

**ARBORICULTURAL SPECIFICATIONS
AND STANDARDS OF PRACTICE
FOR THE CITY OF DARDENNE PRAIRIE, MISSOURI**



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PREFACE

This manual is a supplement to the "Municipal Tree and Landscape Ordinance" for the City of Dardenne Prairie, Missouri. It is intended to serve as a guide for persons planting or performing work on any plant material on City-owned property or public right-of-way. It is also intended to serve as a guide for those persons who are required by ordinance to install landscaping or abate a tree-related public nuisance.

The current and comprehensive arboricultural standards of practice that are detailed in this manual are recommended by the most knowledgeable persons and organizations in the horticulture and arboricultural fields. These standards specify the proper planting and maintenance procedures for trees and shrubs, and they must be strictly adhered to when planting or working on any public plant material in the City of Dardenne Prairie.

Any installation or maintenance of trees or shrubs on City-owned property or public right-of-way must be approved by the City prior to the initiation of such work. Applications for permit to perform maintenance or to install plant material on City-owned property are included in the appendix of this manual. A list of acceptable plant material for City-owned property or public right-of-way is also included in the appendix.

The landscape crediting system used by the City is discussed in this manual. Plant lists stating the square foot credit that may be given per plant are included in the appendix.

These credits will be used to insure each development, area of major rehabilitation, or construction area meets the open-space landscaping that is required by ordinance.

These arboricultural specifications and standards of practice will provide for the proper management of the City's urban forest, insuring the longevity of this invaluable resource.

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INTRODUCTION

It is nearly impossible to overstate the value of trees and landscaping in our urban areas. Properly placed trees and landscape plantings reduce energy consumption, filter pollutants, and slow flooding. They stabilize soil, enhance the ecological environment, and increase property values. Urban plantings also provide an invaluable psychological relief from the concrete and asphalt of the city. The value of these benefits is immeasurable.

Trees reduce the demand for energy consumption by casting shade and blocking winds. By shading concrete and asphalt, trees reduce the absorbed and radiated heat that turns our cities into urban heat islands. Trees shade cars and houses, keeping them cooler in the summer months. And they block cold winter winds, allowing buildings and homes to remain warmer in the winter. These things reduce the demand for air conditioning or heating, which results in less energy being spent. Less energy expenditures mean fewer fossil fuels are burned and less carbon dioxide goes into the atmosphere, reducing the potential for global warming. Less global warming results in more stable temperatures and decreased demand for fossil fuel consumption. This cycle of energy conservation is perpetuated as trees and other urban plantings naturally reduce the demand for heating and cooling. The cycle is enhanced by carbon sequestering, because in addition to reducing the carbon emissions from energy consumption, trees sequester tremendous amounts of carbon from the atmosphere to carry out their process of photosynthesis.

Trees and shrubs are beneficial as air filters. Their leaves remove dust and pollutants from the air we breathe. In addition, many plants help to filter toxins and chemicals from groundwater as it works its way toward our lakes, rivers, and streams. We count on plants to provide these invaluable services and clean our environment. A cleaner environment, composed of cleaner air and water, is healthier for all the animals that live on earth, including humans. And it's not just the physical health trees contribute to. Reduced pollution and the presence of trees have been found to reduce stress and increase feelings of peace and well-being in people.

Urban plantings significantly reduce flooding and soil erosion by slowing water runoff and holding on to soil. When raindrops are intercepted by a tree's canopy, the rate at which the rainwater hits the ground is significantly reduced. The slowed rainwater absorbs into the soil as it filters across vegetation and roots; reducing the amount of water that reaches the creeks and storm sewers. In addition, soil movement is reduced as a result of plant roots holding on to the soil. Without plant roots, soil has no ability to resist the erosive effect of rushing water.

Trees and landscaping enhance the ecological environment and increase property values. Planting allow people to interact with and observe nature because they signal the changing seasons and add different colors and forms at each time of the year. Trees provide food and shelter for small urban dwelling animals, allowing for the enjoyment of watching squirrels scamper up the side of an oak, or listening to birds sing from a nest in a cypress.

They define areas in the landscape by framing, emphasizing and screening. Studies have shown most people prefer to live in an area that has trees and is landscaped attractively. In addition, according to studies done at the University of Illinois at Champaign-Urbana crimes are less prevalent, youth are less violent, ADHD symptoms in youth are reduced and women and young girls score higher on tests for concentration when they live near areas that have more greenery.

With all the benefits trees provide it is easy to see the need to protect and expand the city's urban forest. The City of Dardenne Prairie recognizes the importance of green areas and is making direct efforts to insure the continued development of this invaluable resource. The City's plans include aggressive planting and maintenance programs on City property, providing educational opportunities for residents, and most importantly, enacting legislation which protects the existing urban forest and insures its continued expansion. This legislation allows Dardenne Prairie to move forward, knowing a better city environment will be left to all those who follow.

This Arboricultural Specifications and Standards of Practice manual contains the technical information necessary to perform the work outlined in the "Municipal Tree and Landscape Ordinance" for the City of Dardenne Prairie. This manual is divided into three sections: (I.) Maintenance and Care of Existing Plantings, (II.) Installation and Establishment of New Plantings and (III.) Landscape Guidelines for New Developments in the City of Dardenne Prairie. The first two sections outline the specific practices that must be followed when working with plant material on City-owned property or public right-of-way. The last section references the landscape requirements that are stated in the "Municipal Tree and Landscape Ordinance" for new developments, new construction, or areas undergoing major rehabilitation.

The appendix of this manual contains three important reference documents. First are copies of the applications for permit that must be approved before any work may be initiated on City-owned property or public right-of-way. Second is the list of acceptable tree species for planting on City owned property. Third is a list of plants and the square foot credit that will be given for each of those plants in landscape plans submitted to the City by developers. These documents will be necessary references for anyone working on public plant material or building a new development within the City of Dardenne Prairie.

Keeping Dardenne Prairie beautiful, reducing pollution and erosion, conserving energy, and providing a calm, peaceful environment will require continual team effort, but together the City and its constituents can make it happen.

SECTION I

MAINTENANCE AND CARE OF EXISTING PLANTINGS

The benefits of mature street trees and landscapes do not come without some investment of time in maintenance and follow-up care. The "Municipal Tree and Landscape Ordinance" for the City of Dardenne Prairie, identifies who is responsible for all plant material within the city limits according to its exact location. The allocation of this responsibility will not be repeated in this manual, but proper maintenance techniques will be detailed.

The following section outlines the standards of practice that must be followed by anyone performing maintenance on plant material located on City-owned property, including public right-of-way. While these practices are not mandated for those performing work on privately owned trees or landscapes, they can serve as an excellent reference tool for anyone responsible for maintaining trees and plants.

Any person wishing to perform maintenance on City-owned plant material must first obtain a permit authorizing such action. Applications for a permit are available from the City of Dardenne Prairie. Copies of the applications are also included in the appendix of this manual. Completed applications must be submitted at least five business days before the scheduled work. The application must be approved and a permit must be issued before any work may be performed.

PRUNING GUIDELINES FOR PUBLIC PLANT MATERIALS

No tree, shrub or other plant should be pruned without good reason and a clear understanding of what the results are likely to be. It is very difficult to change the natural growth habit or mature size of a plant, and random pruning may only make a bad situation worse. Such cuts could result in either an irreversible form change or an entry port for insects or disease. This outcome is unnecessary. No tree, shrub or other plant material should be cut back in such a manner that its health is impaired.

Outlined in this section are specific standards of practice that must be adhered to when pruning any plant material located on City-owned property. The guidelines are clear and easy to follow. Any questions should be directed to the Dardenne Prairie Parks Department.

The following general rules must be adhered to when performing approved pruning on plant material located on City-owned property:

1. All pruning tools must be kept adequately sharp to insure smooth cuts.
2. All tools used on disease-infected trees or shrubs must be properly disinfected before being used on any other plant material. Tools must also be disinfected between pruning infected and uninfected plant areas within the same plant

material. Disinfecting can be accomplished by wiping the tools with isopropyl alcohol or ten (10) percent bleach to water solution.

3. No spurs, climbing irons, or spike shoes will be permitted for use on City trees unless the tree is to be removed.
4. All tree pruning cuts must be made just outside the branch collar (see Figure 1). This method will favor the earliest possible covering of the wound by natural callous growth. Flush cuts are not allowed.
5. When only a portion of the branch is being removed, all cuts must be made at a node or branch crotch, and no stubs may be left.
6. When large tree branches are being removed they must be controlled in a manner that prevents damage to property, persons, other plants or other parts of the tree itself. This may require branches to be secured by ropes and lowered safely. Under no circumstances is it permissible to wrap ropes around other trees to aid in lowering large branches.
7. Removing large branches may require two-stage pruning, with the first two cuts being made one to two feet beyond the intended final cut to remove the weight of the branch (see Figure 1). The final cut should be made in a manner to prevent tearing back of the bark and wood.

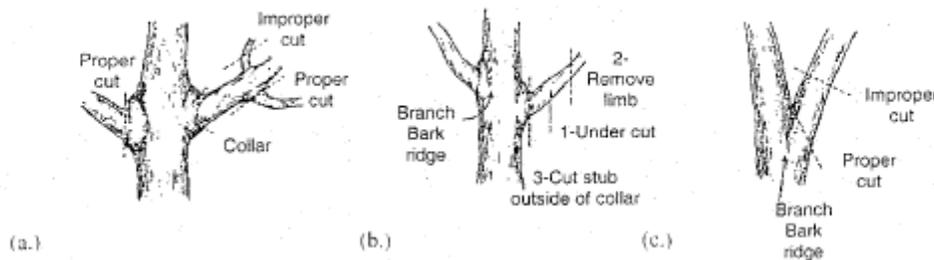


Figure 1 - Pruning - All cuts must be made at a node, branch crotch, or just outside of the branch collar (a). Heavy branches should be removed in two stages with at least three cuts (b). Co-dominant branches may be removed by cutting at an angle outside of the branch bark ridge (c).

8. No individual will be permitted to prune any tree that has branches that touch any utility line. Any such tree requiring pruning will be pruned by the utility company, the City, or the City's Approved contractor.
9. Unless the work area is totally barricaded or otherwise kept safe during tree work, at least one responsible worker must serve to coordinate safe operations from the ground at all times.

10. When large tree sections are being cut, the work area must be barricaded using street and sidewalk barriers, highway cones and/or signs to warn the public of danger.
11. Flashing lights or lighted flares must be placed on all barriers or obstructions remaining in the area after dark.
12. Whenever barricades or work areas block any portion of a street, flagging personnel must be stationed to insure as little obstruction to the flow of traffic as possible. Street blockage techniques must be in accordance with the most-current edition of the U.S. Department of Transportation Federal Highway Administration *Manual on Uniform Traffic Control Devices*.
13. Whenever a street must be blocked off, the police, fire, ambulance, City Administrator and City Parks Director must be notified of the location and length of time the street will be blocked. These departments must also be notified when the barriers are removed or if they are to remain longer than originally expected. Any street closing must be in accordance with the most-current edition of the U.S. Department of Transportation Federal Highway Administration *Manual on Uniform Traffic Control Devices*.
14. Under no circumstances may workers leave the scene of operation with any severed or partially cut branches remaining in any trees.
15. All debris from pruning operations must be cleaned up and removed before workers leave the site. The work area must be kept clean to prevent hazards or unsafe conditions during operations. Debris must not be placed in any manner which could result in a hazardous situation to workers or the public.
16. Exception to parts of these guidelines may occur in situations of emergency relief where immediate danger to persons or property exists. Any such emergency procedures performed must be reported to the Parks Department promptly.

There are three categories of tree pruning addressed in this manual. *Minimum or Safety Prune* consists of the minimum pruning necessary to correct extreme or undesirable conditions which may be hazardous to persons or property. *Medium Prune* includes the steps taken in *Minimum or Safety Prune* in addition to the removal of any branches that may menace the future health, strength, and/or attractiveness of the tree. *Head Back Prune* is reducing up to one third of the height and/or spread of the tree. *Head Back Prune* is discouraged and should be used only under extreme circumstances. The following describes the guidelines for each of these categories.

