporary" branches may be retained along the stem to encourage taper and protect trees from vandalism and sun scald. Less vigorous shoots should be selected as temporary branches and should be about 10 to 15 cm apart along the stem. They should be pruned annually to slow their growth and should be removed eventually.

3. *Crown Reduction* (Fig. 5)

Crown reduction pruning is most often used when a tree has grown too large for its permitted space. This method, sometimes called **drop crotch pruning**, is preferred to topping because it results in a more natural appearance, increases the time before pruning is needed again, and minimizes stress (see drop crotch cuts in the next section).

Crown reduction pruning, a method of last resort, often results in large pruning wounds to stems that may lead to decay. This method should never be used on a tree with a pyramidal growth form. A better long term solution is to remove the tree and replace it

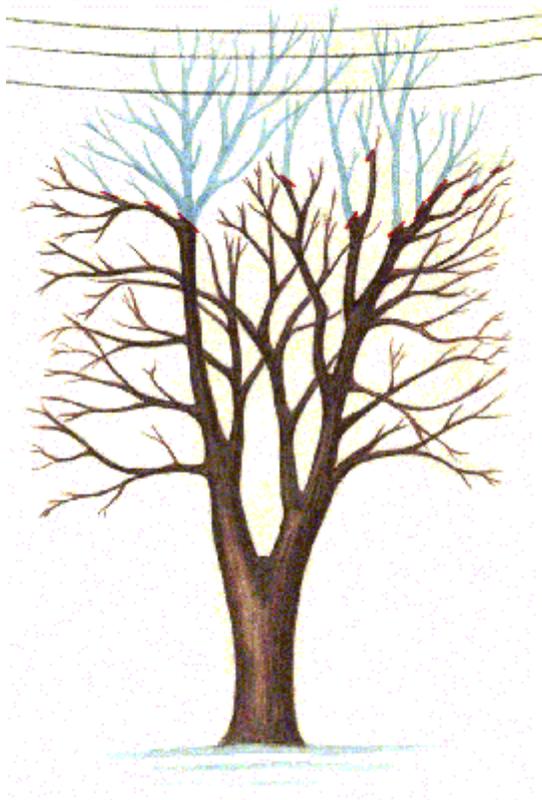


Figure 5. Crown reduction - branches to be removed are shaded in blue; pruning cuts should be made where indicated with red lines. To prevent branch dieback, cuts should be made at lateral branches that are at least one-third the diameter of the stem at their union.

with a tree that will not grow beyond the available space.

Pruning Cuts

Pruning cuts should be made so that only branch tissue is removed and stem tissue is not damaged. At the point where the branch attaches to the stem, branch and stem tissues remain separate, but are contiguous. If only branch tissues are cut when pruning, the stem tissues of the tree will probably not become decayed, and the wound will seal more effectively.

1. *Pruning living branches* (Fig. 6)

To find the proper place to cut a branch, look for the **branch collar** that grows from the stem tissue at the underside of the base of the branch (Fig. 6A). On the upper surface, there is usually a **branch bark ridge** that runs (more or less) parallel to the branch angle, along the stem of the tree. A proper pruning cut does not damage either the branch bark ridge or the branch collar.

A proper cut begins just outside the branch bark ridge and angles down away from the stem of the tree, avoiding injury to the branch collar (Fig. 6B). Make the cut as close as possible to the stem in the **branch axil**, but outside the branch bark ridge, so that stem tissue is not injured and the wound can seal in the shortest time possible. If the cut is too far from the stem, leaving a branch stub, the branch tissue usually dies and woundwood forms from the stem tissue. Wound closure is delayed because the woundwood must seal over the stub that was left.

The quality of pruning cuts can be evaluated by examining pruning wounds after one growing season. A concentric ring of woundwood will form from proper pruning cuts (Fig. 6B).

Flush cuts made inside the branch bark ridge or branch collar, result in pronounced development of woundwood on the sides of the pruning wounds with very little woundwood forming on the top or bottom (Fig. 7D). As described above, stub cuts result in the death of the remaining branch and woundwood forms around the base from stem tissues.

When pruning small branches with hand pruners, make sure the tools are sharp enough

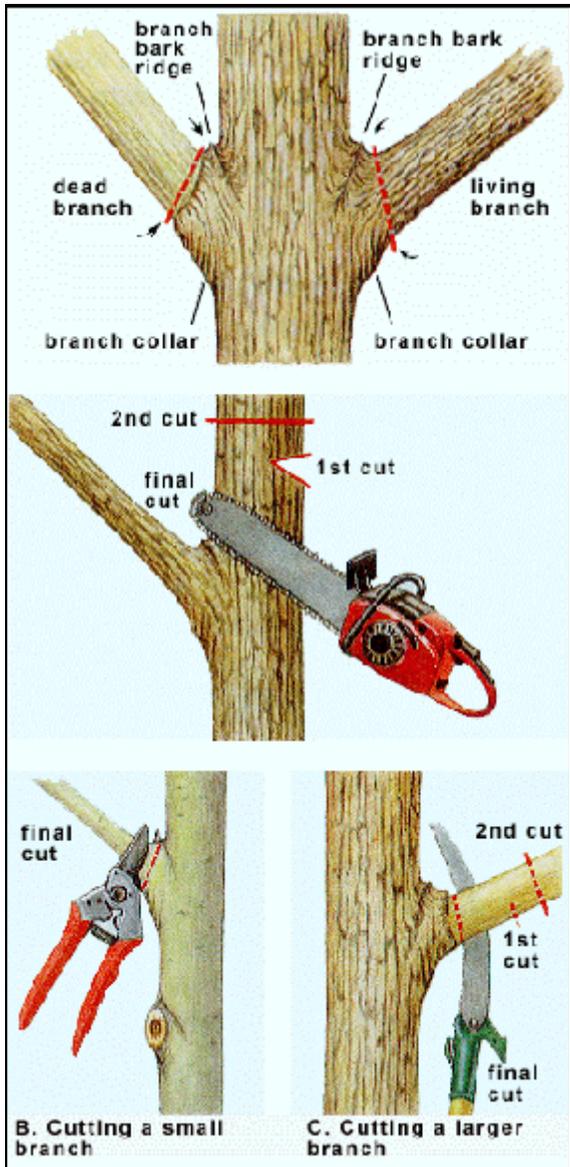


Figure 6. Pruning cuts

to cut the branches cleanly without tearing. Branches large enough to require saws should be supported with one hand while the cuts are made. If the branch is too large to support, make a three-step pruning cut to prevent bark ripping (Fig. 6C).

1. The first cut is a shallow notch made on the underside of the branch, outside the

branch collar. This cut will prevent a falling branch from tearing the stem tissue as it pulls away from the tree.

2. The second cut should be outside the first cut, all the way through the branch, leaving a short stub.
3. The stub is then cut just outside the branch bark ridge/branch collar, completing the operation.

2. Pruning dead branches (Fig. 6)

Prune dead branches in much the same way as live branches. Making the correct cut is usually easy because the branch collar and the branch bark ridge, can be distinguished from the dead branch, because they continue to grow (Fig. 6A). Make the pruning cut just outside of the ring of woundwood tissue that has formed, being careful not to cause unnecessary injury (Fig. 6C). Large dead branches should be supported with one hand or cut with the three-step method, just as live branches. Cutting large living branches with the three step method is more critical because of the greater likelihood of bark ripping.

