Specifications Manual

Tree and Shrub Planting Guidelines

- Prune codominant leaders
- Prune rubbing or cross branches
- DO NOT stake or wrap trunk unless necessary
- Remove tags and labels
- Cut away all balling ropes
- Remove top of wire basket
- Widen and score hole wall
- Remove container and cut circling roots if container-grown, or as much burlap as possible if field-grown
- Leave solid soil pedestal - do not dig deeper than ball depth
- 2"-3" mulch kept away from trunk
- Soil well to contain water
- UNAMENDED backfill soil
- Partially backfill, water to settle soil, finish backfilling
- Area for water drainage (pipe or tile could be installed)
- Dig hole 2-3 times root ball width

Effective October 16, 2008
# Chesapeake Landscape Specifications Manual

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I. DEFINITIONS.

Buffer Yard – An area designated on a site plan or landscape plan for the purpose of creating a physical and visual buffer as specified in Section 19-610 of the Chesapeake Zoning Ordinance. Buffer yards shall be required depending upon the zoning classification of the site to be developed and the classification of the property adjacent to the site. The different buffer yard arrangements are expressed through the chart set out in Section 19-610. The buffer yard requirements are expressed in that subsection in terms of the width of the buffer yard and the number of plant units required per one hundred (100) linear feet of buffer yard. When structures are required, all shrubs shall be located on the side of the structure facing the less intensively zoned property. Trees, since they provide upper canopy, may be placed on either side of the structure but within the confines of the buffer yard. Buffer yards are required along the entire frontage of the property which is being developed.

A buffer yard may be used for passive recreation with the approval of the City Arborist, provided that no required plant material is deleted. Utility easements shall not be included within buffer yards unless the City Arborist determines that it is not feasible to locate the required plant materials outside of the easement. Buffer yards may be waived or modified by the City Arborist where a site has been specifically designed to minimize the impact through a combination of architectural and landscape techniques.

As set out in Section 19-610, landscape buffering between single-family residential properties and streets and similar right-of-way shall be required only when the rear or secondary front yards of such property border such streets or right-of-way. The buffer yard shall be applicable only when such street or right-of-way has an existing or proposed width of at least eighty (80) feet as determined by the Department of Public Works.

Calculation Area – For the purposes of determining the number of trees to be retained or planted on a site to meet the tree canopy coverage requirement, the area of the site shall not include those areas within the site which constitute tidal or non-tidal wetlands; properties submerged under water; properties subject to easements unrelated to the development of the site; properties preserved or dedicated for future street construction or other public facilities; or similar uses. The developer, at his option, may include, as being part of the area of the site for purposes of determining tree canopy coverage, that area designated as open space under Section 19-700 et seq. of the Zoning Ordinance.

In the case of subdivisions, each individual residential lot shall be considered a separate site under the landscape ordinance and this manual.
Canopy Requirement for All Sites –

1. Non-residential – Ten percent (10%) of the calculation area.

2. Residential zoning for multi-family (R-MF-1, R-MF-2) or townhouse (R-TH-1) use – fifteen percent (15%) of the calculation area.

3. Residential zoning other than for multi-family or townhouse use – twenty percent (20%) of the calculation area; provided that for lots one-half acres in size or larger, no more than eighteen (18) large canopy trees or thirty-six (36) small trees, or combination thereof as approved by the City Arborist in accordance with the Chesapeake Landscape Specifications Manual shall be required per lot. Required trees shall be 6 to 8 feet in height at the time of planting.

4. Chesapeake Bay Preservation Area Canopy – In accordance with Chesapeake City Code Chapter 26-513.

Final Landscaping Plan – A plan, drawn to scale by a landscape designer, which delineates all existing and proposed parking spaces, access aisles, driveways, other vehicle areas, all existing and proposed easements (including, but not limited to, utility easements, drainage easements, access easements, telephone easements, cable easements, and Virginia Power easements), right-of-way dedications and reservations, and all existing and proposed utilities. Such final landscaping plan shall show all tree preservation areas with method of preservation; green spaces and buffer yards; specific location, numbers, and types of all plant materials to be planted; and all vegetation and supporting structures for the buffering to be provided; and where applicable, the landscaping for parking areas.

An approved landscape plan can be amended only with approval of the City Arborist.

Green Space – An unpaved area used exclusively for soil and plant materials. Green space areas shall be a minimum of 150 square feet and a maximum of 1,000 square feet and shall contain uncompacted native soil, deemed suitable by the City Arborist, to a minimum depth of three (3) feet. Compacted or clay soils shall be removed to a minimum depth of three (3) feet from the top of the finished grade and be replaced with rich loam soil or uncompacted native soil.

Landscape Designer – A certified landscape architect, a landscape architect, an individual with two (2) or four (4) year degree in ornamental horticulture, a member of the Virginia Society of Landscape Designers, an arborist certified by the International Society of Arboriculture, or a certified Virginia Nurseryman. A final landscaping plan submitted as part of the building permit application for single-family or duplex residential construction may be prepared by a licensed surveyor or engineer. The name and signature of the person responsible for the landscape design must be shown on the plan.

Outstanding Trees -- State Champion Trees and other healthy trees determined by the City Arborist to be within 25% of the State Champion rating or having a diameter within 25% of the State Champion Tree for the species in question.
Owner – Owner of the real property to be landscaped, including employees, agents, contractors, builders, and all successors thereof.

Plat – A schematic representation of land and, where required, of buildings and other structures, as part of a subdivision or site plan, in conformity with the requirements of the Zoning Ordinance and of Chapter 70 of the Chesapeake City Code.

Preservation Areas – The area within the drip-line of existing vegetation that is to be retained throughout construction on the site. (See Appendix H.) Preservation areas shall be protected in the following manner that is acceptable to the City of Chesapeake.

1. Marking of Limits of Clearing.
   a. Prior to any disturbance of the site, the preservation areas shall be visibly marked.
   b. Roots shall be pruned to a depth of 30 inches at the drip-line of trees designated for retention. (See Appendix F.)
   c. Preservation areas on the approved plans shall not be altered without the approval of the City of Chesapeake.

2. The owner has the option to retain additional vegetation over and above that which is required by the approved plan. However, additional vegetated areas on the site that are to be preserved must be protected, in a manner approved by the City Arborist, from encroachment by construction activity. If a natural area or individual tree not shown on the plans to be preserved is retained on site, then the owner is required to protect these trees the same as designated preservation areas.

3. Protective devices for preservation areas must remain in place during clearing and construction.

4. Protection of Vegetation Retained.
   a. The owner shall be responsible for the protection of tops, trunks, and roots of all existing trees, as well as other vegetation that is to be retained on the site. After vegetation has been removed within the area authorized to be cleared, protective devices shall be installed along the limits of clearing prior to any construction work or traffic taking place within the drip line of the vegetation retained on the site. Tree protection shall be maintained until all work in the vicinity has been completed and shall not be removed without the consent of the City of Chesapeake. If the City Arborist finds that the protective devices are insufficient to protect the vegetation retained on the site, additional protective devices, as required by the City Arborist, shall be installed to insure adequate protection.

   b. Heavy equipment, vehicular traffic, stockpiling of any materials, trenching or deposition of sediment, shall not be permitted within the drip-line of trees to be retained.
c. Trees being removed shall not be felled, pushed or pulled into trees being retained. Equipment operators shall maintain a distance of at least 10 feet from the drip-line of vegetation to be retained.

d. No toxic materials shall be stored within 100 feet of vegetation areas to be retained.

e. Fires shall not be permitted within 100 feet of vegetated areas retained unless approved by the City of Chesapeake. All fires shall be limited in size so as not to adversely affect the vegetation.

f. No protective devices, sign, utility boxes or other objects shall be nailed to the trees to be retained on the site.

