TREE PRESERVATION AND REPLACEMENT POLICY

CITY OF SHOREWOOD

I. **Purpose.** It is the policy of the City of Shorewood to recognize and preserve existing natural resources of the community. In its effort to maintain the wooded character of the area, the City finds that trees provide numerous benefits including, but not limited to: stabilization of the soil by the prevention of erosion and sedimentation, reduction of storm water runoff, improvement of air quality, reduction of noise pollution, control of urban heat island effect, protection and increase of property values, protection of privacy, energy conservation through natural insulation, providing habitat for birds and other wildlife and conservation and enhancement of the city's physical and aesthetic environment.

The purpose of this policy is to preserve and protect significant trees or stands of trees whose loss due to land disturbances associated with the process of development or construction would adversely affect the character of neighborhoods, subdivisions, public or semipublic projects and commercial developments. This policy also recognizes that, despite the best efforts of the City and property owners, trees may occasionally be lost in the development or construction process. In those cases tree replacement or reforestation shall be required.

II. **Applicability.** This policy shall apply to any person or entity that would disturb land areas and impact significant trees or stands of trees in neighborhoods, subdivisions, commercial building developments, public and semipublic projects such as streets, utilities and parks whether disturbed by a public agency or private developer; except when the City Council may waive these requirements where there would be greater public need for the project than to meet the requirements of this policy. The terms and provisions of this Policy, in conjunction with the Shorewood Tree Preservation Ordinance No. 324, shall apply to all activity which requires the issuance of a Land Disturbance Permit.

III. **Definitions.** All words in this Policy have their customary dictionary definition except as specifically defined herein. The word "shall" is mandatory and the words "should" and "may" are permissive. Technical terms used in this Policy are defined in Appendix A.

Buildable Area: The portion of a lot which is not located within any minimum required yard, landscape strip/area, or buffer; that portion of a lot wherein a building may be located, as prescribed by the Shorewood Zoning Code.

Caliper: The American Association of Nurserymen standard for trunk measurement of nursery stock, whereby the diameter of the trunk is measured 6 inches above ground for stock up to 4 inches in caliper size.

DBH (Diameter-at-Breast-Height): A standard measure of tree size, whereby a tree trunk diameter is measured in inches at a height of four and one-half feet (4 1/2') above

ground. If a tree splits into multiple trunks below four and one-half feet (4 1/2'), then the trunk is measured at its most narrow point beneath the split.

Dripline: A vertical line extending from the outer surface of a tree's branch tips down to the ground.

Land Disturbance Permit: An official authorization issued by the Zoning Administrator, allowing defoliation or alteration of the site for the commencement of any construction.

Protection Zone: All lands that fall outside the buildable area of a parcel.

Significant Trees: Any healthy long-lived hardwood deciduous tree measuring eight inches (8") DBH or greater; any healthy softwood deciduous tree measuring twelve inches (12") DBH or greater; or any healthy coniferous tree measuring eight feet (8') or more in height. Box-elder, cottonwood, and willow trees shall not be considered to be significant trees.

Specimen Tree or Stand: Any tree or grouping of trees which has been determined to be of a high value by the Zoning Administrator because of its species, size, age, or other professional criteria.

Structure: Anything which is built, constructed or erected; an edifice or building of any kind or any piece of work artificially built up or composed of parts jointed together in some definite manner whether temporary or permanent in character.

Tree: Any self supporting woody plant, usually having a single woody trunk, and a potential DBH of two inches (2") or more.

Tree Preservation Plan: A plan established in Section IV(B) of this Policy. See Appendices B and C.

Zoning Administrator: The agent of the City of Shorewood having the primary responsibilities of administration and enforcement of this Policy.

IV. **Procedures**

A. Development Standards. Developments shall be designed to preserve large trees where such preservation would not affect the public health, safety or welfare. The City may prohibit removal of all or part of a stand of trees. In addition, nothing in this policy shall prevent building on an existing lot of record, provided that such building shall be designed to save as many trees as possible. This decision shall be based on, but not limited to, the following criteria:

1. Size of trees.

2. Species, health and attractiveness of the trees including:

a. Sensitivity to disease
b. Life span
c. Nuisance characteristics
d. Sensitivity to grading

3. Potential for transplanting.

4. Need for thinning a stand of trees.

5. Effect on the functioning of a development.

B. Land Disturbance Permit.

1. A tree survey, prepared by a registered land surveyor or landscape architect, shall be submitted showing size, species and location of significant trees.