3. Drop Crotch Cuts (Fig. 6D)

A proper cut begins just above the branch bark ridge and extends through the stem parallel to the branch bark ridge. Usually, the stem being removed is too large to be supported with one hand, so the three cut method should be used.

1. With the first cut, make a notch on the side of the stem away from the branch to be retained, well above the branch crotch.

2. Begin the second cut inside the branch crotch, staying well above the branch bark ridge, and cut through the stem above the notch.
3. Cut the remaining stub just inside the branch bark ridge through the stem parallel to the branch bark ridge.

To prevent the abundant growth of epicormic sprouts on the stem below the cut, or dieback of the stem to a lower lateral branch, make the cut at a lateral branch that is at least one-third of the diameter of the stem at their union.

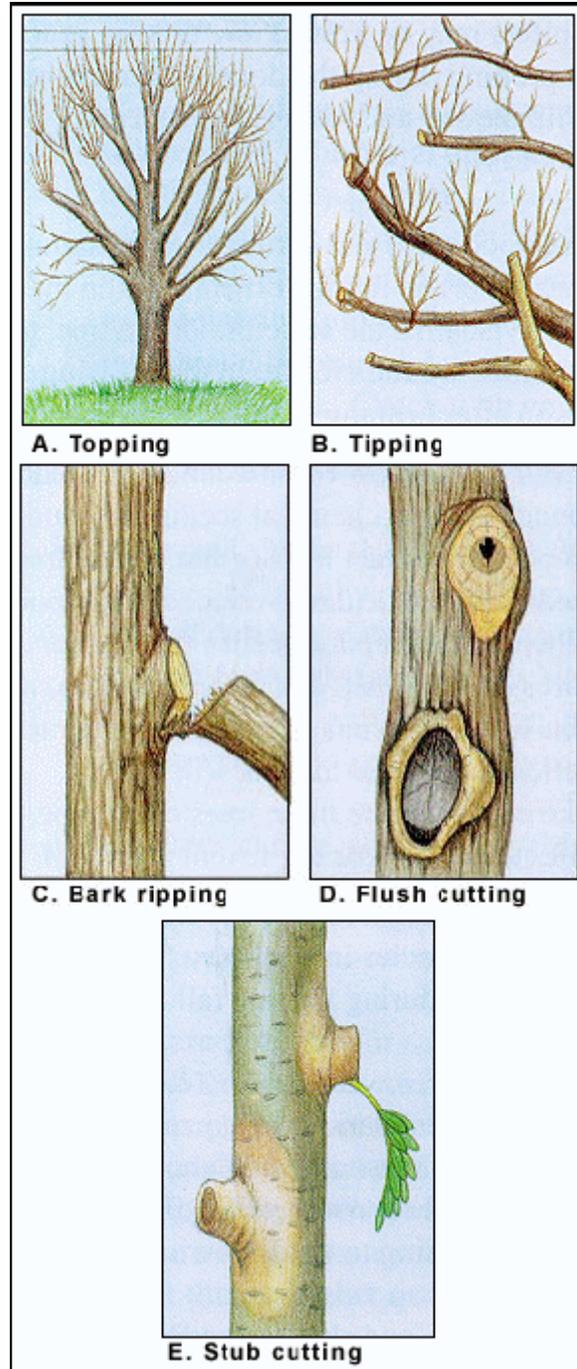
Pruning Practices That Harm Trees

Topping and **tipping** (Fig. 7A, 7B) are pruning practices that harm trees and should not be used. Crown reduction pruning is the preferred method to reduce the size or height of the crown of a tree, but is rarely needed and should be used infrequently.

Topping, the pruning of large upright branches between nodes, is sometimes done to reduce the height of a tree (Fig. 7A). Tipping is a practice of cutting lateral branches between nodes (Fig. 7B) to reduce crown width.

These practices invariably result in the development of epicormic sprouts, or in the death of the cut branch back to the next lateral branch below. These epicormic sprouts are weakly attached to the stem and eventually will be supported by a decaying branch.

Improper pruning cuts cause unnecessary injury and bark ripping (Fig. 7C). Flush cuts injure



stem tissues and can result in decay (Fig. 7D). **Stub cuts** delay wound closure and can provide entry to canker fungi that kill the cambium, delaying or preventing woundwood formation (Fig. 7E).

When to Prune

Conifers may be pruned any time of year, but pruning during the dormant season may minimize sap and resin flow from cut branches.

Hardwood trees and shrubs *without showy flowers*: prune in the dormant season to easily visualize the structure of the tree, to maximize wound closure in the growing season after pruning, to reduce the chance of transmitting disease, and to discourage excessive sap flow from wounds. Recent wounds and the chemical scents they emit can actually attract insects that spread tree disease. In particular, wounded elm wood is known to attract bark beetles that harbor spores of the Dutch elm disease fungus, and open wounds on oaks are known to attract beetles that spread the oak wilt fungus. Take care to prune these trees during the correct time of year to prevent spread of these fatal diseases. Contact your local tree disease specialist to find out when to prune these tree species in your area. Usually, the best time is during the late fall and winter.

Flowering trees and shrubs: these should also be pruned during the dormant season for the same reasons stated above; however, to preserve the current year's flower crop, prune according to the following schedule:

- ? Trees and shrubs that flower in early spring (redbud, dogwood, etc.) should be pruned immediately after flowering (flower buds arise the year before they flush, and will form on the new growth).
- ? Many flowering trees are susceptible to fireblight, a bacterial disease that can be spread by pruning. These trees,

including many varieties of crabapple, hawthorn, pear, mountain ash, flowering quince and pyracantha, should be pruned during the dormant season. Check with your county extension agent or a horticulturist for additional information.

- ? Trees and shrubs that flower in the summer or fall always should be pruned during the dormant season (flower buds will form on new twigs during the next growing season, and the flowers will flush normally).

Dead branches: can be removed any time of the year.

Pruning Tools

Proper tools are essential for satisfactory pruning (Fig.6). The choice of which tool to use depends largely on the size of branches to be pruned and the amount of pruning to be done. If possible, test a tool before you buy it to ensure it suits your specific needs. As with most things, higher quality often equates to higher cost.

Generally speaking, the smaller a branch is when pruned, the sooner the wound created will seal. Hand pruners are used to prune small branches (under 2.5 cm diameter) and many different kinds are available. Hand pruners can be grouped into by-pass or anvil styles based on the blade configuration. Anvil style pruners have a straight blade that cuts the branch against a small anvil or block as the handles are squeezed. By-pass pruners use a curved cutting blade that slides past a broader lower blade, much like a scissors. To prevent unnecessary tearing or crushing of tissues, it is best to use a

by-pass style pruner. Left- or right-handed types can be purchased.

Slightly larger branches that cannot be cut with a hand pruner may be cut with small pruning saws (up to 10 cm) or lopping shears (up to 7 cm diameter) with larger cutting surfaces and greater leverage. Lopping shears are also available in by-pass and anvil styles.

For branches too large to be cut with a hand pruner or lopping shears, pruning saws must be used. Pruning saws differ greatly in handle styles, the length and shape of the blade, and the layout and type of teeth. Most have tempered metal blades that retain their sharpness for many pruning cuts. Unlike most other saws, pruning saws are often designed to cut on the "pull-stroke."

