THE REGINA URBAN FOREST

MANAGEMENT STRATEGY

May, 2000

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EXECUTIVE SUMMARY

Trees make Regina a more desirable and healthy place to live. The city which was once a bald prairie now has an urban forest which includes 124,811 public trees with an estimated value of $223.4 million. Since the urban forest is a growing asset which appreciates in value it is an investment with an increasing return. A cost-benefit analysis estimates that the average public tree in Regina returns 42 times what it cost to plant and maintain it in environmental, ecological, social and economic benefits to the community and larger ecosystem. However, trees are subject to increasing urban stresses and a healthy, sustainable urban forest can only be achieved with proper planning and resource commitment.

The Regina Urban Forest Management Strategy (RUFMS) provides a comprehensive strategy for managing Regina's urban forest in an arboriculturally sound and cost-effective manner. It builds upon the existing body of programs, standards and specifications used to manage the urban forest, and proposes new programs, policies and procedures as well as some modifications to current practices. The strategy was developed through extensive research and consultation. Work Groups were established to identify the current issues confronting the urban forest and develop the strategies to address the issues. In this manner, the functionally related components of the strategy were developed and formatted into appendices that form a Policies and Procedures Manual that can guide managers and field staff in their daily operations.

It is important to recognize that the components of the RUFMS form an operational system that is integrated and complementary. The RUFMS is not a static strategy but one that is capable of adjusting to change and incorporating modifications and improvements as new information becomes available.

The following programs, policies, standards, procedures and guidelines developed in the RUFMS are intended to address the issues currently confronting the urban forest.

- A policy on Plant Material requiring seedling stock and plant material to be propagated and grown within zone 3a or hardier.

- A policy on Species Diversity that sets a goal of no more than 25 per cent of any one genus per forestry sector; 20 per cent of any one genus in a park; 30 per cent of any one genus on residential streets per forestry sector; and 25 per cent for any one genus for the city as a whole.

- Planting Procedures and Specifications to be used by all civic divisions and private developers planting trees on public land.

- An up-dated Species Selection List for different site types to be included in *Zoning Bylaw #9250*.

- A Master Tree Planting Strategy that:

1) provides a comprehensive plan for new tree plantings and replacement plantings based on design principles for the City of Regina;

2) prioritizes the order in which sites should be planted;

3) provides projections for the quantity and species of trees required to assist the City nursery in determining its production plan.

- A policy on Priority Maintenance that establishes categories for prioritizing maintenance work and establishes a response time for each category.

- Tree Spacing Standards to establish setbacks from various infrastructure elements.

- Root Pruning Guidelines that explain when root pruning should be done, by whom it should be done and establishes a process for developing an inventory of existing problem sites.

- A Tree Removal Policy that describes:
  1) the criteria for removing a tree;

  2) the process to be followed when removing a hazardous or infected tree or to accommodate a civic or private development;

  3) who is responsible for the costs and the penalties for failing to comply.

- A policy on Tree Protection that establishes protective lanes, zones, hoarding, soil compaction and grade change requirements for protecting public trees during construction, maintenance and snow removal activities.

- A Heritage Trees of Regina Program intended to locate, designate, catalogue and preserve the heritage trees of Regina.

- An Urban Forest Storm Response Plan that establishes an early warning system for forecasting the magnitude of storms and procedures and mechanisms for coordinating and prioritizing the storm response and clean-up.

- Threshold Indicators for responding to various tree pests and diseases.

- A Tree Donation Program that encourages public involvement in enhancing the urban forest by making trees from the City nursery available to community organizations for planting.

- Establishment of a Public Tree Inventory that will provide the basis for the development of an individual tree inventory.

- Identification of the training needs for employees involved in tree care.

- Safety Requirements that describe the responsibilities, the process and the safety procedures for employees involved in tree care.

Together these components comprise an operational strategy that is comprehensive, practical and future-oriented. They address the critical issues confronting Regina's urban forest and create a shared vision for the future.

1.0 BACKGROUND

1.1 Introduction

The urban forest is essential to the current and future health of our City and its residents. A healthy, well maintained urban forest does not come about without forethought, planning and resource commitment. It is created and maintained through a shared vision, cooperation and an ever-present focus on maximizing benefits and minimizing costs. The Regina Urban Forest Management Strategy (RUFMS) presents a strategy for the development of a sustainable urban forest that is capable of surviving into the future and maximizing the environmental, sociological and economic well-being of the citizens of Regina. The strategy addresses the critical issues confronting the city's urban forest and creates a shared vision for its future. It is not simply a strategy, but also a philosophy that adopts an integrated system of management that utilizes forestry principles, a tree inventory analysis, planting, maintenance and protection standards for tree care, a master tree plan, cooperation among the civic departments involved in tree care, and involvement of the public to achieve a sustainable urban forest. Together the programs, policies, standards, and procedures proposed in the RUFMS form a comprehensive strategy that will ensure the best use of available resources and optimize the benefits of the urban forest.

1.2 Definition of Urban Forestry

"Urban forestry is the sustained planning, planting, protection, maintenance and care of trees, forests, greenspace and related sources in and around cities and communities for the economic, environmental, social, and public health benefits of people."[1]

Proper management of the urban forest requires the integration of the fields of arboriculture, forestry, landscape architecture, ecology, pest management, economics, planning and sociology. The on-going support and involvement of the public is essential to the long-term vitality of the urban forest.

1.3 The Purpose and Objectives of The Regina Urban Forest Management Strategy

Purpose

The purpose of the RUFMS is to provide the City with a comprehensive strategy for effectively managing, sustaining and ensuring the growth of Regina's urban forest in an arboriculturally sound and cost-effective manner.

Objectives

To achieve the purpose the strategy encompasses the following thirteen objectives:

1) To provide a comprehensive inventory of Regina's public trees;

2) To formulate the philosophy, guidelines, criteria and standards for an affordable and sustainable urban forest;

3) To review the City's policies and programs related to tree planting, maintenance, replacement and removal and recommend potential changes;

4) To develop or update planting and maintenance procedures and incorporate them into a manual intended to ensure the best care of the urban forest;

5) To establish guidelines for the prioritization of work needs and service requests;

6) To review the current procedures for handling service requests and recommend potential changes;

7) To formulate urban forestry management guidelines addressing issues such as the responsibility of the City, the public and developers for planting and maintaining trees;

8) To review the role of the City nursery in providing suitable stock for the urban forest and recommend potential changes.

9) To review the integrated pest management program in relation to the urban forest and recommend potential changes.

10) To review the current urban forestry public participation and education programs and recommend potential changes.

11) To coordinate the needs of the RUFMS for a computerized tree inventory and management information system with the project group currently reviewing the feasibility of developing a computerized tree inventory management system.

12) To develop a Master Tree Planting Strategy that prioritizes sites for tree plantings and replacements; and

13) To review the current legislation related to the urban forest and recommend

potential changes.

1.4 The Benefits of the Urban Forest

Trees add aesthetic beauty and a natural richness to our lives. Communities with properly managed and maintained urban forests are more desirable and healthy places to live. The following are some of the long-term environmental, ecological, social and economic benefits the urban forest provides our city.

1) Environmental Benefits of the Urban Forest

(i) Trees Improve the Quality of Air

Trees trap airborne particles on the surface of their leaves and filter large quantities of gaseous pollutants such as carbon monoxide, sulphur dioxide and the nitrogen oxides from the air. They counteract the global "greenhouse effect" by absorbing carbon dioxide. Through the process of photosynthesis they convert carbon dioxide into oxygen. An average tree captures nearly half a ton of carbon dioxide over the first thirty years of its life. Researchers have found that tree-lined streets had up to 70 per cent less pollution in summer, and significantly less in winter as compared to streets without trees. [2]

(ii) Trees Improve the Quality of Water

Trees and vegetation act as a natural filter by intercepting fertilizers and other pollutants flowing into watercourses through ground and surface runoff. Soil erosion and siltation of urban watercourses is reduced by the placement of trees and vegetation along the banks of watercourses.

(iii) Trees Help Reduce the Negative Effects of Noise Pollution

Noise directly effects the quality of life in the city. Tree planting can be used to diminish the psychological effects of noise pollution by visually eliminating the source. Effective noise barriers can be created when trees are planted in combination with earth berms and specialized fencing.

(iv) Trees Reduce Wind and Protect Against Ultra-Violet Rays

The strategic placement of trees can moderate wind speed at ground level and protect against the sun's harmful ultra-violet rays.

v) Trees Reduce Temperature and Heating Costs

Because of heat-absorbing surfaces and land clearing, urban areas generate higher temperatures than the surrounding rural areas. Tree canopies can help to diffuse this effect which is known as "heat islands" by providing shade and evapotranspiration. Tree shelters reduce heating costs in winter.

(vi) Trees Reduce Stormwater Runoff

Trees can significantly reduce stormwater runoff. Their roots absorb the water while their leaves slow the impact of the rainfall thereby reducing the load on storm sewage systems. The resultant reduction in flood size translates into less damage to life and property. Studies show that the urban forest can reduce storm water runoff from 12 to 17 per cent.[3] For a moderate sized community the estimated savings are approximately $600,000 annually.[4]

2) Ecological Benefits of the Urban Forest

City trees and urban natural areas provide ecological diversity and are an important habitat for a variety of flora, birds, small mammals and other wildlife. The urban forest also serves as a stopover point for migratory birds. Preserving this network of habitats and migration systems assists in promoting a natural form of pest control in the City.

3) Social Benefits of the Urban Forest

(i) Trees Impart a Distinctive Character to the City

The beauty which trees add to any landscape is especially appreciated in urban settings. They enrich the aesthetic experience of the city and establish a visual harmony and continuity along city streets.

(ii) Trees Soften and Screen Urban Development

Combined with good planning and design trees can help screen and meld various urban structures and uses with a green unity.

(iii) Trees Help Moderate the Stress of Urban Life

People have a need to maintain links to the natural environment. In the harsh environment of urban centres, the urban forest allows us to experience the natural world in a tangible form that seems to moderate the stress of everyday urban life. Trees provide privacy and a sense of peace and have a restorative effect that can improve physical well-being.

(iv) Trees Provide Passive Recreation Opportunities

As the city's population continues to age there will be an ever-increasing demand for more passive recreational opportunities in the form of treed parks and other green space.

(v) Trees Promote Understanding of the Natural World

Having an urban forest within our city provides an important opportunity for residents to appreciate and understand the natural world. Trees are a natural source for stimulating a child's imagination and sense of wonder.

(vi) Trees Promote Community Identity

Trees offer beauty and create a sense of place in the community. A healthy urban forest can be a great source of civic pride. Tree planting programs allow citizens to participate in creating a city they can be proud of. A study conducted in Chicago by the University of Illinois concluded that urban forests build stronger communities and in so doing contribute to lower levels of domestic violence.[5]

4) Economic Benefits of the Urban Forest

(i) Trees Promote Growth and Prosperity

A well maintained urban forest is a significant factor in promoting community prosperity and in attracting tourism and investment.

(ii) Trees Enhance Property Values

Public trees and trees on private property substantially increase property values and sales. Studies indicate that trees can enhance the marketability of a home and add 5 to 10 per cent to its market value.[6] The economic return to the City in the form of property, sales and taxes is substantial.

(iii) Trees Reduce Energy Costs

Effective windbreaks can reduce heating costs by 10 to 25 per cent in winter. In summer, properly located trees can reduce air conditioning costs up to 50 per cent (Moll 1989)[7].

(iv) Trees Create Employment

Trees create employment and contribute to the local economy through their

production, importation, design, planting and maintenance.

(v) Trees Are A Community Asset

A properly maintained urban forest is an investment that appreciates in value. A 1985 study by the American Forestry Association (now called American Forests) estimated the annual economic value of a fifty-year old urban tree as follows:

- Reduction in air conditioning use: $73
- Soil erosion and storm water control: $75
- Wildlife shelter: $75
- Air pollution control: $50
- Total value in 1985 dollars: $273
- Total value compounded at 5 per cent interest for 50 years: $57,151[8]

While there are various opinions as to the economic value of a tree, all estimates support the basic contention that a tree's value far exceeds the costs of planting and maintaining it.

1.5 Tree Related Problems

While trees provide many benefits to the community they can also create problems. Split or broken limbs can pose a hazard to public safety or property. Hanging limbs can obstruct sightlines and traffic signs for motorists and pedestrians. The roots of certain tree species such as poplar and willow can invade leaky water or sewer pipes and cracked foundations causing additional damage. Roots can also invade storm sewers creating problems with storm water runoff. Interfering trees growing in inappropriate locations such as easements and dikes or trees inappropriately planted in parks, buffers or streets can create problems. These trees can restrict access to easements, impair the integrity of dikes, cause heaving or deterioration to sidewalks and roadways, as well as problems to foundations and underground services. Droppings from trees can clog storm sewers, catch basin grates and interfere with drainage along roadways. Leaf-fall creates water quality issues when leaves sink to the bottom of Wascana Creek, degrade and contribute to the build-up of sludge that will eventually require dredging to clean-up. In the winter trees can inhibit snow ploughing and removal activities and increase the costs associated with winter road maintenance.

Some of the problems associated with trees can be mitigated through proper species selection and planting locations. Other problems are an inevitable result of having an urban forest. However, people are attuned to cities with trees. Cities have an unequivocal need for coherence based on continuity, rhythm, repetition and linkage that trees can provide. Trees contribute to our quality of life and make our city a more enjoyable and healthy place to live.

2.0 THE DEVELOPMENT PROCESS

2.1 The Steering Committee

The Steering Committee was established to guide and direct the development of the RUFMS. The committee was comprised of the Policy Analyst, Planning and Design (Chairperson), the Manager of the Planning and Design Division, the Manager of Open Space Management Division, the Superintendent of Urban Forestry, the Supervisor of Integrated Pest Management, the Superintendent of Parks Maintenance, the Superintendent of Open Space Services, the Park Development Superintendent, the Forestry Technician, the Landscape Architect, the Coordinator of Landscape Design and Capital Planning, the Open Space Services Coordinator and a representative from the Wascana Centre Authority.

2.2 Involvement of the Internal and External Stakeholders in the Development Process

Involvement of both the internal and external stakeholders in the development process was an important aspect in developing the RUFMS. As noted in section 3.4 Responsibilities, a number of City sections, divisions and departments are involved in caring for Regina's urban forest. Staff from the Urban Forestry Section, Parks Maintenance Section, Open Space Services Section, Support Services Department, Integrated Pest Management, Planning and Design Division, Urban Planning Division and Emergency Planning participated in the Work Groups that developed the various components of the strategy. Members of The Regina Urban Environment Advisory Committee also provided input into some of the Work Groups. The Public Works Department, Municipal Engineering Department, Bylaw Enforcement Division, Building Division, Real Estate Division and Legal Deparmtent were consulted on those aspects of the strategy that affected them.

