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# *Tree Pruning Essentials*

Trees continue to survive in spite of the many challenges they face in the urban environment. However, to grow from seedling to a mature tree in the urban forest, they need our help. They are the largest, oldest living organism on the planet and can live long, healthy lives with some assistance. We often place trees in less-than-favorable growing locations that don't allow natural development and maturity and often require pruning to develop a durable structure, improve clearance, and maintain aesthetics.

Pruning has been called "one of the best, worst maintenance practices" performed on trees. The process creates wounds, which have a major impact on plant processes. Improper cutting on a tree causes severe damage or even death. To prune properly, it is important to understand both the proper techniques and how the tree responds to pruning.

Regardless of who is pruning, doing it right and doing it safely are important. This dangerous work requires expertise and training to prevent injury or unnecessary damage. Never let the situation exceed your skills! If you are uncertain about how to prune larger trees, contact a qualified tree expert to assist you.

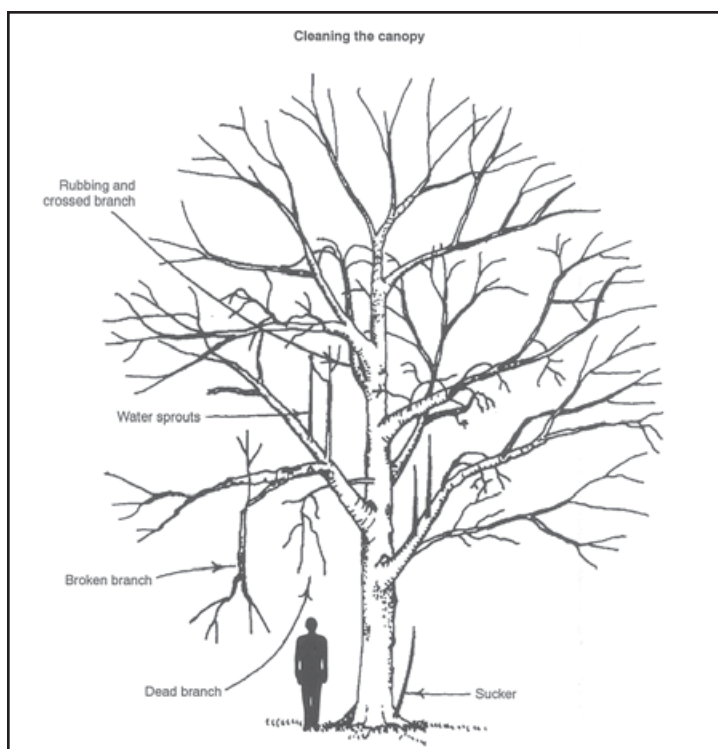
## **Reasons for Pruning**

Let's begin with why we want to prune a tree in the first place. The most common reasons typically include aesthetics, structure, and reducing risk. Typically, people prune to improve the appearance of the tree by reducing the length of fast-growing stems or unwanted growth. However, too many times trees are pruned only to maintain a desired shape or size to fit a location in the landscape. This can be the result of poor placement or because the wrong tree was selected for the intended space.