Chain saws are preferred when pruning branches larger than about 10 cm. Chainsaws should be used only by qualified individuals. To avoid the need to cut branches greater than 10 cm diameter, prune when branches are small.

Pole pruners must be used to cut branches beyond reach. Generally, pruning heads can cut branches up to 4.4 cm diameter and are available in the by-pass and anvil styles. Once again, the by-pass type is preferred. For cutting larger branches, saw blades can be fastened directly to the pruning head, or a separate saw head can be purchased. Because of the danger of electrocution, pole pruners should not be used near utility lines except by qualified utility line clearance personnel.

To ensure that satisfactory cuts are made and to reduce fatigue, keep your pruning tools sharp and in good working condition. Hand pruners,

lopping shears, and pole pruners should be periodically sharpened with a sharpening stone. Replacement blades are available for many styles. Pruning saws should be professionally sharpened or periodically replaced. To reduce cost, many styles have replaceable blades.

Tools should be clean and sanitized as well as sharp. Although sanitizing tools may be inconvenient and seldom practiced, doing so may prevent the spread of disease from infected to healthy trees on contaminated tools. Tools become contaminated when they come into contact with fungi, bacteria, viruses and other microorganisms that cause disease in trees. Most pathogens need some way of entering the tree to cause disease, and fresh wounds are perfect places for infections to begin. Microorganisms on tool surfaces are easily introduced into susceptible trees when subsequent cuts are made. The need for sanitizing tools can be greatly reduced by pruning during the dormant season.

If sanitizing is necessary it should be practiced as follows: Before each branch is cut, sanitize pruning tools with either 70% denatured alcohol, or with liquid household bleach diluted 1 to 9 with water (1 part bleach, 9 parts water). Tools should be immersed in the solution, preferably for 1-2 minutes, and wood particles should be wiped from all cutting surfaces. Bleach is corrosive to metal surfaces, so tools should be thoroughly cleaned with soap and water after each use.

Treating wounds

Tree sap, gums, and resins are the natural means by which trees combat invasion by pathogens. Although unsightly, sap flow from pruning wounds is not generally harmful; however, excessive "bleeding" can weaken trees.

When oaks or elms are wounded during a critical time of year (usually spring for oaks, or throughout the growing season for elms) -- either from storms, other unforeseen mechanical wounds, or from necessary branch removals -- some type of wound dressing should be applied to the wound. Do this immediately after the wound is created. In most other instances, wound dressings are unnecessary, and may even be detrimental. Wound dressings will not stop decay or cure infectious diseases. They may actually interfere with the protective benefits of tree gums and resins, and prevent wound surfaces from closing as quickly as they might under natural conditions. The only benefit of wound dressings is to prevent introduction of pathogens in the specific cases of Dutch elm disease and oak wilt.

Pruning Guidelines

To encourage the development of a strong, healthy tree, consider the following guidelines when pruning.

General

- ? Prune first for safety, next for health, and finally for aesthetics.
- ? Never prune trees that are touching or near utility lines; instead consult your local utility company.
- ? Avoid pruning trees when you might increase susceptibility to important pests (e.g. in areas where oak wilt exists, avoid pruning oaks in the spring and early summer; prune trees susceptible to fireblight only during the dormant season).
- ? Use the following decision guide for size of branches to be removed: 1) under 5 cm diameter - go ahead, 2) between 5 and 10 cm diameter - think twice, and 3) greater than 10 cm diameter - have a good reason.

Crown Thinning

- ? Assess how a tree will be pruned from the top down.
- ? Favor branches with strong, U-shaped angles of attachment. Remove branches with weak, V-shaped angles of attachment and/or included bark.
- ? Ideally, lateral branches should be evenly spaced on the main stem of young trees.
- ? Remove any branches that rub or cross another branch.
- ? Make sure that lateral branches are no more than one-half to three-quarters of the diameter of the stem to discourage the development of co-dominant stems.

- ? Do not remove more than one-quarter of the living crown of a tree at one time. If it is necessary to remove more, do it over successive years.

Crown Raising

- ? Always maintain live branches on at least two-thirds of a tree's total height. Removing too many lower branches will hinder the development of a strong stem.
- ? Remove basal sprouts and vigorous epicormic sprouts.

Crown Reduction

- ? Use crown reduction pruning only when absolutely necessary. Make the pruning cut at a lateral branch that is at least one-third the diameter of the stem to be removed.
- ? If it is necessary to remove more than half of the foliage from a branch, remove the entire branch.

Glossary

Branch Axil: the angle formed where a branch joins another branch or stem of a woody plant.

Branch Bark Ridge: a ridge of bark that forms in a branch crotch and partially around the stem resulting from the growth of the stem and branch tissues against one another.

Branch Collar: a "shoulder" or bulge formed at the base of a branch by the annual production of overlapping layers of branch and stem tissues.

Crown Raising: a method of pruning to

provide clearance for pedestrians, vehicles, buildings, lines of sight, and vistas by removing lower branches.

Crown Reduction Pruning: a method of pruning used to reduce the height of a tree. Branches are cut back to laterals that are at least one-third the diameter of the limb being removed.

Crown Thinning: a method of pruning to increase light penetration and air movement through the crown of a tree by selective removal of branches.

Callus: see woundwood.

Decurrent: a major tree form resulting from weak apical control. Trees with this form have several to many lateral branches that compete with the central stem for dominance resulting in a spherical or globose crown. Most hardwood trees have decurrent forms.

Epicormic Sprout: a shoot that arises from latent or adventitious buds; also known as water sprouts that occur for on stems and branches and suckers that are produced from the base of trees. In older wood, epicormic shoots often result from severe defoliation or radical pruning.

Excurent: a major tree form resulting from strong apical control. Trees with this form have a strong central stem and pyramidal shape. Lateral branches rarely compete for dominance. Most conifers and a few hardwoods, such as sweetgum and tuliptree, have excurrent forms.

Flush Cuts: pruning cuts that originate inside the branch bark ridge or the branch collar, causing unnecessary injury to stem tissues.

Included Bark: bark enclosed between

branches with narrow angles of attachment, forming a wedge between the branches.

Pollarding: the annual removal of all of the previous year's growth, resulting in a flush of slender shoots and branches each spring.

Stub Cuts: pruning cuts made too far outside the branch bark ridge or branch collar, that leave branch tissue attached to the stem.

Tipping: a poor maintenance practice used to control the size of tree crowns; involves the cutting of branches at right angles leaving long stubs.

Topping: a poor maintenance practice often used to control the size of trees; involves the indiscriminate cutting of branches and stems at right angles leaving long stubs. Synonyms include rounding-over, heading-back, dehorning, capping and hat-racking. Topping is often improperly referred to as pollarding.

Topiary: the pruning and training of a plant into a desired geometric or animal shape.

Woundwood: lignified, differentiated tissues produced on woody plants as a response to wounding (also known as callus tissue).