In terms of the external stakeholders, a representative of The Wascana Centre Authority sat as a member of The Steering Committee. A draft of specific sections was discussed with the external stakeholders such as Sask Power, Sask Energy, Sask Highways, Sask Tel, The Regina Home Builders Association, Cable Regina, Regina's Market Square and The Regina Urban Environment Advisory Committee.

2.3 The Work Groups

The following Work Groups were established to develop the major components of the RUFMS.

1) Design and Development
2) Tree Planting
3) Tree Maintenance
4) Tree Removal

5) Tree Protection
6) Pest Management
7) Staff Training and Development
8) Community Involvement and Education
9) The Management Information System
10) The Master Tree Planting Strategy

The Work Groups consisted of supervisory and field staff who possessed an expertise in the above areas together with the Policy Analyst to guide the process from a research standpoint. Each Work Group developed a work plan which identified:

a) the objectives to be achieved;

b) the key issues or problems to be overcome;

c) the methodology to be employed in achieving the objectives;

d) the internal and external persons and organizations who should be involved in the process;

e) any financial implications involved; and

f) the timelines for completing the tasks.

3.0 OVERVIEW OF THE URBAN FOREST PROGRAM

3.1 Goal Statement

Regina's urban forest is essential to the current and future health of our City and its residents. The goal of Regina's Urban Forest Program is to proactively manage and sustain the City's forest in an arboriculturally sound and cost-effective manner that provides the greatest environmental, economic and social benefits to our residents. This goal will be achieved through the programs, policies, standards and specifications contained in the RUFMS.

3.2 Objectives

The objectives of the Urban Forestry Program are as follows:

1) To maintain a current inventory of all trees on public land required for the effective management of the urban forest.

2) To preserve a healthy urban forest through regular maintenance and monitoring.

3) To use a variety of proactive methods to protect trees from diseases and pests.

4) To protect people and property from potential tree hazards.

5) To remove trees that are dead, diseased, hazardous or in conflict with their surroundings.

6) To train and develop staff in the proper methods of planting and pruning trees.

7) To encourage other civic departments, the public and the private development industry to participate in the greening of Regina.

3.3 Statutory Authority

Forestry Bylaw #9607 provides:

1) protection for trees on public land;

2) authority for the Director of Community Services or his designate to enforce the provisions of *The Pest Control Act* on private property;

3) authority for the Director to require the owner of trees on private property which constitute an imminent danger to public safety or public property to take action to eliminate the hazard; and

4) fines for any person who contravenes the bylaw.

Zoning Bylaw #9250 provides landscape and buffering regulations for the city including installation standards and a list of commonly used trees.

Servicing Agreements under *Subdivision Bylaw #7748* that controls and regulates the subdivision of land within the City of Regina including landscaping of parks and boulevards.

3.4 Operating Budget

Figure 1 shows the Urban Forestry budget and that portion of the Integrated Pest Management budgets directed to the urban forest for 1998. Figure 2 shows these budgets in relation to the Community Services Department and City of Regina budgets.

Figure 1: The Urban Forestry and Integrated Pest Management Budgets for 1998.

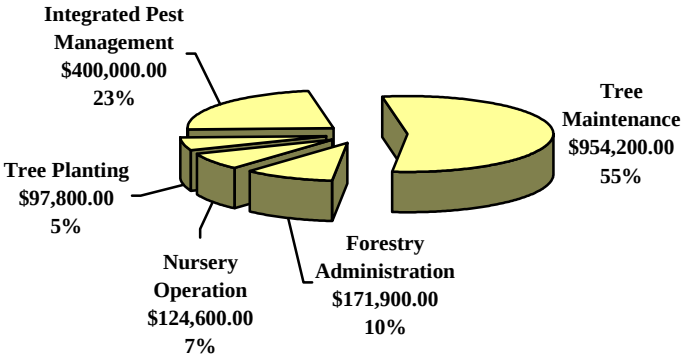
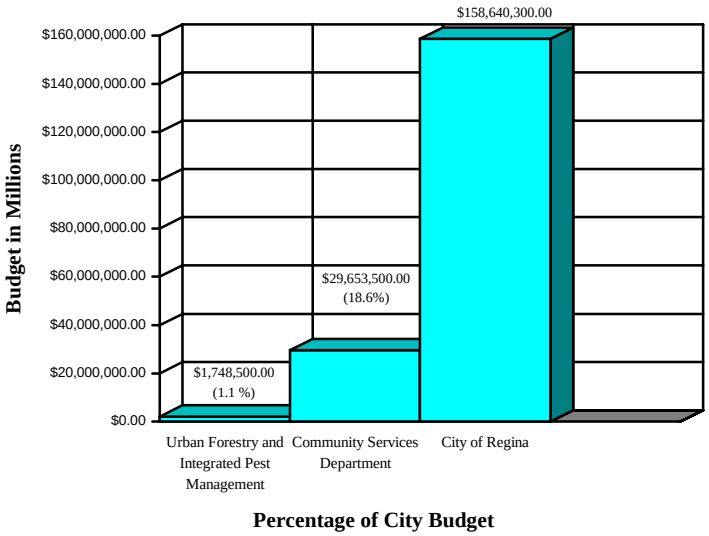


Figure 2: The Urban Forestry and Pest Management Budgets as a Percentage of the Community Services and City of Regina Budgets for 1998.



3.5 Responsibilities

Maintaining a healthy urban forest requires a variety of activities and a significant investment of resources. It also requires the active interaction and participation of several City divisions and sections as well as the Parks and Recreation Board, the development industry and the general public. The responsibilities of the various stakeholders in the urban forest are described below. A more detailed description of their responsibilities is provided in Appendix "A" Responsibility for the Urban Forest.

3.5.1 Urban Forestry Section

The Urban Forestry Section is responsible for planting and maintaining trees on streets, roadways, traffic medians, easements, public parking lots and for selective work in naturalized areas. In addition the Urban Forestry Section is responsible for planting replacement trees in parks while the Parks Maintenance Section is responsible for watering the trees.

3.5.2 The Parks Maintenance Section

The Parks Maintenance Section is responsible for the minor maintenance of small and medium sized trees in parks, cemeteries and for selective work in naturalized areas.

3.5.3 The Open Space Services Section

The Open Space Services Section is responsible for planting and for the minor maintenance

of small and medium sized trees in golf courses and athletic fields.

3.5.4 The Integrated Pest Management Section

The Integrated Pest Management Section is responsible for monitoring the urban forest in order to identify and track insect populations and occurrences of tree diseases. The section is also responsible for implementing programs to manage pests and diseases that affect the health of the urban forest.

3.5.5 The Planning and Design Division

The Planning and Design Division is responsible for designing the urban forest and for providing planning expertise for developing programs, policies and standards necessary for managing and sustaining it.

3.5.6 The Support Services Department - Park Development Division

The Park Development Division is responsible for the installation of trees in parks and athletic fields when new construction or significant upgrades are involved. The division is also responsible for the maintenance of plant material until acceptance by the owner.

3.5.7 Community Services – Urban Planning Division

The Urban Planning Division is responsible for reviewing development plans with the purpose of providing minimum requirements for the landscaping of developed lots, street frontages, paved areas and open spaces, buffer areas and visual screens. The intent is to mitigate pollution, soften views, buffer incompatible land uses, conserve energy, improve the general appearance of the neighbourhood and provide an overall positive image of the City. The department is also responsible for the enforcement of *Zoning Bylaw #9250*.

3.5.8 Community Services - The Bylaw Enforcement Division

The Bylaw Enforcement Division ensures compliance with land use and property maintenance bylaws by providing inspection, public information and enforcement services. As regards the urban forest, Bylaw Enforcement Division enforces compliance with *Forestry Bylaw No. 9607*, the Dutch Elm Disease Control Regulations, the Tree Protection Policy and the Tree Removal Policy.

3.5.9 Municipal Engineering Department

Municipal Engineering is responsible for decisions relating to the safe and efficient movement of traffic and goods on city streets and therefore are concerned with the placement of street trees.

Where the urban forest is involved, the department is responsible for planning and designing municipal development projects in coordination with Planning and Design.

3.5.10 Pubic Affairs and the Horticultural Extension Officer

The Horticultural Extension Officer, in concert with Public Affairs, is responsible for educating the general public regarding horticultural, forestry and pest control programs.

3.5.11 Parks and Recreation Board

As concerns the urban forest, Parks and Recreation Board has the authority to advise, assist and make recommendations, review existing policies, recommend new measures and resolve public issues. It also has the authority to approve or deny all development and private requests for tree removals on public land which are not deemed a "hazard".

3.5.12 The Development Industry

The development industry is responsible for complying with civic bylaws and requirements intended to protect public trees during construction activities. They are also responsible for planting and landscaping in accordance with *Zoning Bylaw #9250, Traffic Bylaw* and the Open Space Development Standards Manual.

3.5.13 The Wascana Centre

One of the most important and beautifully landscaped areas of Regina's urban forest is the Wascana Centre. The Centre is a 930 hectare area in the heart of Regina that was established in 1962 by an act of the Saskatchewan legislature, *The Wascana Centre Act*. The Act unites the Province of Saskatchewan, the City of Regina and the University of Regina into a corporate body known as the Wascana Centre Authority. The Centre includes many of Regina's government, education, culture, recreation and conservation facilities. Included is the Saskatchewan Legislative Building, the University of Regina, the MacKenzie Art Gallery, the Royal Saskatchewan Museum, the Saskatchewan Science Centre, Douglas Park and Sports Centre, Wascana Lake as well as many other facilities and features.

3.5.14 The General Public

The general public is responsible for complying with all forestry statutes and bylaws. Homeowners are responsible for watering newly installed plantings on boulevards adjacent to their residences.

4.0 THE CURRENT STATUS OF REGINA'S URBAN FOREST

4.1 The Urban Forest as a Growing Asset

In Regina trees have long been recognized as a valuable community asset. The ability of the urban forest to appreciate rather than depreciate in value makes it unique among the City's assets. The tree maintenance budget is therefore an investment with an increasing return.

Based on the International Society of Arboriculture's tree valuation formula and the Agriculture Alberta Tree Replacement Value, the asset value of Regina's public tree population is estimated to be $223.4 million. The value of an average tree in Regina is estimated to be $1,790.00.

4.2 Cost-Benefit Analysis

A 1994 study entitled "Chicago's Urban Forest Ecosystem: Results of the Chicago Urban Forest Climate Project" conducted a cost-benefit analysis to estimate the annual dollar value of costs and benefits over a 30 year period associated with planting and maintaining an urban tree. Costs included the initial cost of planting the tree (plant material and labour); the annual maintenance costs; and the administrative costs of supervising staff involved in the care of the urban forest. Benefits to the community included dollars saved or added with respect to energy savings, air pollution mitigation, hydrology, noise abatement, soil conservation, property values, recreation and wildlife habitat. The study estimated the annual benefits of a 30 year old tree to be $402.00 (U.S.).

It is estimated that in 1998 the City of Regina spent $15.18 (planting $200.00 per tree ÷ 31 years average age of a public tree in Regina = $6.45, maintenance $7.65 and administration $1.08 = $15.18) annually per public tree. Based on the Chicago study the average public tree in Regina which is 31 years old would return $632.00 (Cdn) in benefits annually to the community. This is a 4163 per cent return on the investment. A cost-benefit ratio of 41.6 indicates that the value of projected benefits is nearly 42 times the value of projected costs for a public tree in Regina. While the benefits to be derived economically, environmentally and socially in Chicago may differ somewhat from Regina, the study does provide valuable insight into the relative value of a tree in an urban setting. Allowing for the difference between cities, the analysis suggests that the benefits associated with trees in Regina far outweigh the planting and maintenance costs.

4.3 The Urban Forest Inventory

An inventory of Regina's public trees was conducted in December, 1996. The tree inventory provides a portrait of the urban forest. The importance of the tree inventory in

managing the urban forest is based on the premise that the City must have a complete

icture of the tree population in order to ensure the proper care of existing trees, plan for the future and make the most effective use of available resources. The inventory provides basic information on the number of trees, age and species composition, tree removals and replacements, public hazards and maintenance needs that are the basis for planning and decision-making.

4.4 Inventory Methodology

A Tree Inventory Form was developed to ensure consistency in collecting the data. (See Appendix "B" Tree Inventory.) The form was pre-tested for efficacy on a test sample. A street tree inventory and a parks and open space tree inventory were undertaken by field staff. Tree information for each city block and each park was entered into hand-held computers during site visits. The information was aggregrated by sector on the computer to create a database. See Map I Forestry Sectors on page 17a.

4.5 The Benefits of the Tree Inventory

The following benefits will be derived from the tree inventory.

1) Species Composition
Knowledge of the over-all species composition will enable the city to pro-actively manage the tree population to achieve an acceptable species diversity.

2) Tree Maintenance
Identification of trees requiring emergency work, priority prunes or removals will allow priorities to be established and resources allocated based on the needs of the trees.

3) Tree Plantings
Identification of stumps and gaps will allow tree plantings to be prioritized.

4) Master Tree Plan
The inventory provides the basis for planning and decision-making. It is a key planning tool in determining what species and locations should be planted in the future and in developing a master tree plan.

5) Individual Tree Inventory
The tree inventory which identifies trees by blocks will form the basis for a future individualized tree inventory management information system. (See Section 10.0 The Management Information System.)

4.6 Limitations of the Inventory

Certain limitations were imposed by the method in which the inventory was conducted.

1) The inventory was conducted in December 1996 when field staff were available. Because the leaves were not on the trees at that time, insect and disease problems were not visible. An attempt was made to overcome this problem by supplementing the data collected in the tree inventory with data previously collected by the Pest Management section on insect and disease problems.

2) The inventory was conducted by city block and is not an individualized tree inventory. This was due to the lack of manpower needed to conduct an individual tree inventory. The Open Space Management Division is currently developing an automated Tree Inventory System. It is intended that this system will provide an individual tree inventory with each tree located in the data base by street and address.

3) The inventory does not include trees on private property. The use of digital aerial photos to estimate the number of trees on private property and the over-all canopy coverage for Regina was considered but found to be cost prohibitive.

4) Because the inventory was conducted in the late fall and winter it did not provide data on the trees' crown development, foliage and root system necessary for judging the condition of the trees and assigning a qualitative score on the overall condition of the urban forest.