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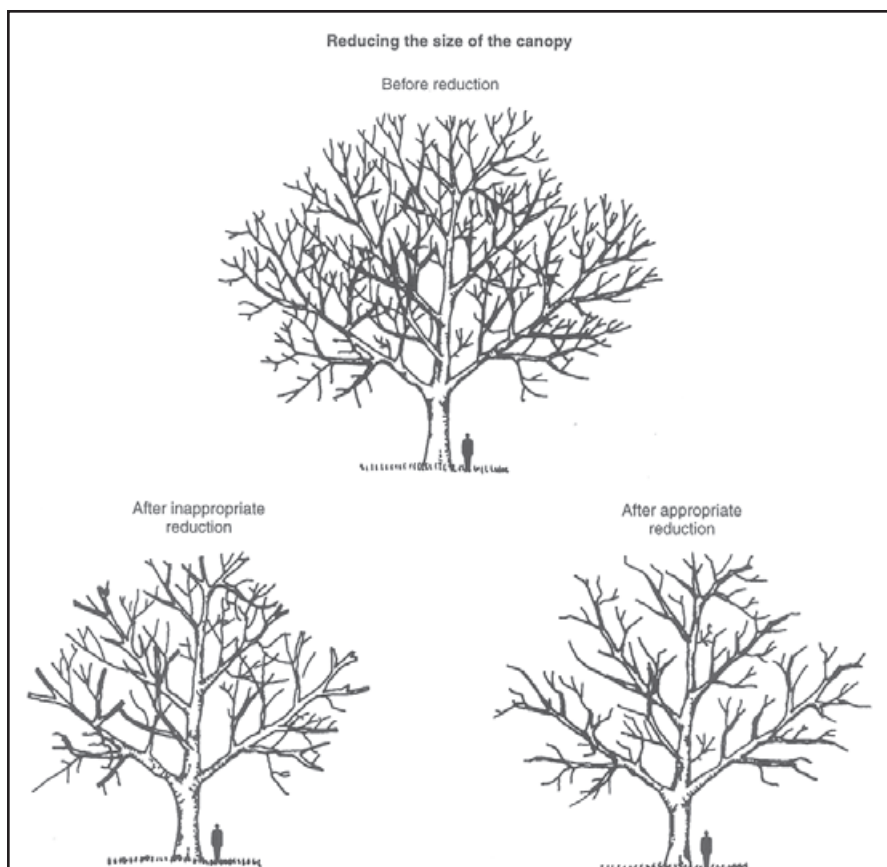




Focus on removing non-beneficial plant parts.

*Crown cleaning* focuses on reducing tree risk and improving appearance. The process involves pruning to remove dead, dying, diseased, broken or poorly attached branches; crossing or rubbing branches; and, perhaps, adventitious shoots, if too numerous. The primary objective is removing non-beneficial plant parts, but minimal live tissue. This is a common pruning practice that not only improves appearance, but also may improve health. Another important objective is to reduce potential risk of failing branches. Crown cleaning is used extensively by arborists after storms have damaged trees and includes selective pruning using proper cuts to repair the damage. This is the most common pruning strategy and is often a regular maintenance procedure in public spaces.