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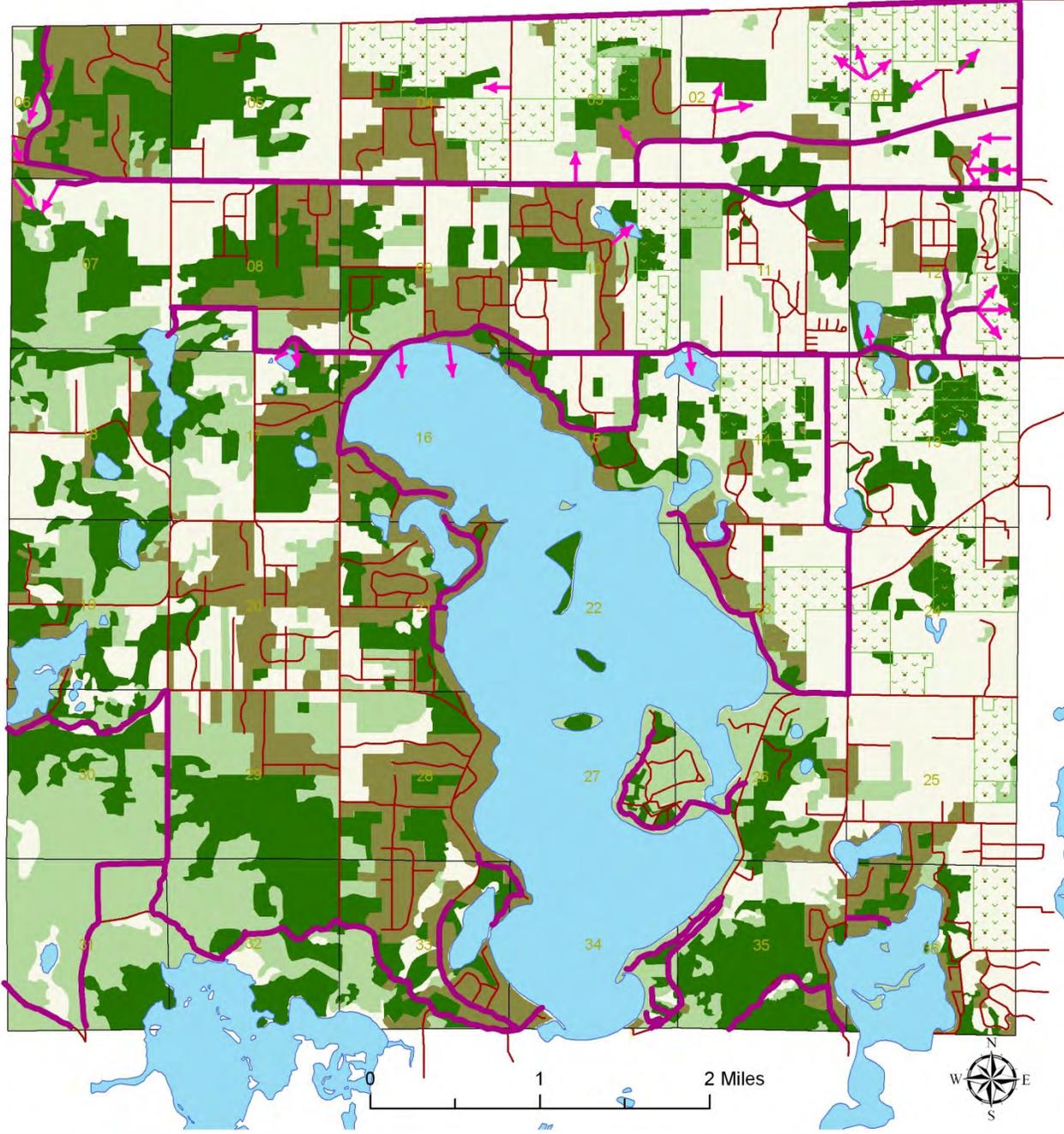
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“How to Prune Trees” was written to help people properly prune the trees they care about. If you doubt your ability to safely prune large trees, please hire a professional arborist. Information in this publication can be used to interview and hire a competent arborist.

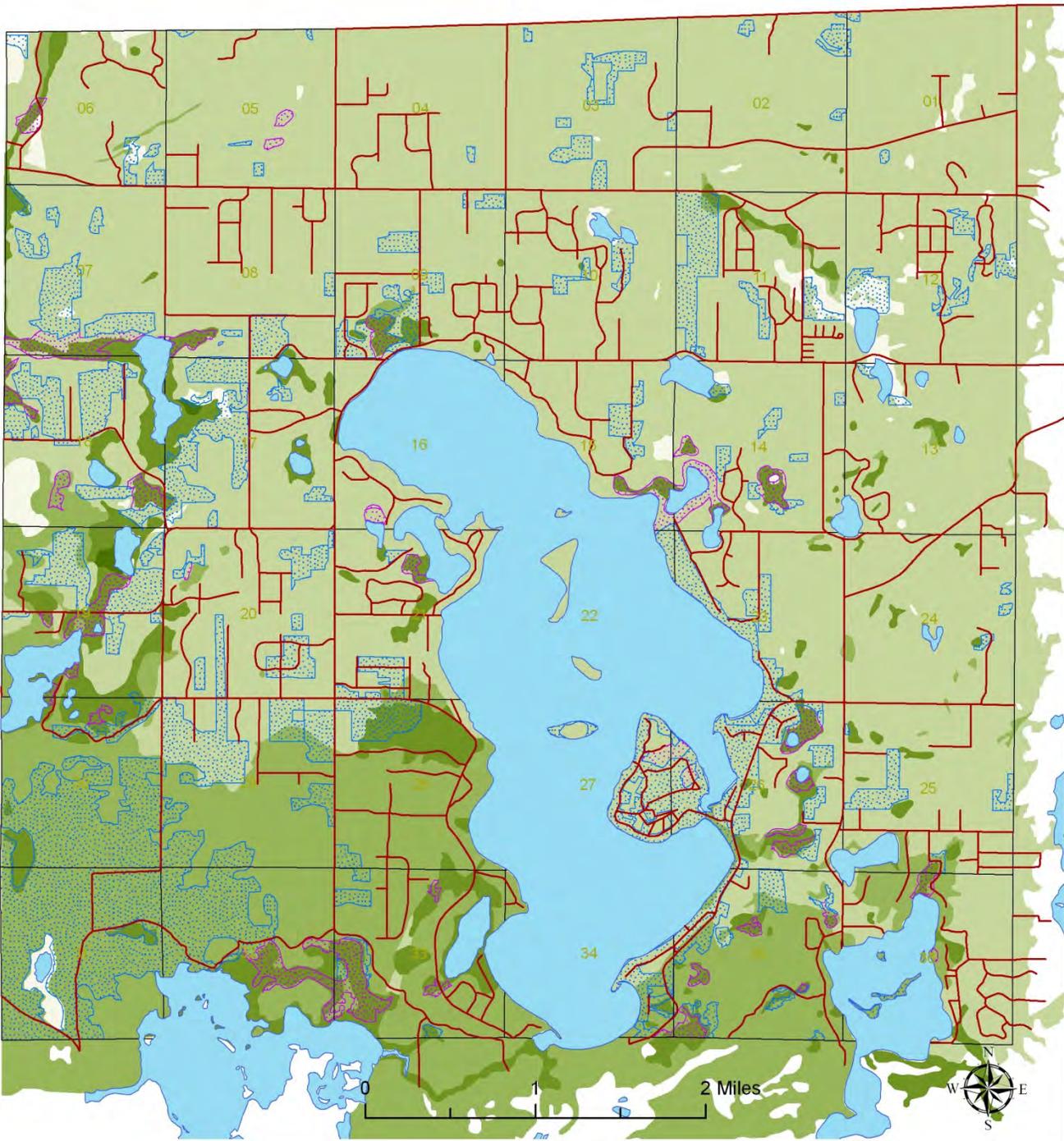
Appendix B

- 1. Significant Features Map**
- 2. Hardwood Tree Profile Map**
- 3. Coniferous Tree Profile Map**
- 4. Preliminary Tree Survey Maps with Notes and Photos**