5. Devices – Any device may be used which will effectively protect the roots, trunk and top of the trees and other vegetation retained on the site. The less formidable the barrier used, the greater the care that must be taken to avoid inflicting damage. Personnel working in the vicinity of the vegetation area retained must be instructed to honor the protective devices. The devices for protection outlined below are suggested devices only and are not intended to exclude the use of other devices, which will protect the vegetation retained, subject to the approval of the City Arborist. (Appendix F).

a. Snow fence/Hi-vis fence – A standard 48-inch high snow fence may be placed at the limits of grading on posts mounted six feet apart.

b. Filter fabric fence or silt fence – This fencing may be placed at the limits of grading and constructed as specified in Standard 1.15 in the ‘Virginia Erosion and Sediment Control Handbook.’

c. Additional trees – Additional trees may be left standing as protection between the trunks of the trees to be retained and the limits of grading. The trunks of trees in this buffer should be no more than approximately eight feet apart to prevent passage of equipment and material though the buffer. When additional trees are used as protection, the limits of clearing shown on the approved plan shall be flagged in the field so that the additional buffer area is delineated. When this method of protection is used, these additional trees shall be removed prior to completion of the project if required by the City Arborist.
d. Berm – The temporary perimeter dike which has been constructed for erosion and sediment control may double as a protective device for vegetation to be retained. This temporary perimeter dike shall be constructed as specified in Standard 1.15 in the ‘Virginia Erosion and Sediment Control Handbook’ and shall be constructed at the limits of clearing outside the drip line of the trees to be preserved.

**Residential Landscaping Plan** – A plan submitted to the Department of Neighborhood Services upon request for a building permit for a single-family home or duplex. A residential landscaping plan is also required for all residential major subdivisions where rear or secondary front yards abut an existing or proposed right-of-way 80 feet or more in width. The plan should include required tree canopy coverage calculations, tree preservation areas, tree preservation methods and the location of trees to be planted. The plan shall also depict buffer yards and existing and known proposed public and private easements.

**Required Structure** -- A fence, wall or berm to be located within a buffer yard as required by the landscape ordinance. Openings within the barriers may be required by the City of Chesapeake for accessibility to the area.

**Secondary Front Yard** – Any yard having street frontage on a corner lot or through-lot other than the yard which the principal building faces.

**Site Analysis** – A plan drawn by a landscape designer and submitted to the City of Chesapeake, which depicts the natural features present in the site, including, but not limited to existing trees, tree preservation areas, general size and location of trees greater than 18” in diameter that fall within limits of construction, easements, water courses, topography, rare or endangered plant material, and existing structures and utilities located on the site. The site analysis may be presented in narrative format only if, based on site conditions, the City Arborist determines that a narrative site analysis will be sufficient.

A site analysis is required as part of the submittal of each preliminary and final subdivision plan, site plan, or erosion and sediment control plan. The site analysis shall include at the same scale as the development plan:

1. Existing tree line and natural features on the site.
2. Specimen or outstanding trees.
3. A narrative of site conditions.
4. Rare or endangered plant material.
5. Existing structures and utilities located on the site.
6. Tree preservation areas and methods of preservation.

**Tree** – Woody vegetation exceeding 6 feet in height.
Tree Canopy – All areas of coverage by plant material exceeding six feet in height. This applies to trees that exist on a site or trees to be planted.

Tree, Large (LCT) – In Appendix A is a list of residential trees that are classified, for the purposed of the landscape and tree preservation ordinance, as large trees. These trees must be 6 - 8 feet in height for single-family and duplex residential lots, and 1 to 1½ inches in caliper for multi-family and townhouse residential properties. Each large tree provides 400 feet of canopy coverage at maturity. Appendix B provides a list of large canopy trees to be planted in nonresidential areas, street buffer yards and parking lots. These trees must be 1 to 1½ inches in caliber at the time of planting.

Tree Maturity – A calculation of the tree canopy at twenty years from the time of planting.

Tree, Small (SCT) – Appendices A and B each provide a list of trees that are classified, for the purposes of the landscape and tree preservation ordinance, as small trees. These trees must be 6 to 8 feet in height at the time of planting. Each small canopy tree provides 200 square feet of canopy coverage at maturity.

Zoning Intensity – The relative intensity of zoning classifications as they result in buffer yard requirements as set forth in Section 19-610 of the Zoning Ordinance, Table of Required Buffer Yards.

II. LANDSCAPE AND TREE PRESERVATION REVIEW PROCEDURES.


1. A site analysis plan and preliminary landscaping plan shall be submitted to the City of Chesapeake as part of every multifamily and commercial preliminary site plan.

2. The preliminary landscaping plan shall show proposed green space, buffers, landscape areas and existing and known proposed public and private easements. This information shall also be included on the preliminary site plan.

3. A final landscaping plan shall be submitted as part of every final site plan for every multifamily and commercial development.

4. Three copies of the final landscaping plan shall be submitted to the City of Chesapeake for review and approval prior to final site plan approval by the Public Works Department.

5. The final landscaping plan shall include all information included on the final site plan, as well as the location of existing and known proposed utilities and utility easement; location of plant material; a plant list including common name, botanical name, size and spacing of plants; tree preservation areas and preservation methods; and any other treatments such as mulch, seed or sod.
6. The final landscaping plan shall be reviewed and comments will be given to the applicant. If required, the revised final landscaping plan shall be reviewed upon resubmittal and the Public Works Department and Department of Neighborhood Services shall be notified upon approval.

7. Prior to the issuance of a Certificate of Occupancy by the Department of Neighborhood Services, a field inspection, requested by the owner, must be conducted by the City Arborist to determine that materials have been installed in accordance with the approved landscaping plan.

8. If the materials have been installed to the specifications found on the approved landscaping plan and in this manual, the Department of Neighborhood Services will be notified and, assuming all other inspections have been completed, the Certificate of Occupancy may be issued. If landscaping is delayed due to certain circumstances referenced in the Zoning Ordinance, a temporary Certificate of Occupancy may be issued.

B. Preliminary Subdivision and Residential Landscaping Plan Approval Procedures:

1. A site analysis plan and a preliminary landscaping plan shall be submitted to the City of Chesapeake with every preliminary subdivision plat for residential major subdivisions where rear or secondary front yards abut an existing or proposed right-of-way 80 feet or more in width.

2. The preliminary landscaping plan shall depict the approximate location of the trees to be retained, trees to be planted, a detailed plant list, specifications for preservation and planting of required trees, buffer yards, green space and existing and known proposed public and private easements.

3. a. Final Landscaping Plan

A final landscaping plan for residential development shall be submitted as part of the building permit application for a single-family or two-family residence and as part of any final subdivision plan for a residential major subdivision where rear or secondary front yards abut an existing or proposed right-of-way 80 feet or more in width.

b. Single Family Residential Landscape Plan

Each single family site plan must have tree canopy calculation data in accordance with the templates provided below. Failure to include this data will delay issuance of the building permit and certificate of occupancy.

Please note that the calculation percentage is different for CBPA (Chesapeake Bay Preservation Area) sites and for non-CBPA sites. Determining whether your site is in the CBPA overlay can be accomplished by consulting the CBPA planner, or by reviewing the CBPA map available on the City’s web site.
Non-CBPA Site Residential Tree Canopy Landscape Plan

Lot Size _________SF  X 20% = _________SF Canopy Required

Canopy Credit: 400 SF For Large Canopy (LCT) and 200 SF For Small Canopy Trees (SCT)

Canopy Provided _________SF_ (# LCT And # SCT X SSF of Credit)

A maximum of 18 LCT only for lots 36,000 square feet or larger.