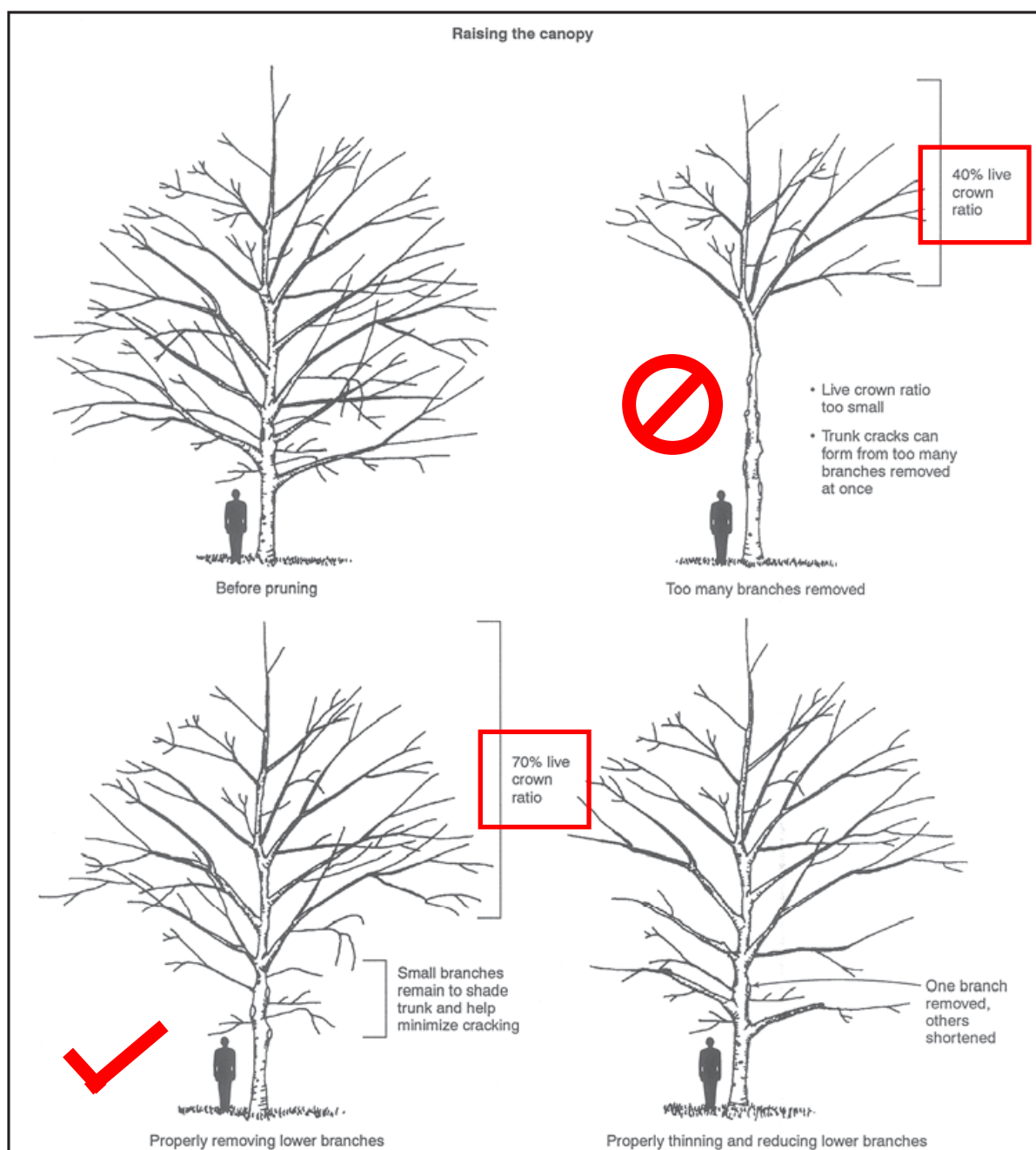
*Crown reduction* decreases the overall size of the tree and is usually an attempt at making a too-large tree fit into its location. Often, this is the result of a poorly placed tree in a location that cannot allow natural, mature growth. Crown reduction is another advanced pruning strategy that typically requires a skilled arborist. If done improperly, affected trees can develop mechanical and physiological stress. This includes poor crown geometry that can lead to instability and failure as well as decay within the tree, which will eventually lead to decline and death.



Proper canopy reduction makes the tree smaller, using proper pruning techniques.

In this process, heading cuts, made back to a node or bud, or reduction cuts, cutting the branches back to lateral stems, lower the size of the tree's height and spread. When using reduction cuts, the branch remaining should be at least  $\frac{1}{3}$  the diameter of the branch removed (small aspect ratio) to be sustainable, otherwise dieback can be expected from the lack of photosynthetic area in the leaves to support it. If done properly, the tree can survive for years in the landscape. Prune branches to avoid large wounds and remove no more than 30% of the foliage during any one pruning occurrence on larger, mature trees.

Before spending time and resources on this type of pruning, consider your objectives. The overall tree size should be reduced by no more than one-quarter. Typically, it will require a commitment to this type of pruning over many years. Does this meet your goal? If not, consider removing and replacing the tree with one more compatible with the location. Talk to a professional arborist to discuss the best options in this situation.



Raising the canopy reduces conflicts with pedestrians and structures.

*Crown raising* elevates the crown of the tree to accommodate pedestrian or vehicular access, structural conflicts, line of sight, safety, or appearance. Removing the lower tree branches is an important pruning process requiring some knowledge of tree growth. The lowest branches remaining will be the lowest branches on the tree as it matures; proper selection is critical. If the tree is too small to raise to the desired height, a gradual elevation will be required over a period of several years.

An important concern in the process is *live crown ratio* (LCR). The resulting LCR should be greater than 60%. This means that the canopy-to-trunk ratio should be about two-thirds canopy to one-third trunk, or the canopy should be at least 60% of the overall height of the tree. Lower than 60% or excessive elevation of branches should be avoided so that trunk taper is not affected adversely. Also, a low LCR can result in greater susceptibility to failure during high winds.