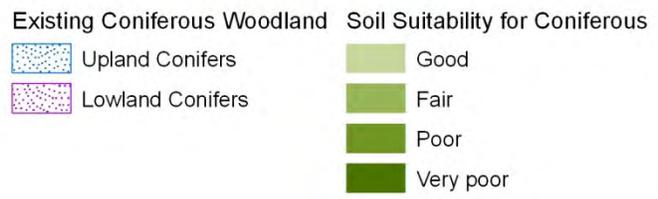


Long Lake Township Roadside Tree Plan Significant Features

- | | |
|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
|  Conifers |  Agricultural lands |
|  Hardwoods |  Scenic Corridor |
|  Developed Forest |  Scenic View |



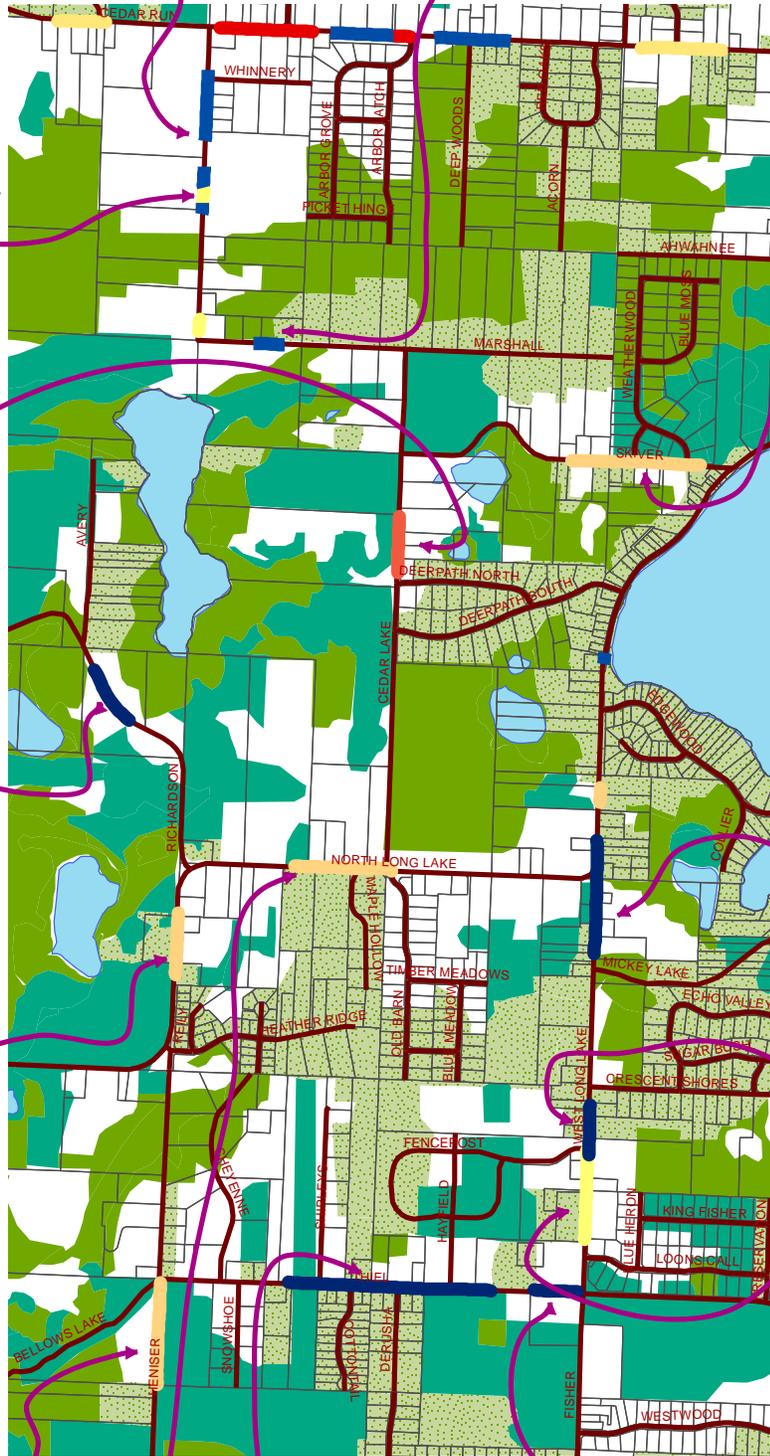
Long Lake Township Roadside Tree Plan Coniferous Tree Profile



Roadside Tree Inventory -- West Side Long Lake Township

Open areas with power lines crossing the road at the north end & along the west side road to the south

Open field on south side, not well traveled



Both sides of road trees in poor condition good replacement area but low visibility



East side of Cedar Lake Rd existing trees in good condition

Both sides of road open field



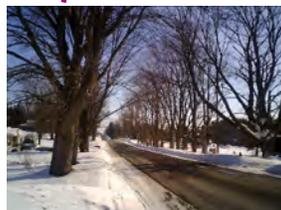
West side of Road existing trees in poor/fair condition



West side Heisner Rd existing trees fair/poor condition



Both sides of N. Long Lake existing trees in poor/fair condition



South Side of Skiver, trees in fair condition, can plant in between



West side of W. Long Lake fair condition 2 new trees of 6/7

East side of W. Long Lake open field, 2 young trees in good health

West side of W. Long Lake open field, 1 tree in good health

West side of W. Long Lake existing trees in poor health



North side Thiel Road open field (row of Spruce good condition)

Both sides Thiel Road open field (2 trees good condition)

Roadside Trees - Condition

- █ Good
- █ Good/Fair
- █ Fair
- █ Fair/Poor
- █ Poor
- █ OpenFields

- █ Conifer Woodlot
- █ Hardwood Woodlot
- █ Developed Forest



Cedar Run: north side, hardwood poor condition replace pine good condition



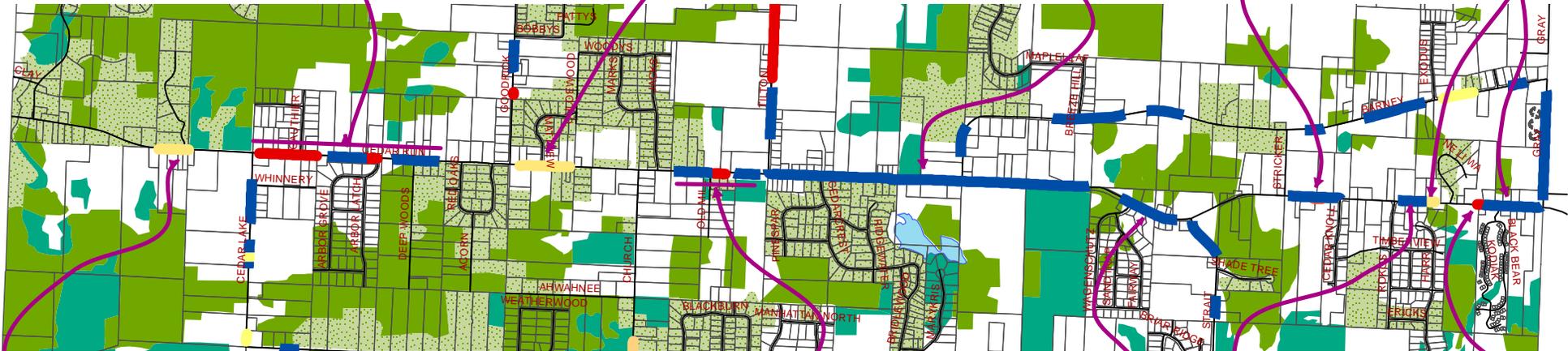
Cedar Run: north side fair/poor condition possible replacement location