Minimum or Safety Prune

1. Removal of dead or dying branches.
2. Removal of broken or loose branches lodged in the trees.
3. Removal of any lower limbs which constitute a threat to persons or property. This includes removal of limbs to achieve the minimum clearance over street or sidewalk as required by City Code. (The City discourages removing lower limbs to the point that the trunk exceeds one third of the height of the tree.)

Medium Prune

Medium Prune may include any or all of the specifications for *Minimum or Safety Prune*, in addition to those listed below.

1. Removal of dead and live branch stubs from previously broken or poorly cut branches.
2. Removal of any live branches that interfere with the tree's structural strength and healthy development. This may include:
 - a. Crossed or rubbing branches
 - b. Multiple leaders in a single leader type tree
 - c. Undesirable sucker and sprout growths
 - d. Excessively heavy branch ends
 - e. Multiple branches near the end of broken or stubbed limbs
3. Removal or severing of girdling roots.
4. Removal of branch tips that extend beyond the natural form or outline of the tree.

Head-Back Prune

Head-Back Prune techniques should only be used when plant growth endangers overhead utility lines, interferes with adjacent structures, or otherwise creates a specific hazard to persons or property. The City of Dardenne Prairie strongly discourages this type of pruning.

1. *Head-Back Pruning* may only be done by the "drop-crotch" method (see Figure 2).



Figure 2. – Head-Back Prune – This pruning can reduce the size of the tree without destroying the tree's natural form. Some branches are removed at their junction with shorter, larger diameter branches while others are removed at the trunk. This pruning is discouraged by the City of Dardenne Prairie and will only be permitted under rare circumstances.

2. No more than one-third of the crown of the tree may be removed.
3. *Head-Back Pruning* will not be permitted when the result would be a tree with a seriously compromised crown to trunk ratio or an excessively reduced canopy, affecting the tree's structural integrity and biological functions such as wound sealing and compartmentalization, photosynthesis, respiration, and productive growth.
4. **Absolutely no "Topping" will be permitted.**

REMOVAL OF PUBLIC TREES OR OTHER PLANT MATERIAL

The City of Dardenne Prairie considers trees to be vital resources that contribute to the beauty and the proper functioning of the expanding City. As a result, each request for removal of plant material on City-owned property will be evaluated carefully. Consideration will be given to the location, health, age, aesthetic value, uniqueness, historical significance and wildlife habitat of the tree or plant material concerned. The decision to remove any plant material on City-owned property will rest with the assigned Agent of the City Administrator.

A completed Application for Permit to remove plant material must be submitted to the City at least five business days before the anticipated work date. If the Agent of the City Administrator approves the removal of the plant material, the following guidelines must be strictly followed.

1. Unless the work area is totally barricaded during tree removal, at least one responsible worker must serve specifically to coordinate safe operations from the ground at all times.

2. Whenever tree sections that pose a hazard to persons or property are being cut, the work area must be barricaded using street and sidewalk barriers, highway cones, or signs. Barriers must be placed to insure the safety of the general public with as little inconvenience as possible to vehicular and pedestrian traffic. Flashing lights or lighted flares must be placed on all barriers remaining in the street after dark. All barrier techniques must be in accordance with the most-current edition of the U.S. Department of Transportation Federal Highway Administration *Manual on Uniform Traffic Control Devices*.
3. Whenever barricades or work areas block any portion of a street, flagging personnel must be stationed to insure as little obstruction to the flow of traffic as possible. All street blockage techniques must be in accordance with the most-current edition of the U.S. Department of Transportation Federal Highway Administration *Manual on Uniform Traffic Control Devices*.
4. Whenever a street must be blocked off, the police, fire, ambulance, City Administrator and City Parks Director must be notified of the location and length of time the street will be blocked. These departments must also be notified when the barriers are removed or if they are to remain longer than originally expected. All street closing must be in accordance with the most-current edition of the U.S. Department of Transportation Federal Highway Administration *Manual on Uniform Traffic Control Devices*.
5. The stumps of all removed trees must be cut or ground down at least six inches below the normal ground level. The area must be backfilled, the soil leveled and vegetation restored.
6. All tree branches being removed must be controlled in a manner to prevent damage to property, persons or other plants. This may require branches to be secured by ropes and lowered safely. Under no circumstances is it permissible to use other trees to aid in lowering branches that are being removed.
7. Neither utility poles nor other trees may be used as an anchor for any procedures, including anchoring of winch trucks or other devices.
8. Replacement of plants may be required as a condition for permit approval. Replacement plant material must meet specifications outlined in Section II of this manual.

STAKING, BRACING, AND CABLING OF ESTABLISHED PUBLIC TREES

Staking, bracing, and cabling of established trees on City-owned property or public right-of-way will be used only as a last resort. Proper plant selection, maintenance, and site selection will first be used to minimize the need for such practices. If it is determined by the Agent of the City Administrator that these practices are necessary, all work must follow the guidelines established by the International Society of Arboriculture.

WATERING, FERTILIZING, AND APPLYING PESTICIDES TO ESTABLISHED PUBLIC PLANT MATERIAL

Watering

Water is vital to plants. It is only by the absorption of water that plants can grow. Yet improperly applied, water could be the direct cause for a plant's demise. There is a delicate balance between adequate moisture and a fatal dose. Special attention must be directed toward proper irrigation.

Newly planted trees and shrubs have reduced root systems. They are not able to take advantage of water in areas away from their planting hole. Established plant material however, is able to utilize water from a much greater distance. For this reason, established plant material should not be given supplemental water except under water stress or drought conditions. When water stress conditions exist, plant material should be monitored and watered as outlined in Section II of this manual.

Fertilizing

Fertilizing plant material on City-owned property will be done on an as-needed basis. Any person wishing to fertilize plant material on City-owned property or public right-of-way must obtain the proper permit from the City prior to the initiation of such work. The type of fertilization and the method of application will be evaluated by the City Administrator or their agent. Acceptable fertilizing methods include, but are not exclusive to root feeding, soil injection, broadcasting, slow release pellets, and foliar sprays. Trunk implants and injections will be allowed only under extreme conditions and only when other methods prove to be ineffective or too difficult. The amount of fertilizer to be applied must be determined by a soil test. Individual situations will be evaluated as requests are received.

Applying Pesticides

Every time a pesticide is applied some interference with nature occurs. Often this interference is the desired result, but the potential for harm is enormous. Air or water can carry a pesticide far away from the application site, causing it to affect organisms other than those targeted. Some pesticides are very persistent in the environment. These pesticides have the potential to cause damage long after the time of application. The risks involved in pesticide applications are numerous. Therefore, all practical cultural, mechanical, and preventative measures must be exhausted before applying pesticides to plant material on City-owned property or public right-of-way. Those pesticide applications deemed necessary by the City, and approved by permit, must be carried out with utmost caution.

The following guidelines must be strictly adhered to when applying pesticides on City-owned property or public right-of-way:

1. All persons applying pesticides must follow the guidelines, rules and regulations set by the Missouri Department of Agriculture, Division of Plant Industries, Bureau of Pesticide Control. They must also adhere to all applicable federal regulations.
2. Pesticide applications may be made only as approved by the permit issued by the City. No plant material may be sprayed, or otherwise treated, with pesticides unless specifically stated on the permit.
3. All pesticides must be applied strictly according to the label. No pesticide may be applied in any manner or amount inconsistent with the label instructions.
4. No pesticide may be applied in any conditions that would allow drift from the targeted area. These conditions include but are not exclusive to:
 - a. Winds in excess of 7 (seven) m.p.h.
 - b. Rain or other precipitation.
 - c. Over-application of the pesticide or excessive run-off.
 - d. Use of unnecessary or excessive pressure in the application process.
 - e. Improper use of equipment or using the incorrect equipment for application.
 - f. Applying pesticides across or near a body of water not intended to be treated.
 - g. Improper filling or cleaning of spray tank causing over-flow or back siphoning.
5. No persons other than the applicator may be allowed in the area during pesticide treatment. All pets and other animals must be removed from the treatment area.
6. No persons or animals may be allowed to enter the treatment area until the pesticide is no longer a danger, or until the re-entry time stated on the label has elapsed, whichever is greater.
7. All safety equipment recommended by the pesticide label must be used during application and mixing.
8. All toys, furniture, pet dishes, and other objects able to be moved, must be removed from the treatment site or covered prior to application.
9. Any chemical spills must be handled according to label directions. All dry or granular pesticides spilled must be swept up and disposed of properly. All liquid pesticide spills must be contained with chemical absorbing products and disposed of properly. All spill areas must be cleaned thoroughly.

These conditions are the minimum guidelines required by the City of Dardenne Prairie for those applying pesticides on City-owned property or public right-of-way. The nature of this type of task and the risks involved require that extreme caution be exercised at all times. In some situations the City may impose stricter guidelines or request more protective measures be taken.

TRANSPLANTING EXISTING PUBLIC TREES

Transplanting trees from their existing location to a new location is a disruptive process and should be done only to avoid eliminating the tree. As often as possible, alternative solutions, such as pruning to correct site line problems or protecting trees during construction, should be implemented first. Random transplanting will not be allowed.

Applications for permit to transplant existing trees on City-owned property or public right-of-way are available from the City of Dardenne Prairie. Completed applications must be submitted at least five business days before the scheduled work date. Each request will be handled individually, taking into consideration the circumstances involved in each situation. Only the assigned Agent of the City Administrator may make the decision to allow an existing tree or shrub on City-owned property or public right-of-way to be transplanted.

Once transplanting has been approved some basic guidelines must be followed. Additional restrictions may apply in certain situations.

1. The diameter of the rootball of all balled and burlapped trees, and trees moved with a tree spade, must measure a minimum of 12 times the caliper of the tree in inches.
2. All dug trees and shrubs must be replanted immediately in accordance with Section II of this manual, or heeled in and mulched for protection. While heeled in, all trees and shrubs must be kept adequately moist.
3. All transplanted trees and shrubs must be thoroughly watered at the time of planting.
4. All utility companies must be contacted to locate any cables, pipes, lines, wires and any other underground structures before beginning any digging work on City-owned property or public right-of-way.
5. All guidelines listed in Section II of this Manual, Installation and Establishment of New Plantings, must be followed for transplanted plant material.

Additional guidelines may also apply. Any such additions to this list will be outlined on the permit issued by the City.

PROTECTION OF PUBLIC PLANT MATERIAL DURING CONSTRUCTION, TRENCHING OR EXCAVATION

Construction sites and areas of excavation can be more than just disruptive to plant material; they can be deadly. Proper protection can reduce or prevent damage, and possibly even save the life of such protected material. Protection does not just mean avoiding contact with the aboveground portions of the plant. Often the most damage in construction sites is done to the belowground portions of plant material. Severed or crushed roots, compacted soil, and a chemically contaminated root zone are common causes for the loss of plant material in construction sites. These events can be avoided by taking a few precautionary measures.

The following section outlines the protective measures that must be taken when trenching, excavating, storing materials, or performing any construction work under either of the following conditions:

1. On City-owned property within the drip line of any tree or shrub, or within a radius of 15 feet from any privately owned plant material, or
2. On private property but within the drip line of any City-owned plant material.

These regulations are stated in the "Municipal Tree and Landscape Ordinance" for the City of Dardenne Prairie. Prior to initiation of such work, the proper permit must be obtained from the City.