4.7 Public Trees Profiles

The results of the public tree inventory were aggregated and profiles were developed for the city as a whole, street trees, park trees, cemeteries, golf courses and each of the 77 forestry sectors in Regina.

4.7.1 The City of Regina Profile

- Number of Trees

  Regina has a total of 124,811 public trees. Of this total 84,094 are street trees, 31,880 are park trees, 5,292 are trees located in the City's two cemeteries and 3,545 are trees in the City's three golf courses.

- Species Composition/Diversity

  Elm is the most common group representing 36 per cent of the public tree population. This is followed by ash which constitutes 32 per cent, deciduous trees 14 per cent, coniferous 13 per cent and ornamentals 5 per cent.

- Tree Height

  The average mean height for a public tree in Regina is 7.64 meters. Thirty-eight per cent of the public trees are smaller trees up to 6 meters in height, 49 per cent are 6.5 to 12 meters, and 13 per cent are 12.5 to 18.5 meters.

Figure 3: Species Diversity Overview

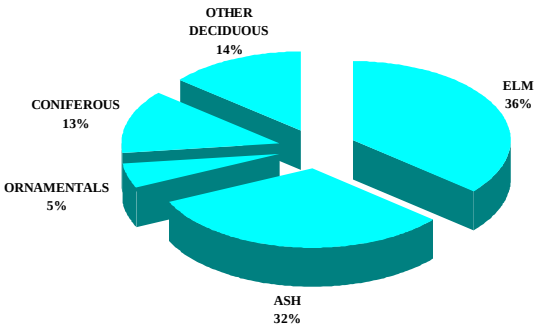
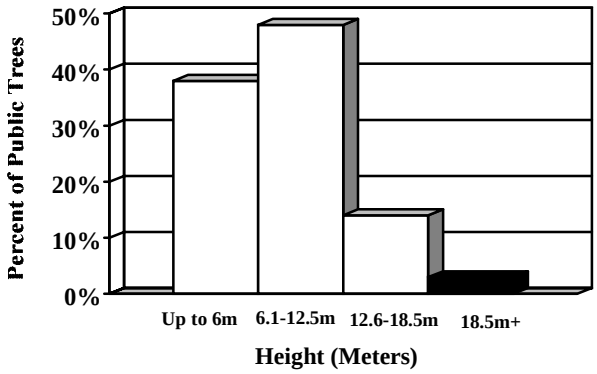


Figure 4: Height Profile



- Age Distribution

  The weighted average age of Regina's public trees as determined by the International Society of Aboriculture's method is 31.27 years. Elms have an average age of 38.54, coniferous 34.30 years, ash 28.90 years, other deciduous trees 20.57 years and ornamentals 11.87 years.

- Tree Diameter

  The average mean diameter of Regina's public trees is 23.76 cm. Sixty-six per cent of the public trees are larger than 18 cm in diameter, 11 per cent are medium sized trees 12 to 17 cm and 23 per cent are less than 12 cm in diameter.

- Emergency Prunes

  Based on the inventory, 43 trees or .03 per cent of the public tree population required an

emergency prune because they had branches that were split, down, obstructed a traffic sign or posed a threat to public safety or property.

- Priority Prunes

  The inventory identified 2,610 trees that required a priority prune because they had low or broken branches, disease or insects, were causing a sightline obstruction or contained over 30 per cent deadwood. These trees constituted 2 per cent of all public trees. The remaining 98 per cent of the public trees required only a routine prune during their next scheduled pruning cycle or were not rated because they are evergreens and do not require pruning.

- Vacancies

  The inventory identified 7,129 vacant sites. This constitutes 5 per cent of the total tree planting sites in the city.

- Removals

  There were 437 trees that required removal because they were dead, diseased, a hazard or a stump. The majority of the removals were located on the City's golf courses, with 332 trees identified as requiring removal.

4.7.2 Street Trees Profile

For the purpose of the inventory, trees on special use areas such as boulevards, buffer strips, public walkways, medians, traffic islands and storm water channels have been included with street trees.

There are a total of 84,094 street trees in Regina. Elms constitute 44 per cent of all street trees, ash 35 per cent, other deciduous 9 per cent, coniferous 7 per cent and ornamentals 5 per cent. The average mean height of a street tree is 7.15 meters. The average mean diameter is 26.59 cm. In terms of their maintenance needs 43 street trees or .05 per cent were identified as requiring an emergency prune, 1,569 trees or 2 per cent a priority prune and 82,482 trees or 98 per cent did not require a prune until their next scheduled pruning cycle. The most frequently cited reason (32) for an emergency prune was because the tree had a split branch that posed a threat to public safety. The most frequently cited reason (820) for requiring a priority prune was because the tree had low hanging branches. The second most frequently cited reason (320) for a priority prune was because the tree was contacting overhead wires. Twenty-eight street trees were identified for removal with the most frequently cited reason being the tree was dead.

4.7.3 Park Trees Profile

There are 270 parks in Regina which contain a total of 31,880 trees. Coniferous trees comprise 30 per cent of park trees, other deciduous 24 per cent, ash 20 per cent, elms 18 per cent, and ornamentals 8 per cent. The average mean height of a park tree is 6.96 meters. The average diameter is 13.92 cm. No park trees required an emergency prune for safety reasons, 195 or .61 per cent required a priority prune and the remaining 99.39 per cent did not require pruning until their next scheduled cycle. No trees were identified for removal. All the trees requiring a priority prune were because the trees had over 30 per cent deadwood.

4.7.4 Cemetery Trees Profile

There are a total of 5,292 trees in the City's two cemeteries. The trees consist of 3,026 ash which comprise 57 per cent of the tree population, 1,137 elms or 21 per cent, 945 coniferous or 18 per cent, 135 other deciduous or 3 per cent and 49 ornamental or 1 per cent. The average mean height of the trees is 10.40 meters. The average mean diameter is 33.09 cm. No cemetery trees required an emergency or priority prune. The inventory did not identify any cemetery trees for removal.

4.7.5 Golf Course Trees Profile

There are a total of 3,545 trees in the City golf courses located within the city limits. (The Regent Park Par 3, The Joanne Goulet and The Lakeview Par 3.) Other deciduous trees constitute 44 per cent of the total golf course trees, coniferous 23 per cent, elms 19 per cent, ash 12 per cent and ornamentals 2 per cent. The average mean height of the trees is 6.63 meters. The average mean diameter is 18.53 cm. No golf course trees required an emergency prune. Seven hundred and sixty-four trees or 22 per cent of the total golf course trees required a priority prune. Most of the trees identified for removal (332 of a total 437) in the inventory were located on the City's golf courses. One natural stand of trees on The Joanne Goulet Golf Course that had deteriorated, accounted for 232 of the total removals.

4.7.6 Forestry Sector Profiles

Appendix "C" Sector Profiles provides a profile of each of the city's 77 forestry sectors. Map I: Forestry Sectors on page 17a illustrates the location of the forestry sectors on a city map.

An overview of the Sector Profiles is provided below.

- Species Diversity

  It is revealing to note that all 77 forestry sectors exceed the species diversity guideline proposed in Appendix "D" Tree Planting Priorities, Requirements, Procedures and Specifications which states that there should be no more than 25 per cent of any one genus in a sector. Furthermore, the inventory reveals that one species constitutes over 50

per cent of the tree population in 37 sectors (elms in 24 sectors, ash in12 sectors and coniferous in 1 sector).

- Average Age of Species

The following table with the exception of the ornamentals is based on the Prairie Farm Assistance Administration estimates of the longevity of different tree species used for shelterbelt plantings in Saskatchewan. While the estimates are based on shelterbelt plantings and do not take into account the various urban stresses that impact the life of an urban tree, the estimates do provide valuable information on the longevity of various species based on our climate and soil conditions.

Table 1: Tree Longevity

Species	Longevity
ash	60 years
coniferous	70 – 80 years
deciduous	45 – 60 years with the exception of poplars (12 – 50 years)
elm	60 years
ornamental	25 – 40 years

When the above longevity estimates are compared to the average age of the different tree species in the various forestry sectors, it is possible to identify those trees that may need replacement in the next ten years.

Table 2: The Average Age of Sector Trees

Species	Sector	Number of Trees	Average Age
Ash	30	1,442	50 – 53
Total		1,442	
Coniferous	14 16 30	8 56 410	62.01 62.01 72.78
Total		474	

Species	Sector	Number of Trees	Average Age
Deciduous	1	75	54.09
	2	9	35.43
	4	350	35.43
	16	51	41.26
	30	26	42.69
	51	11	45.70
	63	31	37.06
	82	264	44.19
	86	14	37.96
Total		831	
Elm	16	669	51.27
	51	828	65.76
	53	1141	61.42
	63	984	50.33
	86	1183	53.26
Total		4,805	
Ornamental	6	39	21.65
	8	88	19.40
	9	31	16.60
	10	68	16.16
	14	1	32.48
	16	6	27.07
	17	31	27.74
	18	40	23.82
	20	29	15.47
	21	86	17.11
	30	15	17.32
	33	30	15.70
	36	27	15.34
	39	59	15.01
	51	2	21.65
	55	82	23.41
	62	18	19.85
	66	44	17.14
	67	12	16.24
	68	236	20.66
	70	91	15.02
	73	79	17.59
	74	11	15.16
	80	56	18.14
	86	7	18.41
	88	18	23.55
Total		1,206	

Species	Sector	Number of Trees	Average Age
Grand Total		8,758	

It is significant to note that the average age of 37 per cent of the city's elms is 40 years or older.

- Emergency Prunes

  Forty-three trees required an emergency prune. Of these 42 are in the southeast quadrant that was hit by a storm just prior to the inventory. It should be noted that the tree inventory was conducted in December 1996 and the emergency prunes identified were corrected.
  The following sectors required more than two emergency prunes.

  Sector 59 - 18 emergency prunes
  Sector 58 - 11 emergency prunes
  Sector 57 - 7 emergency prunes
  Sector 60 - 4 emergency prunes

- Priority Prunes

  The following sectors required more than 100 priority prunes.

  Sector 26 - 667 priority prunes
  Sector 23 - 460 priority prunes
  Sector 25 - 176 priority prunes
  Sector 57 - 154 priority prunes
  Sector 58 - 146 priority prunes
  Sector 83 - 105 priority prunes
  Sector 4 - 101 priority prunes

- Vacancies

  Only 15 of the forestry sectors had more than 10 per cent of their total tree planting sites vacant. With the exception of sector 58 in Whitmore Park the sectors on the outer perimeter of the city in the new subdivisions have the greatest number of vacant tree planting sites. This can be explained by the fact it usually takes from 3 – 5 years in new developments before housing and landscaping is completed.

  The following sectors had more than 300 vacant tree planting sites.

  Sector 25 - 546 vacancies
  Sector 38 - 481 vacancies
  Sector 72 - 477 vacancies
  Sector 69 - 402 vacancies

Sector 40	-	379 vacancies
Sector 23	-	378 vacancies
Sector 34	-	362 vacancies
Sector 58	-	349 vacancies
Sector 15	-	347 vacancies
Sector 39*	-	344 vacancies
Sector 27	-	333 vacancies
Sector 16	-	321 vacancies
Sector 62	-	307 vacancies
Sector 73	-	301 vacancies

* This sector is primarily industrial.

- Removals

The following sectors required more than six tree removals.

Sector 26*	-	325 tree removals
Sector 4**	-	100 tree removals
Sector 57	-	12 tree removals
Sector 65	-	10 tree removals
Sector 8	-	10 tree removals
Sector 11	-	10 tree removals
Sector 18	-	9 tree removals
Sector 24	-	7 tree removals
Sector 32	-	7 tree removals
Sector 33	-	7 tree removals

* These trees are located on the Joanne Goulet Golf Course

** These trees are located on the Regent Park Par 3 Golf Course

4.7.7 Other Public Trees

In addition to the public trees on City land, Regina also has a significant number of public trees on provincial and federal government lands and The Wascana Centre. (See section 3.5.13 The Wascana Centre).

The Wascana Centre is estimated to include over 40,000 trees. Ash is the dominant species comprising approximately 23 per cent of the trees. Elm, poplar and Colorado spruce each comprise about 12 per cent. White spruce and pine each comprise about 8 per cent while white maple and willow comprise about 5 per cent each. The remaining 15 per cent of the Centre's trees consist of species such as birch, linden, crabapples and tree lilacs.

Other public lands that include significant tree populations are Government House and the Royal Canadian Mounted Police Academy. Tree statistics are not available for these sites.

5.0 DESIGNING THE URBAN FOREST

5.1 Context

Regina is a city built on what was once a treeless mixed grass prairie. Before settlement by immigrants in the late 1800's, creek shorelines and floodplains were the only locations where trees grew in the immediate vicinity of the area now defined as Regina. Reginans are perhaps more attuned to the important role trees play in making our urban environment hospitable because surrounding us on all sides, what was once treeless prairie is now mostly treeless agricultural fields - except for shelterbelt plantings around farmsteads and between fields. The moment one leaves the city limits, the significance of tree planting on our flat, arid, windy plain becomes obvious.

Some areas close to Regina, particularly the Qu=Appelle Valley to the north, abound with trees. Green ash, black poplar, trembling aspen, and Manitoba maple are common. American elm is also found; burr oak is somewhat rarer. It is in these areas that we see the tree species native to the broader region, although not necessarily well suited to the demands of the urban environment. For example, Manitoba Maple, also known as Box Elder, (acer negundo) can be found growing throughout the prairies, but is only suitable to plant within a park or residential yard due to its low, broad branching habit and irregular form. Relative to other urban centres in North America, the difficulties encountered with tree planting in Regina are great: temperature extremes, a high evapotranspiration rate, frequent drought, disease, as well as heavy clay soils have an effect on the urban forest.

Planting trees is an act of faith and foresight. Looking at early pictures of Regina, one appreciates the impact and importance of tree planting to our present urban environment. Virtually every tree in Regina was planted by hand, however, they seem as if they were always here. We must remind ourselves that the Provincial Legislature was visible from all areas of the city when it was first built. It stood out in an ocean of grasses and cultivated fields. In contrast, late in the century, we view the Legislature, through vistas framed by elms, ash and willows from throughout the city. The tall spruce that line and define a significant portion of the east side of Albert Street in rows near the legislature were once a humble grouping of stubby trees. Victoria Park, now an oasis in the heart of the city, was once a treeless patch of dusty clay.

5.2 Design Philosophy

Trees are indispensable not only for their intrinsic beauty and capacity to improve air quality, provide shade, and screen visual clutter, and mitigate winds, but also for their ability to unify the city as a spatial structure, to provide coherence and a sense of well-being. Trees should be recognized as an essential part of the infrastructure of the city and not merely as a decoration or embellishment. Imagine Regina without trees; would we want to live here, regardless of whether or not good roads, clean water and electricity were

provided?