Total Canopy Provided Must Meet or Exceed Canopy Required

CBPA Site Residential Tree Canopy Plan (50% For RPA, 20% For RMA)

Canopy Credit: 400 SF For Large Canopy (LCT) and 200 SF For Small Canopy Trees (SCT)

Lot Size ________ SF X (50 or 20%) = ________ SF Canopy Required

Canopy Provided= # LCT X 400 + # SCT X 200 ________SF

Total Canopy Provided Must Meet or Exceed Canopy Required.

4. Buffer yards required as part of a final subdivision plan for residential major subdivisions shall be depicted on the final subdivision plat to be recorded in the Clerk’s Office of the Circuit Court. The plat shall contain a note stating that no structures are permitted in the buffer yards and that all plant materials therein are to be maintained.

5. Single Family Site Plan Template

a. A standard template shall be provided on the single family site plan when applying for a building permit. The information on this template must be completed and appear on the site plan. A building permit will not be issued without the required information.

b. Samples of the templates are provided below. Please note that the calculation data is different for CBPA (Chesapeake Bay Preservation Area) and for non-CBPA. The information on the site plan should appear in the same order as on the template.

c. Any questions regarding canopy requirements should be directed to the City Arborist.
d. Sample templates (400SF credit for large canopy trees (LCT), 200 sf credit for small canopy trees (SCT):

1. NON-CBPA TREE CANOPY LANDSCAPE PLAN

   LOT SIZE-----------------------------------SF
   CALCULATION AREA------------------SF
   CALCULATION AREA X 20% = SF CANOPY REQUIRED
   CANOPY PROVIDED (# OF LCT /SCT X SF OF CREDIT) = ------SF

2. CBPA TREE CANOPY LANDSCAPE PLAN

   LOT SIZE-----------------------------------SF
   RPA SF X 50% = CANOPY REQUIRED----------SF
   RMA SF X 20% = CANOPY REQUIRED----------SF
   RPA + RMA = TOTAL CANOPY REQUIRED -------SF
   CBPA CANOPY PROVIDED (# OF LCT/SCT X SF OF CREDIT =-SF


e. As required in Sec 19-602, of the required tree canopy, one large, or two small canopy trees shall be planted in the front yard of each residential lot for residential districts allowing ten or fewer dwellings per acre.

6. Upon approval of the residential landscaping plan by the City Arborist, the Department of Neighborhood Services may issue a building permit for the residential lot or lots shown on the approved plan.

7. If trees indicated on the landscaping plan for preservation are found to be severely damaged, as determined by the City Arborist, the City of Chesapeake will require replacement in order to meet the canopy coverage calculations as set forth in the landscape ordinance prior to the issuance of a final Certificate of Occupancy.

### III. TREE PRESERVATION.

#### A. Stresses of Construction

Construction activities expose trees to a variety of stresses resulting in injury ranging from superficial wounds to death. An understanding of these stresses is helpful in planning for tree preservation.

1. Surface Impacts.

   Natural and man-related forces exerted on the tree above the ground can cause significant damage.

   a. Wind damage – Removal of some trees from groups will expose the survivors to greater wind velocities. Trees tend to develop
anchorage where it is most needed. Isolated trees develop anchorage rather equally all around, with stronger root development on the side of prevailing winds. The more a tree is protected from the wind, the less secure is its anchorage. The result of improper thinning or clearing is often wind thrown trees.

b. Excessive pruning – Unprotected trees are often “topped” or carelessly pruned to prevent interference with utility wires or buildings. When too many branches are cut, the tree may not be able to sustain itself. Pruning should be done with consideration of growth habit and using proper techniques to reduce opportunities for decay. If the branches are not pruned correctly, decay may occur. (See Appendix D.)

c. Trunk damage – Tree trunks are often nicked or scarred during construction. Superficial wounds provide access to insects and disease. Bark wounds shall be treated to reduce these problems. (See Appendix D.)

2. Root Zone Impacts

a. Raising the grade as little as four inches can retard the normal exchange of air and roots may suffocate due to lack of oxygen, or be damaged by toxic gasses and chemicals released by soil bacteria.

b. Raising or lowering the grade may affect the water table.

c. Deep fills and relatively impervious fills may retard the normal exchange of soil gases and air to such a degree that root mortality occurs.

d. Shallow fill over heavy turf or thick leaf litter can cause root mortality.

e. Shallow cuts of five to eight inches will remove most of the top soil, natural mulch and ground vegetation, removing some feeder roots and exposing the rest to drying and freezing.

f. Deep cuts may sever a large portion of the root system, depriving the tree access to nutrients and reducing essential anchor roots.

g. Trenching is often necessary to facilitate the installation of utility lines the construction of buildings, driveways, walkways, curbing and guttering. Trenching or excavation through a tree’s root zone can eliminate much of the root system. Trees suffering such damage usually die within two to five years.
h. Tunneling usually causes less disturbance and mortality of the root system and where pipe can be driven under a tree’s root system, the physiological impact is lessened considerably.

i. Compaction of the soil within the drip-line of a tree by equipment operation, materials storage, or paving can block off air and water from roots.

j. Construction chemicals or refuse disposed of in the soil can change soil chemistry to be toxic to trees.

B. Site Planning for Tree Protection

1. If the lot size allows, trees to be saved should be selected prior to siting the building. No tree should be destroyed or damaged in any manner until the design of buildings and utility systems are final.

2. Critical areas such as steep slopes, and wetlands, should be left in their natural condition or only partially developed as open space.

3. Roadways are to be located where they would cause the least damage to valuable stands. The original contours should be followed, where feasible, to minimize cuts and fills.

4. Trenching should be minimized, where possible, by locating several utilities in the same trench. Excavations for utilities shall be located outside the drip line of trees which are to be preserved to meet canopy requirements, proffers or stipulations.

5. Construction material storage areas, construction entrances, and worker parking shall be noted on the site plan, and located where they will not impact trees to be retained.

6. When retaining existing trees in parking areas, enough ground around the tree should be left to allow for its survival or grass pavers should be used to allow air and moisture to reach the tree roots.

C. Guide for Selection of Trees to Be Retained

1. Grading – Consideration must be given to the proximity of proposed grading to the trees and other vegetation retained. Mechanical grading shall not take place within the drip-line of trees retained unless approved by the City Arborist.

2. Tolerance to Sudden Exposure – Consideration should be given to the tolerance of the trees and other vegetation to the new environmental conditions such as increased direct sunlight, increased radiant heat from proposed buildings and pavement, and increased exposure to wind. Trees with a strong tap or fibrous root system should be given propriety over those with a weak root system.
3. Water Table – Consideration should be given to the effect of grading on the water table and its accompanying effect on trees and other vegetation retained. Grades that are lowered will cause the water table to drop which will reduce the ground water available to the vegetation.

4. Outstanding Specimens – Trees and other vegetation of impressive size or shape, of historical significance, or rare species shall be preserved if possible.

5. Appearance – Trees with a well developed crown should generally be given preference over those with misshapen crowns or trunks, those with a small crown at the top of a tall trunk or those with narrow, V-shaped crotches. Trees grown in the open usually possess better form than those which are grown in the woods.

6. Wildlife Value – The retention of trees and other vegetation is desirable to provide a good source of food, cover and nesting sites for wildlife. Example: Oaks, Hickories, and Dogwoods have a high food value.

7. Other Vegetation – Consideration should be given to other vegetation growing in the immediate area. Examples: Virginia Pine, which would not be of particular value if growing with hardwoods, would increase in value if this were the only species present on the site, trees which have been standing alone are of higher value than those in a wooded situation.

8. Health and Disease Susceptibility – Trees should be checked for scarring caused by fire or lightening, insect or disease damage, and rotted or broken trunks or limbs. Pest and pollution resistant trees are preferred when considered for retention.