2. A Tree Preservation Plan shall be submitted with the following:

a. Preliminary plat for the subdivision of property.
b. Other permit drawings as a part of the building permit process for the construction of new principal buildings.
c. Nonresidential site plans, either as a separate drawing or as part of the landscape plan.

3. The Tree Preservation Plan shall be certified by a forester, arborist, or registered landscape architect and shall include the following information:

a. Identification of spatial limits:

(1) Limits of land disturbance, clearing, grading and trenching
(2) Tree protection zones
(3) Specimen trees or stands of trees
(4) Location of significant trees which will be saved
(5) Location of significant trees which will be removed
(6) Location of trees to be transplanted
(7) Location of replacement trees

b. Detail drawings of tree protection measures as provided for in Section VI. of this Policy (where applicable):

(1) Protective tree fencing
(2) Tree protection signs

c. Drawings indicating location of applicable utilities:

(1) City water or well
(2) City sewer
(3) Electricity
(4) Gas
(5) Cable TV
(6) Telephone

4. These plans shall be reviewed by the Zoning Administrator for conformance with this Policy, in conjunction with the Shorewood Tree Preservation Ordinance No. 324, and will either be approved, or returned for revisions. Reasons for denial shall be noted on the Tree Preservation Plan, or otherwise stated in writing.

5. Issuance of the Land Disturbance Permit is contingent upon approval of preliminary plats, or metes and bounds subdivision approval for the subdivision of property, or approval of the Tree Preservation Plan for other building permit processes or nonresidential site plans.

6. A fee as provided in Chapter 1302 of the City Code shall be charged for review of Tree Preservation Plans. Any costs incurred by the City in reviewing plans for plats and nonresidential site plans shall be charged to the developer. The Zoning Administrator may submit the plan to a consulting forester for a recommendation, the costs of which shall be paid by the developer or builder.

7. All tree protection measures shall be installed prior to beginning building construction and inspected by the Zoning Administrator or his agent.

8. The Zoning Administrator or his agent will conduct follow-up site inspections for enforcement of this Policy, in conjunction with the Shorewood Tree Preservation Ordinance No. 324.

9. If any significant tree in a development or on a building site is cut, damaged, or the area within the tree's dripline has been encroached upon by grading equipment, without City authorization, the City shall require replacement pursuant to 10. below. In addition, if the City determines that a damaged tree will probably not survive, it shall be removed by the developer or builder.

10. Except as provided in IV.13. of this Policy, all significant trees removed or damaged during the process of land development or construction activities shall be replaced on site. The removal of trees on public right-of-way, conducted by or on behalf of a

governmental agency in pursuance of its lawful activities or functions, shall be exempt from this replacement.

a. Any trees required to be planted shall be varied in species, shall maximize the use of species native to the area, shall not include any species under disease epidemic, and shall be hardy under local conditions.

b. Tree Replacement Ratio.

(1) Significant deciduous trees eight inches (8") DBH or greater shall be replaced by two (2), three (3) inch caliper or greater deciduous trees or two, six-foot (6') high coniferous trees.

(2) Significant deciduous trees twelve inches (12") DBH or greater shall be replaced by three (3), three (3) inch caliper or greater deciduous trees or three (3), six-foot (6') high coniferous trees.

(3) Significant coniferous trees six feet (6') high or greater shall be replaced by one (1) six-foot (6') high or greater coniferous tree.

(4) Significant coniferous trees twelve feet (12') high or greater shall be replaced by two (2) six-foot (6') high or greater coniferous trees.

(5) In no case will the total number of replacement trees exceed eight (8) trees per acre.

c. Before any construction takes place, tree protection measures as set forth in VI.B. of this Policy shall be placed around tree protection zones and around the driplines of significant trees to be preserved. Signs shall be placed along fence lines prohibiting grading beyond the fence line.

d. Any trees required to be planted shall be replaced if they die or appear to be dying within two (2) full growing seasons of planting by the person responsible for the planting.

e. Replacement trees shall be of a similar species to the trees which are lost or removed and shall include those species shown on the following list:

Deciduous Trees

Green Ash - *Fraxinus pennsylvanica*
Mountain Ash - *Sorbus spp.*
River Birch - *Betula nigra*
Kentucky Coffeetree - *Gymnocladus dioicus*
Amur Corktree - *Phellodendron amurense*
Flowering Crabapple - *Malus spp.*
Ginkgo (male only) - *Ginkgo biloba*
Hackberry - *Celtis occidentalis*
Hawthorn - *Crataegus spp.*
Shagbark Hickory - *Carya ovata*
Honeylocust - *Gleditsia Hatriacanthos*
Ironwood - *Ostrya virginiana*
Japanese Tree Lilac - *Syringa amurensis japonica*
American Linden - *Tilia americana*
Littleleaf Linden - *Tilia cordata*
Redmond Linden - *Tilia americana 'Redmond'*
Black Locust - *Robinia psuedoacacia*
Amur Maple - *acer ginnala*
Norway Maple - *Acer platanoides*
Red Maple - *Acer rubrum*
Silver Queen Maple (seedless) - *Acer saccharinum 'Silver Queen'*
Sugar Maple - *acer saccharum*
Northern Catalpa - *Catalpa speciosi*
Bur Oak - *Quercus macrocarpa*
Pin Oak - *Quereus palustris*
Red Oak - *Quercus rubra*
Swamp White Oak - *Quercus bicolor*
White Oak - *Quercus alba*
Ohio Buckeye - *Aesculus glabra*
Russian Olive - *Eleagnus angustifolia*
Black Walnut - *Juglans nigra*

Conifers

American Arborvitae - *Thuja occidentalis*
Balsam Fir - *Abies balsamea*
Douglas Fir - *Pseudotsuga menziesii*
White Fir - *Abies concolor*
Canadian Hemlock - *Tsuga canadensis*
European Larch - *Larix decidua*
Austrian Pine - *Pinus nigra*
Norway Pine - *Pinus resinosa*
Red Pine - *Pinus resinosa*
Scotch Pine - *Pinus sylvestris*
White Pine - *Pinus strobus*
Black Hills Spruce - *Picea glauca densata*
Colorado Spruce - *Picea pungens*
Norway Spruce - *Picea abies*
White Spruce - *Picea glauca*
Tamarack - *Larix laricina*

11. Financial Guarantee - Subdividers.

a. Subdividers shall provide a financial guarantee as part of the development contract to ensure replacement of significant trees lost in the development process. The amount of the financial guarantee shall be determined by the Zoning Administrator, based upon estimates made by the subdivider's registered landscape architect or actual bids prepared by a certified nurseryman. This shall be a

separate line item in the development contract and shall be the basis for a development contract where the lack of public improvements would otherwise not require a contract.

This financial guarantee shall be held for at least two (2) full growing seasons beyond the date of installation of the last replacement tree or beyond the last date of site activity that may impact tree survival.

b. In addition to a. above subdividers shall provide a financial guarantee as part of the development contract to ensure protection of all significant trees to be saved. For each mass graded lot with at least one (1) significant tree to be saved and each custom graded lot with at least one (1) significant tree, the subdivider shall pay a fee as established in Chapter 1302 of the Shorewood City Code.

This financial guarantee will be released upon 1) certification in writing by the subdivider's forester, arborist, or landscape architect indicating that tree protection measures were installed on mass graded lots and tree replacement is completed, if necessary and/or 2) the builders have posted security for the custom graded lots.

12. Financial Guarantee - Builders.

a. Homebuilders shall provide a financial guarantee as part of the building permit application to ensure protection of all significant trees to be saved. For all lots with at least one (1) significant tree to be saved the builder shall provide a letter of credit or cash escrow as established by Chapter 1302 of the City Code.

b. Prior to the issuance of a certificate of occupancy or release of the tree protection guarantee, the builder's forester, arborist, or landscape architect shall certify to the City in writing that all the tree protection measures identified on the tree preservation plan were installed from the start of construction to the end of construction and tree replacement is completed, if necessary.

c. The Building Official will monitor the tree protection measures at the time of routine inspections.

d. Builders are liable for subcontractors which destroy or damage significant trees which were indicated to be saved on the individual lot tree preservation plan.

13. Tree Replacement Fund.

a. In cases where it can be demonstrated that a construction site can not accommodate additional trees, a builder or developer may place replacement trees on public property at the direction of the Zoning Administrator. The City shall maintain a list of public properties where replacement trees may be planted.

b. As an alternative to placing trees on public property, the City may require a builder or developer to contribute to a City tree replacement fund. This fund shall be used solely for the purpose of planting trees on public property. The Zoning Administrator shall annually establish a fee schedule for replacement trees, based upon market conditions.

V. Tree & Site Related Disturbances.

A. Tree protection zones, specimen trees or stands of trees designated to be saved must be protected from the following damages which may occur during all phases of land disturbance and construction processes. Methods of tree protection and disturbance prevention are provided in Section VI.

1. Direct physical root damage

2. Indirect root damage

3. Trunk and crown disturbance

B. Direct physical root damage most frequently occurs during site clearing and grading operations, where transport or feeder roots are cut, torn, or removed.