Cedar Run north side: Windbreaks in good condition, good place to connect with infill tree plantings

Cedar Run: north side several scattered trees along road, many on small parcels

Cedar Run: north side open fields



Cedar Run: south side fair/poor health powerlines, replanting not feasible



Cedar Run: south side good condition, fill in to the east and west with additional trees



Cedar Run: open fields to the south many small parcels

Cedar Run: open fields to the south small parcels



Cedar Run: south side good condition

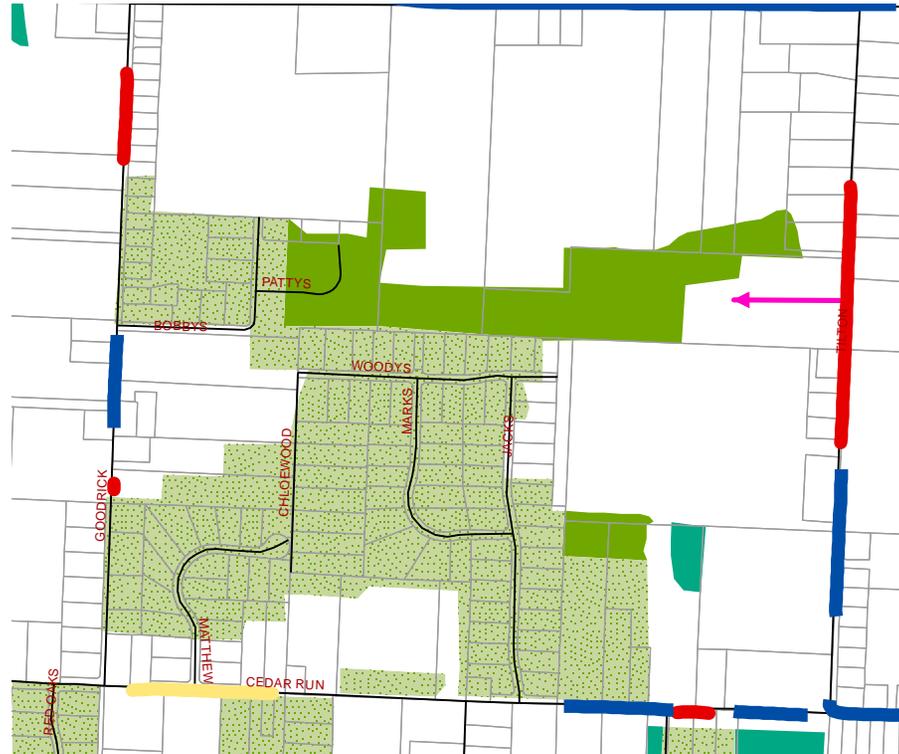
Roadside Tree Inventory -- Cedar Run Road Long Lake Township

- Conifer Woodlot
- Hardwood Woodlot
- Developed Forest

- Roadside Trees - Condition**
- Good
 - Good/Fair
 - Fair
 - Fair/Poor
 - Poor
 - OpenFields



Above: East side of Goodrick,
windbreak in good condition
Both sides of Goodrick,
good place to connect
Below: West side of Goodrick



Tilton Road east side:
nice woodbreak
open field to the
south on east side

Roadside Trees - Condition

- Good
- Good/Fair
- Fair
- Fair/Poor
- Poor
- OpenFields
- Conifer Woodlot
- Hardwood Woodlot
- Developed Forest