9. Clusters – Where trees to be retained are growing in clusters in their natural state, retaining these clusters may improve survival.

10. Age – Potential life span should be evaluated based on preceding factors and genetic potential.

IV. GUIDE FOR SELECTION OF TREES TO BE PLANTED.

A. Proposed Development

The mature height and spread of the trees shall be considered to ensure that they will not interfere with the proposed structures and overhead utilities. The root development characteristics shall be considered to ensure that they will not cause interference with walls, walks, drives, patios, and other paved surfaces or affect water and sewer line, septic systems or underground drainage systems.

B. Proposed Use

The proposed use of the developed area shall be considered. Trees which exhibit a tolerance to air pollution should be selected if a large amount of air pollution will be present. Trees which are suitable for buffering or screening
should be selected if noise or objectionable views are going to be a problem. (Evergreens provide more effective buffering and screening than deciduous trees). Trees should be selected which can tolerate de-icing salts if there is a chance these will be used.

C. Landfills

The proximity to landfills should be considered. Generated gases can travel underground for a considerable distance to kill trees by displacement of oxygen.

D. Life Span

Preference should be given to trees with long life spans.

E. Resistance to Disease and Insects

Trees that are known to be resistant to attacks by disease or insects should be given preference to those known to be susceptible.

F. Aesthetic Value

Consideration should be given to flowering habits, autumn foliage, bark and crown characteristics, and type of fruit.

V. STANDARDS FOR FIELD PRACTICE.

A. Grade Changes

1. Lowering Grade – Grade cuts of 5 inches or more which, in the determination of the City of Chesapeake, are harmful to trees, shall be reduced or eliminated within the drip-line of trees to be retained by the construction of a tree wall. (See Appendix G.) Once grade has been lowered, the wall shall be constructed within two weeks.

a. Roots should be pruned to a depth of 30" prior to excavation. When excavating, all tree roots that are exposed and/or damaged should be trimmed cleanly, and covered temporarily with moist peat moss, burlap or other suitable material to keep them from drying out.

b. Tree walls should be constructed in accordance with Tree Wall Detail. In some cases a building permit may be required.

c. The backfill should consist of top soil to retain moisture and aid root development.

d. Fertilizer should be applied according to Virginia Cooperative Extension Publication 430-018 (1999), entitled “Fertilizing Landscape Trees and Shrubs.”
e. Pruning shall be conducted in accordance with ANSI standards and recommendations.

f. A means for drainage through the wall should be provided so water will not accumulate behind the wall. Weep holes should be provided with a solid masonry wall.

2. Raising Grade – When fill of four inches or more is necessary within the drip-line of a tree to be retained, a tree well may be required and should be installed prior to any filling. The following method should be used to ensure survival of the tree.

a. Before making a fill, the green vegetation, sod, leaf litter and other organic matter from beneath the tree should be removed and the surface soil loosened without damaging the roots.

b. Fertilizer should be applied according to Virginia Cooperative Extension Publication 430-018 (1999), entitled “Fertilizing Landscape Trees and Shrubs.”

c. The dry well, should be constructed so as to allow for tree trunk growth. Clearance for a younger tree should be greater than that for an older tree.

d. The well should be built high enough to bring the top just above the level of the proposed fill.

e. The well should be constructed of large stones, brick, building tile, concrete blocks, or cinder blocks with care being taken to ensure that ample openings are left through the wall of the well to allow for free movement of air and water. Mortar should be used only near the top of the well and only above the porous fill. Well construction should be in substantial compliance with Appendix I.

f. One or more drain lines should begin at the lowest point inside the well and extend down and outward from the tree trunk. Additional drain lines should also radiate out from the well wall with vertical tiles and/or pipes being used if fills over two feet are contemplated.

g. Tar paper or approved equivalent should be placed over the tile and/or pipe joints to prevent clogging and large stones and should be placed around and over the drain tiles and/or pipes for protection.

h. Filling shall be completed by hand with porous soil such as top soil until the desired grade is reached.

i. To prevent clogging of the drain lines, crushed stone shall be placed inside the dry well over the openings of the radial tiles.
Vertical tiles shall also be filled with crushed rock and may also be covered with a screen.

j. The area between the trunk and the well wall may either be covered by an iron grate or filled with a 50-50 mixture of crushed charcoal and sand, if desired for safety or vector control.

B. Trenching and Tunneling

1. If in the determination of the City Arborist, a tree or group of trees shown to be preserved on the approved plans is of significant value or importance, the City of Chesapeake may determine whether trenching or tunneling is required when working within the drip line of these trees.

2. Trenching shall be done outside the drip line of the tree unless otherwise approved by the City Arborist so as to reduce the amount of root area damaged or killed by trenching activities and to preserve trees to meet canopy requirements, or proffers and stipulations.

3. Tunneling shall be conducted in accordance with accepted horticultural techniques.

4. The avoidance of large roots or root concentrations may be accomplished by curving the trench or by tunneling under large roots in areas that do not have a large tap root.

5. Roots should not be left exposed to the air. The ends of damaged and cut roots should be cut off smoothly and covered with soil or protected and kept moistened with wet burlap or peat moss until the trench can be filled.

6. Trenches and tunnels shall be filled as soon as possible. Air spaces in the soil should be avoided by carefully filling. When it is necessary that trenches be left open for purposes of inspection of utilities, the inspection should be scheduled as soon as possible after opening of the tunnel or trench.

7. The tree should be mulched and fertilized to conserve moisture and stimulate new root growth and enhance general tree vigor. Fertilize according to Virginia Cooperative Extension Publication 430-018 (1999), entitled “Fertilizing Landscape Trees and Shrubs.”

8. If a significant amount of root system has been damaged or killed, pruning should be minimized to stimulate root regeneration.

C. Dead or Dying Trees

1. In the event any tree or portion thereof which is dead or dying due to construction or environmental changes brought about by construction and/or clearing poses a hazard to either life or property, the permittee may be required to take such action as requested by the City Arborist to eliminate the hazard.
2. Trees which are removed by the permittee should be cut down to within 2 inches of the final grade.

3. If a stump created by the removal of a hazardous tree is determined by the City Arborist to pose a hazard then the stump should be removed by acceptable means in conjunction with the removal of the tree.

4. If any trees shown on the approved plan to be saved are dead or dying due to acts of negligence by the permittee, they should be removed and replaced if they contribute to the required canopy.

D. Pruning

1. All pruning of branches should be done according to proper American National Standards Institute recommendations. (See Appendix D).

2. Crepe myrtles or other trees shall not be “topped.” Any trees “topped” rather than pruned according to the American National Standards Institute (ANSI) will be required to be removed and replaced.

E. Repair of Damage

1. Any damage to the crown, trunk or root system of trees retained on the site shall be repaired immediately.

2. Branches – All damaged branches shall be cut off cleanly. (See Appendix D).

3. Bark – All jagged bark wounds shall be cut clean immediately by making all edges smooth and rounding the wounds at the top and the bottom. (See Appendix D). In the event that callous growth has already started to grow, it should not be removed when trimming the wound.

4. Roots – Damaged roots shall be cut off cleanly behind the damage and covered with topsoil immediately.

VI. PLANTING.

A. Substitutions

The trees and shrubs that are planted shall be of the species and size specified on the approved plans unless a written request for the substitutions have been submitted and approved by the City Arborist prior to planting. Undesirable substitutions (See Appendix C) that have been planted without prior approval by the City of Chesapeake may be required to be removed and replaced with acceptable species.

B. Material

1. Trees and shrubs shall be nursery grown unless otherwise approved and be healthy and vigorous plants, free from defects, decay, disfiguring roots,
sun scald, injuries, abrasions of the bark, plant diseases, insect pest eggs, borer
ers and all forms of infestations of objectionable disfigurements as determined by the City Arborist. Plants shall be in accordance with the current American Association of Nurserymen’s standards and conform in general to representative species.