In the past the City of Regina has embraced a design-philosophy typical of other North American centres: a few species of trees have been used over a majority of the city; grander streets and avenues of the greatest civic/social importance were planted more densely and consistently; and commercial and industrial areas have less intensive planting or no planting at all. As is also typical of other cities, the greatest diversity of tree species is found in residential areas. For the most part, this philosophy and aesthetic practice, imported mostly from Great Britain, Ireland and Europe (the homelands of the majority of immigrants who settled the city) has served us well.

American elm and green ash dominate the urban forest in Regina. One of the greatest challenges to the health of urban forests in North America is Dutch elm disease. This disease attacks our most significant urban forest species - American Elm. One can criticize the monocultures of species across North America, but in fact these were, and in some cases still are, the species of tree most suited to planting in our cities. To its credit, the City of Regina has avoided the extensive planting of fast-growing, but "problem" trees like poplar and Siberian elm that are seen in other prairie cities. Dutch Elm Disease (DED) now threatens our elm population. With diligent maintenance and education, losses from this disease can be kept to a minimum. In the future, efforts must be made to diversify the species used, so that no one disease can threaten so much of the urban tree population.

As in any other city, trees are planted in Regina for their ability to create useful, beautiful and meaningful outdoor space. Attention is given to the fact that tree planting within the city plays an important functional role. Tree planting and landscape design in the urban context should not be interpreted as an act of decorating spaces, but rather as creating spaces using the architecture of trees. The urban forester, the landscape architect and others who are directly involved with tree planting and design think of trees as the raw material for building space, much like bricks and mortar. In fact, trees often outlive buildings and hard infrastructure, and over time have a far greater impact on the way urban space is used, modified and perceived.

The bosque, the allee, and the circle are all traditional ways of structuring trees to create outdoor urban open space. This type of structuring of trees should be utilized to compliment, enhance or, at least, respect the existing built environment. However, acceptance of the urban grid as a design consideration is often resisted in the organization of plantings. This may result in spotty, contrived looking groupings of trees along streets which appear chaotic. Attempts to create a classic English pastoral landscape or boreal forests along Regina’s streets have proven misguided. "Naturalistic" plantings are more appropriate in open space such as parks where the size and context of the space allows for this type of design approach.

Applying the principles of shelterbelt planting, used by farmers on the prairies to reduce

wind velocity and soil erosion and trap snow for moisture, is worthy of consideration during the design process. The Prairie Farm Rehabilitation Administration (PFRA) is a valuable source of information for the selection and organization of tree species suited to our region for these purposes. Modified, this planting technique can be applied as a general approach throughout the city along major corridors and within parks and would provide a unifying element and mitigate against harsh environmental conditions.

In Trees in Urban Design, the definitive text on the design of the urban forest, Henry F. Arnold outlines eight important design characteristics of tree use:

1) "Transparency at the pedestrian's eye level permits the visual grasp of extensive areas of the city. The emphasis is on spatial continuity that extends and broadens views.
2) In each view, a discrete pattern or rhythm is discernible flowing from the arrangement, spacing and structure of trees, expressing the particular site.
3) Each landscape conveys a scale that is sympathetic to the movement and perception of pedestrians.
4) The great diversity and intricacy of individual trees is subordinated to an established repetitive composition that acts as a counterpoint in unifying the individual parts into a single whole.
5) There is a homogeneity of texture, pattern, light and shade, resulting from the use of a single species that makes the collective impact more important than the individual trees.
6) Trees are related to their surroundings sometimes by bold geometry and sometimes by subtle rhythms. In each case, there is a consistency between tree pattern and the surrounding order.
7) The ground surface, whether flat or undulating, is visually unobstructed to permit a clear expression of trees rising out of the ground. This clarity is amplified when there is a crisp, smooth ground surface.
8) Trees modulate space vertically to create a ceiling with great variability in transparency and height." (p39)[9]

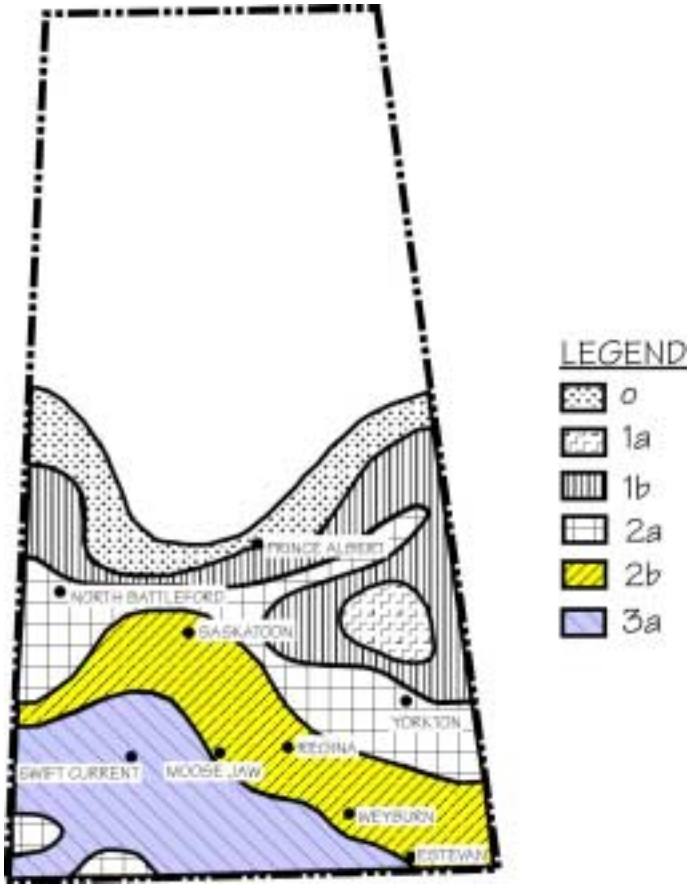
5.3 Design Guidelines

Selecting tree species suitable for the site and for the spatial/functional/aesthetic goals of the project is an important design consideration. Conditions specific to each site must be considered including the presence of road salts, irrigation, wind, soil condition (compaction/drainage/fertility), spatial limitations, snow removal/storage and pedestrian use. A detailed list of tree species and their suitability for various site types are referenced in Appendix "D" Tree Planting Priorities, Requirements, Procedures and Specifications - Section 3.0 Table 2: Tree Species and Site Suitability.

Tree species must be selected based upon their hardiness. Map 2 on the following page, developed by the Soil Research Institute, Research Branch Department of Agriculture

illustrates the hardiness zones in Saskatchewan. Some trees are very hardy and can survive almost anywhere; others can only live within certain temperature or humidity ranges. Plant hardiness is based on three factors: temperature, availability of water, and soil conditions. Of these, temperature is by far the greatest factor. Most tree selection reference catalogues include information related to hardiness characteristics and categorize trees within these hardiness zones.

Map 2: Hardiness Zones of Saskatchewan



Regina falls within Zone 2b and therefore trees should be selected which are hardy within this zone. However, trees not generally considered hardy in this zone may be tried where the micro-climate is favourable. Several small horse chestnut trees can be found growing on Regina's residential street near the General Hospital, but this species is not considered hardy in this zone. The process of sourcing tree stock must also consider tree hardiness zones. Tree nursery stock grown in the interior of British Columbia (Zone 6b) is not a

suitable source for trees in Regina. Native trees such as green ash, American elm, plains cottonwood, Manitoba maple, chokecherry, black poplar and trembling aspen, or those adapted to this region, should be planted . Note that only green ash, American elm and plains cottonwood are suitable as street trees. Master plans and planning documents should be constructed and consulted to ensure that all plantings not only enhance the existing built environment, but also do not compromise future development.

The long winter is a fact of life on the Canadian prairies. Although generally not suitable as street trees, the importance of coniferous trees cannot be overemphasized. Their persistent colour and foliage and also their superior ability to act as a wind barrier, to trap

snow and provide wildlife a habitat are indispensable. Some pines, especially scots pine, may be suitable as street trees, due to their higher branching habit. It has been shown that coniferous tree plantings at the northwest corner of buildings can reduce wind speed during winter and reduce heating costs. Other desirable characteristics for tree selection with respect to adding winter interest are the persistence of fruits/seeds, bark colour/texture and branching form.

Winters are long in Regina, but summers can be quite hot. For this reason it is important to plant shade trees in public open space. Shade produced by deciduous tree plantings on the south side of buildings can reduce air conditioning costs, while still allowing sunshine to penetrate through the branches in the winter months.

Experiencing wildlife first hand is preferable to learning about it through television or books. Plantings for wildlife are considered in locations where such habitats will not be compromised by future human developments. Food, water, shelter and space are essential considerations when designing for habitat. Regina's urban forest can provide shelter and sustenance for several animal species, especially birds. Trees and shrubs that retain their fruit above the snow line, throughout the winter, can be an important source of food. The density of shrub branching habits and coniferous plantings provides a protective cover for all species throughout the seasonal and reproductive cycles. The determination of habitat requirements varies in scale depending on the wildlife species that the habitat is intended to attract. The PFRA's information on "Designing Tree Planting for Wildlife" is a useful resource when considering such developments.

Temporary plantings such as potted trees may become an important part of the tree planting strategy in the future in areas of the city such as the downtown where the hardscape does not allow plantings. Trees may be planted in concrete planters that can be removed for the winter season, allowing for easy snow removal. The trees will be planted in the fall and new trees planted in the planters for the spring.

5.4 The Criteria for Reviewing Landscape Design

It is impossible to create a landscape design without first clearly enunciating the criteria

that should govern landscape development. The following criteria express the philosophy and beliefs that should guide the landscape design process.

1) Public open space shall be designed with an integrated vision that incorporates public safety and security into the landscape design elements.

2) The landscape design shall adhere to other related regulatories.

3) The functional relationship of the landscape design to the existing and proposed land uses shall be resolved with a view to maximizing social benefits and maintaining environmental integrity.

4) The selection of trees shall encompass the basic principles of design such as line, form, diversity, scale, colour, unity and balance.

5) Consideration shall be given not only to the capital costs of the landscape design but also to the level of maintenance required to sustain it.

6) The satisfaction of human needs including recreational, social, perceptual and educational shall be a prime consideration in designing public open space.

7) The proposed landscape development shall be suitable to the site and the existing and future uses of the adjacent land.

8) The landscape design shall take into account the age, socio-economic status, ethnicity, cultural diversity and abilities of the intended users.

9) The principles of conservation shall be applied to the landscape design of open space including the reduction of water use, CO^2 emissions, chemical pesticides and fertilizers.

10) The landscape design shall facilitate public access and circulation and to the extent possible attempt to accommodate persons having cognitive or mobility constraints.

11) Preservation of the natural environment and biological ecosystems shall be promoted in the design of public open space.

12) Whenever possible the landscape design shall facilitate winter use of the open space.

13) All stakeholders shall be given the opportunity to influence in the design of public open space.

Based on the above landscape design criteria, the Community Services Department has developed design standards for the development of public open space. These standards reside in Chapter 12 of the Development Standards Manual.

5.5 Design Standards

Several City documents outline policies, guidelines and standards for the design of the urban forest. These include:

Zoning Bylaw No. 9250 includes Landscape and Buffer Regulations that outline the requirements for landscaping including minimum acceptable tree size and the tree canopy (deciduous) for landscaping on all sites for new buildings and land uses.

The City of Regina's **Open Space Development Standards Manual** (OSDSM) outlines Design Criteria (including some criteria for tree planting) with respect to: Buffer Strips, Public Walkways, Traffic Islands, Boulevards and Medians, Pipeline Rights-of-Way, Utility Parcels and Flood Plains, Storm Water Channels/Watercourses, Storm Water Retention/Detention Areas, Municipal Reserves and Athletic Surfaces. The OSDSM also provides guidelines with respect to Plant Materials (section 12.4.5) for public recreational open space: the minimum crown cover to be provided by a balanced mix of shade trees, evergreen trees, ornamental trees and shrubs; and the size of trees to be used in areas of concentrated pedestrian traffic or play activity.

The Discussion Paper on the Urban Environment 1990 and The Development Plan for the City of Regina (Oct. 1994) outline the need for major entries into Regina and ceremonial routes to reinforce its identification as the capital city of Saskatchewan. As mentioned under the Design Guidelines, consideration should be given to maintaining views of the dome of the legislature building from entry points.

City of Regina Traffic Bylaw No. 9900 (Section 22 Schedule L) provides the standard setback for sight line control at intersections, driveways, walkways and alleys.

City of Regina Forestry Bylaw No. 9607 outlines the restrictions and precautions that are to be taken into consideration with regard to existing or proposed trees on public or private property.

The City of Regina Noise Attenuation Policy defines acceptable standards for community noise levels originating from roadway traffic standards and provides implementation strategies, standards, guidelines and procedures.

The Provincial Department of Highways and Transportation Policy for Setback of Existing Obstacles, 1989 pertains to tree planting within provincial road rights-of-way and is intended to provide assistance in judging the desirable clearance between the edge of the driving lane and existing roadside obstacles having due regard for snow

clearance, safety and appearance.

5.6 The Landscape Development Process

The landscape development process varies according to whether it is funded by the City through its capital development process, a private land developer; or a non-profit organization. In each case, however, the landowner, the design team and the public are involved in the creative process.

The following charts describe each process.

6.0 THE TREE PLANTING PROGRAM

A program for planting trees on public land and replacing trees that die or that must be removed due to other problems is essential for Regina to achieve the maximum benefits of the urban forest. Planting trees involves establishing planting priorities, scheduling workers, and arranging for equipment. The species and size of trees most suitable to the location must be determined. Proper planting methods are essential to tree survival. The planting of trees also requires coordination with other municipal and provincial departments to prevent conflicts with utilities and roadways. Effective coordination begins in the planning phase and continues through planting and maintenance.

6.1 Planting Levels

The City of Regina plants trees along streets that have not been previously planted. These trees are additions to the current street tree inventory. The City also replaces trees that have been removed over the years as a result of disease, accident or vandalism.

Table 3 shows the estimated number of trees planted by the City during the past eight years.