1. Transport and feeder roots tend to tangle and fuse among the roots of adjacent trees. The removal of trees with heavy machinery along the outer periphery of a tree save area causes root damage.

2. The most substantial form of root damage for all root types occurs in the form of cut roots. Roots are cut in grade reduction, or from trenching for underground utilities, sanitary sewer, or storm sewer lines.

3. A more subtle type of root damage is the loss of feeder roots. Feeder roots normally occur within the organic layer, and the surface four inches (4”) of top soil, subsequently, these roots can be easily damaged by the track action from a single bulldozer pass.

The stripping of top soil within a tree's critical root zone can totally eliminate its feeder root system.

C. Indirect root damage through site modification can result from positive grade changes, temporary storage of fill material, the sedimentation of erosion materials, soil compaction, and soil chemical changes.

1. Positive grade changes from fill and sedimentation causes a decrease in soil oxygen levels. An increase in soil carbon dioxide and other toxic gases can also occur, leading to large areas of anaerobic conditions. Anaerobic soil conditions cause a decrease in the root respiration process which is essential for the uptake and transport of minerals and nutrients.

2. Anaerobic soil conditions are also produced by soil compaction, the increase in soil bulk density with a decrease in soil spore space. Compacted soil is also impervious to root penetration, and thus inhibits root development. Soil compaction is generally caused by the weight and vibrations of heavy machinery, vehicle parking, and the storage of fill and/or construction materials within the critical root zones of trees.

3. Changes in soil chemistry will adversely affect tree survival. The most frequent occurrence is the change (decrease) in soil acidity by concrete washout. The leakage or spillage of toxic materials such as fuels or paints can be fatal for trees.

D. Trunk and crown disturbances are generally mechanical in nature and are either caused directly by clearing and grading machinery, or indirectly by debris being cleared and falling into trees marked for protection.

1. Common forms of damage include stripped bark and cambium, split trunks, and broken limbs.

2. Damage also occurs from the posting of signs such as building permits, or survey markers on trees.

3. Indirect damage can be caused by the placement of burn holes or debris fires too close to trees. The possible range of damages include scorched trunks with some cambial dieback, the loss of foliage due to evaporative heat stress (leaf desiccation), and completely burned trunks and crowns.

VI. **Methods of Tree Protection.**

A. Planning and considerations. Tree space is the most critical factor in tree protection throughout the development process. The root system of trees can easily extend beyond the dripline of the tree canopy (Figure 1). The

root system within the dripline region is generally considered to be the protected root zone. Disturbance within this zone can directly affect a tree's chances of survival. With reference to root zones, the following standards shall apply:

1. The use of tree save islands and stands is encouraged rather than the protection of individual (nonspecimen) trees scattered throughout a site. This will facilitate ease in overall site organization as related to tree protection.

2. The protective zone of specimen trees or stands of trees or otherwise designated tree save areas shall include no less than the total area beneath the tree(s) canopy as defined by the farthest canopy dripline of the tree(s). In some instances, the Zoning Administrator may require a protective zone in excess of the area defined by the tree's dripline.

3. Layout of the project site utility and grading plans shall accommodate the required tree protective zones. Utilities must be placed along corridors between tree protective zones.

4. Construction site activities such as parking, material storage, concrete washout, hole placement, etc., shall be arranged so as to prevent disturbances within tree protective zones.

5. Alterations to the protective zone of the specimen trees or stands of trees must be approved by the Zoning Administrator.

B. Protective Barriers.

1. Active protective tree fencing shall be installed along the outer edge of and completely surrounding the critical root zones of all specimen trees or stands of trees, or otherwise designated tree protective zones, prior to any building construction.

2. These fences will be a minimum four feet (4') high. Four-feet (4') high orange polyethylene laminar safety fencing is acceptable (Figure 2).

3. All tree protection zones should be designated as such with "Tree Save Area" signs posted visibly on all sides of the fenced area. These signs are intended to inform subcontractors of the tree protection process. Signs requesting subcontractor cooperation and compliance with tree protection standards are recommended for site entrances.

4. All tree fencing barriers must be installed prior to and maintained throughout building construction and should not be removed until completion of construction and until landscaping is installed.