2. Balled and burlapped trees and shrubs should be dug with firm, natural balls of earth of adequate size as specified by the American Association of Nurserymen, “American Standard for Nursery Stock,” with the balls securely wrapped.

3. Container grown stock should have grown in a container long enough for the root system to have developed sufficiently to hold its soil together.

4. All plant material shall meet the following specifications at the time of planting.

a. Shrubs used for low screening shall be a minimum of 18 to 24 inches in height shall comply with American Nursery Standards.

b. Small canopy trees (SCT) used for landscaping or canopy cover calculations shall be a minimum of 6 to 8 feet in height at planting and shall comply with American Nursery Standards.

c. Large canopy trees (LCT) used for landscaping or tree canopy cover calculation shall be a minimum of 6 to 8 feet in height for single-family and duplex residential lots and 1 to 1½ inches caliper for nonresidential, street buffer yards, parking lots and multi-family and townhouse residential developments at planting and shall comply with American Nursery Standards.
5. Calculating Canopy Coverage – The formula for calculating tree replanting for canopy coverage required by ordinance is as follows:

\[ \frac{A \times B}{C} = D \]

A) Percentage of site requiring coverage as set forth by the zoning ordinance. (10, 15, or 20% for non-CBPA; 50 or 20% for CBPA; 10 or 20% for CBPA/IDA)

B) Calculation area as set forth in the Definitions section of the Chesapeake Landscape Specifications Manual, expressed in square feet.

C) a. Divide AxB by 400 to obtain (D), the number of large canopy trees (LCT) required.

   b. Divide AxB by 200 to obtain (D), the number of small canopy trees (SCT) required.

D) Number of large or small canopy trees to be provided. Any number .5 or higher is rounded off to the next highest number.

When using varying sizes of trees, the total square footage of new canopy provided must equal the required percentage of the site calculation area.

Large canopy trees (See Appendices A and B) shall be 6 – 8 feet in height for single-family and duplex residential lots and 1 to 1½ inches caliper for nonresidential, street buffer yards and parking lots, and multifamily and townhouse residential at planting and will count for 400 square feet of canopy coverage.

Small canopy trees shall be 6 – 8 feet tall at planting and will count for 200 square feet of canopy coverage.

An example of canopy coverage calculation requirements for single-family and duplex residential lots, is as follows:

<table>
<thead>
<tr>
<th>Lot Size</th>
<th>Large Canopy Tree</th>
<th>Large Canopy Tree</th>
<th>Large Canopy Tree</th>
<th>Large Canopy Tree</th>
<th>Large Canopy Tree</th>
<th>Large Canopy Tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot Size</td>
<td>5,000</td>
<td>10,000</td>
<td>12,000</td>
<td>15,000</td>
<td>20,000</td>
<td>36,000 +</td>
</tr>
<tr>
<td>Large Canopy Tree</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>18 maximum</td>
</tr>
<tr>
<td>Small Canopy Tree</td>
<td>6</td>
<td>10</td>
<td>12</td>
<td>16</td>
<td>20</td>
<td>36 maximum</td>
</tr>
</tbody>
</table>

Combinations of large and small canopy trees may be utilized to achieve the required coverage. Trees not listed under Appendix A or B must be approved by the City Arborist. Specific lot canopy requirements will vary somewhat depending on the actual calculation areas.
C. Delivery and Temporary Storage

1. Plants shall be protected during delivery.

2. Trees and shrubs shall be planted as soon as possible. The owner shall protect unplanted trees by keeping them in shade, well protected with soil, mulch or other acceptable material and should keep trees well watered.

D. Planting

1. All trees and shrubs shall be planted in such a manner as to ensure their survival. This shall include the planting of intact balls, planting at the proper depth, properly backfilling and watering, and construction of a planting saucer. See example in Appendix E.

2. Any rope or wire binding the ball shall be cut prior to the conclusion of backfilling operations to prevent girdling of the tree trunk.

3. If a non-biodegradable material is used around the ball, it shall be completely removed prior to backfilling.

4. Prior to installation, the roots of container grown stock shall be separated or split to ensure proper root development.

5. The following planting seasons are recommended:

   Evergreen Shrubbery              September through May
   Deciduous Shrubbery & Trees      Oct 15 through April 15
   Evergreen Trees                 November 14 through March 31

E. Guying and Staking

Trees shall be guyed or staked to keep them in a vertical position only if planted on a windy site, on a hill, or under other such conditions which, in the opinion of the City Arborist, warrant staking. See Appendix E.

F. Mulching

1. All trees and shrubs should be properly mulched after planting, to a minimum depth of 2 inches, with an appropriate mulch such as pine bark, pine needles, or shredded bark.

2. Mulch should cover the entire plant saucer.

G. Fertilization

Fertilization shall be conducted in accordance with the Virginia Cooperative Extension Publication 430-018 (1989), entitled “Fertilizing Landscape Trees and Shrubs.”
VII. REFORESTATION GUIDELINES

When reforestation is proposed, whether it is for uplands or for riparian buffers in non-tidal wetlands as in the Chesapeake Bay Preservation Area (CBPA) Resource Protection Area (RPA), a standard policy has been established. This policy follows guidance from the Virginia Department of Forestry, and the Chesapeake Bay Local Assistance Department’s Riparian Buffer guidance Manual.

The reforestation shall be depicted on a landscape plan that is a scale drawing, showing area to be planted, along with a plant list which includes species, size, number, and packaging.

1. The basic density of plantings is 300 large canopy trees per acre. This is approximately 12’ on center. In order to provide the desired diversity and flexibility in a reforestation project, the following guidelines are provided:
   a. The plant list must show a diversity of no more than 20% of any single species of tree. (For example, 10 Live Oaks, 10 Willow Oaks, 10 Loblolly Pines, 10 Bald Cypress, 10 Black Gum, out of a 50 tree requirement).
   b. 10 shrubs may be substituted for one large canopy tree.
   c. 2 small canopy trees (Dogwood, Red Bud, etc.) may be substituted for one large canopy tree.
   d. At least one third of the reforestation should be evergreen.
   e. At least two thirds of the reforestation must be large canopy trees.

2. Minimum size of required trees is 6-8’.

3. Minimum size of required shrubs is 18-24” or 3 gallon size.

4. The entire reforestation area should be covered with 2-4” of organic mulch. This will help retain moisture and provide a beneficial environment for the reforestation.

5. For reforesting empty lots within subdivisions and along right of ways, see the Reforestation Supplementary Guidelines on page 2.

6. Criteria for reforesting empty residential lots along right of ways.
   a. Utilize the reforestation guidelines on page one.
   b. The area between curb and sidewalk, and a 10’ wide buffer adjacent to the sidewalk (away from the street) shall be kept mowed and clear in accordance with Chesapeake City Code 62-2.
   c. Reforestation by seedlings, (1-3’ tall) as opposed to 6-8’ saplings as described on page one is permitted with the following criteria:
      i. Density and diversity must be as described on page 1.
ii. Establishment of an annual monitoring plan to ensure that the required density is maintained.

7. All reforestation areas are to be clearly marked with “Reforestation/No Mow” signage at 50’ intervals (see sample below minimum dimensions are 8"X 4"). Where there is no sidewalk, the signage is to be installed at the edge of the right of way easement. These signs must be visible and be maintained until trees reach an average of 6’ height. Failure to maintain these signs could result in action by the city to have the area mowed per City Code 62-2.

REFORESTATION AREA
NO MOWING NO DUMPING
III. WAIVERS.

Section 19-606 of the Landscape Ordinance allows waivers and modifications to planting, preservation, buffer yard and green space requirements upon the satisfaction of specific criteria and upon the joint approval of the City Arborist and the Planning Director or designee.