Table 3: Tree Planting

Program Area	1991	1992	1993	1994	1995	1996	1997	1998	Total
1. Parks and Open Space	552	1,006	908	1,824	475	379	180	840	6,164
2. New Subdivision Development	224	376	61	165	168	63	13	112	1,182
3. Streetscape									
a) Replacements	304	389	487	274	389	711	737	565	3,856
b) New	142	1,013	1,057	1,432	892	470	1,457	680	7,143
4) Golf Courses	141	322	344	72	114	32	0	0	1,025
5) Cemeteries	32	203	191	111	0	5	3	0	545
6) Special Interest Planting	-	-	-	-	-	-	-	125	125
TOTAL	**1,395**	**3,309**	**3,048**	**3,878**	**2,038**	**1,660**	**2,390**	**1,757**	**20,040**

6.2 Species Diversity

A major concern of the tree planting program is species diversity. Monocultures create unfavourable conditions that contribute to tree disease and insect problems in Regina. It is recommended that Regina set a goal of no more than 25 per cent of any one genus per

sector. (See Appendix "D" Table 1: Species Diversity).

Note that all of the 77 forestry sectors in the city currently exceed this guideline. While the composition of the existing urban forest cannot be easily modified, application of the guideline will have an immediate impact on future development projects or subdivision plantings and over a period of years on replacement plantings in existing sites.

6.3 Species Selection

Selecting the most appropriate species of trees for a particular location and function will have a significant impact on Regina's urban forest. Planting decisions will have an ongoing impact on future tree care needs and maintenance costs.

6.4 Plant Material

To create the ultimate control of the longevity and health of a tree, plantings must be chosen which are tolerant to the local growing conditions. The investment in installation and several years of care far exceed the cost of the tree. It makes no sense therefore to install a genetically inferior specimen.

Trees must be chosen that are:

- Tolerant to local growing conditions (weather and soil) and urban environmental conditions.
- Less susceptible to local tree diseases and insect pests.
- As a minimum, all plant material must be nursery grown and meet the specifications set out in the latest Guide Specifications for Nursery Stock prepared by the Canadian Nursery Trade Association, (C.N.T.A.) and the International Society of Arboriculture (I.S.A.) for size, height, spread, grading, quality and method of cultivation.
- Propagated and grown from seedling stock and plant material within zone 3a or hardier. The only exceptions to this requirement are those trees identified in Appendix "D", Table 2: Tree Species and Site Suitability as experimental trees to be tried on a limited, trial basis only.

6.5 Summary of Tree Planting Issues

The following issues were identified by the Tree Planting Work Group.

Issue

- There is a need to identify where the City should and should not plant trees.

Strategic Action

- Appendix "D" Tree Planting Priorities, Requirements, Procedures and Specifications provides tree spacing standards which identify the distance trees should be planted from infrastructure elements and those areas where trees should not be planted.

Issue

- There is a need to establish planting density standards and species distribution and diversity for various site types (ie. street trees, parks, boulevards and special use areas).

Strategic Action

- Appendix "D" Tree Planting Priorities, Requirements, Procedures and Specifications provides a species selection list for various site types and tree spacing standards.

Issue

- There is a need to establish tree planting standards and specifications for civic departments and private developers working on public land.

Strategic Action

- The tree planting standards and specifications proposed in Appendix "D", Tree Planting Priorities, Requirements, Procedures and Specifications apply to both civic departments and private developers contracted to work on public land.

Issue

- There is a need for greater consistency in the tree planting procedures employed by civic departments and private developers working on public land.

Strategic Action

- Planting procedures that that would apply to all civic departments and private developers involved in planting trees on public land are proposed in Appendix "D" Tree Planting Priorities, Requirements, Procedures and Specifications.

Issue

- There is a need to establish a policy and procedures relating to:
    - street light interference;
    - signage interference; and
    - obstructed sightlines.

Strategic Action

- Appendix "D" Tree Planting Priorities, Requirements, Procedures and Specifications provides guidelines for the distance trees should be planted from various infrastructure elements including underground utilities, street lights, street signs and traffic signals.

Issue

- The need to ensure the RUFMS is properly referenced with other forestry documents, ie: *Zoning Bylaw*, Development Standards Manual.

Strategic Action

- Those documents affecting the urban forest have been referenced within the RUFMS.

6.6 The City Nursery

The City of Regina owns and operates a tree nursery located on Dewdney Avenue West by the City Sewage Treatment Plant. Previously the City had operated two nurseries, but in 1997 the Riverside nursery was closed and its operations consolidated with the Dewdney Avenue site as recommended in the 1994 Review of the Nursery Operations. The objective of the City nursery is to provide the City of Regina with most of its tree and shrub requirements for boulevards, parks and new subdivisions. The total annual budget for the nursery in 1998 was $120,000. It is staffed by one permanent person and 0.7 casual person years. The nursery incorporates fifty acres and in 1998 contained approximately 7,340 units of useable stock ranging in various sizes. Table 4 shows the number of trees provided by the City nursery for various civic projects during the past five years in relation to the total tree plantings.

Table 4: Trees Provided by the City Nursery for Civic Projects

YEAR	1994	1995	1996	1997	1998
City Nursery	2,256	1,791	1,359	943	1,338*
Private Sources	1,622	247	301	1,447	419
Total Plantings	**3,878**	**2,038**	**1,660**	**2,390**	**1,757**

* An early snow storm cancelled the fall planting in 1998. This figure includes 125 trees provided to private organizations through The Tree Donation Program.

The Comprehensive Audit Report – Forestry, Horticulture, New Construction – March, 1988 and the Review of the Nursery Operation in April, 1994 both identified the need for the civic divisions involved in tree planting to provide the nursery with estimates of their tree and shrub needs for the foreseeable future. Difficulties in providing tree estimates to the City Nursery may be explained in part by the fact that a decision was made to shut down the nursery operation in 1992. At this time there was a push to use as much of the existing inventory as possible. Then in late 1994, after a review of the nursery operations, it was recommended that the nursery continue operating. This recommendation was approved by City Council in 1995. Since the decision to continue was made the nursery has begun lining out a number of trees and shrubs in anticipation of the future requirements for new plantings and replacements. However, the years 1992 – 1995 have left the nursery with a limited number of mature species until the future liner stock matures.

For the City nursery to be economically viable in the future the following is required:

1) civic divisions involved in tree planting must provide the nursery with estimates of their tree and shrub requirements;

2) the nursery must produce this stock and meet the appropriate specifications; and

3) the divisions must be required as a matter of policy to use the City nursery as their first source for trees and shrubs. Enforcing these basic requirements should considerably enhance the economic viability of the City nursery.

6.6.1 Summary of City Nursery Issues

The following issues were identified by the Nursery Work Group.

Issue

- There is a need to provide the City nursery with projections of the species and quantities of trees the City will require over the next several years.

Strategic Action

- Section 12.0 The Master Tree Planting Strategy describes in general the estimated number of trees and the preferred cultivars to be considered for new plantings and replacements over the next fifteen years. These projections can be used by the nursery to develop a Five Year Production Plan.

Issue

- The divisions involved in tree planting frequently acquire their planting stock from private sources and do not necessarily use the City nursery as their primary source.

Strategic Action

- Civic divisions should be required to use the civic nursery as their primary source of planting stock. If the City nursery is unable to provide the quantity or quality of plant material designated for a specific project, then and only then, should the plant material be purchased from an outside source. This recommendation is consistent with both the recommendations and intent of the 1988 and 1994 nursery audits where it was stated "Unless there is justifiable reason to do otherwise, operating sections in the City should use current nursery stock as much as possible". Now that the tree planting budget is consolidated under the Urban Forestry Section and the Master Tree Planting Strategy provides a detailed description of the number of trees and specific cultivars required by the various civic divisions involved in tree planting, the problem of the nursery having relevant planting stock should be alleviated in the future.

Issue

- The diversity of species to be grown at the City nursery should be identified. The question whether the nursery should attempt to produce all the various species the divisions require or whether it should concentrate on growing certain basic species and have the divisions acquire any additional needs from outside sources.

Strategic Action

- The City nursery should concentrate on producing the species most frequently used by the City (See Section 12.4.2).

Issue

- A large portion of the City Nursery is overgrown with mature trees and shrub material. This plant material is unsuitable for planting projects and requires a significant portion of the program budget to maintain.

Strategic Action

- A work plan that identifies funding and completion time frames needs to be developed to clear-dispose-recycle the overgrown plant material. If the land is not required for nursery purposes, consideration should be given to retaining the trees for a wildlife shelter, windbreak, snow barrier or for water conservation purposes.

Issue

- There is a need to review the operational procedures for requisitioning plant material from the City nursery with a view to ensuring a quality product.

Strategic Action

- A Work Group should be established to review the operational procedures for requisitioning plant material from the City nursery and make recommendations for facilitating the process and ensuring a quality product.

Issue

- The access road to the City nursery is often impassable during rainy weather.

Strategic Action

- Consideration should be given to improving the road to ensure the accessibility of the City nursery.

Issue

- Should the nursery consider growing Dutch Elm resistant cultivars?

Strategic Action

- Because the Dutch Elm Disease has been discovered at Sherwood Forest and the nursery's location is midway between Sherwood Forest and the city, growing elms at the civic nursery is not advisable. However, the Wascana Centre Authority is willing to work with the City on a cooperative venture to grow Dutch Elm Disease resistant elms in their nursery located in the city for use in Regina's urban forest.

Issue

- A decision should be made as to whether the nursery should be charging its customers for the stock they remove.

Strategic Action

- If the decision is made to have the nursery "charge" its customers, an appropriate pricing mechanism should be determined for the stock taken out of the nursery. The chargeout rates should be sufficient to enable the nursery to meet its financial goals but remain competitive with the private sector.

7.0 THE TREE MAINTENANCE AND PROTECTION PROGRAMS

Timely, proper tree maintenance is the key to a healthy and well managed urban forest. Tree maintenance includes pruning, surgery, watering, fertilizing, tree well cleaning, damage clean-up and disease and insect control. An effective tree maintenance program must have the capacity to prune all public trees on a regular cycle and be able to respond to emergency and potential safety hazards in a timely manner.

7.1 The Systematic Tree Pruning Program

Trees are pruned for four different reasons: to preserve their health; to remove limbs that pose a safety hazard to people or property; to remove limbs that obstruct traffic signs or sightlines; to change their appearance; and to prevent storm damage in our windy conditions. Ground crews prune small trees, while medium to large trees are pruned with aerial lifts. Pruning cycles vary according to tree type. Systematic pruning is the orderly pattern or scheduling of tree pruning and surgery. The City of Regina has operated a systematic pruning program for the past fifteen years. The City is currently on a 6 to 7 year cycle for elms and a 5 year cycle for all other trees over 9 meters in height. Each year approximately 12,000 trees are pruned requiring about 18,000 man hours.

The following are the benefits of systematic pruning.

1) Cost Savings

Systematic pruning enables trees to be pruned in a planned systematic fashion. Crew efficiency and productivity are significantly increased because work operations can be performed more effectively and residents can be advised in advance to remove their vehicles.

The cost savings that result from a systematic pruning program can be considerable. Analysis of municipal systematic pruning programs in Santa Maria, California and in Ohio showed a 5.1 and 22 percent decrease, respectively, in man-hours per tree when pruning was done on a systematic basis. Additional cost savings are also realized since systematic pruning reduces the number of reactive emergency evening and week-end call outs and related overtime.

2) Reduced Requests for Service

Systematic pruning reduces the number of service requests from the public because the trees have fewer dead, broken and other types of hazardous limbs.

3) Improved Safety and Decreased Liability

Citizen safety is a prime consideration for systematic pruning. Pruning on a 5 to 7

year cycle reduces the possibility of dead or hazardous wood developing in trees. Systematically pruning for sightlines and traffic signs for pedestrians and vehicles results in fewer accidents and damages.

A systematic pruning program decreases the City's exposure to liability by reducing the hazardous conditions that could result in bodily injury or property damage.

4) Reduced Insect and Disease Problems

Systematic pruning is an important aspect of Regina's Integrated Pest Management Program. The number of potential disease and insect problems are reduced because less deadwood will exist and the trees will be healthier and less susceptible to infestations.

5) Improved Tree Condition and Tree Value

Systematic pruning improves the condition of trees. This improves their condition rating and value.

6) Increased Property Values

Property values are increased by healthy, well-cared for trees. Trees on the property to be sold, as well as adjacent street and neighbourhood trees, are considered a definite selling point.

7) Enhanced Public Image

The public image of Regina is enhanced by a well-cared for urban forest.

8) Employee Pride

Staff morale is affected by the City's overall approach to tree care. Employees respond favourably to an organized, systematic approach that produces positive results. Systematic pruning also allows attainable production objectives to be set and crew performance to be evaluated and recognized.

7.2 Priority Maintenance

Maintenance needs shall be categorized and prioritized as follows:

1) Emergency Work - Trees that pose a safety hazard that could result in bodily injury or property damage. This includes any tree that is split, down, has broken or hanging limbs, or is obstructing a traffic sign (stop, yield, etc.).

Response time – The goal is to respond to an emergency tree situation as soon as possible depending on the availability of staff and resources and the magnitude of the problem. While the expectation is that staff would respond to an emergency situation as soon as they become aware of it, this may not always be possible. For example, if the request for service occurs after hours or on weekends, it may take time to locate staff to respond to the situation. After a major storm has struck the city there could be several emergency situations at the same time. In these situations staff would respond to life threatening situations first. Appendix "I" The Urban Forest Storm Response Plan describes the criteria for prioritizing work assignments as a result of a storm.

2) Priority Prune - Trees receiving this rating have the potential of becoming safety hazards if not corrected in the near future. Included is man made damage, broken or hanging branches, obstructing sightlines, interference with overhead wires, sign obstruction, (no parking, etc.) or trees with over 30 per cent deadwood. Tree diseases or insects that do not pose an immediate threat would be included in this category.
Response time - Trees in this rating should be responded to within two weeks.

3) Regular Prune - Trees in this rating have minor dead or dying branches or other incipient problems that are judged not to need immediate maintenance attention and pose little threat of becoming serious problems before their next regular pruning cycle.
Response time - Trees in this rating should be pruned during their next regular pruning cycle.

5) Tree Removals - Trees designated for removal have one or more defects that cannot be cost effectively or practically treated. These trees fall into four categories:

i) Trees that are structurally damaged and weakened and pose a threat to public safety or property.
Response time - Trees in this category will be removed within 48 hours.

ii) Smaller trees (0 - 6 inches DBH) that have died as a result of transplant shock, vandalism, poor cultural practices, or other causes.
Response time - Replacements will be prioritized and completed as the operational tree planting budget allows.

iii) Trees infected with a disease or insect that have deteriorated to the point that they are a hazard to spread the infestation.
Response time – As outlined in Appendix "F" Tree Removal Policy.

iv) Trees removed to accommodate civic and private development projects.

Response time – as outlined in Appendix "F" The Tree Removal Policy.