Permit applications are available in the Dardenne Prairie City Hall. The completed application must be submitted at least five business days before the scheduled work date. Upon approval from the City to perform such work, these guide lines must be followed:

1. All plant material within the activity site must be surrounded with a substantial fence, frame, or box not less than four feet high that extends beyond the drip line of the tree or plant on all sides (see Figure 3).
2. No fence, frame or box being used to protect plant material may be less than 16' square. All plant material must be centered in the protected area.
3. Absolutely no excavation, trenching, construction, driving of vehicles or equipment, storage of materials or other activity may occur within the barricaded or fenced area.
4. Under rare circumstances the City may allow construction traffic within the drip line of plant material on City-owned property. In such situations, the area must be protected to prevent compaction of the plant material's root zone. Acceptable methods of protection are outlined below.

- a. *Bridging root areas* - Rail ties must be laid on top of the ground, between the major roots of the plant material. Steel plates must be bridged across the ties (see Figure 3). All motorized traffic must be routed across the bridged steel plates. When construction is complete, all ties and steel plates must be removed from the area.
 - b. *Mulching* - A six- to ten-inch layer of wood chips must be spread across the traffic area within the drip line of the plant material to temporarily absorb the impact and distribute the weight of vehicles and equipment. This mulch layer must be maintained through the duration of the activity. When construction is complete all mulch must be removed in a manner that does not damage the plant's roots nor compact the soil. Regardless of the method used, when the project is complete the protected area must be aerated by injecting pressurized water into the root zone.
5. Absolutely no trenching will be allowed within the drip line of any tree on City-owned property or public right-of-way. Underground utilities should be either re-routed to avoid the root zone area, or tunneled under the root zone area of the tree (see Figure 3).
 6. Absolutely no grade changes will be allowed within the root zone of any plant material on City-owned property or public right-of-way.

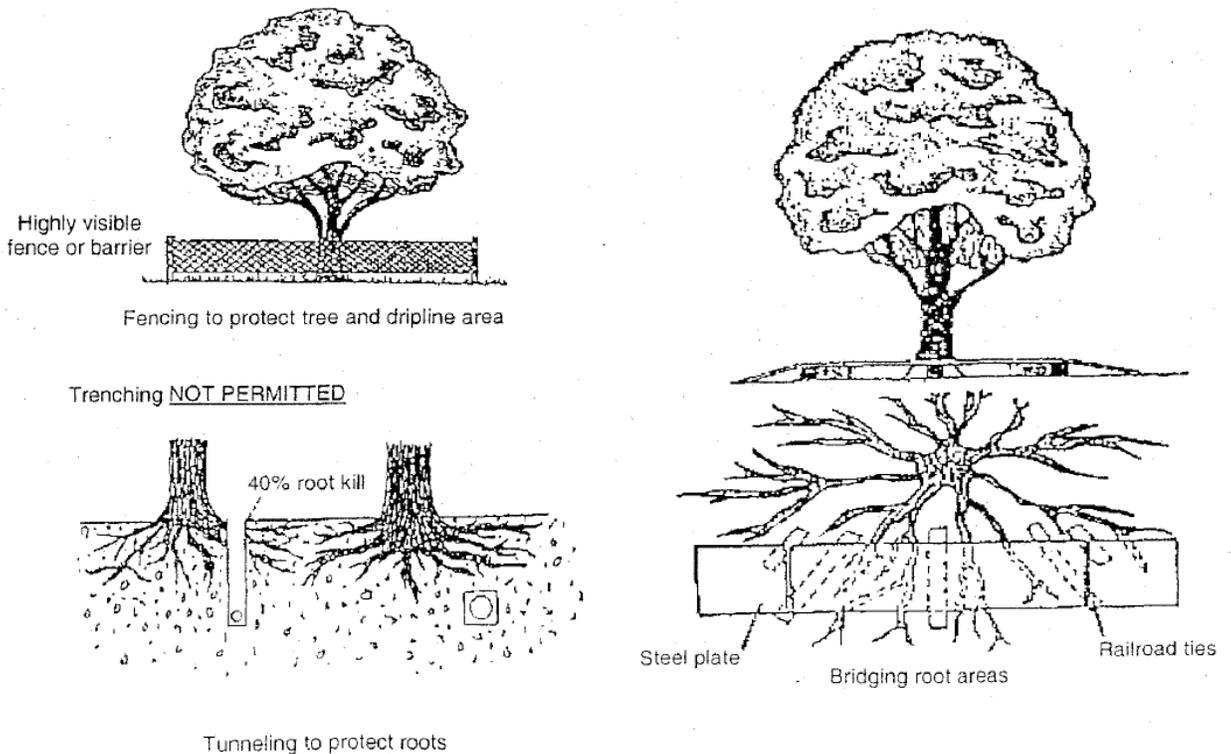


Figure 3 - Protecting Trees During Construction

SUMMARY

This section of the Arboricultural Specifications and Standards of Practice for the City of Dardenne Prairie clearly outlines the correct maintenance procedures of pruning, watering, fertilizing, and protecting the City's plant material. Safe pest management procedures are also addressed in this section. These maintenance procedures will be under constant review to insure new techniques are incorporated as they are proven worthy by the horticultural and scientific communities.

A proper maintenance program includes recognizing when a tree or shrub should be removed or relocated. Due to the considerable value of the City's trees and shrubs, the decision to remove or relocate plant material will be made only by the assigned Agent of the City Administrator and will not be taken lightly.

The value of our urban forest cannot be overstated. The community that protects this living resource and helps it to mature will receive rewards unattainable by any other means. The mature tree will cast the most shade, filter the most air and slow the most rainwater. To maximize the return on its investment, the City of Dardenne Prairie will strive toward having a community of mature trees. Through intensive maintenance programs and working with the residents of the community, Dardenne Prairie will maintain the quality of its urban tree population. As a result, the City's urban forest will flourish and the residents will reap the benefit for generations to come.

SECTION II

INSTALLATION AND ESTABLISHMENT OF NEW PLANTINGS

Regardless of the amount of care they are given, some urban trees and plant material will be lost due to natural causes or unavoidable circumstances. Continual investment in new plantings is necessary to sustain and expand this vital resource. However, indiscriminate or unregulated planting could cause more harm than good. The wrong tree planted in a good area, or a good tree planted in the wrong area, is often worse than no tree planted at all. Street trees that are planted in conflict with things like public utilities, traffic signals, and pedestrian walkways can create long-term maintenance issues for the City. It is for this reason that all plantings on City-owned property or public right-of-way must be pre-approved by the Agent of the City Administrator.

Applications for a permit to install and maintain plant material on City right-of-way are available from the City of Dardenne Prairie. Copies of the applications are also included in the appendix of this manual. Completed applications must be submitted at least five (5) working days before the scheduled work date. The planting and establishing methods outlined here insure the greatest success rate possible. They must be followed when planting on City-owned property or public right-of way.

Though these methods will not be mandated on private property, they should be considered a valuable reference tool for anyone installing trees or landscaping. Any questions regarding these methods should be directed to the Dardenne Prairie Parks Department.

INSTALLATION OF NEW PLANT MATERIAL

There are some general rules that must be followed when installing approved plant material on City-owned property or public right-of-way. These rules are:

1. Before beginning any digging work, all utility companies, and any such related companies, must be contacted to locate any underground cables, pipes, lines, wires, or other structures. All applicable City, State and Federal laws regarding excavation must be followed.
2. No trees other than those maturing at less than 30 feet in height may be planted within 15 feet of any overhead utility line. This may not always apply to service lines running to a building.

3. When planting street trees in the right-of-way, large-maturing trees should be spaced a minimum of 30 feet apart; Medium-maturing trees should be spaced a minimum of 25 feet apart; and small-maturing trees should be spaced a minimum of 20 feet apart. These minimum spacing requirements are for ease of maintenance, optimum growth and to allow the tree to develop properly. Some exceptions may be necessary. (Categories of large-, medium-, and small-maturing trees are listed in the Appendix of this manual).
4. The preferred planting site for a street tree is in the green strip between the sidewalk and the street curb or within a tree planter. However, no street tree may be planted in any green space that is less than five (5) feet wide in any direction. If the distance between the curb and detached sidewalk is less than five (5) feet in any direction, street trees should be planted in the right-of-way on the private property side of the sidewalk. (See Figure 4).
5. When green space limitations require right-of-way plantings to be on the private property side of a sidewalk, care should be taken to place the tree so the entire trunk will remain within City right-of-way as the tree matures. In most situations, this will necessitate centering the tree in the right-of-way between the sidewalk and the property boundary line. Typically this will place the tree 30" off the sidewalk and 30" off the private property boundary line. There may be exceptions to this guideline.
6. No tree may be planted less than 30" from a curb or less than 24" from the edge of a sidewalk (See Figure 4).

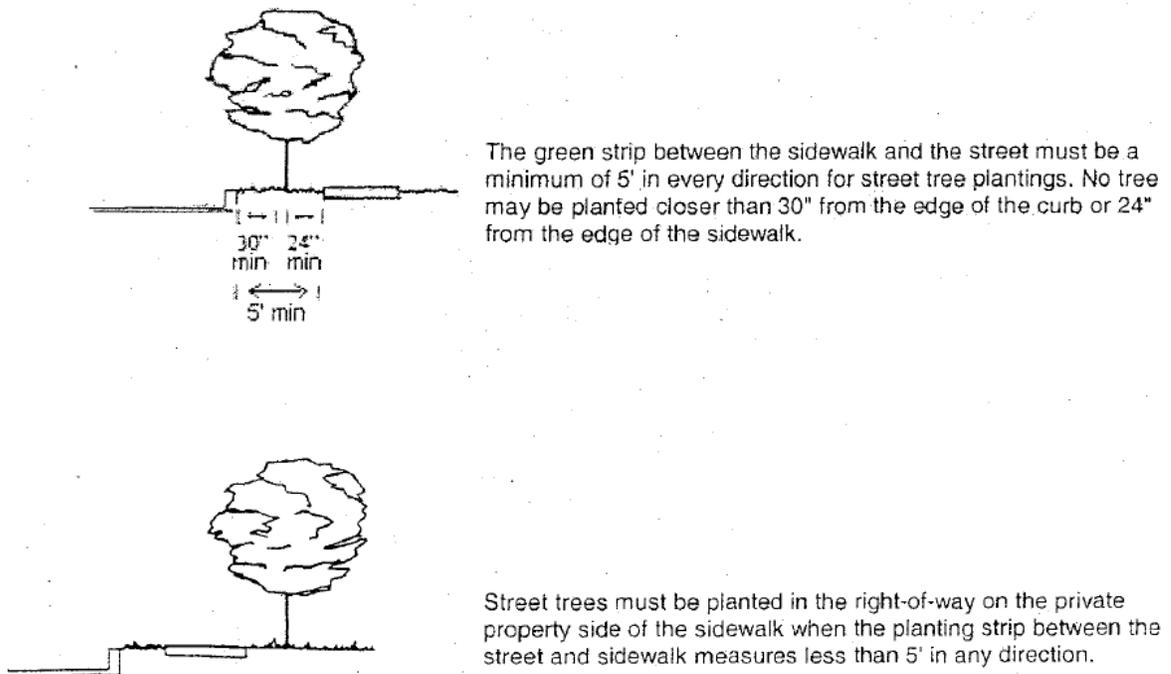


Figure 4 - Street Tree Planting

7. Only trees and shrubs approved by the Agent of the City Administrator may be planted in City right-of-way. Lists of acceptable street trees and applications for a permit to plant street trees are included in the appendix of this manual.
8. All trees and shrubs planted must be specimen-quality plants. They must be free of disease, insects, and any other disfigurements.
9. All trees and shrubs must be planted so the root flare or first main order root is at the same level as the natural surface of the ground. No tree or shrub may be planted too deep. Trees with more than one (1) inch of soil covering the first main order roots will not be accepted by the City of Dardenne Prairie. This requirement may necessitate the excavation of excess soil from the top of the rootball during the planting process (See Figure 5).
10. Any planting holes that are drilled with an auger must be roughened on the sides and bottom to reduce the effect of glazed walls.
11. When backfilling planting holes, only the soil originally removed from the hole may be used.
12. Any tree with its rootball in a wire basket must have an absolute minimum of the upper $\frac{1}{2}$ of the wire basket removed before planting is complete.
13. All trees that have their rootball wrapped in burlap must have the top of the burlap pulled back and removed or buried before planting is complete (see Figure 5).
14. All twine or ropes encircling the trunk of any tree must be removed.
15. All trees and shrubs must be mulched with approximately 3 inches of an appropriate mulching material, such as shredded hardwood bark (See Figure 5).