It is the further intent of City Council that no substantial waiver or modification be granted under Section 19-606 of the Landscape Ordinance without first consulting with two members of the Planning Commission appointed by the Chairman to serve on the landscape review committee.

Whether a waiver or modification is deemed “substantial” shall be determined jointly by the City Arborist and the Planning Director or designee using the following criteria:

1. Any decrease in buffer yards by two or more categories (e.g., reduction of Buffer Yard E to Buffer Yard C) or the elimination of a buffer yard shall be deemed substantial.

2. The elimination of any required structure (e.g. fence or wall) from a buffer yard shall be deemed substantial.

3. The elimination of a green space at the end of a row of parking spaces containing 7 or more spaces shall be deemed substantial.

4. Any waiver or modification which will affect buffer yards, green spaces, planting requirements or preservation requirements referenced in or governed by a proffer or stipulation shall be deemed substantial.

5. Any other changes deemed substantial by the City Arborist or Planning Director given the totality of the circumstances.

In no event shall any waiver or modification be made in derogation of, or in contravention to, a proffer or stipulation.
### APPENDIX A
**SMALL CANOPY RESIDENTIAL TREES**
6' to 8' at Planting
Canopy Cover 200 Square Feet

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acer buergerianum</td>
<td>Trident Maple</td>
</tr>
<tr>
<td>Acer campestre</td>
<td>Hedge Maple</td>
</tr>
<tr>
<td>Acer griseum</td>
<td>Paperbark Maple</td>
</tr>
<tr>
<td>Amelanchier canadensis</td>
<td>Serviceberry</td>
</tr>
<tr>
<td>Betula nigra (dwarf cultivar)</td>
<td>River Birch (dwarf)</td>
</tr>
<tr>
<td>Carpinus betulus</td>
<td>American Hornbeam</td>
</tr>
<tr>
<td>Carpinus caroliniana</td>
<td>American Hornbeam/musclewood</td>
</tr>
<tr>
<td>Cercis canadensis</td>
<td>Redbud</td>
</tr>
<tr>
<td>Chionanthus virginicus</td>
<td>White Fringe Tree</td>
</tr>
<tr>
<td>Cornus florida</td>
<td>Flowering Dogwood</td>
</tr>
<tr>
<td>Cornus kousa</td>
<td>Kousa Dogwood</td>
</tr>
<tr>
<td>Cornus mas</td>
<td>Cornelian Cherry</td>
</tr>
<tr>
<td>Crataegus phaenopyrum</td>
<td>Washington Hawthorn</td>
</tr>
<tr>
<td>Halesia tetraptera</td>
<td>Carolina Silverbell</td>
</tr>
<tr>
<td>Ilex opaca</td>
<td>American Holly</td>
</tr>
<tr>
<td>Koelreuteria paniculata</td>
<td>Goldenraintree</td>
</tr>
<tr>
<td>Lagerstroemia spp</td>
<td>Crape Myrtle (all species and cultivars except Dwarf and Semi-Dwarf)</td>
</tr>
<tr>
<td>Magnolia x soulangiana</td>
<td>Saucer Magnolia</td>
</tr>
<tr>
<td>Magnolia stellata</td>
<td>Star Magnolia</td>
</tr>
<tr>
<td>Magnolia virginiana</td>
<td>Sweet Bay Magnolia</td>
</tr>
<tr>
<td>Malus spp</td>
<td>Flowering Crabapple (all species &amp; cultivars)</td>
</tr>
<tr>
<td>Ostrya virginiana</td>
<td>American Hophornbeam/Ironwood</td>
</tr>
<tr>
<td>Oxydendrum arboretum</td>
<td>Sourwood</td>
</tr>
<tr>
<td>Pinus nigra</td>
<td>Australian Pine</td>
</tr>
<tr>
<td>Prunus serrulata</td>
<td>Japanese Flowering Cherry (all cultivars)</td>
</tr>
<tr>
<td>Prunus subhirtella var. pendula</td>
<td>Weeping Cherry</td>
</tr>
<tr>
<td>Prunus x yedoensis</td>
<td>Yoshino Cherry (all cultivars)</td>
</tr>
<tr>
<td>Pyrus calleryana ‘Aristocrat’</td>
<td>Approved Callery Pear Cultivars</td>
</tr>
<tr>
<td>Quercus acuta</td>
<td>Japanese Evergreen Oak</td>
</tr>
<tr>
<td>Quercus robur ‘Fastigiata’</td>
<td>Columnar English Oak</td>
</tr>
<tr>
<td>Sophora japonica</td>
<td>Japanese Pagoda Tree (all cultivars)</td>
</tr>
<tr>
<td>Stewartia monadelpha</td>
<td>Tall Stewartia</td>
</tr>
<tr>
<td>Styrax japonicus</td>
<td>Japanese Snowbell Tree</td>
</tr>
</tbody>
</table>
**APPENDIX A**

**LARGE CANOPY RESIDENTIAL TREES**

6 to 8 Feet at planting for Single-Family & Duplex Residential Lots

And 1 to 1½ Inches Caliper at planting for Multi-Family & Townhouse Residential

Canopy Cover 400 Square Feet

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acer rubrum</td>
<td>All cultivars*</td>
</tr>
<tr>
<td>Betula nigra</td>
<td>River Birch</td>
</tr>
<tr>
<td>Celtis (all species)</td>
<td>Hackberry</td>
</tr>
<tr>
<td>Cercidiphyllum japonicum</td>
<td>Katsuratree</td>
</tr>
<tr>
<td>Ginkgo biloba</td>
<td>Ginkgo (male variety – ‘Maidenhair’)</td>
</tr>
<tr>
<td>Juniperus virginiana</td>
<td>Eastern Red Cedar</td>
</tr>
<tr>
<td>Liriodendron tulipifera</td>
<td>Tulip Poplar</td>
</tr>
<tr>
<td>Magnolia grandiflora</td>
<td>Southern Magnolia</td>
</tr>
<tr>
<td>Metasequoia glyptostroboide</td>
<td>Dawn Redwood</td>
</tr>
<tr>
<td>Nyssa sylvatica</td>
<td>Black Gum</td>
</tr>
<tr>
<td>Pinus elliottii</td>
<td>Slash Pine</td>
</tr>
<tr>
<td>Pinus taeda</td>
<td>Loblolly Pine</td>
</tr>
<tr>
<td>Pistacia chinensis</td>
<td>Chinese Pistache</td>
</tr>
<tr>
<td>Platanus x acerifolia ‘Bloodgood’</td>
<td>‘Bloodgood’ London Planetree</td>
</tr>
<tr>
<td>Platanus occidentalis</td>
<td>Sycamore</td>
</tr>
<tr>
<td>Quercus acutissima</td>
<td>Sawtooth Oak</td>
</tr>
<tr>
<td>Quercus alba</td>
<td>White Oak</td>
</tr>
<tr>
<td>Quercus bicolor</td>
<td>Swamp White Oak</td>
</tr>
<tr>
<td>Quercus coccinea</td>
<td>Scarlet Oak</td>
</tr>
<tr>
<td>Quercus hemisphaerica “Darlington”</td>
<td>Darlington Oak</td>
</tr>
<tr>
<td>Quercus macrocarpa</td>
<td>Bur Oak</td>
</tr>
<tr>
<td>Quercus nigra</td>
<td>Water Oak (favors moist soil)</td>
</tr>
<tr>
<td>Quercus phellos</td>
<td>Willow Oak</td>
</tr>
<tr>
<td>Quercus prinus</td>
<td>Chestnut Oak</td>
</tr>
<tr>
<td>Quercus robur</td>
<td>English Oak</td>
</tr>
<tr>
<td>Quercus robur ‘Fastigiata’</td>
<td>Columnar English Oak</td>
</tr>
<tr>
<td>Quercus velutina</td>
<td>Black Oak</td>
</tr>
<tr>
<td>Quercus virginiana</td>
<td>Live Oak</td>
</tr>
<tr>
<td>Taxodium distichum</td>
<td>Bald Cypress</td>
</tr>
<tr>
<td>Ulmus parvifolia</td>
<td>Chinese Elm</td>
</tr>
<tr>
<td>Zelkova serrata</td>
<td>Japanese Zelkova</td>
</tr>
<tr>
<td>Zelkova serrata ‘Village Green’</td>
<td>‘Village Green’ Zelkova</td>
</tr>
</tbody>
</table>