Roadside Tree Inventory -- Goodrick & Tilton Roads
Long Lake Township

Open, north side
two smaller area, good
potential for planting

Open, west side of Grey Road
good area for new plantings



East Side, open, but
powerlines in the way

Open, south side
might be difficult to plant

Open, south side
hilly, difficult to plant

Open, south side

Open, south side,
small area, 1 existing tree

South side of road, trees in poor health
Good area for replacement

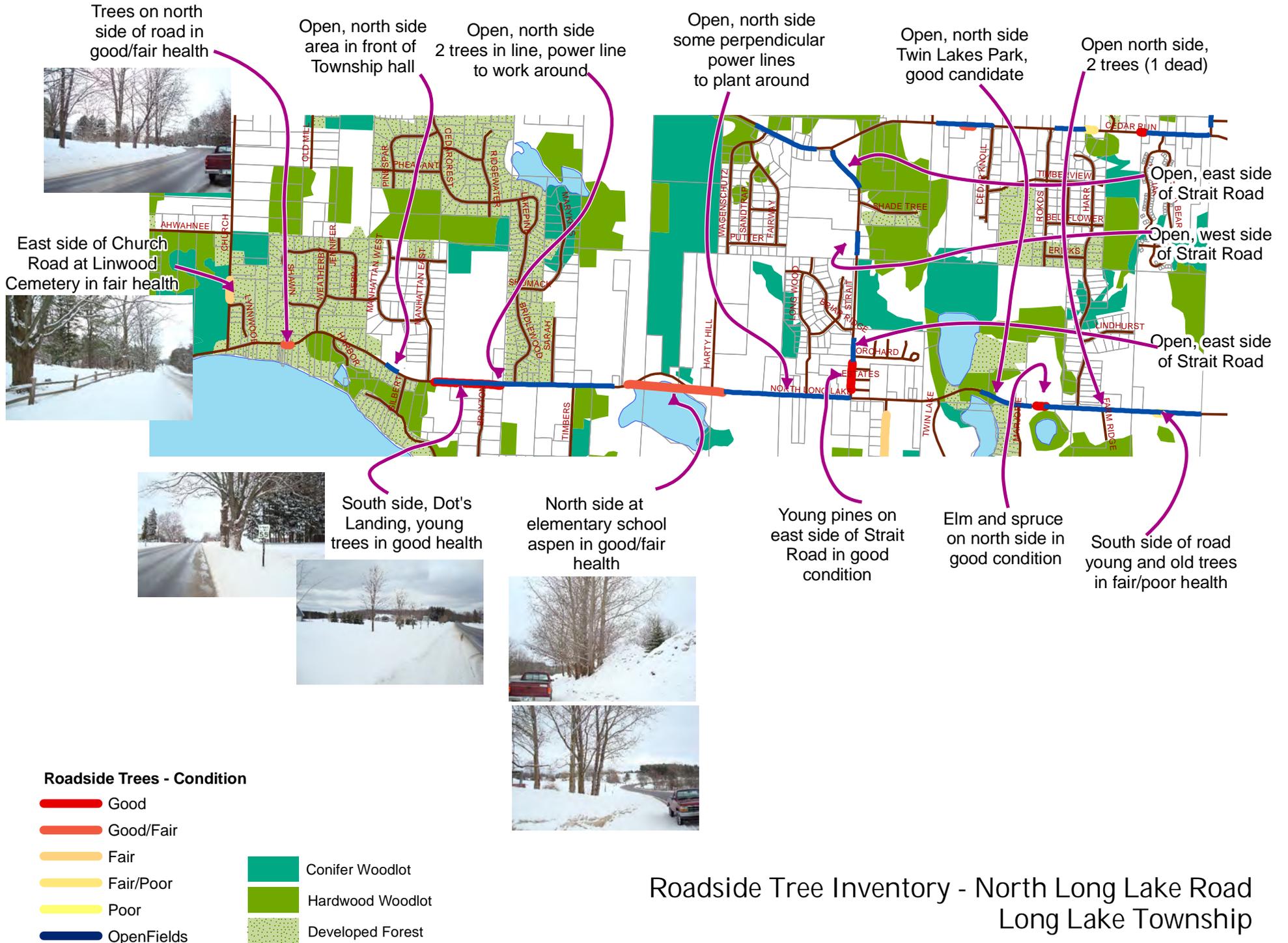


Roadside Trees - Condition

- █ Good
- █ Good/Fair
- █ Fair
- █ Fair/Poor
- █ Poor
- █ OpenFields

- █ Conifer Woodlot
- █ Hardwood Woodlot
- █ Developed Forest

Roadside Tree Inventory -- Barney & Grey Roads
Long Lake Township



Scotch pine east side windbreak fair condition



East side trees in fair condition



Poor health south side tops are dying

North side existing trees in fair/poor health may need removal



North side good health

Open area north side, too tight to plant much



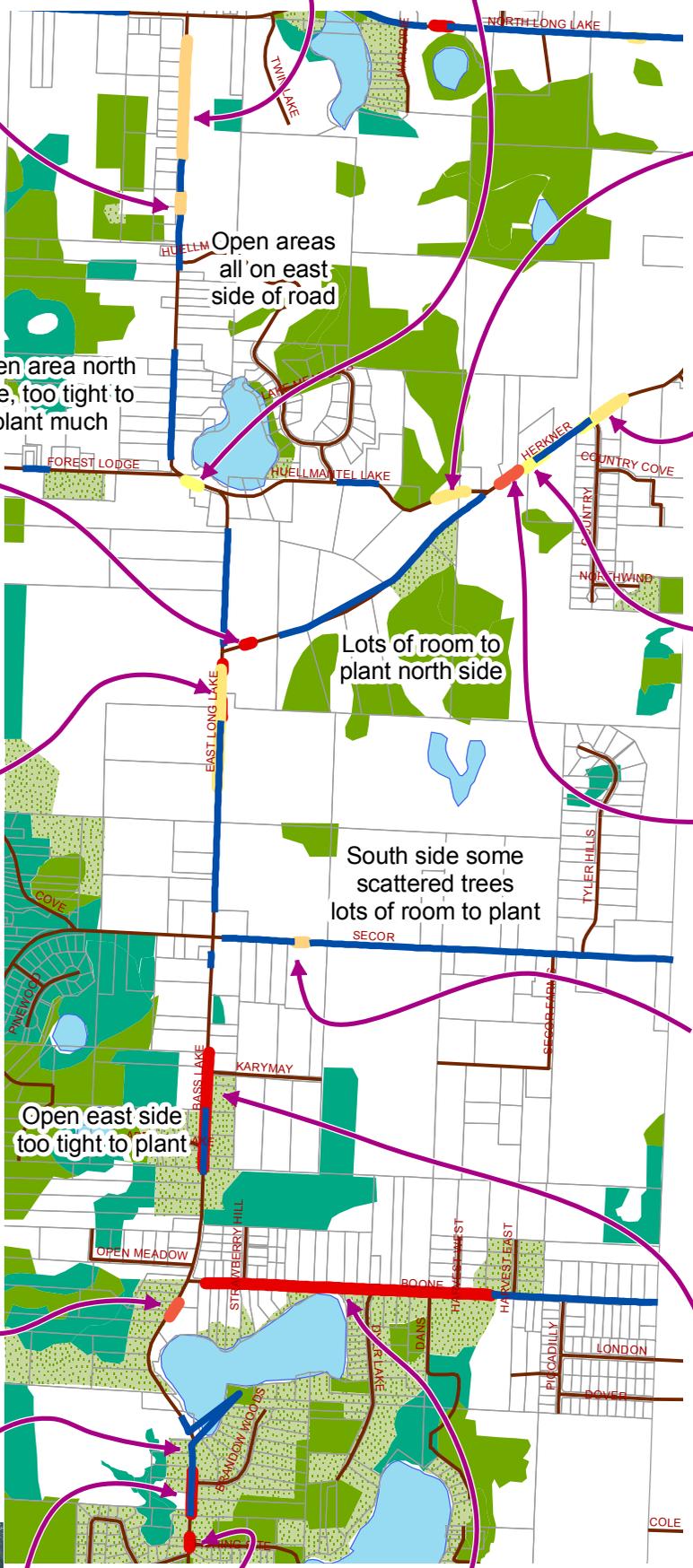
South side poor health North side poor/fair



East side good health West side fair/poor (below) powerlines may be in way



South side poor health powerline conflicts



Lots of room to plant north side

South side some scattered trees lots of room to plant

Open east side too tight to plant



Pine windbreak west side good/fair condition

Open area west side tight but plantable



North side good/fair condition little room for replacements



Lots of room to plant north side

East side good health pine windbreak



West side good condition



West side white pine in good condition



South side pine windbreak good health hardwood poor health

Roadside Trees - Condition

- █ Good
- █ Good/Fair
- █ Fair
- █ Fair/Poor
- █ Poor
- █ Open Fields

- █ Conifer Woodlot
- █ Hardwood Woodlot
- █ Developed Forest

Roadside Tree Inventory - East Side Long Lake Township

Appendix C

- 1. Sample of Telephone Survey Questions for Property Owners**
- 2. Summary of Survey Results for Roadside Tree Planting**
- 3. Summary of Survey Results for Tree Removal and Replacement**



Schillinger
FORESTRY, LLC

615 WEST ELEVENTH STREET
TRAVERSE CITY MI, 49684

Long Lake Township Roadside Tree Planting Survey
Conducted By: Daniel Schillinger

Long Lake Township is dedicated to implementing the adopted Township wide Community Forestry Plan. Within that plan “Roadside Trees” are identified as one of the goals to pursue. Specifically, the Roadside Tree goal is to: “preserve, protect and restore primary tree lined corridors in the Township”. The goal of this survey is to understand the resources required to achieve/implement this goal and to gauge the public’s interest in supporting this endeavor.

Questions for landowners identified in re-planting areas.

Does this planting restoration plan sound like a good idea? _____(yes/no)

Would you be willing to allow trees to be planted on your property, with a legal easement solely to allow inspection? _____

Would you be willing to invest some of your own capital in return for having these trees on your property, just outside of the right of way? _____ Tree removal costs? _____

If so, what is the maximum would you consider spending?