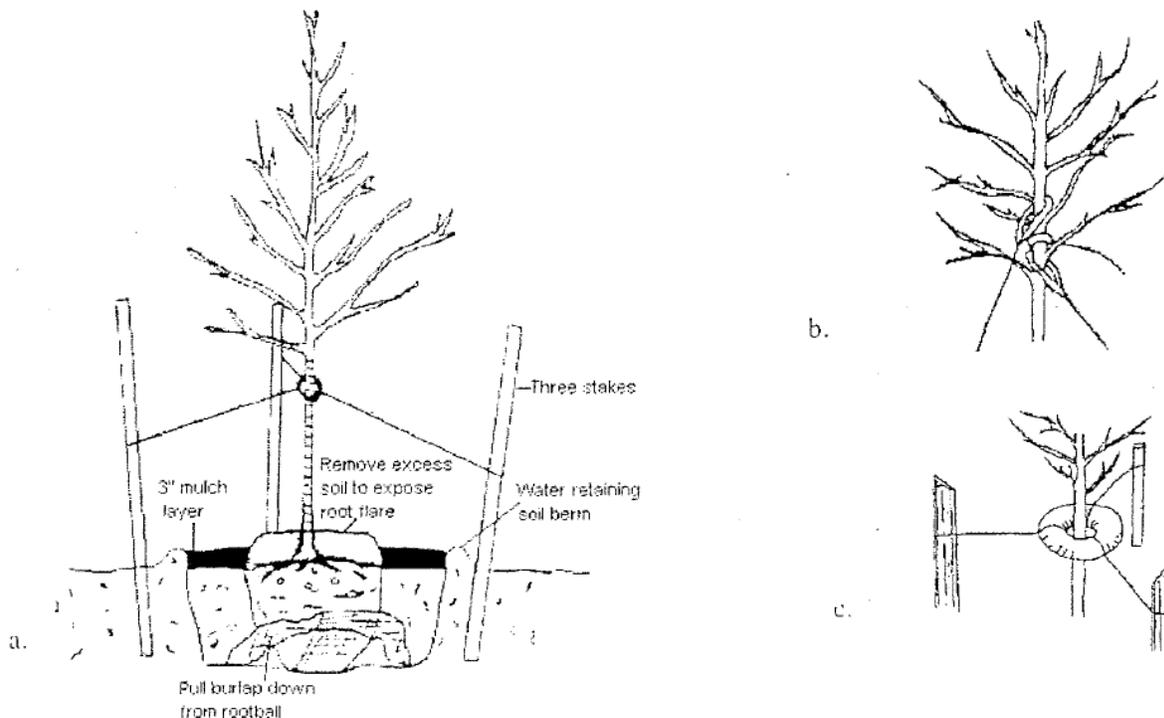


Figure 5 - Planting detail (a.) Removing excess soil to expose the root flare, pulling back burlap and mulching are critical steps in the planting process. (b.) & (c.) Typical hose and wire arrangements for staking trees.

16. Some newly planted trees may need staked to insure they remain upright. Staking may be done by extending wires from three equal-distant stakes around the tree, with the wires running through hose loops to prevent them from contacting the tree. The wires should be loose enough to accommodate some slight swaying of the tree. The hose loops must be loose enough to insure girdling cannot occur within two years of normal growth (See Figure 5). Staking of trees should only be done when absolutely necessary.

17. With some exceptions, no tree stakes or wires may be removed from a tree sooner than twelve months after planting or later than twenty-four months after planting.

18. All newly planted trees and shrubs must be thoroughly watered at the time of planting. To insure proper watering, the rootball and the surrounding soil should be thoroughly saturated. Under no circumstances may a tree or shrub be planted without being thoroughly watered within 24 hours of planting.

ESTABLISHMENT OF NEW PLANT MATERIAL

Water is the most critical factor in the establishment of new plant material. As the primary solvent for nutrient and food transport, water is absolutely vital for a plant's survival.

It is water that allows plants to remain turgid and to carry out photosynthesis. It is only by the absorption of water that plants can grow. Water can also be the cause of a plant's demise if applied improperly. Newly planted trees and shrubs have reduced root systems. This reduction in roots limits a plant's ability to access water. The newly planted tree or shrub cannot take advantage of moisture in the soil away from the immediate planting area. It also has reduced abilities to deal with excess water. Without all of the fine hair roots and lateral roots that established plants have, the newly planted tree has less water-absorbing surface area. Since water can't be absorbed and processed as efficiently, an excessive amount could saturate and rot the root tissues. There is a delicate balance between adequate moisture and a fatal dose, so special attention must be directed toward proper irrigation.

All newly planted trees and shrubs on City-owned property or public right-of-way must be monitored to insure adequate soil moisture. This monitoring must continue for a minimum of two years. During this monitoring period, the moisture content of the soil around the trees and shrubs must be checked a minimum of twice monthly. If the soil moisture is found to be inadequate, water must be applied in a manner that insures proper absorption into the rootzone of the tree or shrub.

To determine if a newly planted tree or shrub needs water, check the soil. The appearance of a tree may help signal a water problem exists, but the appearance may also be deceptive. For example, wilting is usually a sign of water stress, but it could also be a sign of chemical injury, root damage, disease or even too much water. The only way to be sure the tree needs water is to check the soil.

When checking the soil for moisture, pull back any mulch from the area under the tree and probe down three to four inches into the rootzone. If the soil in that area feels moist, or if it stays in a sticky or firm ball when it is pressed together, the soil moisture is probably adequate. If the soil is crumbly and will not press together or if it feels dry the tree probably needs a thorough watering. This process of checking the soil is extremely important.

Watering methods that insure proper absorption into the rootzone are those that provide a deep, thorough watering. Preferred methods include: filling a basin/berm area around the tree with water and allowing it to soak in slowly, spiking a hollow tube into the ground and slowly supplying water into the rootzone, and using any of the many available methods of drip irrigation. Each of these methods allows the water to soak in deeply with less water being wasted by run-off. Newly planted trees require a minimum of the equivalent of 1 to 2 inches of rainfall per week.

SUMMARY

The importance of proper installation and establishment of trees and shrubs cannot be overstated, for these things may determine the survival or failure of the plant material. The guidelines in this section provide a minimum standard for the installation and establishment of trees or shrubs on City-owned property or public right-of-way. They must be followed closely.

SECTION III

LAND CLEARING AND LANDSCAPE GUIDELINES FOR NEW DEVELOPMENTS, CONSTRUCTION SITES, AND AREAS OF MAJOR REHABILITATION

The City of Dardenne Prairie is a continually changing community. New development, building rehabilitation, and land clearing projects are regularly occurring within its boundaries. Typically each project is independent of the others; however, they usually occur near existing businesses and residential communities. The existing business owners and residents have a significant investment in Dardenne Prairie. The City realizes it has a responsibility to help protect the value of that investment. To insure random land clearing and inadequately landscaped developments do not occur, Dardenne Prairie has adopted a standard for land clearing and landscaping that is universally applied and strictly adhered to. This standard is mandated in the "Municipal Tree and Landscape Ordinance" for the City of Dardenne Prairie.

The related guidelines to the ordinance are detailed in this section of the Arboricultural Specifications and Standards of Practice. References listing approved street trees and the landscape crediting system are included in the appendix of this manual. Permit applications for the various work associated with development, including work that affects public plant material, some private plant material, and some woodlands, are included in the appendix of this manual. Any plant material installed on City property, including public right-of-way, must be installed in strict accordance with the procedures detailed in Section I and Section II of this manual.

LANDSCAPE REQUIREMENTS AND STREET TREES

Commercial Development

All sites in Dardenne Prairie having new construction, major additions to property or structures, or major rehabilitation are required to submit landscape plans to the City for approval. The landscape plan must show details of the lot, including existing trees, lot size, square foot area of permanent structures, open space calculations and significant features of the site. The plan must also detail all plant material to be installed, including the species, size and quantity of plants. This information will be used to insure the plan is in compliance with the ordinance. If the project is on a tract of land that is greater than three acres and has woodlands, then tree clearing calculations and any tree preservation methods must also be detailed in the landscape plan.

The City of Dardenne Prairie uses a square foot area crediting system to determine if new developments meet a minimum landscape standard. Trees and shrubs have been assigned a square foot credit associated with their mature size. Because trees mature the largest and provide the most benefit to the environment, they are assigned a much higher credit. Shrubs and groundcovers are aesthetically pleasing, but mature smaller and typically do not provide as much environmental service - so they are assigned a smaller square foot credit. Every plant in a landscape, with the exception of turf grass

and annual flowers, is awarded some credit for its contribution to the environment. A list of plants and their square foot credits is included in the appendix of this manual.

Every development is required to install a certain number of square foot landscape credits based on the lot size and the percentage of open space within the development site. As stated in the "Municipal Tree and Landscape Ordinance", open space consists of paved surfaces, green space, landscaping, and all areas that are not covered with a permanent structure.

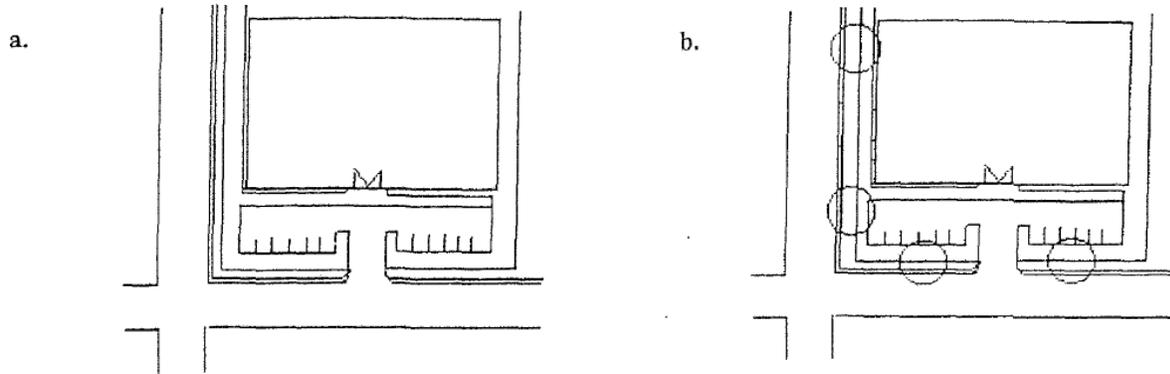
The percentage of open space is calculated by dividing the total open space by the total lot size. All lots having forty percent or less open space must have a minimum total square foot credit equal to twenty percent of the open space. All lots having more than forty (40) percent open space must have a minimum total square foot credit equal to ten (10) percent of the total lot. Most developments will fall into the category of having more than forty (40) percent open space and will default to the simple formula requiring a minimum of ten percent of their lot size in square foot credits.

An example of both scenarios is as follows. Consider a 20,000 square foot lot. If it has 12,000 square feet of permanent structure, then it has 8,000 square feet of open space, or forty (40) percent. The landscape credits must equal or exceed twenty (20) percent of the 8,000 square feet of open space, or 1,600 credits. If that same lot were developed with 4,000 square feet of permanent structure, it would have much greater than forty percent open space. Therefore it would be required to have a minimum of ten (10) percent of the total lot in square foot credits, or 2,000 credits. The difference in the square foot credits required in these two examples equates to the credit for one large maturing tree. The development that has the limited open space would be required a total landscape credit equal to four large maturing trees, while the development that has more available planting area would be required a credit equal to five (5) large maturing trees. This example is illustrated in Figures 6 and 7.

Once the required landscaping credit is calculated, it is compared to the total square foot credits of the proposed plant material shown on the landscape plan submitted to the City. The total credits must meet or exceed the required square foot credits.