7.3 Pruning Guidelines and Standards

Trees shall be pruned according to the International Society of Arboriculture "Tree –Pruning Guidelines "and the National Arborist pruning standards.

7.4 Summary of Tree Maintenance Issues

The following issues were identified by the Tree Pruning and Maintenance Work Group.

Issue

- Staff expressed concern about their ability to maintain current workloads in relation to the staff complement. It was further explained that the City has a sufficient compliment of aerial lifts and aerial lift trained staff as well as chippers and the associated equipment to perform various tree functions. Where it may lack resources is in the maintenance of trees under ten metres. At present this work is done when either equipment is down, it's too cold to aerial prune or when there is extra summer staff. The City is currently pruning these trees on a 2 – 4 year cycle when they should be pruned every 1 – 2 years to provide adequate care.

Strategic Action

- The RUFMS will result in a more efficient use of both capital and manpower resources. Since the issue of the pruning cycle for trees under 9 meters, was identified there has been a change in the use of aerial lifts during the winter months. Whereas aerial lifts were previously employed during the winter unless it was too cold to operate them, now there is a scheduled down-time of two to two and a half months during the winter. During this period, staff who usually aerial prune now assist in ground pruning. This change has resulted in lowering the pruning cycle for trees under 9 metres to an acceptable frequency.

Issue

- The use of pruning to control insects and diseases versus chemical controls.

Strategic Action

- Section 8.2 Non-Chemical Control Measures states that an effective measure for controlling insects and diseases involves keeping trees healthy through fertilization, irrigation and pruning. Pruning may also be used to remove the infected limbs of a tree. While Integrated Pest Management does not preclude the judicious use of chemicals, it operates on the premise that if all other non-chemical control measures are implemented successfully the useage of chemicals should be minimized.

Issue

- Within the open space maintained by the City there exists a large number of "interfering trees". These are trees that:

1) are growing in inappropriate locations such as easements and dikes and impede access or interfere with public maintenance work;

2) cause or have the potential to cause damage to the public infrastructure; or

3) species of trees such as poplar and willow that have aggressive root systems that can cause problems to foundations and underground services.

Strategic Action

- Appendix "F" Tree Removal provides a policy for dealing with interfering trees that include:

1) a definition of an interfering tree;

2) the statutory authority for removing interfering trees;

3) the criteria for identifying an interfering tree; and

4) the process for removing an interfering tree on public or private land.

7.5 Root Pruning

Root pruning may be required to eliminate safety hazards and damage caused by tree roots to sidewalks, streets, paving and foundations. The Urban Forestry Section must determine when root pruning can be safely done without injuring the tree. The decision to root prune is based on the vigour of the tree, the proportion of roots that must be cut and the particular species involved. Indiscriminate root pruning will not only damage the health and appearance of trees, it often weakens their stability and creates a serious hazard. When roots are cut, trees lose their resistance to wind and snow and can become a public hazard.

7.5.1 Summary of Root Pruning Issues

The following issues were identified by the Root Pruning Work Group.

Issue

- The need to develop guidelines outlining when root pruning should be done, how it should be done and by whom.

Strategic Action

- Appendix “E” Root Pruning explains when root pruning should be done and by whom, establishes a process for developing an inventory of existing problem sites, and provides guidelines to follow when root pruning.

Issue

- Damage to tree roots as a result of construction and public works activities.

Strategic Action

- Appendix "G" Tree Protection establishes protective lanes, tree protection zones and excavation and trenching requirements to protect and/or mitigate the impact on tree roots during construction and public works activities.

7.6 Tree Removal

Eventually all trees in the urban forest will have to be removed due to old age or deterioration as a result of landscape destruction. Hazardous trees must be removed immediately to protect the public from dangerous conditions. Similarly infected trees must be removed to prevent the spread of disease. Lastly, some public trees are approved for removal by the Parks and Recreation Board to accommodate civic or private development projects. Table 5 shows the number of trees and stumps removed annually by the city during the past five years.

Table 5: Tree and Stump Removals

YEAR	1994	1995	1996	1997	1998
Number of Trees	560	484	825	451	658
Number of Stumps	223	421	175	208	174
Total	**783**	**905**	**1000**	**659**	**832**

7.6.1 Summary of Tree Removal Issues

The following issues were identified by the Tree Removal Work Group.

Issue

- The need for a policy to establish the criteria and the process for removing hazardous trees, infected trees or those approved for removal to accommodate civic or private development projects.

Strategic Action

- Appendix "F" Tree Removal describes the authority, the criteria for the removal, the process to be followed, who is responsible for the costs and the penalty for failing to comply when removing hazardous or infected trees or those to accommodate civic or private development projects.

Issue

- A considerable amount of Parks and Recreation Board and staff time is taken up considering requests from private landowners to have public trees removed to accommodate private development.

Strategic Action

- Only those cases where there is a dispute between the City and the private landowner or in cases where the removal of a tree or trees could impact the surrounding residents should be forwarded to the Parks and Recreation Board for their consideration. This would significantly reduce the number of cases heard by the board. Trees which may be removed by a tree spade and relocated to another area for planting should be considered a relocation and not a removal.

7.7 Tree Protection

A healthy urban forest is the principal goal of the forestry program. Preservation of the city's existing trees is essential to this goal. Without guidelines to protect trees during construction work, maintenance activities, and snow removal operations, their survival would be threatened. All activities around public trees should be carried out with the aim of protecting trees against unintentional damage from equipment. This includes damage to the roots and root zone, branches or the bark of trees.

Construction damage is thought to be the number one cause of premature tree mortality in urban centres. While modifying the urban environment through building, renovating and removal of physical and landscape features is ongoing, a proactive approach to managing construction activities around trees is essential for preserving Regina's tree assets and minimizing the liability risks. Because decisions about construction projects are made in the planning and design phases, it is critical that tree preservation be included in these discussions.

Through the Save-A-Tree Program the City relocates trees that would otherwise be destroyed from private property to public open spaces. Only those trees whose value is more than the cost to relocate and maintain are considered. Six trees were saved through the program in 1998.

7.7.1 Summary of Tree Protection Issues

The following issues were identified by the Tree Protection Work Group.

Issue

- There is a need for a policy to protect trees on public land during construction.

Strategic Action

- Appendix “G” Tree Protection establishes a protective lane, a tree protection zone, soil compaction, hoarding, and grade change requirements for protecting trees on public land during construction. The policy also provides for enforcement of the requirements, cost recovery and penalties for violations for damaged trees.

Issue

- There is a need to establish tree protection practices for turf maintenance around the base

of public trees.

Strategic Action

- Appendix "G" Tree Protection section 6.2 describes the practices to be followed to protect trees on public land during turf maintenance.

Issue

- There is a need for Regina to recognize and protect its landmark trees.

Strategic Action

- Appendix "H" The Heritage Trees of Regina Program establishes a program to locate, designate, catalogue and preserve the heritage trees of Regina.

7.8 Storm Response

Storms can have a major impact on the urban forest. High velocity winds, tornadoes, hail and ice storms can break branches, uproot trees and threaten citizen safety and property. Downed trees can pose a hazard to traffic movement through the city and obstruct emergency vehicles access to injured people.

Through proper planning and preparation a municipality can mitigate or minimize the damage caused by severe storms. Careful species selection and location of trees together with proper planting and maintenance activities will better enable trees to withstand the severity of a storm's impact. A storm response plan will enable the City to mobilize its resources rapidly and efficiently in response to a severe storm.

The three action phases of a storm response plan are:

1) Preparation - planning and early warning activities. This includes establishing equipment lists, call-out procedures and a pre-planning meeting to coordinate the overall response to a storm. An effective early warning system for impending severe storms is essential. The lead time gained before a severe storm strikes is crucial for mobilizing staff and resources. Information on when a severe storm may strike and the magnitude of the storm can be obtained from Environment Canada's Atmospheric Environment Program.

2) Response - immediate activity prior to and after a severe storm. Roles and responsibilities for all staff involved in the storm response should be clearly defined. A process for receiving and responding to public requests for service should be established. Response priorities (ie: life threatening situations, trees blocking arterial streets and general clean-up) for responding to public requests for service should be prioritized.

3) Recovery - activities to return the damaged areas to pre-storm conditions. Included in this phase are damage assessment and replacement of damaged trees after a storm.

7.8.1 Summary of Storm Response Issues

The following issue was identified by the Tree Protection Work Group.

Issue

- There is a need for a storm response plan that will enable the City to respond to severe storms or natural disasters rapidly and efficiently.

Strategic Action

- Appendix "I" the Urban Forest Storm Response Plan provides a comprehensive action plan for responding to storm damage to the urban forest. The plan provides an early warning system for forecasting the magnitude of storms. It establishes procedures and mechanisms for coordinating the storm response and prioritizes the clean-up priorities.

7.9 Safety Requirements

Maintenance of the urban forest often involves danger to personnel. Sharp cutting instruments, power equipment, above ground work in trees and heavy lifting are often required and sometimes carried out near vehiculer traffic. Following proper safety procedures will protect the health and safety of city crews and reduce potential liability problems for the City. In order to provide for the safety of City tree care employees safety requirements are necessary for those engaged in pruning, trimming, repairing and removing trees and cutting brush on public land. Appendix "J" Safety Requirements describes the responsibilities, the process and the safety requirements for civic employees involved in tree care.

8.0 THE INTEGRATED PEST MANAGEMENT SECTION

The goal of The Integrated Pest Management Section is to proactively manage tree diseases and insect pests by utilizing the safest, most economical and effective combination of cultural, biological, genetic and chemical control methods. The emphasis is on "integrated" whereby the treatment strategies are focused on specific tree diseases or insect pests while preserving the integrity of the landscape ecosystem. While The Integrated Pest Management Section does not preclude the judicious and restricted use of chemicals, it operates on the premise that if all other aspects of the control program are implemented successfully the usage of chemicals should be minimized. The main activities of the program are monitoring, data collection and sampling, assessment, treatment and public education and awareness. There are 3permanent and 10.3 casual person years of staff involved with these activities.

8.1 Statutory Authority

The Pest Control Products Act governs the sale, use, distribution and handling of pesticides in Saskatchewan. Every substance that is registered under *The Pest Control Products Act*

(Canada) is covered by the Act.

The Pest Control Act is administered by the Sustainable Production Branch of Saskatchewan Agriculture and Food. The Minister of Agriculture and Food may declare any animal, insect, or disease to be a "pest" if it is considered destructive or dangerous to crops, grain, livestock or other property. Currently, there have been four declared pests. Norway rats were declared in 1956, grasshoppers in 1957, the Warble Fly in 1971 and Dutch Elm Disease in 1977.

The Environmental Management and Protection Act and its regulations are administered by Saskatchewan Environment and Resource Management. The Act regulates the prevention of environmental pollution and the restoration of the environment when pollution occurs. The disposal of pesticides and pesticide containers are also regulated through this Act.

The Dutch Elm Disease Control Regulations are the enabling regulations that provide the authority to manage the disease on private property.

Forestry Bylaw #9607 provides the authority and protection for the city's urban forest.

8.2 Non-Chemical Control Measures

The following are cultural practices that are utilized operationally to the maximum extent possible to control diseases and insect pests. While points 1 and 2 are the responsibility of the Planning and Design Division, the Urban Forestry Section is responsible for points 3 to 7 The Integrated Pest Management Section can identify problems in these areas and make recommendations for their correction in relation to controlling tree diseases and insect pests.

1) Species Selection

   Species and cultivars should be selected based on their suitability to the site and proven resistance to local tree diseases and insect pests.

2) Species Diversity

   From the perspective of the long-term health and appearance of the urban forest, maintaining a diversity of tree species and ages is vital. A diverse urban forest like a natural ecosystem or a diversified economy, is likely to be more stable than a simple one, with change occurring gradually as trees die and are replaced.

   Monocultures create unfavourable conditions. Some species such as elms are threatened by virulent diseases like Dutch Elm Disease. A large stand of elms in a single location can support the rapid spread of disease if an insect pest or disease should strike (ie: cankerworms), single-species plantings are particularly vulnerable. Diversification provides insurance against the kind of wholesale defoliation of the forest cover that took place in some cities with the invasion of Dutch Elm Disease.

3) Tree Vigor

Maintaining tree vigor through fertilization, irrigation, pruning and pest management, not only enhances the appearance of trees, but also promotes a healthy tree that is less susceptible to infection. For this reason the most effective insect and disease control measure involves keeping trees in optimum health.

4) Systematic Pruning

Systematic pruning of trees has a definite positive effect toward reducing many insect and disease problems in the urban forest. Pruning on a periodic basis will open the canopy, reduce the amount of weak and dead wood on trees and eliminate crossing or rubbing branches. There will be fewer entry wounds and broken branches which are breeding sites for insects and diseases. Once a tree is infected, pruning can be utilized in some cases to remove the infected branches and prevent further spread.

5) Rotation Planting

Rotation planting is similar to crop rotation in agriculture. When an infected tree is removed the replacement species should not be susceptible to the same problem. The rationale being that the particular insect or disease that infected the previous tree could still be present after the tree is removed.

6) Remove and Replace

The Pest Control Act and *Forestry Bylaw #9607* provide for the removal of trees that exhibit symptoms of disease or insect infestation. All alternative forms of control including pesticides will be explored before removing and replacing a tree.

7) Inspection and Certification of Imported Plant Materials

One reason Regina is beginning to see insect pests and diseases which have traditionally not been a problem is because of new tree species imported into the city from other areas. Most people are aware that Dutch Elm Disease can be transported and spread through the transportation of elm materials. However, other tree species may also carry disease and insect populations. This includes fireblight, black-knot, gypsy moths, borers, beetles and eggs which can quickly become established under the right conditions.

Discovering plant materials that are infected before they are planted prevents the disease from spreading through the urban forest and reduces maintenance costs due to mortality. The Superintendent of The Urban Forestry Section is responsible for inspecting and certifying imported plant material. For this purpose he may utilize either Urban Forestry or Integrated Pest Management Section staff to act as his agents.

8) Sanitation

Sanitation which involves removing infected, dead and fallen branches and leaves in many cases can effectively eliminate or destroy the breeding refuge of various insects and diseases.

9) Alternative Pest Control Measures

Not all insects are harmful and require control measures. In many cases the presence of insect populations may be beneficial. Insect species that prey on other insect populations are a natural form of control. The control of insect populations by natural enemies can be effective, long-lasting, economical and less disruptive on the ecosystem than some control products.