- None
- \$1-100
- \$101-300
- \$301-500
- \$501-1000
- Willing to pay whatever it cost

State care instructions. Would you be willing to provide the suggested care using your own resources? _____

Do you have any comments or suggestions?

Potential Additional Questions: Would you pay for future pruning costs? Is there a species you will not want? Is there a species you only want?

Roadside Tree Planting Project – Long Lake Township

Survey Results of Owners with Dead/Dying Trees

Prepared by Schillinger Forestry

Throughout Long Lake Township 97 roadside trees were identified as having 30% or more of the canopy dead. Of those 97 trees, 91 were well over 60% dead and should come out simply for safety. These 97 trees front 48 Long Lake Township property owner's land. All affected landowners were identified, were sent letters and Schillinger Forestry spoke with 17 owners about their willingness to participate in the planting program. 13 owners' numbers were disconnected or were left messages and did not call back. The 17 owners who were spoken with were asked if they would allow for their trees to be marked and bid by local tree service companies for removal. Many owners said yes and 17 trees to date could be bid for removal. All owners wanted to know the costs before proceeding with the actual removal. There were a few owners who said they would take the trees down themselves. These owners were encouraged to get a permit from the Grand Traverse County Road Commission. Most owners were quite hesitant to list a price they would be willing to pay for removal and re-planting but those who were interested seemed to be the most willing to contribute. The actual survey results follow.

Recommendations after cut/remove survey: The economic times made most people surveyed hesitant to commit financially. Additionally, when implementation begins most folks would be hesitant to invest large amounts, particularly with removal costs since the trees are technically the Road Commission's responsibility. Perhaps cut and removal should be placed back further after some trees are planted in openings and the program gets some momentum.

Address	Project a Good Idea?	Would you Allow trees to be planted on your property?	Contribute to removal costs?	\$ Max you would spend	Would you provide water/irrigation?	Ok to dot trees for removal?	Total Trees to mark-
4914 M-72	Not interested						
10491 N.LL	Yes	Yes	Yes		Do whatever, it takes to help water	Yes	7
7333 Cedar Run	Yes	Yes	No	Cannot Pay anything to help	No	Yes	3
6353 Boone Rd.	Don't want to be involved, they want to care for their own property	No	No	N/a	N/A	No	
11281 Cedar Run	Yes	Yes	Tough to handle	\$100	Glad to help with watering, hose or irrigation	Yes	2
Cedar Run	Yes	Yes		Want to participate, but wants to approve cost(s) prior to commitment	No	Yes	1
8960 N. LL	Yes	Yes	See right	Would have to approve costs	Could do watering, but would like automatic watering	Yes	1
9080 N. LL	Yes	N/A-No room	No DIY	N/A		No	
10855 Cedar Run		No Room				No	
6197 Herkner	Yes	Yes	No	Laid off, can't pay, would if she could	Would be willing to water or allow irrigation	Yes	1
11000 N. LL	No			Too High Taxes, won't pay anything			

Address	Project a Good Idea?	Would you Allow trees to be planted on your property?	Contribute to removal costs?	\$ Max you would spend	Would you provide water/irrigation?	Ok to dot trees for removal?	Total Trees to mark-
912 Bass Lake Rd.	Yes	Potentially	\$0	will check costs and likely cannot contribute much \$	Would allow, but would like water truck	Yes	1
10578 N. LL		No Room				Yes	1
5891 N. LL	Yes	Will talk w/husband		Things are tight right now		need to call again	
2177 W. LL	Yes	Yes	Yes	Look into it	Yes but may be too far	will cut themselves	
6360 Herkner	Yes	Yes	Yes		Would provide if needed	Does not want trees down on property, may pay extra to help neighbors	
4170 M-72	Yes	Yes	Consider paying depending on cost	\$500	Would water if needed	OK	
8616 Cedar Run	Yes	Yes Very interested to have more trees planted	Would consider, may want to prune	Would look at costs	No	No, Look at first pruning maybe first but may cut with advice	

Roadside Tree Planting Project – Long Lake Township

Survey Results of Owners with Open Spaces for Trees

Prepared by Schillinger Forestry

Open spaces along road corridors were identified through our initial roadside tree inventory. Within these open spaces a random sampling of owners were surveyed by phone to gauge their interest in participating in our tree planting program. 30 landowners were called and 16 were spoken with. Of the people spoken with 11 of those were agreeable to have trees planted on their land and 2 were identified incorrectly in our GPS survey. 11 people thought additional tree plantings were a good idea Township wide. All the people surveyed would not commit a dollar amount they would spend on the project but most people seemed favorable to sharing in the cost of planting trees.

Recommendations after Open Space Survey: This surveyed group of landowners was overwhelmingly more willing and excited about this project than the tree removal and re-plant landowners. The reason for this appeared to have been mostly financial. New plantings and under plantings, where applicable, could be the first stage of work in this project to get people excited about the project. Perhaps the excitement with the open space plantings may lead to finding several donors who could cover the costs for removal for those owners with large dying roadside trees. Additionally, the Road Commission may have the funding to remove these trees in the future. Perhaps we let the Road Commission/donors remove trees when there is money and replace trees the following spring under our program. In either case, most owners with room to plant were agreeable to having the trees on their property.

Owner	TWP Address	Good Idea?	Allow Planting?	Max Spending	If Not, Payments?	Provide Water?	Comments
Karen Doherty	6071 Secor		No				Property is too hilly, and flat part trees would be in the way of hayfield
Joseph Deluca	6369 Secor	Yes	Yes	Would consider	Would help participate more	Too far	Would want meet to discuss planting, one acre opening to plant in
Bob Breithaupt	897 Bass Lk Rd	Yes	Yes	Would consider		Yes	Room for one tree only possibly, go with BB rather than bare root b/c of size
Bruce Remail	Cedar Run	Yes	Yes	Would consider	Would help participate more	No	Would have conifer to move if needed
Jim for Joan Lautner	Titon/ Cedar run	Yes	Yes	Would consider		Could do it if needed	Has water truck and would water on family property
Duard Rokos	East Long lk		No				Not interested
Dennis Farley	8146 Cedar Run	Yes	Yes	Would consider	Does not need	Would water if needed	want 2 trees, wants input about location/species \$100 sounded ok for 2
Glen Coleman	2900 West LL	Yes	No				Good Idea, Not interested personally
Micheal Powell	Barney	Yes	Yes	None		Too far	Financial times trying, can't commit to spending \$
Rebecca Barron	6244 North LL	Yes	Yes	Would consider	Might help but would try to avoid	Would try to reduce cost, 200' to go	Hilly, planting might be difficult
Fred Martin	Theil - West LL	Maybe	Yes	None			LOTS of frontage, don't want to participate if it will cost anything, only allow planting if it doesn't cost anything
Bob Hanson	Herkner, ELL	Yes	Yes	Would consider		Would water if needed	Great Idea, lots of good frontage, East LL and Herkner, could water to reduce costs
Glenn Noonan	M-72	Yes	Yes	If property allows, would pay		No	Would consider donating to help others regardless of his personal property's problems with planting
Mike Revard	6095 Boone	Yes	Yes	Would consider		Would water to save \$	Excited to participate, have room for 2-3 trees, can get water to trees if good cost savings
Janet Chouinard	Secor	Yes	Yes	Would consider		Could do it if needed	Likes the program, may enhance value of lots she's trying to sell on Secor