Developers are encouraged to exceed the standards set in the ordinance. If site restrictions such as overhead utility lines or existing paved areas prohibit the developer from meeting the required landscape credits, the developer may apply to the City Administrator for a variance from the landscape requirement. Conditions for approval of the variance will include requiring the Developer to make a cash contribution to the City's tree bank in lieu of the required plantings. Funds in the tree bank will be used to plant trees on road right-of-way and other publicly owned property within the City. The cash value of the deposit to the City's tree bank will be calculated by dividing the outstanding landscape credits by 300, which is the credit for a medium maturing tree. This number will be rounded up to the nearest whole number. That whole number will be multiplied by the then average cost of purchasing and installing a 1 1/2" caliper

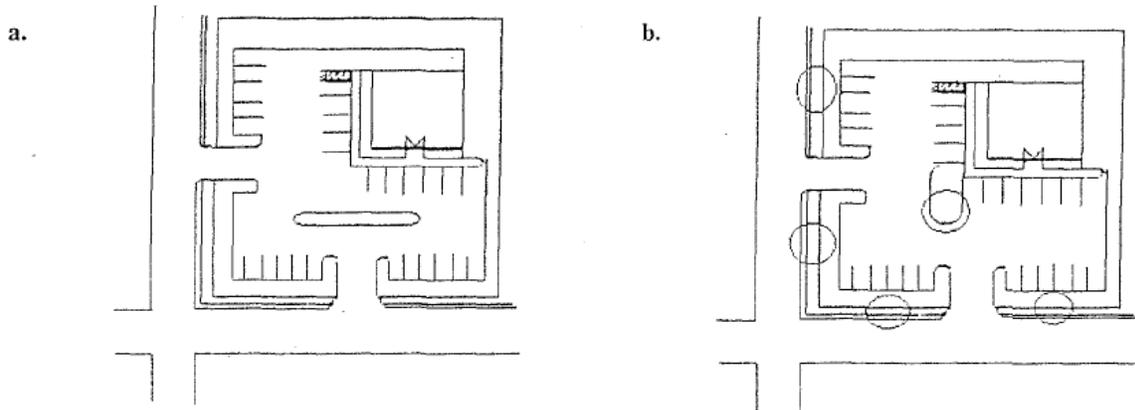
shade tree. That total will equal the required deposit to the City's tree bank in mitigation for not meeting the required landscape plantings.



a.) 20,000 sq. ft. lot with a 12,000 sq. ft. building and 8,000 sq. ft. of open space. First calculate open space percentage. $8000 \div 20,000 = 40\%$ open space. With 40% or less open space, landscape credits must equal 20% of open space.

b.) Next calculate landscape credits required. $8,000 \text{ sq. ft. open space} \times 20\% = 1,600 \text{ sq. ft. credits}$. 4 Sugar Maple trees are shown. At 400 sq. ft. landscape credits for each tree, this illustration meets the requirement.

Figure 6 - Illustrations of Landscape Credit Requirement with 40% or less open space



a.) 20,000 sq. ft. lot with a 4,000 sq. ft. building and 16,000 sq. ft. of open space. First calculate open space percentage. $16,000 \div 20,000 = 80\%$ open space. With more than 40% open space, landscape credits must equal 10% of the total lot.

b.) Next calculate landscape credits required. $20,000 \text{ sq. ft. lot} \times 10\% = 2,000 \text{ sq. ft. credits}$. 5 Sugar Maple trees are shown. At 400 sq. ft. landscape credits for each tree, this illustration meets the requirement.

Figure 7 - Illustrations of Landscape Credit Requirement with more than 10% open space.

Another part of the landscape requirement for commercial developments is the planting of street trees along all road frontages. All developments must plant trees at a maximum spacing of sixty (60) feet along each road or right-of-way the property borders. In commercial and industrial development, it is the preference of the City that these trees be located within the property boundaries of the development, but set back no more than ten feet from the property line (except in the Uptown Zoning District). Street tree spacing in the Uptown Zoning District shall be pursuant to the SmartCode as adopted by the Board of Aldermen. In some situations, it will be acceptable for these trees to be planted in City right-of-way. Planting in right-of-way requires approval by permit prior to installation of plant material and adherence to all the guidelines in this manual. The square foot credits of these trees may be applied toward the required landscaping credits and any required reforestation for that project.

There are quality and size standards that must be met when planting trees on public right-of-way. Unless otherwise specified, all shade trees must have a minimum of 1 ½" caliper and must be single stemmed. Typically, no clump or multi-stemmed trees will be allowed for planting in right-of-way. Flowering and ornamental trees must be a minimum of 6 foot tall and evergreen trees must be a minimum of 5' tall. All shrubs must be in a 2 gallon or larger size container, be balled and burlapped, or be a minimum of 16 inches tall. All plant material must be of specimen quality. These standards are the absolute minimum for right-of-way plantings, and most right-of-way plantings will be required to exceed them. Additionally, a no-cost permit must be applied for and obtained before the installation of any plant material on City-owned property, including public right-of-way.

Since mature trees are the most beneficial, additional credit will be given to developers who preserve existing plant material. Each situation will be evaluated individually. The age, size, species, health, and location of existing trees and shrubs will be taken into consideration. The method of preservation must also be evaluated. If proper preservation techniques are implemented and the plant material is not damaged, a greater landscape credit than that listed in the table may be assigned. A landscape credit equaling the square foot area of a high quality, properly preserved woodlands could be awarded. In some situations it may be possible to achieve the entire required landscape credits with existing plant material. The street tree requirement must still be met in those situations, but other landscaping would not be required to comply with City Code.

All developments in the City of Dardenne Prairie, excluding single-family residential lots, are required to meet the landscape credits. If forested areas are cleared, additional plantings may be required as outlined in the Land Clearing and Reforestation section that immediately follows this Landscape Requirements and Street Tree section of this manual.

Residential Development and Subdivisions

Single-family residential developments are not subject to the landscape credit requirements, but they are subject to the street tree requirements in City Code. Developers are required to plant street trees in public right-of-way in the residential development. A street tree planting plan should be submitted to the City in the initial stages of planning the development. The planting plan should clearly illustrate the number, size and species of trees to be planted in front of every residential lot within the development. The Parks Department will review the proposed street tree plan and issue a planting permit once the plan is approved. A permit must be obtained before street trees are installed. Any restrictions or guidelines the City may impose in addition to those in the ordinance or accompanying manual will be outlined in the conditions for approval on the permit. **Street trees must be planted in the right-of-way and in strict accordance with Section II of this manual and the SmartCode for developments within the Uptown Zoning District.**

By ordinance, one tree must be planted for every forty feet of road frontage on each lot, with a minimum of one tree per lot (except within the Uptown Zoning District. The spacing of street trees within the Uptown Zoning District shall be pursuant to the SmartCode). This requirement may be calculated by dividing the total linear feet of roadway in a development by 40, but that method usually results in a higher than required number of trees. The ordinance requirement is based on a calculation per lot. To calculate the required street trees per lot, the road frontage along each individual lot is totaled. This total must be inclusive of the linear feet of every road that individual lot abuts to, including streets that border the sides and rear of the property. This individual lot right-of-way abutment total is divided by forty and rounded down to the nearest whole number. That whole number is the number of street trees that must be planted in the right-of-way bordering that lot.

If a development has sidewalks and the green strip between the curb and sidewalk is at least five (5') feet wide in every direction, then street trees must be planted between the street and sidewalk. In such a situation, the required street trees may not be planted in the right-of-way on the private property side of the sidewalk. The trees must be centered in the green space between the curb and sidewalk. However, the exact placement along the lot line (left or right) is typically left up to the developer's or homeowner's discretion to accommodate for driveways, future landscaping concerns, or other situations. If a development has sidewalks but the green strip between the curb and sidewalk is less than five (5') feet wide in every direction, street trees may not be planted between the street and sidewalk. In such a situation, the required street trees must be planted in the right-of-way on the private property side of the sidewalk. When green strip limitations require such placement, care should be taken to insure the entire trunk of the tree will remain within City right-of-way as the tree matures. In most situations, this will necessitate centering the tree in the right-of-way between the sidewalk and the property boundary line, typically 30" off the sidewalk and 30" off the private property boundary line. There may be exceptions to this guideline. The exact placement along the lot line

(left or right) is typically left up to the developer's or homeowner's discretion to accommodate for driveways, future landscaping concerns, or other situations.

If a development does not have sidewalks, then street trees should be centered in the right-of-way between the curb and the property line. Again, the exact placement along, or parallel to, the property line will typically be left to the discretion of the developer or bordering property owner.

Some situations may prohibit the installation of street trees. These situations include lots with narrow road frontage or lots with numerous above-ground structures in the right-of-way. As a result, street trees may be omitted from the right-of-way in front of some individual lots. If trees cannot be planted, or if a lot owner requests that no tree be planted, the trees must be planted in other right-of-way within the City of Dardenne Prairie or a cash donation may be made to the City's tree bank in lieu of planting. The number of trees required for a development will not be reduced as a result of these situations. Requests to omit trees must be submitted in writing from the lot owner to the City of Dardenne Prairie. The City prefers the required number of trees for a subdivision be planted in right-of-way within that subdivision. If a lot owner with limited road frontage desires to have a street tree planted in spite of the confined area, every attempt must be made to plant the tree in that area. A developer may request the City be responsible for plantings street trees in their project site. In such a situation the required number of street trees would be calculated and the developer would make a cash donation to the City of Dardenne Prairie for the value of these trees as detailed below. In such situations the City would handle all aspects of the street tree installation however the developer would be responsible for informing homebuyers prior to signing a contract that the subdivision streets will be tree-lined.

If the developer opts to make a cash donation to the City's tree bank in lieu of tree planting or to account for omitted trees, the cash value of the deposit will be calculated by multiplying the number of omitted trees times the then-average cost of purchasing and installing a 1 ½" caliper shade tree. All tree bank funds will be used to plant trees on road right-of-way or other publicly owned property within the City.

Quality and Size Standards

There are quality and size standards that must be met when planting trees on public right-of-way. Unless otherwise specified, all shade trees must have a minimum of 1 ½" caliper and must be single stemmed. Typically, no clump or multi-stemmed trees will be allowed for right-of-way plantings. Flowering and ornamental trees must be a minimum of 6' tall and evergreen trees must be a minimum of 5' tall. All plant material must be of specimen quality. These standards are the absolute minimum and some developments may be required to exceed them.

LAND CLEARING AND REFORESTATION

The "Municipal Tree and Landscape Ordinance" for the City of Dardenne Prairie is very specific about the amount of forested area that may be cleared on tracts of land over three acres. Repeatedly, studies have shown land clearing directly increases erosion, flooding, and urban heat potential while decreasing the filtration of dust and pollutants. These outcomes result in a negative and expensive impact that reaches far beyond the tract of land being cleared, affecting the entire community.

There are many examples of cities that have developed beyond their capacity to process storm water. Systems like the River Des Peres in St. Louis, Missouri and the Deep Tunnel in Milwaukee, Wisconsin illustrate the expense and the problems associated with storm water running off too fast. Forested areas slow storm water. No man made structure can replace nature's solution to slowing storm water and reducing flooding.

Urban heat problems in the city of Atlanta, Georgia, illustrate how drastically temperature, change when land is cleared. Thermal images captured by NASA over parking lots in Atlanta measured temperatures as high as 120 degrees Fahrenheit while the nearby forest radiated only 85 degrees Fahrenheit. The average temperature in Atlanta, Georgia, increased dramatically over a twenty-year span because so many trees were removed and forests were cleared.

Removing tree canopy also reduces the amount of filtration of dust and pollutants from the air. A 1999 study through Duke University found the earth's tree canopy will need to double by the year 2050 just to process the carbon emissions from automobiles alone.