C. Encroachment. Most trees can tolerate only a small percentage of critical root zone loss. If encroachment is anticipated within the critical root zones of specimen trees, stands of trees, or otherwise designated tree protective zones, the following preventive measures shall be employed:

1. Clearing Activities: Roots often fuse and tangle amongst trees. The removal of trees adjacent to tree save areas can cause inadvertent damage to the protected trees. Wherever possible, it is advisable to cut minimum two foot (2') trenches (e.g., with a "ditch-witch") along the limits of land disturbances, so as to cut, rather than tear, roots. Directionally felling trees outward into disturbance areas and grinding stumps is also acceptable.

2. It is very strongly suggested that all clearing in oak stands be done before May 1st and after July 1st of each season. This will help to prevent the inadvertent wounding of trees with the consequential spread of oak wilt. If clearing has to be done at this time, all stumps and wounded trees shall have the wound areas painted thoroughly with a tree paint. To be effective, the painting shall be performed within the same day of cutting. Should oak wilt get started as a result of construction during the months of May and June, then the developer/builder shall pay for all additional on-site oak wilt control measures needed to control the disease.

3. Where the Zoning Administrator has determined that irreparable damage has occurred to trees within tree protective zones, they must be removed and replaced by the developer/builder as provided in Section IV(B)9.

D. Reclamation of the Growing Site. A tree's ability for adequate root development, and ultimately its chances for survival, are improved with reclamation of the growing site. Whenever possible, the soil should be brought back to its natural grade. Unnecessary fill, erosion sedimentation, concrete washout, and construction debris should be removed. When machinery is required for site improvement, it is recommended that a "rubber-tired skid steer loader" or similar light weight rubber tire vehicle be used so as to minimize soil compaction.

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APPENDIX A

Technical Terms:

Cambium: The tissue within the woody portion of trees and shrubs which gives rise to the woody water and nutrient conducting system, and the energy substrate transport system in trees.

Cambial dieback: The irreparable radial of vertical interruption of a tree's cambium, usually caused by mechanical damage, such as "skinning bark", or from excessive heat.

Coniferous: Belonging to the group of cone-bearing evergreen trees or shrubs.

Deciduous: Not persistent; the shedding of leaves annually.

Feeder roots: A complex system of small annual roots growing outward and predominantly upward from the system of "transport roots". These roots branch four or more times to form fans or mats of thousands of fine, short, non-woody tips. Many of these small roots and their multiple tips are 0.2 to 1mm or less in diameter, and less than 1 to 2mm long. These roots constitute the major fraction of a tree's root system surface area, and are the primary sites of absorption of water and nutrients.

Major Woody Roots: First order tree roots originating at the "root collar" and growing horizontally in the soil to a distance of between 3 and 15 feet from the tree's trunk. These roots branch and decrease in diameter to give rise to "rope roots". The primary function of major woody roots include anchorage, structural support, the storage of food reserves, and the transport of minerals and nutrients.

Protected Root Zone: The rooting area of a tree established to limit root disturbances. This zone is generally defined as a circle with a radius extending from a tree's trunk to a point no less than the furthest crown dripline. Disturbances within this zone will directly affect a tree's chance for survival.

Root Collar: The point of attachment of major woody roots to the tree trunk, usually at or near the groundline and associated with a marked swelling of the tree trunk.

Root Respiration: An active process occurring throughout the feeder root system of trees, and involving the consumption of oxygen and sugars with the release of energy and carbon-dioxide. Root respiration facilitates the uptake and transport of minerals and nutrients essential for tree survival.

Rope Roots: An extensive network of woody second order roots arising from major woody roots, occurring within the surface 12 to 18 inches of local soils, and with an average size ranging from .25 to 1 inch in diameter. The primary function of rope roots is the transport of water and nutrients, and the storage of food reserves.

Soil Compaction: A change in soil physical properties which includes an increase in soil weight per unit volume, and a decrease in soil pore space. Soil compaction is caused by repeated vibrations, frequent traffic and weight. As related to tree roots, compacted soil can cause physical root damage, a decrease in soil oxygen levels with an increase in toxic gases, and can be impervious to new root development.

Transport Roots: The system or framework of tree roots comprised of major roots and rope roots.