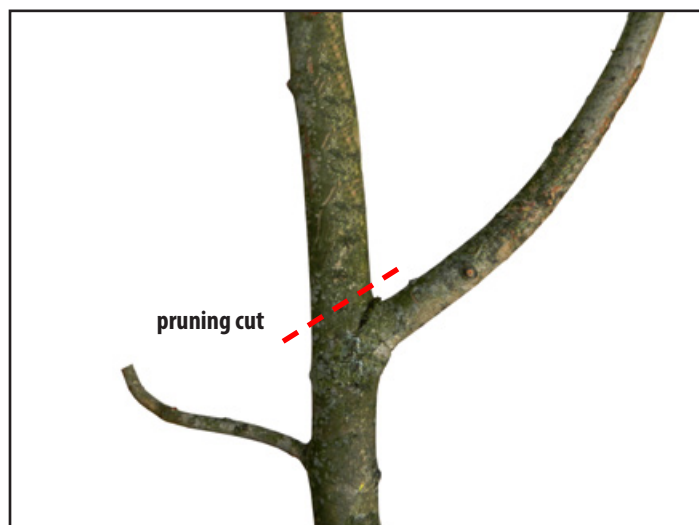
This tree has an improperly raised crown with about a 20% LCR after pruning.

Begin the canopy or crown-raising process while the tree is younger and actively growing and to prevent cutting larger branches. Large pruning wounds compromise healing, promote decay, leave defects, and increase the likelihood for failure in the tree. On larger trees, careful consideration of branches is important to prevent excessive removal of live tissue and large pruning wounds. It may be necessary to raise the canopy over the course of multiple pruning cycles.

### Types of Cuts

The tree's response to pruning can be anticipated based on the type of pruning cut you use. Most plants respond in much the same way to pruning. So, if you understand the responses, you can choose the best cut for the situation. There are three types of pruning cuts: reduction, removal, and heading.

*Reduction* cuts shorten a limb by removing the terminal portion back to a lateral branch of equal or smaller diameter. The cut should be made just beyond the lateral branch and the remaining branch should be one-third to one-half the size of the branch removed. This remaining branch will then assume the very important terminal role for support and survival. Reduction pruning is often used for improving branching structure, directing growth, removing branch defects, or decreasing plant size. Focus on cuts that leave the smallest cut diameter to facilitate faster wound recovery. This is a preferred method of reducing risk by shortening branches with large aspect ratios. The density and weight on branches is reduced. Also, reducing branch length using reduction cuts diminishes mass and motion on limbs, helping reduce potential storm damage as well.



This shows how to make a reduction cut to a proper sized lateral branch.

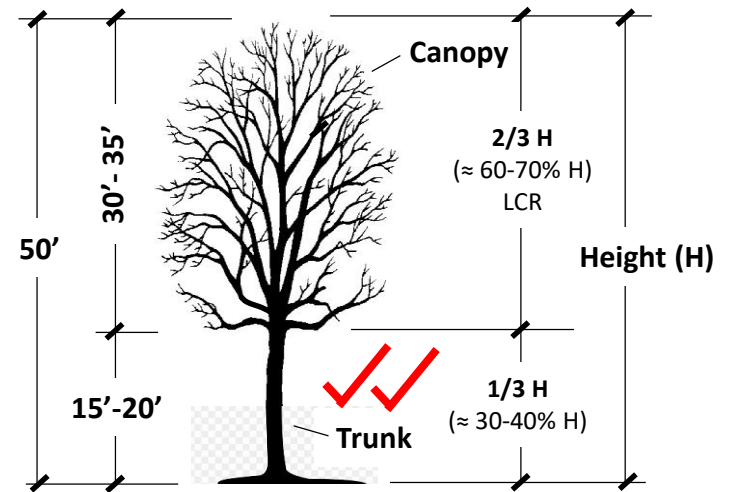
*Removal cuts* eliminate a branch back to the trunk or a primary stem just outside the branch collar or branch bark ridge, if the branch collar cannot be identified. For this pruning cut, the part of the plant that remains must have a larger diameter than the part that was removed. Anything less will not support the branch and will result in decline and dieback. These are much different than reduction cuts. The part of the plant that remains following a removal cut has a larger diameter than the part removed (for example, removing a limb from a trunk to a lateral branch from a larger stem).