Birds are another form of natural control. Some species will feed on large numbers of insects. To assist in increasing the number of beneficial bird populations, bird houses have been placed at various locations throughout the city. Houses have been placed for American Kestrel, Tree Swallows and Purple Martins. In addition, bats feed heavily on flying insects. The City has produced a brochure for home owners on how to attract wildlife to their yards and has worked cooperatively with Nature Saskatchewan, the Wascana Centre Authority and Ducks Unlimited to attract beneficial wildlife to Regina.

Pheromone traps are another non-toxic or alternative control method. Pheromone or synthetic scent attractants are used to attract insect species as a monitoring tool. For the past several years The Integrated Pest Management Section has used pheromone traps as a control strategy for the control of ash borers. The insects are attracted to the traps and once trapped are not able to reproduce, thereby reducing the number of borers affecting ash trees. This method of control has replaced the use of moderately toxic chemical control products.

10) Tree Banding

Tree banding for cankerworm control is an effective non-toxic control. Female cankerworms are wingless and must crawl up the tree to lay their eggs. By constructing a tree band that the female must crawl across, she becomes trapped on the sticking agent and is unable to lay egg masses in the trees where damage will result. A public awareness campaign to encourage home owners to band their trees has been active in Regina for many years. In areas where all the trees have been properly banded cankerworm damage has been much less severe than in areas where few trees are banded.

8.3 Monitoring Diseases and Insect Pests

The Integrated Pest Management Section monitors insect population levels and tree diseases.

The monitoring program determines if insect populations or diseases are increasing, decreasing or remaining constant. This enables The Integrated Pest Management Section to identify the areas of the city which have higher levels of infestation or infection and determine the appropriate control measures. These areas are then targeted for control strategies which may include tree spraying with biological, cultural or chemical control products. In some cases the monitoring programs acts as the control program. Pheromone or synthetic scent lures attached to sticky traps will attract and catch insect pests. In the case of ash borers, pheromone traps are used as the control method. In other cases the biological control may be the release of predator insect species to target or attack insect pests in the tree.

Analysis of historical records has enabled The Integrated Pest Management Section to establish a list of insect pests to consider for control initiatives. Insects which are monitored include aphids, leaf rollers, plant bugs, pear slugs, leaf miners, bronze birch borers, cankerworms, ash borers, ash plant bugs, spider mites, boxelder bugs, tent caterpillars, elm bark beetles and other insect populations that may cause harm. The monitoring program determines the population levels and the insects' stage of development. Control products can then be applied when the insect pests are most vulnerable. The Integrated Pest Management Section is currently using a number of biological or non-toxic control products including insecticidal soaps, pheromone or synthetic scent attractants as well as tree banding to control insect pests.

Tree diseases also have an impact on the urban forest. Among those monitored are Dutch Elm Disease, dothiorella wilt, verticillium wilt, bacterial wetwood infection, fireblight, anthracnose, blights, canker growths, chlorosis, environmental stress and a host of other diseases which affect the urban forest.

8.4 Chemical Insect Control

Traditionally pest control operations have relied upon chemical control measures. Chemical control remains a common practice for many cities. The City of Regina currently operates on the belief that chemical controls should be implemented only when other control strategies have been unsuccessful or when other options are not available as is the case with elm bark beetles. The implementation of control strategies which have resulted in the discontinuation of the use of chemicals include cankerworm control where tree banding assists in reducing cankerworm populations and spray applications are done with the biological control product Bacillus thuringiensis var. kurstaki rather than using moderately toxic chemicals. Control of aphid populations is another program where the use of a chemical control product has been discontinued. Insecticidal soap is currently being used to manage aphids. These initiatives have had a positive impact on the urban environment by allowing a mode of action specifically targeted to insect pests. Residents, pets, birds and other wildlife are not harmed by exposure to these products.

The judicious and prudent use of chemicals to control specific insect pests that pose

significant economic and aesthetic losses to the city should continue to be an option. This option will be necessary in the event of a major disease or insect pest outbreak that can only be effectively stopped with the use of chemical control products.

8.5 The Dutch Elm Disease Program

8.5.1 The Biology of Dutch Elm Disease

The highly destructive Dutch Elm Disease (DED) is caused by the fungus Ceratocystis ulmi. When introduced into elms, the fungus produces spores which block the water conducting vessels of the sapwood and causes the tree to die. The disease is vectored by three possible routes:

- By the native American elm bark beetle (Hylurgopinus), and European Elm bark beetles (Scolytus multistriatus). The former is a native to Saskatchewan, with the latter coming in as a transient.

- Through intraspecific root grafts between adjacent elm trees.

- On pruning tools used on healthy elms after dead and diseased elms are pruned or removed.

The early symptoms of the disease appear from the latter part of June to the middle of July when the leaves on the tree begin to wilt, droop and curl. The later symptoms appear from mid-July when the leaves begin to droop, turn yellow and fall off prematurely. All these symptoms are accompanied by brown streaks in the sapwood that can be seen by removing the bark of the infected branch. Since other wilt diseases may show similar symptoms, laboratory culturing is required to confirm DED.

8.5.2 The History of Dutch Elm Disease in Regina

In Regina where elms comprise 36 per cent of the public tree population, DED poses the greatest threat of all tree diseases. DED may kill an elm in as little as three weeks. The disease was first detected in Regina in 1981. As a result of this discovery, the City implemented a DED monitoring program. In 1990 DED was found to have infected a large natural stand of elm trees in the Souris River Valley. In 1991, the disease was confirmed at Sherwood Forest, just northwest of the city limits. The presence of the disease on our doorstep resulted in the City expanding the DED program. Since then isolated cases of DED have been found in Regina in 1994, 1995 and 1997.

8.5.3 The Dutch Elm Disease Program

The DED Program consists of seven components.

1) Monitoring and Surveillance

During the growing season, when symptoms of DED may appear, a systematic monitoring program is implemented. The program involves visually inspecting all elm trees within the city. This inspection process includes all City owned and privately owned elm trees. Staff conduct thorough street by street, alley by alley inspections. The goal of the monitoring program is to detect DED infected trees as early as possible. Early detection allows the City to initiate corrective measures to remove the infected tree and thereby prevent or reduce the number of additional trees which could become infected. All elms are currently inspected approximately every two weeks during the growing season. The monitoring program has proven successful. Without a monitoring program it is unlikely that the loss of elm trees could have been held to a single tree in these years. The prompt removal of infected trees has prevented the disease from becoming firmly established within city limits and prevented the potential loss of thousands of elms.

In 1999 Integrated Pest Management received a grant in cooperation with the Federal Urban/Rural Habitat Renewal Program and the Saskatchewan Dutch Elm Disease Association to conduct an inventory of privately owned elm trees in Regina. The inventory will be used to assist in the management of DED.

2) Sanitation

Elm bark beetles are a major threat to the spread of the fungus which causes DED. Bark beetles breed in dead and dying elm wood. A critical component of the DED Program is the removal of dead and dying tree limbs and branches. Under the City of Regina *Forestry Bylaw* #9607– Hazard Tree Removal – trees that have greater than 50 per cent deadwood and can provide a habitat for elm bark beetles are removed. The Urban Forestry Section is responsible for the pruning and maintenance of 43,615 elm trees. The section is currently on a 6 - 7 year pruning cycle. This means all City-owned elm trees are pruned every 6 - 7 years depending upon their age and growth rates. The Urban Forestry Section prunes approximately 7,000 elm trees each year.

3) Firewood

As previously mentioned, elm bark beetles colonize dead and dying elm wood for brood galleries to rear their young. Elm wood stored for use as firewood provides an ideal habitat for this purpose. Local residents bringing infected firewood into the city pose a major threat to the urban forest. A single piece of elm wood could carry thousands of infected beetles. With more and more of the province becoming infected each year, the chances of DED occurring are increasing. When inspecting elm trees, surveillance crews

are also on the look out for elm firewood. Provincial regulations prohibit the storing of elm wood for any purpose. When located, homeowners are requested to immediately dispose of elm wood at the City's landfill site. This reduces the risk that beetles could use this wood to produce a new generation and infect additional elm trees. If homeowners fail to remove the elm wood, a city crew is dispatched to clean-up and dispose of the material.

4) Bark Beetle Spray Program

Since bark beetles provide the major threat for the spread of the DED fungus, the control of their populations is a critical component of the maintenance program. Bark beetles construct their brood galleries at the bases of elm trees. Each year The Integrated Pest Management Section targets select areas of the city for the control of bark beetle populations. Pheromone traps and regular inspection of elm trees and prunings are used to identify areas of the city containing high population levels. These areas are then sprayed to control beetle populations. All City-owned elm trees are sprayed on a two year cycle.

5) Infill Planting

As elm trees are removed they are replaced in most instances with trees of a different species. Alternative tree species such as Ash, Schubert, Linden and Maple are among the trees now planted to reduce the dependence on elms.

6) Public Awareness and Education

Education of the public and community organizations is key to the management of DED. In recent years the department has spent as much as $25,000.00 per year toward the promotion of public awareness of the disease. The marketing campaign raises the awareness of DED and provides information about when to and when not to prune elm trees and what steps can be taken to improve the health of elm trees. The campaign discusses the threat caused by elm wood and lets residents know who to contact and what steps home owners may take to assist in maintaining their private trees. The threat of elm wood transported into the city for use as firewood is a specific issue being addressed.

7) Research

The City is currently involved with a number of research initiatives that are considering alternative strategies for managing DED. One of the projects under the auspices of the University of Toronto involves conducting genetic research into elm tree resistance to the DED pathogen. The Integrated Pest Management Section is assisting this research by conducting field trials involving the injection of elm trees with a substance which may provide some resistance to the fungus. If this research proves successful, it may be possible to protect the majority of the mature elms within the city.

The Supervisor of The Integrated Pest Management Section is a representative on the Saskatchewan Dutch Elm Disease Management Advisory Committee and also participates on the research sub-committee. Research initiatives have included:

1) two year study on the elm bark beetle life-cycle;

2) a project to survey elm trees throughout the province utilizing remote sensing with satellite imagery; and

3) the sampling and testing of beetles and elm samples to determine the various strains of DED.

8.6 Public Awareness

The annual budget provides $25,000.00 for a public awareness and education program. The funding is used for radio, television and print advertising. Brochures and signage have also been a regular component of the awareness campaign. In addition, a display board has been developed and is set up at the Home and Garden Show, the Exhibition, at schools and various conferences and trade shows. Tree ribbons were featured once to raise awareness and assist residents in identifying elm trees.

Radio, television and print media coverage have added to the efforts. Utilization of the news media allows the City to reach a large audience with no additional cost. Eleven media interviews were conducted in 1998, 27 in 1997 and 25 in 1995. The Integrated Pest Management staff have made group presentations to school groups, government departments, other civic departments and the general public. Each year The Integrated Pest Management Section takes thousands of phone calls requesting information on the care and control of insect pests and tree diseases.

8.7 Statistical Information

The following table shows the activities of The Integrated Pest Management Section during the past five years in combating tree diseases and insect pests.

Table 6: Integrated Pest Management Statistical Information

ACTIVITY	YEAR				
	1994	1995	1996	1997	1998
Invertebrate Pests					
Cankerworm Control					
Dipel WP (kilograms)	166	165	272	194	260
Foray (Litres)	n/a	n/a	80	69	138
Number of Monitoring Traps	500	500	500	400	400
Number of Trees Treated	10,141	9,757	18,428	15,762	26,717
Aphid Control					
Volume of Control Products					
Insecticidal Soap (Litres)	1,017	1,055	1,447	1,299	2,043
Number of Trees Treated	7,711	6,221	8,409	9,022	14,529
General Insects					
Number of Clear Wing Borer Traps	500	500	500	500	500
Dutch Elm Disease Control Program					
Elm Trees					
Inventory of City Owned Trees	44,000	43,900	43,800	43,615	43,554
Trees Removed	91	22	44	168	161
Hazard Trees Identified	118	45	223	78	50
Trees Inspections – Frequency	5	6	7	9	10
DED Infected Trees Removal	1	-	1	1	0
Tree Samples Taken	n/a	530	411	206	55
Trees Fertilized	-	-	-	2,406	111
Elm Bark Beetle Control					
Volume of Control Product					
Dusban Turf (Litres)	159	200	211	203	213
Number of Pheromone Traps	150	212	200	200	200
Number of Trees Treated	31,193	19,917	20,244	20,546	25,353
Elm Firewood Enforcement	49				
Elm Firewood Notices Issued	49	121	57	102	13
Elm Firewood pick up and disposal actioned	22	80	28	52	2
Elm Firewood action by owner	27	41	29	50	12
Total Elm Firewood Removed	n/a	n/a	n/a	3.2 tonnes	1.09 tonnes
General Tree Inspections at Sites (private and City)	1,238	915	854	266	212
Tree Injections					
Mauget Injections	n/a	n/a	n/a	12	40
University of Toronto Research	n/a	n/a	n/a	48	48

8.8 Summary

An integrated approach to managing insect pests and tree diseases provides a more effective, safer and less expensive control program. To be effective an Integrated Pest Management Program must be a community effort involving a combination of

maintenance and control measures.

8.9 Summary of Integrated Pest Management Issues

The following issues were identified by The Integrated Pest Management Section Work Group.

Issue

- There is a need to identify a process for removing Dutch elm infected trees on private property (ie: the notification period required, who removes, who pays, the liability issue and the use of private contractors).

Strategic Action

- Appendix "F" Tree Removal provides a detailed description of the process for removing Dutch elm infected trees on private property including the method of notification for removal, the notice period, who is responsible for removing the tree and the course of action to follow if the homeowner fails to complete the work within the specified time.

Issue

- There is a need to establish a policy for protecting public trees during snow removal activities, sidewalk repairs and sewer replacements and construction projects undertaken by City departments.

Strategic Action

- Appendix "G Tree Protection proposes a proactive tree protection policy that provides guidelines for protecting public trees during construction, maintenance work and snow removal activities.

Issue

- There is a need to ensure that contractors who import plant material for landscaping public land notify The Integrated Pest Management Section to inspect and certify the material is free of pests and diseases.

Strategic Action

- The requirement for contractors to have The Integrated Pest Management Section inspect and certify imported plant material prior to planting on public land is included in Appendix "D" Tree Planting Priorities, Requirements, Procedures and Specifications and distributed.

Issue

- There is a need to more actively enforce the protection of trees on public land during construction involving private developers.

Strategic Action

- The Requirement for Construction Near Trees on Public Land outlined in Appendix "G" Tree Protection shall be incorporated into *Forestry Bylaw No. 9607* and distributed to developers when they apply for a building permit. Forestry will monitor

the construction site for compliance and Bylaw Enforcement will enforce the provisions of the bylaw.