For these reasons and many others, the "Municipal Tree and Landscape Ordinance" for the City of Dardenne Prairie allows no more than fifty percent of the forested area to be cleared or developed on tracts of land over three acres. If this restriction creates a hardship, a developer may apply for a permit to clear additional land. The conditions for approval to clear additional land begin with developing a Reforestation Agreement and implementing the steps outlined in the agreement, which includes replanting a larger area on the same property or on other Dardenne Prairie property, implementing all tree protection measures as necessary, and posting a surety or cash escrow bond.

In rare instances of extreme hardship, the City Administrator has the ability to waive the ordinance reforestation requirement. This administrative relief will be negotiated to compensate for the reduced reforestation and the hardship situation.

Reforestation

When forested areas are cleared, the services they provided are immediately eliminated. The impact is not only instantaneous: it is often accumulative. Erosion begins, storm water run-off increases, flooding increases, sediments begin building in streams and rivers, pollution filtration benefits are eliminated, and wildlife habitat is destroyed. These things set in motion a cycle of degradation that perpetuates itself if not restricted. For this reason, the "Municipal Tree and Landscape Ordinance" for the City of Dardenne Prairie limits forest clearing to fifty (50) percent on tracts of land over three acres.

Property of this size has great potential to impact the entire municipality. If acres of forest are suddenly cleared, all the surrounding properties suffer, especially those downstream. Property owners of tracts of land over three acres may clear up to fifty (50) percent of their forested areas with no restriction. If more than fifty (50) percent needs to be removed, the developer must apply for and obtain a permit for the additional clearing. Conditions of permit approval include developing a "Reforestation Agreement" and establishing a reforestation escrow.

The Reforestation Agreement is prepared by the City and is based on the clearing calculations, planting plan, cost estimate all submitted by the developer. The calculations must be submitted on a plan that clearly identifies existing woodlands, proposed preserved woodlands and proposed removed woodlands. The square footage, or acreage of these areas must be included along with a detail of any preservation methods that will be used. The calculations to show the required mitigated reforestation area and the number of trees required for reforestation must be on the plan. The uses of existing woodlands shown on the plan will be field verified by City staff. Preserved areas and protection measures will also be field verified City staff before a tree-clearing permit will be issued. Protection measures for preserved woodlands must be in place prior to the commencement of clearing or grading operations.

The planting plan submitted as part of the reforestation requirement may be very simple. It is difficult at such an early stage in the development process to establish the specific details of the final planting. Therefore, the planting plan is required only to be representative of an option that would accomplish the installation of the required number of trees. A reasonable and accurate quote from a reputable nursery to complete the required plantings must also be submitted. This quote is used to establish the escrow that is required to obtain a tree-clearing permit. Quotes that are determined to be unrealistic by the City will be rejected and the developer will then be required to provide three quotes from separate nurseries. The City will use those quotes to establish an accurate escrow sum.

The formula for calculating the required reforestation is outlined below. The developer is required to reforest an area equal to 1.5 times the surface canopy of the additionally cleared woodlands. Newly planted trees take years to provide the services the established trees had provided. That is why the formula for reforestation includes a reforestation factor that multiplies the extra cleared area by 1.5, to begin the mitigation for the lost ecological services.

Formula to Calculate Mitigated Reforestation Area

Total area of woodlands	x	50%	=	Unrestricted or Allowable clearing
Total proposed woodland clearing	-	Unrestricted or allowable clearing	=	Additionally Cleared Area
Additionally cleared area	x	1.5 Reforestation Factor	=	Mitigated Reforestation Area

As an illustration of this formula, consider a developer with an eight-acre site of which half, or four acres, is woodlands and the other half is open ground. The four acres of open ground and two acres of the wooded area could be developed with no land clearing restrictions. On the eight acres in this example, six acres are unrestricted. If the developer needed to clear additional forested area, possibly an extra 2/3 acre, the conditions for approval would include requiring the developer to reforest 1.5 times the additionally cleared area, or in this example approximately one (1) acre.

Example:

4 acres of woodlands	x	50%	=	2 acres Unrestricted or Allowable clearing
2.66 acres proposed woodland clearing	-	2 acres allowable clearing	=	0.66 acres Additionally Cleared Area
0.66 acres	x	1.5 Reforestation Factor	=	0.99 acres Mitigated Reforestation Area

The planting requirement associated with the Mitigated Reforestation Area is modeled after standard forestry practices of planting three hundred (300) to six hundred (600) hardwood trees per acre. Using this standard as a guide, the City of Dardenne Prairie requires planting four hundred (400) trees per reforested acre, with no more than one-third (1/3) of those trees being small maturing trees. Naturally occurring woodlands may have two to three times this number of trees but the City realizes replacing an entire forest has its limits and a reasonable standard must be set. To complete the reforestation calculations, multiply the mitigated reforestation area in acres by four hundred (400) trees per acre. The resulting number will be the number of trees required for reforestation.

Formula to Determine the Number of Trees Required for Reforestation

Mitigated Reforestation Area in acres (as calculated above)	x	400 trees per acre	=	Number of Trees Required for Reforestation
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It is the preference of the City of Dardenne Prairie that mitigation be accomplished by planting masses of young trees in naturalized groupings that are at least minimally connected. Such massing and connectivity offers corridors for wildlife and magnified environmental benefits. Young trees, approximately 1" caliper, offer the greatest ratio of having an immediate impact on the environment while at the same time having the greatest potential for successful establishment. As a result, the City of Dardenne Prairie requires reforestation plans to be established on the basis of planting 1" caliper trees.

On some development sites, it may be difficult to re-establish a large area of contiguous woodlands. Additionally, many developers feel it is advantageous to their development to plant larger, more mature trees. As a result, the City will often allow the number of trees required for mitigation to be equated directly to caliper inches of trees. In such situations, every tree planted on the development site may be credited toward the required planting at a rate equal to its caliper inch measurement. This option is subject to approval by the City Administrator.

If the reforestation requirement is impossible to achieve on the development site, as many trees as possible must be planted on the site and the remaining balance of trees must be either planted on other property within the city limits of Dardenne Prairie or be provided for planting on Dardenne Prairie public properties. Any balance of trees provided to the City will be in the form of a cash deposit to the City's tree bank. The dollar amount will be calculated by multiplying the number of outstanding trees to be planted by the then average dollar amount for purchasing and planting a 1" caliper tree.

Additional standards for reforestation include a minimum number of tree species and a minimum planting size. There must be at least five different tree species planted in each reforested area. Tree species must be approved by the City of Dardenne Prairie. The minimum size tree for reforestation is a 1-inch caliper, six-foot tall branched deciduous tree and a four foot tall evergreen tree. Areas planted as mitigation to clear additional land on a development site may not be cleared a later date without being replaced at 1.5 times the calculated reforested surface canopy. This stipulation applies to all areas reforested, regardless of whether they are on the developer's site, other privately owned property, or public land.

Tree Protection Measures and Replacing Preserved Canopy

Methods of protecting trees during construction are detailed in Section I of this manual. These or other approved methods must be implemented to protect the preserved tree canopy on a development site. If a preserved tree or any tree within the required canopy coverage dies as a result of grading or construction damage, or if trees suffer damage that compromises their health or stability, the developer will be responsible for tree replacement or a fine as decided by the City Administrator. Tree replacement will be determined by measuring the total caliper inches of trees that were damaged or destroyed and requiring that number of caliper inches of trees to be planted on site in addition to any previously required plantings. City staff must approve the replacement species, and all trees must be planted in strict accordance to this manual. Any trees that were planted on site in surplus of the required landscape credits and reforestation requirement may be applied to this replacement requirement. If a fine is rendered, it will be equal to the value of the trees that died or were compromised using the International Society of Arboriculture's Guide for Plant Appraisal.

The determination of whether a tree has been compromised as a result of the construction project will be made by a City employed certified arborist. If a dispute arises, the developer will have the right to hire a certified arborist, not affiliated with the City of Dardenne Prairie, to evaluate the situation and mediate with City staff. The City Administrator will make all final decisions.

Surety or Cash Escrow

Before the City will issue a tree removal permit for clearing additional acreage, the developer will be required to post a surety or cash escrow to account for trees in the preserved canopy area that die or are damaged beyond repair as a result of grading or construction damage. This surety or cash escrow will be held by the City of Dardenne Prairie for three years after the completion of grading or one year after the completion of the entire project, whichever is longer. At that time it will be returned as long as all requirements have been met and no irreparable damage has occurred. The surety or cash escrow will be the greater of either \$10,000.00 or the calculated amount using the formula described below. If the total preserved area is five acres or less, the developer will be required to post \$10,000.00 in cash escrow. If the site to be preserved is greater than five acres, the amount of escrow is determined using the formula in Section 515.100 of the Municipal Tree and Landscape Ordinance. To calculate the escrow, measure the total perimeter length of the preserved area. Multiply this by one hundred (100) feet or the width of the preserved area, whichever is smaller. Divide this by 43,560 feet (1 acre). This determines the number of acres within the described area. The developer will be required to escrow \$2,000.00 for each acre contained in the described area or \$10,000.00, whichever is greater.

CONCLUSION

The installation and maintenance of trees and landscaping is not only beneficial, it is essential. Trees and landscaping enhance the ecological environment, reduce energy consumption and pollution, stabilize soil, reduce flooding, increase property values, and provide an invaluable psychological relief from the concrete and asphalt of the city. The necessity of these things cannot be overstated.

The aesthetic and ecological benefits begin immediately upon installation of trees and shrubs. In addition, the value of a well-maintained landscape increases as it matures. Studies have shown that trees and landscaping can increase property values by as much as twenty (20) percent.

To protect the environment, enhance the aesthetics, and increase the property values within the City of Dardenne Prairie, aggressive action must be pursued. Preservation of the urban forest will necessitate proper maintenance, continual replenishment, and legislative protection. It is the civic duty of the leaders of the City of Dardenne Prairie to assume this responsibility and provide a standard that will protect and enhance the urban forest. It is for these reasons this Arboricultural Specifications Manual exists.

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APPENDICES

1. Application for Permit - Installation, Maintenance and Removal of Plant Material on City Property
2. Application for Permit - Approval of Specifications for Routine Operations Affecting Public Plant Material
3. Application for Permit - Tree Removal on Tracts of Land Over Three Acres, for Excavation Affecting Plant Material, and for Landscape Installation and Removal in Conjunction with Development Acceptable Trees for Street Tree Plantings - Large, Medium, and Small Tree Categories
4. Acceptable Trees for Street Tree Planting
5. Plant List and Square Foot Landscape Credits
6. References

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Permit # _____

**Municipal Tree and Landscape Ordinance Permit Application for Installation,
Maintenance and Removal of Plant Material on City Property**

Please print or type. Fill in all applicable spaces. Attach additional sheets if necessary.

Property Owner Name: _____

Address: _____

City: _____ State: _____ Zip: _____ Phone: _____

Contractor Name (if different than above): _____

Address: _____

City: _____ State: _____ Zip: _____ Phone: _____

PERMISSION IS REQUESTED TO:

_____ Install plant material on City-owned property or right-of-way

_____ Perform maintenance on plant material on City-owned property or right-of-way

_____ Remove plant material from City-owned property or right-of-way

Describe specific plant material to be installed, maintained or removed: _____

Specific location of plant material to be installed, maintained or removed: _____

Detail all procedures and equipment to be used: _____

Any person violating any of the following conditions or willfully failing to comply with the requirements of this permit shall be subject to fines as outlined in the Municipal Tree and Landscape Ordinance and subject to revocation of this permit.

- A. All applicable construction permits must be approved prior to initiation of any work.
- B. Missouri One Call System must be notified before any excavation begins. The excavator is responsible for insuring all utility companies having services in the excavation area are notified and they mark their respective underground utility lines.
- C. The City must be notified at least twenty-four (24) hours prior to the initiation of any work.
- D. A protective lane for traffic shall be provided at all times.
- E. All excavated areas must be properly backfilled and graded.
- F. All work performed must conform to the guidelines in the Arboricultural Specifications and Standards of Practice Manual.