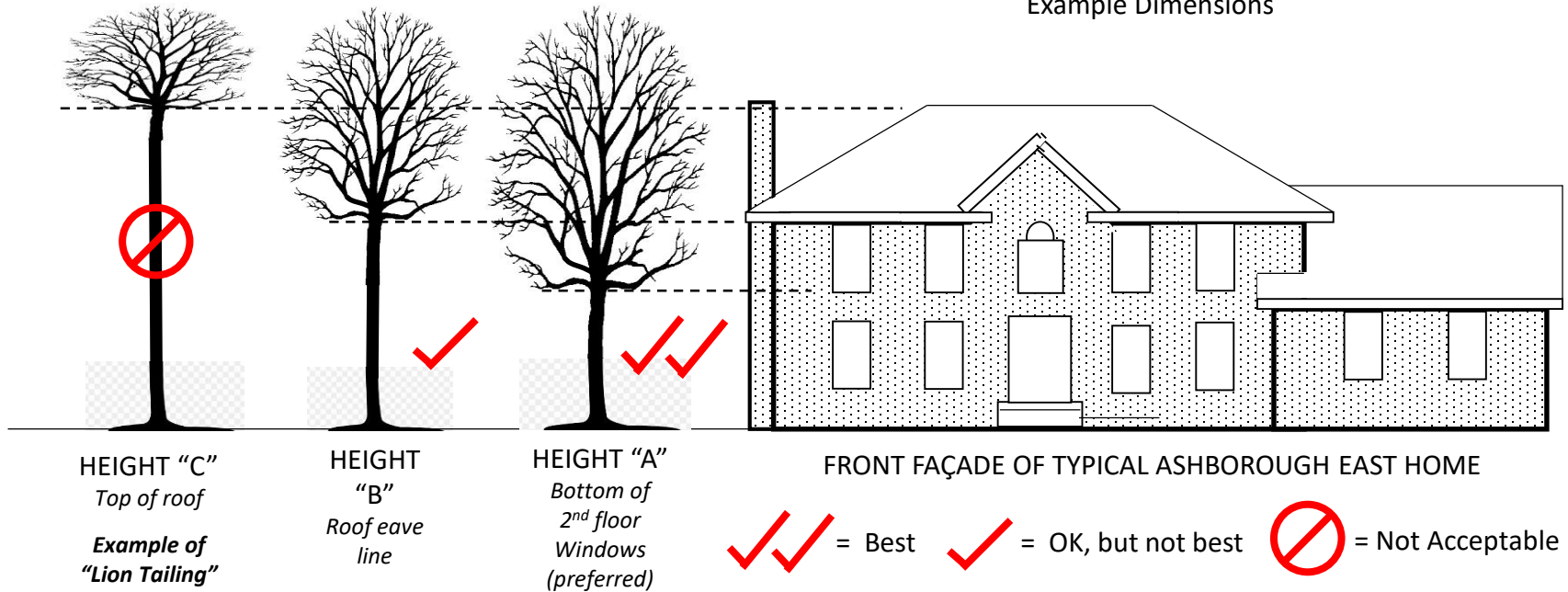
"An important concern in raising the tree canopy (or crown) is the **Live Crown Ratio (LCR)**. The resulting LCR should be greater than 60%. This means that the canopy-to-trunk ratio should be about **two-thirds (2/3) Canopy to one-third (1/3) Trunk**, or the canopy should be at least 60% of the overall height of the tree. Lower than 60% or excessive elevation of branches should be avoided so that trunk taper is not affected adversely. Also, a **low LCR** can result in greater susceptibility to failure during high winds."

from **Tree Pruning Essentials** (FNR-506-W July 2015)  
Purdue University Extension

The practice of "raising the tree canopy" should focus on selective branch thinning throughout the crown and not wholesale lower limb removal.



