

Reforestation Plan
Fort Campbell Army Garrison
Fort Campbell, Kentucky
2009-2018



Directorate of Public Works
Environmental Division
Forestry Section
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1.0 Introduction

The urban forest is a dynamic ecosystem that is always changing. Without human influence the forest becomes over-mature, unsafe, unhealthy and dies. The environmental and economic benefits are lost to the people who reside at Fort Campbell. In order to maintain the forest canopy, dead and sick trees should be replaced with new trees and proper steps taken for establishment. Many of the problems associated with tree survival can be reduced by planting the right tree in the right space.

1.1 Scope

This plan is to guide the Directorate of Public Works (DPW) with the reforestation of the Cantonment area of Fort Campbell. Planting sites will be selected for new and reestablishment of tree sites. A minimum of 100 trees per year should be planted as recommended in the Urban Forest Management Plan 2008. The sites will be chosen for three types of areas: 1) established canopy areas that need new trees to replace those removed, dead, over-mature, or infected with insects or diseases. 2) sites identified in the tree inventory as tree planting spaces. 3) sites (projects) identified as being able to support mature trees and approved by Master Planning Division.

2.0 Design Guidelines

The 2005 Fort Campbell Installation Design Guidelines have set standards for design in the Cantonment area. Included in these guidelines are recommendations of acceptable planting vegetation (trees, shrubs and ground covers) and design criteria to ensure that buildings and landscape meet Army needs. Acceptable trees and recommended spacing in the landscape are listed in Section 6. Guidelines should be followed as to placement and care of trees. Proper planting and establishment will help ensure that trees grow to maturity and are healthy and safe.

2.1 Proper Planting

Proper planting requires understanding that selected trees should adapt, adjust and thrive in the soil and environmental conditions of the planting site. Native trees have developed to adapt to an area and are often low maintenance. Proper planting also ensures trees are set in the ground in a way that allows roots to absorb nutrients and water from the soil. This enhances the root's ability to take up oxygen throughout the tree's life. Proper planting is making sure that the tree is not growing in a place that will be a visual obstruction of traffic structures, interfere with building structures and infrastructure to a point it may damage property or people; in other words it's putting the "right tree in the right place".

2.2 Establishment

Being proactive and making sure new trees are properly planted is important to the survival of the tree. Trees should receive one inch of water a week for a year to help rejuvenate the growth of the roots. Without this water, trees become stressed and often become infected by insects and diseases that are fatal. Either a landscaping contractor or Garrison personnel should be responsible for supplemental watering of newly planted trees. Another important maintenance practice is removal of stakes. The majority of trees planted properly do not need staking. However, it was found during the 2006 tree inventory that many times trees were planted and staked but the hardware was never removed. As the tree continues to grow, it grows around the guying wire which girdles the young tree, killing it. It is very important that somebody has the responsibility to remove the stakes and any remaining transport protection trunk covering after the first growing season. Otherwise trees will be lost before reaching maturity. Adequate resources are necessary to maintain newly established trees and help ensure their long term survival.

2.3 Maintenance

Once trees are established (1 to 3 years), proactive management is beneficial to the tree and helps reduce the maintenance budget. Routine pruning schedules train the tree for desired shape and proper structure at maturity. Structure pruning should be completed every 3 to 5 years until the tree reaches a mature height and size. This consists of crown cleaning the canopy to help prevent insect and disease infections and removing dead branches or branches with structural problems. Being proactive and beginning structure pruning when trees are young can help reduce damage to trees from decay and storms when trees are mature. Over the life of the tree, maintenance costs are reduced.

3.0 Fort Campbell Family Housing

Fort Campbell Family Housing (FCFH) is very conscientious about tree resources. They have designed new sub-divisions with street trees as well as lot trees. FCFH is the hosting partner with the Arbor Day celebration which is one requirement to receive the Tree City, USA award. These celebrations have focused on neighborhood playgrounds and green spaces. However, FCFH is not budgeting to replace trees in the established housing areas. They are only doing maintenance and removals of existing trees. Under current regulations residents may not plant new trees. This will be a problem over time as trees are removed in the housing areas. With the loss of environmental benefits such as heating and cooling in the winter and summer, storm water interception and pollution absorption, the comfort level of the housing subdivisions may change as well as put more demand on the infrastructure resources of DPW. A change to the current lease agreement to include the replacement of trees at homes should help prevent problems with the lack of tree cover in the future.