APPENDIX B

Checklist for Tree Protection Plan:

1. Tree Protection Plans.

   a. Provisions for tree protection on the site shall be, at minimum, in conformance with the requirements of the City of Shorewood Tree Preservation Policy in conjunction with the Shorewood Tree Preservation Ordinance No. 324.

   b. A Tree Preservation Plan shall be submitted either as part of a landscape plan, preliminary plat, or as a separate drawing, to include the following:

      (1) All tree protection zones
      (2) Approximate location of all specimen trees or stands of trees
      (3) Approximate location of all specimen trees when their preservation is questionable, or might result in a change of the site design
      (4) Identification of specimen trees to be removed. (Removal of specimen trees is subject to Zoning Administrator approval.)
      (5) Limits of clearing and land disturbance such as grading, trenching, etc. where these disturbances may affect tree protection zones.
      (6) Proposed location of underground utilities.
      (7) Methods of tree protection shall be indicated for all tree protection zones, aeration systems, staking, signage, etc.
      (8) The plan should indicate staging areas for parking, material storage, concrete washout, and burial holes where these areas might affect tree protection.

   c. The following notes shall be indicated on both tree preservation plans and grading plans in large letters:

      (1) Contact the City Planning Department at (952) 474-3236 to arrange a preconstruction conference with the City Zoning Administrator prior to any land disturbance.

      (2) All tree protection measures shall be installed prior to building construction.

      (3) Contact the City of Shorewood Planning Department at (952) 474-3236 for a Site Inspection upon completion of landscape installation.

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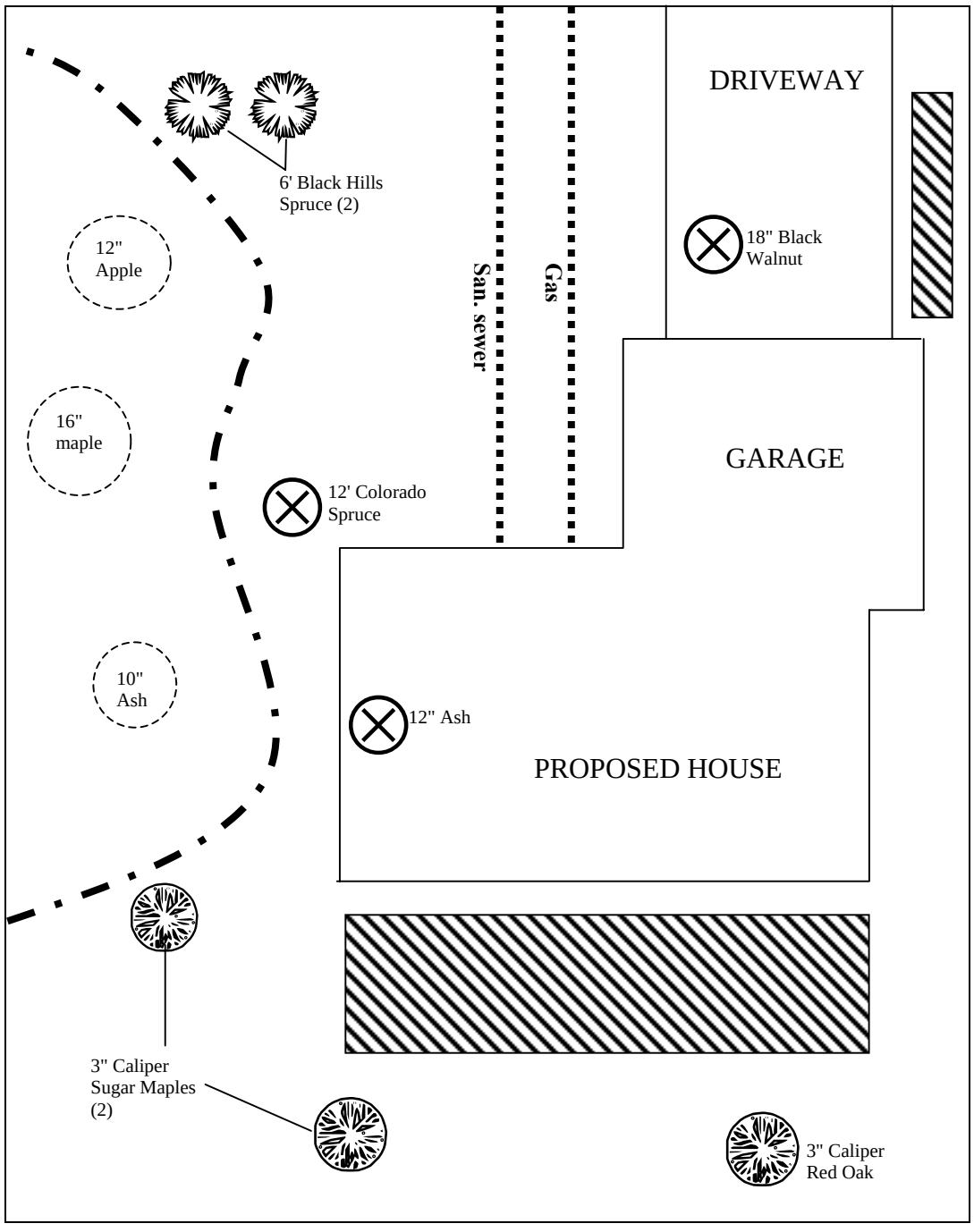
APPENDIX C