Work Start Date: _____ Estimated Completion Date: _____

I hereby certify that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his/her agent, and I agree to conform to all applicable laws of this jurisdiction. I have read and understand all the terms and conditions of this permit.

Name (Please Print): _____

Signature: _____ Date: _____

Conditions of Approval: _____

Permit Expires: _____

Approved By: _____ Date: _____

Permit # _____

Municipal Tree and Landscape Ordinance Permit Application for Approval of Specifications for Routine Operations Affecting Public Plant Material

Please print or Type. Fill in all application spaces. Attach additional sheets if necessary.

Utility or Contractor Name: _____

Address: _____

City: _____ State: _____ Zip: _____ Phone: _____

Contact Person: _____ Title: _____

SPECIFICATIONS ARE BEING SUBMITTED FOR. *(Please check):*

- _____ Performing maintenance on plant material on City-owned property or right-of-way
- _____ Excavating on City property or right-of-way within the drip line of City-owned plant material
- _____ Excavating on City property or right-of-way within 15' of privately owned plant material
- _____ Excavating on private property within the drip line of City-owned plant material

Detail all procedures and equipment used in the indicated operations. Attach additional sheets if necessary: _____

All requests for installations or removal of City-owned plant material will be handled on an individual permit basis.

Submitted by: _____ Date: _____

Any person violating any of the following conditions, or willfully failing to comply with the requirements of this permit shall be subject to fines as outlined in the Municipal Tree and Landscape Ordinance revocation of this permit.

- A. All applicable construction permits must be approved prior to initiation of any work.
- B. Missouri One Call System must be notified before any excavation begins. The excavator is responsible for insuring all utility companies having services in the excavation area are notified and they mark their respective underground utility lines.
- C. The City must be notified at least 24 hours prior to the initiation of any work.
- D. A protective lane for traffic shall be provided at all times.
- E. All excavated areas must be properly backfilled and graded.
- F. All work performed must conform to the guidelines of the Arboricultural Specifications and Standards of Practice Manual.

I hereby certify that the specifications submitted detail the manner in which all routine operations affecting public plant material will be done. I understand that approval of these specifications in no way authorizes any work to be done, and any necessary permits will be applied for as appropriate. I have been authorized by the owner to make this application as his/her agent, and we agree to conform to all applicable laws of this jurisdiction. I have read and understand all the terms and conditions of this permit.

Name (Please Print): _____

Signature: _____ Date: _____

Conditions of Approval: _____

Permit Expires: _____

Approved By: _____ Date: _____

Permit # _____

Municipal Tree and Landscape Ordinance Permit Application for Tree Removal on Tracts of Land Over Three Acres, for Excavation Affecting Plant Material, and for Landscape Installation and Removal in Conjunction with Development

Please print or type. Fill in all applicable spaces. Attach additional sheets if necessary.

Development Name: _____

Address: _____

Property Owner Name: _____

Address: _____

City: _____ State: _____ Zip: _____ Phone: _____

Contractor Name (if different than above): _____

Address: _____

City: _____ State: _____ Zip: _____ Phone: _____

PERMISSION IS REQUESTED TO:

_____ Clear or develop more than fifty (50) percent of woodland area on a tract of land greater than three (3) acres.

_____ Excavate on City-owned property or public right-of-way within the drip line of City-owned plant material.

_____ Excavate on City-owned property or public right-of-way within fifteen (15) feet of privately owned plant material.

_____ Excavate on private property within the drip line of City-owned plant material.

_____ Removal of plant material from City-owned property or public right-of-way.

_____ Installation of plant material from City-owned property or public right-of-way.

Describe specific plant material to be installed, affected, maintained or removed: _____

Specific location of plant material: _____

Detail all procedures and equipment to be used: _____

Reason additional clearing is necessary: _____

Any person violating any of the following conditions or willfully failing to comply with the requirements of this permit shall be subject to fines as outlined in the Municipal Tree and Landscape Ordinance and subject to revocation of this permit

- A. All applicable construction permits must be approved prior to initiation of any work.
- B. Missouri One Call System must be notified before any excavation begins. The excavator is responsible for insuring all utility companies having services in the excavation area are notified and they mark their respective underground utility lines.
- C. The City must be notified at least twenty-four (24) hours prior to the initiation of any work.
- D. A protective lane for traffic shall be provided at all times.
- E. All excavated areas must be properly backfilled and graded.
- F. All work performed must conform to the guidelines in the Arboricultural Specifications and Standards of Practice Manual.

Work Start Date: _____ Estimated Completion Date: _____

I hereby certify that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his/her agent, and I agree to conform to all applicable laws of this jurisdiction. I have read and understand all the terms and conditions of this permit.

Name (Please Print): _____

Signature: _____ Date: _____

Conditions of Approval: _____

Permit Expires: _____

Approved By: _____ Date: _____

ACCEPTABLE TREES FOR STREET TREE PLANTINGS
IN THE CITY OF DARDENNE PRAIRIE (Listed by Height)

Note: All trees must be placed in appropriate locations as approved by the City. Trees marked by an asterisk (*) have additional restrictions. Specimen quality, single stem trees only. No clump forms are acceptable.

Large Deciduous Trees Over 60 feet Mature Height

Acer saccharum*	Sugar Maple
Liriodendron tulipifera	Tulip Tree
Quercus alba*	White Oak
Quercus macrocarpa*	Burr Oak
Quercus robur	English Oak
Quercus rubra	Red Oak
Tilia americana*	American Linden
Zelkova serrata	Japanese Zelkova

Medium Deciduous Trees 30 - 60 Feet Mature Height

Acer campestre*	Hedge Maple
Acer platanoides*	Norway Maple
Acer rubrum	Red Maple
Aesculus glabra*	Ohio Buckeye
Aesculus hippocastanum*	Horsechestnut
Betula nigra*	River Birch
Carpinus betulus	European Hornbeam
Cercidiphyllum japonicum	Katsuratree
Fagus sp.*	Beech
Fraxinus sp.	Ash ————— Removed 4/2008
Ginkgo biloba*	Ginkgo
Gymnocladus dioicus	Kentucky Coffeetree
Juglans sp.*	Walnut, Butternut
Nyssa sylvatica	Black Gum
Phellodendron amurense	Amur Corktree
Pseudolarix kaempferi*	Golden-larch
Quercus imbricaria*	Shingle Oak
Quercus phellos	Willow Oak
Quercus velutina*	Black Oak
Quercus stellata*	Post Oak
Robinia pseudoacacia	Black Locust
Sassafrass albidum	Sassafrass
Sophora japonica	Japanese Pagodatree
Taxodium distichum	Baldcypress
Tilia cordata	Littleleaf Linden
Tilia x euchlora	Crimean Linden

* - Designates trees that have additional restrictions due to size, growth habit, fruit production, typical root aggressiveness, susceptibility to storms, specific cultural requirements or other reasons. These trees will be approved only under the ideal situation for the specific species. Single-trunk, tree-form specimen trees only.

Small Deciduous Trees 0 - 30 Feet Mature Height

Acer buergeranum	Trident Maple
Acer ginnala	Amur Maple
Acer griseum	Paperback Maple
Acer palmatum*	Japanese Maple
Acer tataricum	Tatarian Maple
Amelanchier arborea*	Serviceberry
Carpinus caroliniana	American Hornbeam
Cercis canadensis*	Redbud
Cornus sp. (tree forms)*	Dogwood
Halesia carolina	Carolina Silverbell
Hamamelis virginiana*	Common Witchhazel
Koelruetaria paniculata	Goldenraintree
Malus sp.*	Crabapple
Styrax japonicus	Japanese Snowbell
Syringa reticulata	Japanese Tree Lilac

* - Designates trees that have additional restrictions due to size, growth habit, fruit production, typical root aggressiveness, susceptibility to storms, specific cultural requirements or other reasons. These trees will be approved only under the ideal situation for the specific species. Single-trunk, tree-form specimen trees only.

PLANT LIST AND SQUARE FOOT LANDSCAPE CREDITS

Botanical Name	Common Name	Right-of-Way	Credit
<i>Abelia x grandiflora</i>	Glossy Abelia	yes	15 sq. ft.
<i>Abies</i> sp.	Fir	limited use	400 sq. ft.
<i>Acer buergeranum</i>	Trident Maple	yes	200 sq. ft.
<i>Acer campestre</i>	Hedge Maple	yes +	300 sq. ft.
<i>Acer ginnala</i>	Amur Maple	yes	200 sq. ft.
<i>Acer griseum</i>	Paperback Maple	yes	200 sq. ft.
<i>Acer palmatum</i>	Japanese Maple	yes	200 sq. ft.
<i>Acer platanoides</i>	Norway Maple	yes +	300 sq. ft.
<i>Acer rubrum</i>	Red Maple	yes	300 sq. ft.
<i>Acer saccharinum</i>	Silver Maple	no	300 sq. ft.
<i>Acer saccharum</i>	Sugar Maple	yes	400 sq. ft.
<i>Acer tataricum</i>	Tatarian Maple	yes	200 sq. ft.
<i>Aesculus glabra</i>	Ohio Buckeye	yes +	300 sq. ft.
<i>Aesculus hippocastanum</i>	Horsechestnut	yes +	300 sq. ft.
<i>Aesculus parviflora</i>	Bottlebrush Buckeye	yes	50 sq. ft.
<i>Ailanthus altissima</i>	Tree of Heaven	no	200 sq. ft.
<i>Albizia julibrissin</i>	Mimosa	no	200 sq. ft.
<i>Alnus glutinosa</i>	European Alder	no	200 sq. ft.
<i>Amelanchier arborea</i>	Downy Serviceberry	yes	200 sq. ft.
<i>Amelanchier canadensis</i>	Shadblow	yes	50 sq. ft.
<i>Aronia</i> sp.	Chokeberry	yes	30 sq. ft.
<i>Berberis</i> sp. **	Barberry	limited use	10 to 20 sq. ft.
<i>Betula</i> sp.	Birch	limited use	300 sq. ft.
<i>Buddleia davidii</i>	Butterfly-bush	yes	30 sq. ft.
<i>Buxus</i> sp. - evaluated and credits assigned per cultivar		yes	10 to 50 sq. ft.
<i>Calycanthus floridus</i>	Carolina Allspice	yes	30 sq. ft.
<i>Campsis radicans</i>	Trumpet Vine	limited use	40 sq. ft.
<i>Caragana arborescens</i>	Siberian Peashrub	yes	50 sq. ft.
<i>Carpinus betulus</i>	European Hornbeam	yes	300 sq. ft.
<i>Carpinus caroliniana</i>	American Hornbeam	yes	200 sq. ft.
<i>Carya</i> sp.	Hickory	limited use	400 sq. ft.
<i>Castanea mollissima</i>	Chinese Chestnut	limited use	300 sq. ft.
<i>Catalpa</i> sp.	Catalpa	limited use	300 sq. ft.
<i>Celastrus scandens</i>	Am Bittersweet	limited use	40 sq. ft.
<i>Celtis</i> sp.	Hackberry	limited use	300 sq. ft.
<i>Cephalanthus occidentalis</i>	Button Bush	limited use	20 sq. ft.
<i>Cercidiphyllum japonicum</i>	Katsuratree	yes	300 sq. ft.
<i>Cercis canadensis</i>	Redbud	yes	200 sq. ft.
<i>Chaenomeles speciosa</i>	Flowering Quince	limited use	30 sq. ft.
<i>Chionanthus virginicus</i>	Fringetree	yes	50 sq. ft.
<i>Cladrastis lutea</i>	American Yellowwood	limited use	300 sq. ft.
<i>Clematis</i> sp.	Clematis	yes	20 sq. ft.
<i>Clethra alnifolia</i>	Summersweet Clethra	yes	20 sq. ft.
<i>Cornus</i> (shrub forms)	Dogwood	yes	40 sq. ft.
<i>Cornus</i> (tree forms)	Dogwood	yes +	200 sq. ft.
<i>Cotinus coggygria</i>	Smoketree	limited use	50 sq. ft.
<i>Cotoneaster</i> sp.	Cotoneaster	yes	20 sq. ft.
<i>Crataegus</i> sp.	Hawthorn	limited use	200 sq. ft.
<i>Deutzia gracilis</i>	Slender Deutzia	yes	20 sq. ft.
<i>Deutzia scabra</i>	Fuzzy Deutzia	yes	30 sq. ft.