* Subject to gloomy scale infestation, bores
**APPENDIX B**

**NON-RESIDENTIAL, STREET BUFFER YARD AND PARKING LOT TREES**

**SMALL CANOPY TREES***

6 to 8 Feet Tall at Planting

Maximum Spacing 30 Feet

Canopy Cover 200 Square Feet

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acer buergerianum</td>
<td>Trident Maple</td>
</tr>
<tr>
<td>Acer griseum</td>
<td>Paperbark Maple</td>
</tr>
<tr>
<td>Betula nigra (dwarf cultivars)</td>
<td>River Birch (dwarf)</td>
</tr>
<tr>
<td>Cornus kousa</td>
<td>Kousa Dogwood</td>
</tr>
<tr>
<td>Crataegus phaenopyrum</td>
<td>Washington Hawthorn (large thorns)</td>
</tr>
<tr>
<td>Crataegus spp</td>
<td>Hawthorn</td>
</tr>
<tr>
<td>Koelreuteria paniculata</td>
<td>Goldenraintree</td>
</tr>
<tr>
<td>Lagerstroemia spp</td>
<td>Crape Myrtle (all species and cultivars except Dwarf and Semi-Dwarf)</td>
</tr>
<tr>
<td>Oxydendrum arboreum</td>
<td>Sourwood</td>
</tr>
<tr>
<td>Prunus serrulata</td>
<td>Japanese Flowering Cherry (all cultivars)</td>
</tr>
<tr>
<td>Prunus x yedoensis</td>
<td>Yoshino Cherry (all cultivars)</td>
</tr>
<tr>
<td>Quercus acuta</td>
<td>Japanese Evergreen Oak</td>
</tr>
<tr>
<td>Quercus robur ‘Fastigiata’</td>
<td>Columnar English Oak</td>
</tr>
<tr>
<td>Sophora japonica</td>
<td>Japanese Pagoda Tree (all cultivars)</td>
</tr>
</tbody>
</table>

* Small trees may be used in parking lots only in extenuating circumstances subject to the approval of the City Arborist
## APPENDIX B

### NONRESIDENTIAL, STREET BUFFER YARD AND PARKING LOT TREES

#### LARGE CANOPY TREES

1 to 1½ Inches Caliper at Planting  
Maximum Spacing 60 Feet  
Canopy Cover 400 Square Feet

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Betula nigra</td>
<td>River Birch</td>
</tr>
<tr>
<td>Celtis (all species)</td>
<td>Hackberry</td>
</tr>
<tr>
<td>Cercidiphyllum japonicum</td>
<td>Katsuratree</td>
</tr>
<tr>
<td>Ginkgo biloba</td>
<td>Ginkgo (male variety – ‘Maidenhair’)</td>
</tr>
<tr>
<td>Juniperus virginiana</td>
<td>Eastern Red Cedar</td>
</tr>
<tr>
<td>Metasequoia glyptostroboides</td>
<td>Dawn Redwood</td>
</tr>
<tr>
<td>Nyssa sylvatica</td>
<td>Black Gum</td>
</tr>
<tr>
<td>Pistacia chinensis</td>
<td>Chinese Pistasche</td>
</tr>
<tr>
<td>Platanus acerifolia “Bloodgood”</td>
<td>“Bloodgood” London Planetree</td>
</tr>
<tr>
<td>Quercus acutissima</td>
<td>Sawtooth Oak</td>
</tr>
<tr>
<td>Quercus bicolor</td>
<td>Swamp White Oak</td>
</tr>
<tr>
<td>Quercus coccinea</td>
<td>Scarlet Oak</td>
</tr>
<tr>
<td>Quercus hemisphaerica “Darlington”</td>
<td>Darlington Oak</td>
</tr>
<tr>
<td>Quercus macrocarpa</td>
<td>Bur Oak</td>
</tr>
<tr>
<td>Quercus nigra</td>
<td>Water Oak (favors moist soil)</td>
</tr>
<tr>
<td>Quercus phellos</td>
<td>Willow Oak</td>
</tr>
<tr>
<td>Quercus prinus</td>
<td>Chestnut Oak</td>
</tr>
<tr>
<td>Quercus robur</td>
<td>English Oak</td>
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<tr>
<td>Quercus velutina</td>
<td>Black Oak</td>
</tr>
<tr>
<td>Quercus virginiana</td>
<td>Live Oak</td>
</tr>
<tr>
<td>Taxodium distichum</td>
<td>Bald Cypress</td>
</tr>
<tr>
<td>Ulmus parvifolia</td>
<td>Chinese Elm</td>
</tr>
<tr>
<td>Zelkova serrata “Green Vase”</td>
<td>“Green Vase” Zelkova</td>
</tr>
<tr>
<td>Zelkova serrata “Village Green”</td>
<td>“Village Green” Zelkova</td>
</tr>
<tr>
<td>Botanical Name</td>
<td>Common Name</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Acer negundo</td>
<td>Box Elder</td>
</tr>
<tr>
<td>Acer rubrum</td>
<td>Red Maple</td>
</tr>
<tr>
<td>Acer saccharinum</td>
<td>Silver Maple</td>
</tr>
<tr>
<td>Ailanthus altissima</td>
<td>Tree of Heaven</td>
</tr>
<tr>
<td>Albizia julibrissin</td>
<td>Mimosa</td>
</tr>
<tr>
<td>Betula papyrifera</td>
<td>Paper Birch</td>
</tr>
<tr>
<td>Catalpa bigonioides</td>
<td>Southern Catalpa</td>
</tr>
<tr>
<td>Cedrus deodora*</td>
<td>Deodora Cedar</td>
</tr>
<tr>
<td>Fraxinus pennsylvanica</td>
<td>Green Ash</td>
</tr>
<tr>
<td>Ginkgo biloba</td>
<td>Ginko (female plant)</td>
</tr>
<tr>
<td>Laburnum anagyroides</td>
<td>Golden Chain Tree</td>
</tr>
<tr>
<td>Magnolia grandiflora*</td>
<td>Southern Magnolia1</td>
</tr>
<tr>
<td>Melia azedarach</td>
<td>Chinaberry</td>
</tr>
<tr>
<td>Morus species</td>
<td>Mulberries</td>
</tr>
<tr>
<td>Paulownia tomentosa</td>
<td>Empress Tree</td>
</tr>
<tr>
<td>Pinus sylvestris</td>
<td>Scotch Pine</td>
</tr>
<tr>
<td>Pinus thunbergi*</td>
<td>Japanese Black Pine</td>
</tr>
<tr>
<td>Populus alba</td>
<td>White or Silver Poplar</td>
</tr>
<tr>
<td>Populus deltoids</td>
<td>Eastern Cottonwood</td>
</tr>
<tr>
<td>Populus nigra</td>
<td>Lombardy Poplar</td>
</tr>
<tr>
<td>Prunus serotina</td>
<td>Black Cherry</td>
</tr>
<tr>
<td>Pyrus calleryana 'Bradford'*</td>
<td>Bradford Pear</td>
</tr>
<tr>
<td>Salix</td>
<td>Willow</td>
</tr>
<tr>
<td>Ulmus Americana</td>
<td>American Elm</td>
</tr>
<tr>
<td>Ulmus pumila</td>
<td>Siberian Elm</td>
</tr>
</tbody>
</table>

*Undesirable as a street tree only.
APPENDIX D-1

PRUNING DAMAGED BRANCHES

Figure 1 - Removing a large lateral branch requires two preliminary cuts before the final cut.