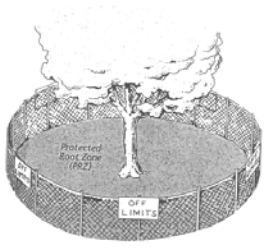
Preservation Plan:

- Existing trees to remain
- Trees to be removed
- Protective fencing
- Construction material and stockpile perimeter
- Utilities location

Replacement Plan:

- Deciduous trees to be shown by species and caliper size
- Coniferous trees to be shown by species and height





Tree fencing shall consist of 4' high minimum orange polyethylene laminar safety netting.

NOTICE:

- Contact the City Planning Dept. at (952) 474-3236 to arrange a preconstruction conference with the City Zoning Administrator prior to any land disturbance.
- All tree protection measures shall be installed prior to building construction.
- Contact the Planning Dept. for a site inspection upon completion of landscape installation.

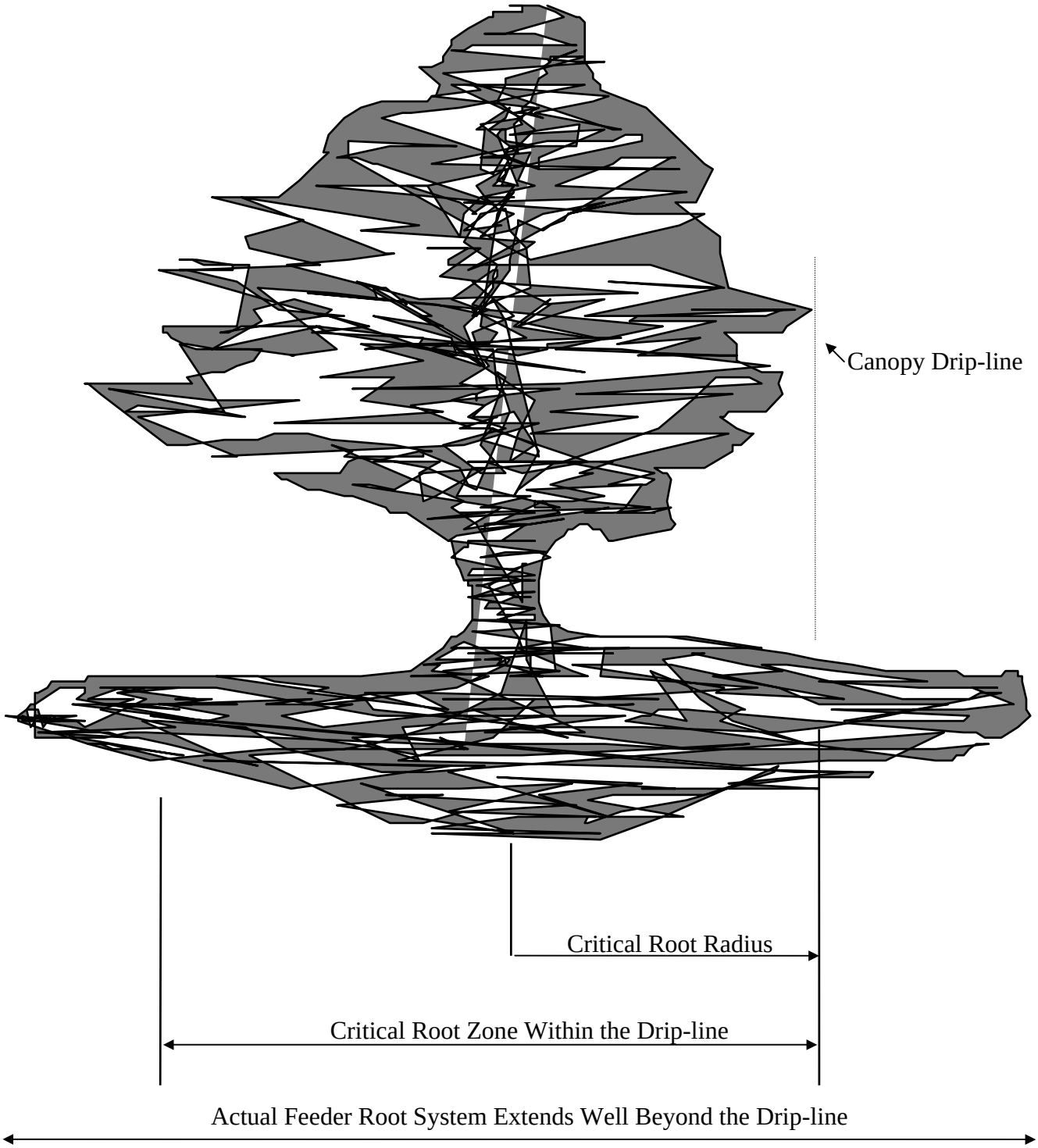
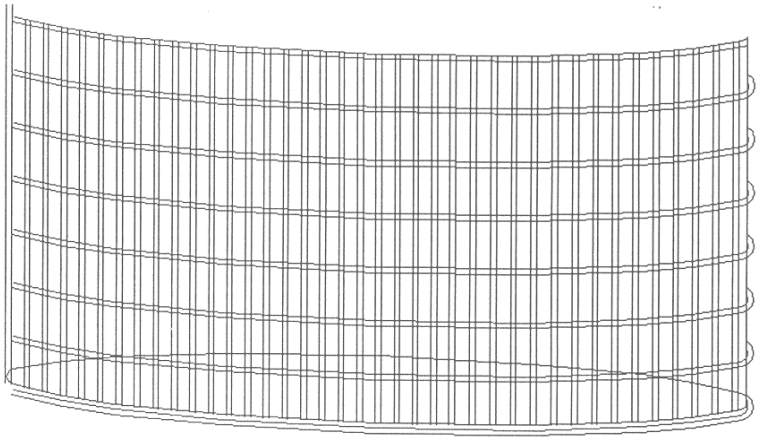