4.0 Planting Priorities

In order to insure that the Cantonment has a continued presence of a tree canopy, new trees should be planted in designated areas to enhance the environment of Fort Campbell and add to the morale of its Soldiers, Families, and workers. There are areas that have replacement needs that will improve aesthetics and promote the environmental benefits and cost savings of mature trees. Some of the replacement species chosen are better for the site than what is currently planted on the site and will not cause maintenance problems in the future. For example, along Indiana Ave. at the new 5th Group barracks complex, the ash trees planted are under power lines. These trees will grow 40 to 50 ft. tall and will grow into the lines and cause future maintenance problems. This is an opportunity to select a species that will add to the site without interfering with utility operations. Replacements and new plantings are set as high, medium, and low priorities. This will help guide in the decision process as money is available.

4.1 High Priority

Newly constructed buildings have had a lot of mortality due to the drought of 2007 and all the effects of the drought that may be seen over the next several years. These include the following sites:

- Areas of high concentration of people (Post exchange, area convenience stores, Blanchfield Community Hospital)
- Entrances to the Installation
- Division headquarters
- 160th Barracks and 160th BCT complex
- 5th group Special Forces Barracks
- Sustainment Brigade Complex
- 4th Brigade Complex
- 101st Aviation Brigade Complex

These are the buildings that should be reforested first. Some of the landscape trees may be under warranty and can normally be replaced at no additional cost. Warranty information should be established before plans for replacement are made. The standard is any tree planted more than a year ago or has been replaced once will be out of warranty.



Figure 1. Front of Building 7269 160th BCT complex.



Figure 2. Front of Building 6748 Sustainment BCT complex.

4.2 Medium Priority

Other Brigade Combat Training areas have had problems with insect, disease and mortality and need replacements for those trees.

Areas needing attention are:

- 1st BCT complex
- 2nd BCT complex
- 3rd BCT complex
- Garrison headquarters
- Primary circulation systems

Public areas have lost a lot of trees mostly to insect and diseases and mechanical injury. These areas include:

- Wickham Ave., Kentucky Ave. and Tennessee Ave. – Trees along these streets have also been affected by drought with many of the pine trees along Wickham Ave. dying as well as white poplar on Kentucky Ave.
- Building 32 – The only tree at the building was removed because of Dutch elm disease.
- Fort Campbell Schools – Specifically Marshal Elementary

The Pin Oaks in front of Marshall Elementary have a horned oak wasp epidemic that is slowly killing the trees. These trees need to be replaced a few at a time to reestablish the design, although all of the schools have lost trees, and would benefit from tree replacements.



Figure 3. Pine trees along Wickham Ave.



Figure 4. Horn Gall wasp infected trees at Marshall Elementary.

4.3 Low priority

These areas have mature tree canopy in the landscape and should only receive trees when other priority areas have been reforested. Areas that have low priority reforestation are:

- Parks – Wilkes Park, Eagle Park, Clarksville Base Park, Cole Park, Joe Swing Park
- Green spaces – Gardner Memorial Grove and other semi-improved areas
- Other buildings and areas determined as needing or requesting replacement trees.

5.0 Annual Work Plan

This annual work plan helps determine what sites should be planted with the right tree species. A species list and site plan will be developed for each planting area for the year. Three hundred trees per year should be planted to help replace trees that have died and removed do to construction activities. One hundred and fifty trees should be planted in the spring and 150 planted in the fall. Specifications will be provided to ensure proper planting and follow-up care for each season.

YEAR	ACTIVITY	COMPLETED BY
2009-2012	Identify tree sites for high priority areas.	Forestry personnel
2013-2015	Prepare replacement tree list and plan.	Forestry personnel
2013-2015	Identify tree sites for high and medium priority areas.	Forestry personnel
2013-2015	Prepare replacement tree list and plan.	Forestry personnel
2016-2018	Identify tree sites for medium and low priority areas	Forestry personnel
2016-2018	Prepare replacement tree list and plan.	Forestry personnel