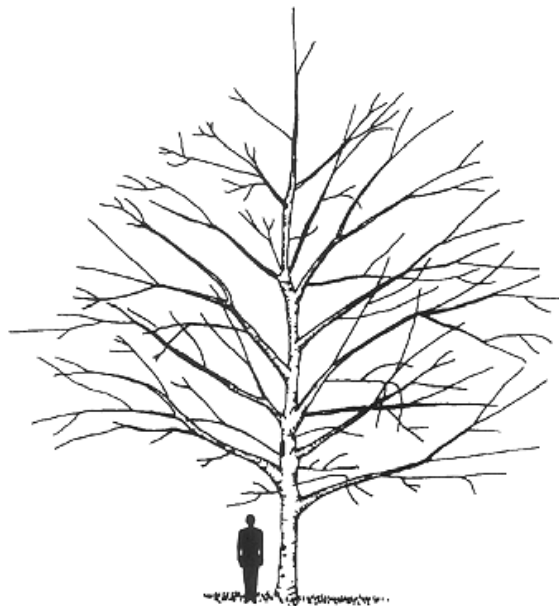
Example Dimensions



## Guidelines for allowable lower branch removal when "raising tree canopy" in Ashborough East

**NOTE:** Raising tree canopy in Ashborough East requires written Architectural Review Board (ARB) approval before work can begin.

## Raising the canopy



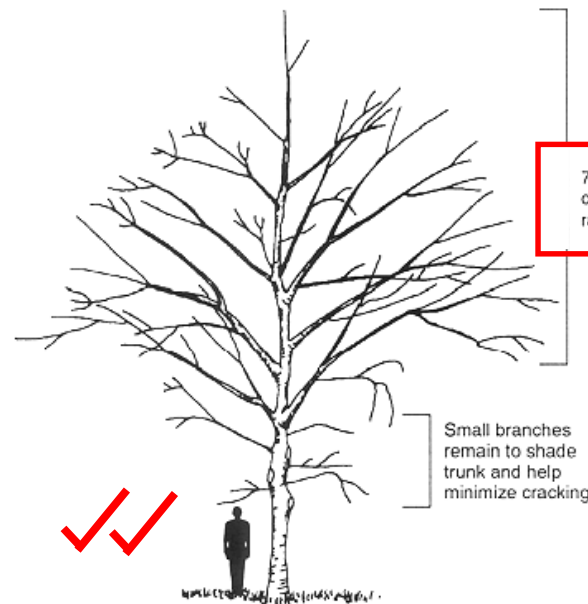
Before pruning



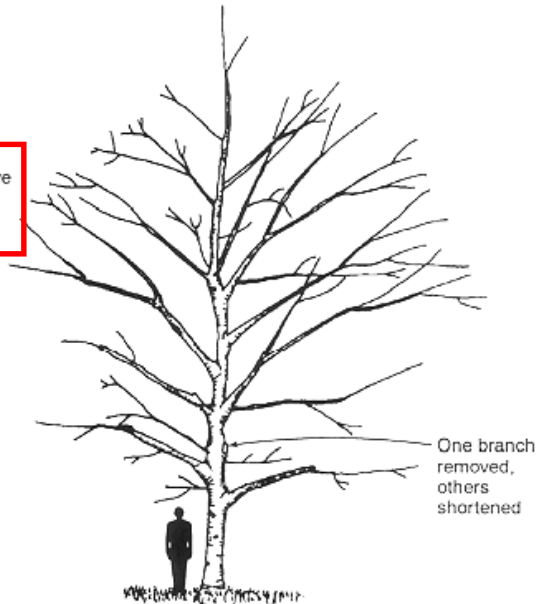
**Not Acceptable**

- Live crown ratio too small
- Trunk cracks can form from too many branches removed at once

Too many branches removed



Properly removing lower branches



Properly thinning and reducing lower branches

Illustrations source:  
***Tree Pruning Essentials***  
 (FNR-506-W July 2015)  
 Purdue University Extension



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## Guidelines for branch removal when “raising tree canopy” in Ashborough East

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