FIGURE 1

TYPICAL CRITICAL ROOT ZONE

TREE FENCING SHALL CONSIST OF 4.0' HIGH MINIMUM ORANGE POLYETHYLENE LAMINAR SAFETY NETTING.

FENCE SHALL BE SECURELY ANCHORED BY STEEL FENCE POSTS INSTALLED 6.0 FEET ON CENTER.



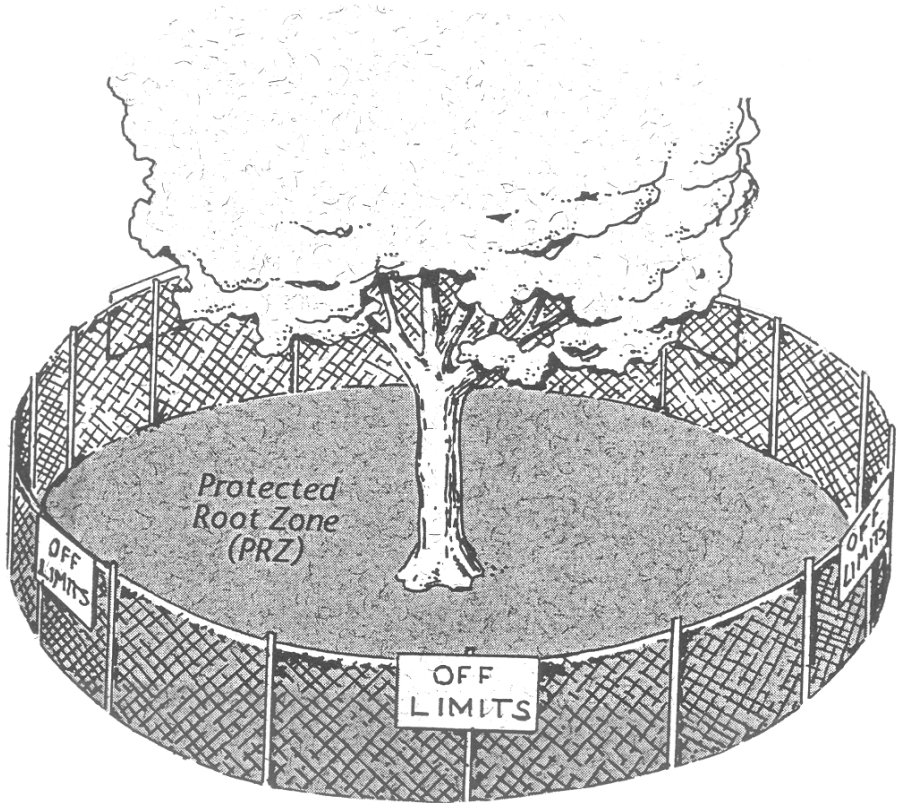


FIGURE 2

ACTIVE PROTECTIVE TREE FENCING