Table 1. Annual work plan activities

6.0 Recommended Tree Species and Spacing

Large Trees

BOTANICAL NAME	COMMON NAME	SPACING (IN FEET)
<i>Acer rubrum</i>	Red maple	40 - 45
<i>Acer saccharum</i>	Sugar maple	40 - 45
<i>Aesculus flava</i>	Yellow buckeye	40 - 45
<i>Carya cordiformis</i>	Bitternut hickory	40 - 45
<i>Celtis occidentalis</i>	Common hackberry	40 - 45
<i>Fagus grandifolia</i>	American beech	40 - 45
<i>Fraxinus americana</i>	White ash *	35 - 40
<i>Fraxinus pennsylvanica</i>	Green ash *	35 - 40
<i>Gleditsia triacanthose inermis c.v.</i>	Thornless honeylocust	40 - 45
<i>Gymnocladus dioicus</i>	Kentucky coffeetree	35 - 40
<i>Liquidambar styraciflua</i>	American sweetgum	35 - 40
<i>Liquidambar styraciflua 'Rotundiloba'</i>	Fruitless sweetgum	35 - 40
<i>Liriodendron tulipifera</i>	Tulip poplar	40 - 45
<i>Platanus occidentalis</i>	Sycamore	40 - 45
<i>Platanus x acerifolia c.v.</i>	London Plane tree	45 - 50
<i>Populus deltoides</i>	Eastern cottonwood	35 - 40
<i>Quercus acutissima</i>	Sawtooth oak	35 - 40
<i>Quercus alba</i>	White oak	45 - 50
<i>Quercus bicolor</i>	Swamp White oak	45 - 50

Large Trees (con't)

BOTANICAL NAME	COMMON NAME	SPACING (IN FEET)
<i>Quercus palustris</i>	Pin oak	40 - 45
<i>Quercus phellos</i>	Willow oak	40 - 45
<i>Quercus rubra</i>	Northern Red oak	40 - 45
<i>Quercus falcata</i>	Southern Red oak	40 - 45
<i>Salix nigra</i>	Black willow	40 - 45
<i>Juniperus virginiana</i>	Eastern redcedar	35 - 40
<i>Taxodium distichum</i>	Baldcypress	35 - 40
<i>Tsuga canadensis</i>	Eastern hemlock	35 - 40
<i>Pinus strobus</i>	Eastern white pine	35 - 40
<i>Ulmus americana</i>	American elm	40 - 45
<i>Thuja occidentalis</i>	American arborvitae	35 - 40

*Limit use of this species due to the threat of Emerald Ash borer.

Medium Trees

BOTANICAL NAME	COMMON NAME	SPACING (IN FEET)
<i>Crataegus phanopyrum</i>	Washington hawthorn	30 - 35
<i>Diospyros virginiana</i>	Persimmon	30 - 35
<i>Morus rubra</i>	Red mulberry	35 - 40
<i>Nyssa sylvatica</i>	Black Gum	25 - 30
<i>Ginkgo biloba</i>	Maidenhair tree or Ginko (male only)	30 - 35
<i>Tilia cordata</i>	Littleleaf linden	30 - 35
<i>Sassafras veriflorium</i>	Sassafras	30 - 35
<i>Zelkova serrata</i>	Green vase zelkova	35 - 40
<i>Ilex opaca</i>	American holly	30 - 35
<i>Magnolia virginiana</i>	Sweet Bay magnolia	30 - 35
<i>Prunus cerasifera</i>	Purpleleaf plum	30 - 35
<i>Prunus sargentii</i>	Sargent cherry	30 - 35
<i>Picea abies</i>	Norway spruce	35 - 40
<i>Pinus echinata</i>	Shortleaf pine	30 - 35
<i>Pinus virginiana</i>	Virginia pine	30 - 35

Small Trees

BOTANICAL NAME	COMMON NAME	SPACING (IN FEET)
<i>Acer ginnala</i>	Amur maple	20 - 25
<i>Amelanchier ssp.</i>	Serviceberry	20 - 25
<i>Cercis canadensis</i>	Eastern redbud	20 - 25
<i>Chionanthus virginicus</i>	Fringe tree	20 - 25
<i>Cotinus coggugria</i>	Smoketree	20 - 25
<i>Cornus florida</i>	Flowering dogwood	20 - 25
<i>Magnolia soulangiana</i>	Saucer magnolia	20 - 25
<i>Magnolia stellata</i>	Star magnolia	20 - 25
<i>Malus floribunda</i>	Flowering crabapple	20 - 25
<i>Prunus x yedoensis</i>	Yoshino cherry	20 - 25