Figure 2 - When cutting back to a lateral, bisect the angle between the branch bark ridge and an imaginary line perpendicular to the leader or the branch being removed.

Figure 3 - When removing a branch with a narrow branch attachment, cut from the bottom upward.
APPENDIX D-2

WOUND REPAIR

When scribing wounds, figure 1, make rounded, shallow cuts, figure 2. Do NOT use wound dressing.
APPENDIX E

Tree and Shrub Planting Guidelines

Bonnie Lee Appleton and Susan French

Plant and Site Selection

Select trees and shrubs well-adapted to conditions of individual planting sites. Poorly-sited plants are doomed from the start, no matter how carefully they’re planted.

Test soil drainage before planting. Dig a test hole as deep as your planting hole and fill with water. If water drains at a rate of less than one inch per hour, consider installing drainage to carry water away from the planting hole base, or moving or raising the planting site (berm construction).

Also consider using more water-tolerant species. For trees, try red maple, sycamore, bald cypress, willow oak, or river birch. For shrubs, try inkberry, redtwig dogwood and buttonbush. Avoid dogwoods, azaleas, boxwoods, Japanese hollies, and other plants that don’t like “wet feet” where drainage is poor.

Examine soil for compaction before planting. If soils are compacted, consider replacement with a good loam soil, or incorporation of several inches of an organic material such as composted yard waste to a depth of at least 8 inches over the entire planting area. Do not incorporate small quantities of sand - compaction will increase and drainage decrease.

Site Preparation

Dig shallow planting holes two to three times as wide as the root ball. Wide, shallow holes encourage horizontal root growth that trees and shrubs naturally produce.

In well-drained soil, dig holes as deep as the root ball. In poorly-drained heavy clay soil, dig holes one to two inches shallower than the root ball. Cover the exposed root ball top with mulch.

Don’t dig holes deeper than root balls or put loose soil beneath roots because loose soil will compact over time, leaving trees and shrubs planted too deep. Widen holes near the soil surface where most root growth occurs. Score walls of machine-dug (auger, backhoe) holes to prevent glazing.

Backfill holes with existing unamended soil. Do not incorporate organic matter such as peatmoss into backfill for individual planting holes. Differences in soil pore sizes will be created causing problems with water movement and root growth between the root ball, planting hole, and surrounding soil.

Backfill half the soil, then water thoroughly to settle out air pockets. Finish backfilling, then water again. Cover any exposed root ball tops with mulch.

Incorporate slow-release granular fertilizers into backfill soil to provide nitrogen, or if a soil test indicates a need for phosphorus or potassium. Avoid using fast-release agronomic fertilizers that can dehydrate tree roots. Use no more than 1# actual nitrogen per 1,000 sq ft of planting hole surface. (Example - if using 18-6-12 with a 5’ diameter hole, incorporate 0.3 oz per planting hole.)

Tree and Shrub Preparation

Closely inspect the wrapping around root balls of B&B (balled and burlapped) trees and shrubs. Growers use many synthetic materials, as well as burlap treated to retard degradation, to wrap root balls. Many of these materials will not degrade. To insure root growth into surrounding soil, remove pinning nails or rope facing, then cut away or drop the wrapping material to the bottom of the planting hole, backfilling over it.

Wire baskets used to protect root balls degrade very slowly underground. Remove the top 8-12 inches of wire to keep equipment from getting caught in wire loops, and surface roots from girdling.

Remove all rope, whether jute or nylon, from trunks. Again, degradation is slow or nonexistent, and ropes can girdle trunks and roots.

Remove plastic containers from container-grown trees and shrubs. For plants in fiber pots, break away the top or remove the pot entirely. Many fiber pots are coated to extend their shelf life, but this slows degradation below ground and retards root extension.

If roots are circling around the root ball exterior, cut through the roots in a few places. Cutting helps prevent circling roots from eventually girdling the trunk. Select trees grown in containers with vertical ribs or a
copper-treatment on the interior container wall. These container modifications and treatments minimize circling root formation.

**Tree Care After Planting**

- Remove tags and labels from trees and shrubs to prevent girdling branches and trunks.
- Good follow-up watering helps promote root growth. Drip irrigation systems and water reservoir devices can facilitate watering.
- Mulch, but don’t over-mulch newly planted trees and shrubs. Two to three inches of mulch is best - less if a fine material, more if coarse. Use either organic mulches (shredded or chipped, pine bark, pine straw, composts) or inorganic mulches (volcanic and river rocks).
- Keep mulch from touching tree trunks and shrub stems. This prevents disease and rodent problems if using organic mulches, and bark abrasion if using inorganic mulches.
- Don’t use black plastic beneath mulch around trees and shrubs because it blocks air and water exchange. For added weed control, use landscape fabrics that resist weed root penetration. Apply only one to two inches of mulch atop fabrics to prevent weeds from growing in the mulch.

Only stake trees with large crowns, or those situated on windy sites or where people may push them over. Stake for a maximum of one year. Allow trees a slight amount of flex rather than holding them rigidly in place. Use guying or attaching material that won’t damage the bark. To prevent trunk girdling, remove all guying material after one year.

**Most trees should not have their trunks wrapped.** Wrapping often increases insect, disease, and water damage to trunks. Thin-barked trees planted in spring or summer into hot or paved areas may benefit from wrapping if a white wrap is used. To avoid trunk girdling, do not attach wraps with wire, nylon rope, plastic ties, or electrical tape. If wraps must be used, remove within one year.

For protection against animal or equipment damage, install guards to protect the trunk. Be sure the guards are loose-fitting and permit air circulation.
APPENDIX F-1

CONSTRUCTION RELATIVE TO THE LOCATION OF PROTECTED TREES

- Drip Line
- Protective Device
- Limits of Clearing no grading
- Proposed Grading
- 3 Times Diameter of Tree, Minimum
- Root Pruning
APPENDIX F-2

TREE PROTECTION BARRIERS

- **Wood Fence**
  - Drip line / undisturbed area
  - 4x4 posts
  - 2x4 rails

- **Sand / Snow Fence**
  - Drip line / undisturbed area
  - Metal fence posts or 4x4 posts

- **Post and Wire Fence**
  - Drip line / undisturbed area
  - 4x4 posts

- **Plastic Safety Fence**
  - Drip line / undisturbed area
  - Metal fence posts or 4x4 posts
APPENDIX G

SAMPLE RETENTION WALL

Drip Line

Original Grade

New Grade

Line of Minimum Excavation for Wall Construction (Drip Line)

Topsoil Backfill

Gravel fill if wall is more than 2' high

Taper Wall 1%/foot

Tile Drain

30" Minimum

Tree Wall Detail

Roots Penetrating Beyond the Wall Location Should Be Bridged
APPENDIX H

TYPICAL CRITICAL ROOT ZONE

Drip Line

Critical Root Radius

Critical Root Zone Within the Drip Line

Actual Feeder Root System Extends Well Beyond the Drip Line
APPENDIX I

TREE WELL DETAIL

diagram showing tree well details with labeled components:
- Triad
- Fill with Stone
- Fill with Sand & Crushed Charcoal
- Trip Line
- Fill with Soil
- Filter Fabric
- Small Stone
- Large Stone
- Tar Paper
- Tile Drain