** - 10 sq. ft. credit for dwarf or pygmy cultivars

+ Designates trees acceptable for right-of-way with restrictions

PLANT LIST AND SQUARE FOOT LANDSCAPE CREDITS - continued

Botanical Name	Common Name	Right-of-Way	Credit
Diospyros virginiana	Persimmon	limited use	300 sq. ft.
Elaeagnus sp.	Russian-olive	limited use	200 sq. ft.
Euonymus alatus	Burning Bush	yes	40 sq. ft.
Euonymus a. 'compactus'	Dwarf Burning Bush	yes	30 sq. ft.
Euonymus fortunei	Wintercreeper	yes	4 sq. ft.
Fagus sp.	Beech	yes +	300 sq. ft.
Forsythia sp.	Forsythia	yes	50 sq. ft.
Fraxinus sp.	Ash Removed 4/2008	yes	300 sq. ft.
Ginkgo biloba	Ginkgo	limited use	300 sq. ft.
Gleditsia tricanthos var. inermis	Thornless Honeylocust	limited use	300 sq. ft.
Gymnocladus dioicus	Kentucky Coffeetree	yes	300 sq. ft.
Halseia carolina	Carolina Silverbell	yes	200 sq. ft.
Hamamelis vernalis	Vernal Witchhazel	yes	40 sq. ft.
Hamamelis virginiana	Common Witchhazel	yes	200 sq. ft.
Hamamelis mollis	Chinese Witchhazel	yes	50 sq. ft.
Hedera helix	English Ivy	yes	4 sq. ft.
Hibiscus syriacus	Rose-of-Sharon	limited use	40 sq. ft.
Hydrangea petiolaris	Climbing Hydrangea	yes	40 sq. ft.
Hydrangea arborescens	Smooth Hydrangea	limited use	20 sq. ft.
Hydrangea macrophylla	Bigleaf Hydrangea	yes	10 sq. ft.
Hydrangea paniculata	Panicle Hydrangea	yes	50 sq. ft.
Hydrangea quercifolia	Oakleaf Hydrangea	limited use	20 sq. ft.
Hypericum sp.	Shrubby St. Johnswort	yes	20 sq. ft.
Ilex x attenuata	Foster Holly	limited use	200 sq. ft.
Ilex cornuta	Chinese Holly	yes	40 sq. ft.
Ilex crenata	Japanese Holly	yes	30 sq. ft.
Ilex decidua	Possumhaw	yes	50 sq. ft.
Ilex glabra	Inkberry	yes	40 sq. ft.
Ilex x meserveae	Meserve Hybrid Hollies	yes	20 sq. ft.
Ilex opaca	American Holly	limited use	300 sq. ft.
Ilex pedunculosa	Longstalk Holly	yes	50 sq. ft.
Ilex verticillata	Common Winterberry	yes	40 sq. ft.
Itea virginica	Virginia Sweetpire	yes	20 sq. ft.
Juglans sp.	Walnut	yes +	300 sq. ft.
Juniperus chinensis	Chinese Juniper	yes	50 sq. ft.
Juniperus conferta	Shore Juniper	yes	20 sq. ft.
Juniperus horizontalis	Creeping Juniper	yes	20 sq. ft.
Juniperus procumbens	Japgarden Juniper	yes	20 sq. ft.
Juniperus sabina	Savin Juniper	yes	30 sq. ft.
Juniperus virginiana	Eastern Redcedar	limited use	200 sq. ft.
Kalmia latifolia	Mountain-laurel	limited use	50 sq. ft.
Kerria japonica	Japanese Kerria	limited use	20 sq. ft.
Koelreuteria paniculata	Goldenraintree	yes	200 sq. ft.
Kolkwitzia amabilis	Beautybush	limited use	30 sq. ft.
Lagerstroemia indica	Crapemyrtle	limited use	30 sq. ft.
Larix decidua	Common Larch	limited use	400 sq. ft.
Ligustrum amurense	Privet	yes	40 sq. ft.
Ligustrum x vicaryi	Golden Vicary	limited use	30 sq. ft.
Lindera benzoin	Spicebush	yes	40 sq. ft.
Liquidambar styraciflua	Sweetgum	limited use	400 sq. ft.
Liriodendron tulipifera	Tuliptree	yes	400 sq. ft.
Liriope sp.	Lilyturf	yes	4 sq. ft.

** - 10 sq. ft. credit for dwarf or pygmy cultivars

+ Designates trees acceptable for right-of-way with restrictions

PLANT LIST AND SQUARE FOOT LANDSCAPE CREDITS - continued

Botanical Name	Common Name	Right-of-Way	Credit
Lonicera sp. (shrub form)	Honeysuckle	yes	40 sq. ft.
Lonicera sp. (vine form)	Honeysuckle	yes	30 sq. ft.
Maclura pomifera	Osage Orange	limited use	300 sq. ft.
Magnolia sp.	Magnolia	limited use	200 sq. ft.
Mahonia aquifolium	Oregon Grapeholly	limited use	20 sq. ft.
Malus sp.	Flowering Crabapple	limited use	200 sq. ft.
Metasequoia glyptostroboides	Dawn Redwood	limited use	400 sq. ft.
Miscanthus and similar size ornamental grasses		limited use	10 sq. ft.
Morus sp.	Mulberry	no	300 sq. ft.
Myrica pensylvanica	Northern Bayberry	yes	40 sq. ft.
Nandina domestica	Heavenly Bamboo	limited use	20 sq. ft.
Nyssa sylvatica	Blackgum	yes	300 sq. ft.
Oxydendrum arboreum	Sourwood	limited use	200 sq. ft.
Parthenocissus quinquefolia	Virginia Creeper	limited use	30 sq. ft.
Pennisetum and similar size ornamental grasses		limited use	4 sq. ft.
perennial plants - evaluated and credits assigned per cultivar		limited use	2 to 4 sq. ft.
Phellodendron amurense	Amur Corktree	yes	300 sq. ft.
Philadelphus coronarius	Sweet Mockorange	yes	50 sq. ft.
Physocarpus opulifolius	Ninebark	yes	40 sq. ft.
Picea sp. (tree form spruce) - evaluated and credits assigned per cultivar		limited use	40 to 300 sq. ft.
Picea sp. (shrub form spruce) - evaluated and credits assigned per cultivar		limited use	4 to 40 sq. ft.
Pieris japonica	Japanese Pieris	no	40 sq. ft.
Pinus sp. (tree forms)	Pines	limited use	300 sq. ft.
Pinus sp. (shrub forms)	Pines	limited use	40 sq. ft.
Platanus x acerifolia	London Planetree	limited use	400 sq. ft.
Platanus occidentalis	Sycamore/Planetree	limited use	400 sq. ft.
Populus sp.	Poplar	no	300 sq. ft.
Potentilla fruticosa	Potentilla	yes	10 sq. ft.
Prunus sp. (tree forms)	Cherry, Plum, Peach	limited use	200 sq. ft.
Prunus sp. (shrub forms)	Sandcherry, Almond	yes	20 sq. ft.
Pseudolarix kaempferi	Golden-larch	yes +	300 sq. ft.
Pseudotsuga menziesii	Douglasfir	limited use	300 sq. ft.
Pyracantha coccinea	Scarlet Firethorn	limited use	50 sq. ft.
Pyrus calleryana	Ornamental Pear	limited use	300 sq. ft.
Quercus alba	White Oak	yes +	400 sq. ft.
Quercus imbricaria	Shingle Oak	yes +	300 sq. ft.
Quercus phellos	Willow Oak	yes	300 sq. Ft.
Quercus macrocarpa	Burr Oak	yes +	400 sq. ft.
Quercus palustris	Pin Oak	no	400 sq. ft.
Quercus robur	English Oak	yes	400 sq. ft.
Quercus rubra	Red Oak	yes	400 sq. ft.
Quercus velutina	Black Oak	yes +	300 sq. Ft.
Quercus stellata	Post Oak	yes +	300 sq. ft.
Rhamnus cathartica	Common Buckthorn	yes	50 sq. ft.
Rhododendron sp.	Rhododendron	yes	50 sq. ft.
Rhododendron	Azalea	yes	30 sq. ft.
Rhus aromatica	Fragrant Sumac	yes	20 sq. ft.
Robinia pseudoacacia	Black Locust	yes	300 sq. ft.
Rosa sp.	Rose	limited use	4 sq. ft.
Salix alba	White Willow	limited use	400 sq. ft.
Sambucus canadensis	American Elder	limited use	30 sq. ft.

** - 10 sq. ft. credit for dwarf or pygmy cultivars

+ Designates trees acceptable for right-of-way with restrictions

PLANT LIST AND SQUARE FOOT LANDSCAPE CREDITS - continued

Botanical Name	Common Name	Right-of-Way	Credit
<i>Sassafras albidum</i>	Sassafras	yes	300 sq. ft.
<i>Sohpora japonica</i>	Japanese Pagodatree	yes	300 sq. ft.
<i>Sorbus aucuparia</i>	European Mountainash	limited use	200 sq. ft.
<i>Spiraea x bumalda</i>	Bunald Spirea varieties	yes	10 sq. ft.
<i>Spiraea japonica</i>	Japanese Spirea	yes	10 sq. ft.
<i>Spiraea nipponica</i>	Snowmound Spirea	yes	20 sq. ft.
<i>Spiraea prunifolia</i>	Bridalwreath Spirea	yes	20 sq. ft.
<i>Spiraea x vanhouttei</i>	Vanhoutte Spirea	yes	40 sq. ft.
<i>Stewartia ovata</i>	Mountain Stewartia	yes	50 sq. ft.
<i>Styrax japonicus</i>	Japanese Snowbell	yes	200 sq. ft.
<i>Syringa meyeri</i>	Meyer Lilac	yes	30 sq. ft.
<i>Syringa patula</i>	Manchurian Lilac	yes	40 sq. ft.
<i>Syringa reticulata</i>	Japanese Tree Lilac	yes	200 sq. ft.
<i>Syringa vulgaris</i>	Common Lilac	limited use	50 sq. ft.
<i>Taxodium distichum</i>	Baldcypress	yes	300 sq. ft.
<i>Taxus baccata</i>	English Yew	yes	50 sq. ft.
<i>Taxus cuspidate</i>	Japanese Yew	yes	40 sq. ft.
<i>Taxus x media</i>	Anglojap Yew	yes	40 sq. ft.
<i>Thuja occidentalis</i> ** - evaluated and	credits assigned per cultivar	limited use	16 to 200 sq. ft.
<i>Tilia Americana</i>	American Linden	yes +	400 sq. ft.
<i>Tilia cordata</i>	Littleleaf Linden	yes	300 sq. ft.
<i>Tilia x euchlora</i>	Crimean Linden	yes	300 sq. ft.
<i>Tsuga Canadensis</i>	Canadian Hemlock	limited use	300 sq. ft.
<i>Ulmus sp</i>	Elm	limited use	300 sq. ft.
<i>Viburnum sp.**</i>	Viburnum	yes	50 sq. ft.
<i>Vinca minor</i>	Periwinkle	yes	4 sq. ft.
<i>Weigela florida</i>	Weigela	yes	30 sq. ft.
<i>Yucca sp.</i>	Yucca	limited use	10 sq. ft.
<i>Zelkova serrata</i>	Japanese Zelkova	yes	300 sq. ft.

** - 10 sq. ft. credit for dwarf or pygmy cultivars

+ Designates trees acceptable for right-of-way with restrictions

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