Issue

- There is a need for threshold indicators for tree diseases and insect pests that will indicate when a corrective action is required such as: 1) pruning; 2) non-chemical control measures; 3) tree removal; or 4) chemical spraying if necessary. Without threshold indicators it is difficult to rationalize when Integrated Pest Management should or should not spray or when additional funds may be required for spraying.

Strategic Action

- Vancouver and Lethbridge have established threshold indicators for tree diseases and insects pests relevant to their cities. Appendix "K" Pest Management Threshold Indicators establishes threshold indicators for those tree diseases and insect pests common to Regina. These threshold indicators should be used to determine when The Integrated Pest Management Section should or should not spray and when additional funds may be required to prevent a possible infestation.

9.0 PUBLIC EDUCATION AND INVOLVEMENT

As is the case with most cities, trees that grow on private land comprise the majority of Regina's urban forest. Since the actions of individual homeowners will collectively have a significant impact on the health of our City's trees, the cooperation and involvement of the public is vital to the success of any urban forest strategy.

Educational and participatory programs are an investment in the long-term vitality of our urban forest, since a tree educated public results in a healthier forest. The following programs and special events are offered by the City of Regina to encourage public awareness and participation in enhancing and preserving the city's urban forest.

9.1 Participatory Programs

1) Adopt-A-Greenspace

   The program provides an opportunity for citizens to enhance the quality of public green space in Regina by volunteering their time to do light maintenance tasks.

2) Gifts and Memorials Program

   The program provides individuals, groups and organizations the opportunity to purchase trees for planting in public open space in remembrance, observance or acknowledgement of a special event such as birth, marriage, anniversary or bereavement.

3) Public Requests for Boulevard Trees

Each year the City receives approximately 300 requests from the public to plant boulevard trees. Where possible the City attempts to accommodate these requests and include them in their tree planting schedule.

9.2 Educational Programs and Services

1) Arbor Day

Arbor Day is held each year. It is generally alternated between the public and separate school systems and includes activities such as a tree planting ceremony. Information on Arbor Day and the Tree Tour as well as tree care brochures are provided to the schools to educate the students about the urban forest. In 1996 and 1997 Weyerhauser has sponsored Arbor Day Colouring Books for distribution to all grade three classes in Regina. On occasion other opportunities present themselves and are incorporated into the program. For example, in 1996 Census Canada provided 5,000 seedlings that were distributed to all grade three classes in Regina. In 1997 Regina hosted the Provincial Arbor Day in conjunction with Saskatchewan Environment Resource Management. The Lieutenant Governor and Smoky the Bear were in attendance. Three classes were invited to attend and each narrated a poem about trees and were taken on a tree tour. A public service announcement and media invitation accompanies these events. In 1998 the City participated in an Arbor Day event at the Science Centre in conjunction with Saskatchewan Forestry Association and the Wascana Centre Authority.

2) Trees For The Millenium

In 1999 the City approved a Trees For Millenium planting contest in which a maximum of 10,000 burr oak seeds would be distributed to contestants and planted along the Wascana Creek, Pilot Butte waterways and selected residential and park areas. Distribution of the seeds is to begin in January 2000. Contest winners receive a cash prize.

3) The Tree Tour

The Tree Tour invites residents to learn more about the trees in their city. The tour begins in Rotary Park and continues through Kiwanis and Les Sherman Parks. It is promoted through various means such as the Program Guide, literature distributed in schools, community newsletters, the City information page, Arbor Day and the Home Show.

4) Xeriscape Classes

Information on tree species and tree care is provided in a workbook.

5) Tree Care Brochure Series

The City made available for public distribution brochures on tree planting, tree care and tree pests. Included are brochures on Cankerworms, Birch Dieback and Bronze Birch Borer, Dutch Elm Disease, Wetwood, Fireblight, Aphids, Colorado Spruce and Tree and Shrub Planting.

6) Community Partnerships and Shelterbelts

In 1999 the Public Works Department in cooperation with the Community Services Department established a program to identify suitable locations for shelterbelt plantings and provide an opportunity for community and resident participation. The program provides for written submissions to be received from individuals or community groups interested in cooperating with the City to establish shelterbelts of mutual benefit to the City and the community. The Public Works Department has identified $5,000.00 annually from its Winter Road Maintenance budget for this purpose.

7) Home Show

The City's Enviro Group which is comprised of representatives of those divisions that have an interest in promoting environmental programs provides a display at the Home Show that includes tree related brochures and display.

8) Dutch Elm Disease Communication Plan

For the past ten years the City has, as noted in Section 8.0 the Integrated Pest Management Program, conducted a DED public awareness campaign.

9) Cankerworms
Public service announcements and City information page advertisements are placed in the local newspaper in the spring and fall when it is time to band and de-band.

10) Pruning Schedule

City information page advertisements are placed twice a year to indicate which areas of the city are being pruned. The advertisement includes information on how the schedule works and highlights from the bylaw.

11) Tree Care Series

In 1997 the City provided information on the City information page and the radio regarding tree care and City programs.

12) Yellow Page Advertisement

In 1998 and 1999 a Tree Care Notice was placed in the yellow pages providing residents with information regarding the care of public trees on the city owned portion of their property.

13) Newsletter Information

Each spring information on tree care and tree pests is sent to the community associations for inclusion in their newsletters.

14) The Program Guide

Timely tree care and pest information is placed in the Program Guide.

15) Tree Information Brochure

A brochure entitled "Almost Everything You Wanted To Know About Regina's Trees" is available to the public. The brochure contains the answers to questions frequently asked by the public such as getting a city tree planted in their yard or pruned, how to prune and keep a tree healthy, and how to identify DED.

While the above programs and services may be offered in any given year the emphasis may vary depending on budget constraints and the need.

9.3 Conclusion

A more educated and aware public will result in greater support for urban forest programs. Since the majority of the urban forest is privately owned, public support is crucial for promoting a healthy and sustainable urban forest.

9.4 Summary of Public Education and Involvement Issues

The following issues were identified by the Public Education and Involvement Work Group.

Issue

- There is a need to formalize the current City practice of providing excess trees from

the civic nursery to community organizations for planting.

Strategic Action

- Appendix "L" The Tree Donation Program encourages public involvement in enhancing the urban forest by making trees from the City nursery available to community organizations for planting.

Issue

- The need to protect Regina's heritage trees was identified by the Tree Protection Work Group.

Strategic Action

- Since many of the city's heritage trees are on private property, The Heritage Trees of Regina Program proposed in Appendix "H" Tree Protection requires the involvement and support of the general public.

10.0 THE MANAGEMENT INFORMATION SYSTEM

The public tree inventory conducted by the City in December, 1996 was done on a block by block basis. In other words, the data was aggregated by block and not by each individual tree. It is the intention of The Open Space Management Division to add to this information and develop an individual tree inventory which would contain specific information on every public tree in Regina.

A management information system which has as its basis an individual tree inventory is required to plan and schedule work as well as to develop budgets and personnel requirements and monitor costs and performance.

10.1 The Benefits of an Individualized Tree Inventory

The following are the benefits of an individualized tree inventory.

1) Work Management

An individual tree inventory will enable mangers to allocate manpower and equipment based on the actual species, size, condition and maintenance requirements of the tree. Daily work schedules will be based on the priorities derived from the inventory, grouped into efficient combinations of tasks and geographic areas.

2) Requests for Service

An individualized tree inventory with each tree located by address in the computerized data base will expedite requests for services by providing a detailed service history of each tree that will enable staff to respond in a timely and

professional manner.

3) Insect and Disease Control

A computerized inventory is necessary for tracking infected trees and recording treatments for The Integrated Pest Management Program.

4) Accurate Information for Management Decisions

Data on maintenance performed, condition and size of the tree population can be summarized to prioritize resources and develop well-grounded annual budget requests.

5) Accurate Cost Analysis

Work completed is recorded by each individual tree. This will allow a cost analysis of the manpower, equipment and material including the extent and frequency of services. Resource expenditures identified by tree serviced would provide more accurate data for future manpower and equipment budgeting.

6) Continuous Inventory

A computerized tree inventory that is updated using daily work reporting foRegina's Market Square will provide up-to-date data on the status of the urban forest on an on-going basis.

7) Prioritizing Tree Maintenance and Tree Plantings

An individualized tree inventory will identify the maintenance requirements of each tree in the urban forest and the sites for future plantings. This will allow priorities to be established and resources allocated based on accurate and current information.

8) Species Performance

Valuable knowledge about the response of a species to different growing conditions and maintenance treatments can be obtained from an individual tree inventory.

9) Tree Values

The individual tree inventory will allow each tree to be assigned a monetary value which can be used for cost recovery purposes in the event of damage.

10) Risk and Liabilities

Trees that pose a public hazard can be identified for immediate inspection and care. By documenting that the City exercised reasonable care in detecting and correcting problems, the inventory can provide a valuable defence against claims that might arise.

11) Evaluation

The inventory will allow the City to evaluate its success in meeting goals and policies and the resources required for the next fiscal year.

12) Master Tree Planting Strategy

The individual tree inventory provides a profile of existing trees which will be used as an analytical tool in selecting species for replacements or new plantings in associated areas. The intent is to allow for consideration of existing plantings which may influence decisions on species selection for diversity and location.

13) Staff Safety

An individual tree inventory will enable the City to maintain a listing of trees with bolts/cables and reduce the change of staff being injured by contacting a hidden bolt.

10.2 Summary of Management Information Issues

The following issue was identified by the work groups.

Issue

- There is a need for an individualized tree inventory that can be accessed and updated by both The Urban Forestry Section and The Integrated Pest Management Section.

Strategic Action

- The Open Space Management Division is currently developing a computerized individual tree management information system that would serve as a base inventory for those divisions involved in tree care.

11.0 STAFF TRAINING AND DEVELOPMENT

An important consideration in maintaining a healthy urban forest is ensuring employees have the skills and knowledge needed to do their jobs. Currently an orientation is conducted annually to update and refresh staff in pruning, planting and tree removal. During the course of developing The RUFMS several of the Work Groups identified the need for additional training for employees involved with the care of the urban forest

11.1 Summary of Staff Training and Development Issues

Issue

- There is a need for Parks Maintenance and Open Space Services staff to receive training in tree maintenance.

Strategic Action

- It is recommended that civic employees involved in tree pruning attend both the tree pruning seminar offered by The Urban Forestry Section and the tree pruning course offered by the Saskatchewan Institute of Applied Science and Technology.

Issue

- Urban Forestry, Parks Maintenance, Open Space Services and Support Services staff who are involved in caring for the urban forest should in addition to their regular training receive additional specialized training to identify tree diseases and insect pests.

Strategic Action

- Pest Management staff should provide staff who care for the urban forest with training to enable them to identify common pests and insects.

12.0 THE MASTER TREE PLANTING STRATEGY

12.1 Background and Purpose

A tree planting program should be a function of a community's master tree plan. A master tree plan brings together the various elements that must be considered in establishing a healthy, sustainable urban forest.

The purpose of the Master Tree Planting Strategy (MTPS) is threefold:

1. To provide a comprehensive plan for new tree plantings and replacements for the City of Regina.

2. To prioritize the order in which sites should be planted.

3. To provide projections for the quantity and species of trees that will be required.

These projections will assist the City nursery and private nurseries from whom the City purchases plant material in determining their production plans. It should be noted that the MTPS is a conceptual plan and the specific number of trees or species for each site is subject to change when a site specific analysis is conducted and design plans are developed.

It is also important to note that the Master Tree Planting Strategy accounts only for tree planting on each designated site although detailed design plans (particularly for Ceremonial Routes, Gateways and Regina's Market Square) may include lighting, site furnishings, architectural

elements, artwork, signage, etc.. The tree numbers associated with the MTPS and the associated Nursery Production Plan are based upon an annual budget for Streetscaping. Should any of these funds be directed towards design elements other than plant material, the tree numbers previously identified will require adjustment. Furthermore, projected timelines for nursery production and tree planting installations will be also require adjustment according to funding re-allocation.

12.2 The Criteria for Prioritizing New Tree Planting Projects

Each year an effort will be made to install plantings within more than one of the following location categories, with the intent being a planting cross-section of the six main categories.

In general new tree planting projects should be prioritized in the following order:

1) Ceremonial Route – The key ceremonial routes include:
   a) airport to legislative ground
   b) downtown (Victoria Park) to legislative ground
   c) downtown to Exhibition Park
   d) territorial administration area (RCMP and Government House) to legislative ground.Gateway – A street that is a main entrance point to Regina. This would include Albert Street, Victoria Avenue, Pasqua Street North, Lewvan Drive and Arcola Avenue.

2) Gateway – A street that is a main entrance point to Regina. This would include Albert St., Victoria Avenue, Pasqua Street, Lewvan Drive and Arcola Avenue.

3) Regina's Market Square – A designated business improvement district located in the heart of the city. Refer to section 12.3.5 for a more detailed discussion.

4) Major Arterial Intersection (Priority One) – The intersection of two priority one major arterials (see definition below).

5) Major Arterial (Priority One) – A street that carries major traffic flows between traffic generators and communities. Residential frontage is not allowed. Direct access is not desirable and median openings are not permitted except at intersections. No parking on the street is permitted. For the purposes of this strategy, the major arterials identified for study have been selected according to the Public Works Snow Removal and Maintenance Pioritization Map.

6) Residential Street* – A street designed primarily to provide access to abutting property. For the purposes of this study, the following two roadway types will be referred to as "residential street":

   a) Local Street - A street designed primarily to provide access to abutting

property.

b) Collector Street - A street designed to intercept, convey and distribute traffic between local and arterial streets with direct access to properties permitted.

* Residential Streets are prioritized according to a different set of criteria defined by the Urban Forestry Division. The plantings proposed for these streets will be addressed through vacancy assessment and new development and therefore will not appear on the Master Tree Planting Plan. Refer to section 6.0 for a more detailed discussion.

The following criteria shall also be applied in prioritizing each project. Each criteria should be weighed and projects prioritized based upon the sum total of all the criteria.

1) Those sites which have the greatest public visibility should be assigned a higher priority.

2) The adjacent land use to the proposed development should be considered. Those projects adjacent to residential areas should be given priority over those adjacent to commercial areas. Similarly projects adjacent to commercial areas should be prioritized over those adjacent to industrial areas.

3) The availability of the appropriate species and size of tree at the City nursery for a particular site should be taken into account.

4) The possibility of securing funding partners for a particular project should be weighed.

5) The possibility of maximizing the City's capital investment by coordinating the landscape design with other capital projects planned for the site should be explored with other civic divisions and departments.

6) The context in which the planting is to occur is also a consideration. Is the site a special attraction? Is it a major intersector for vehicles, pedestrians or bicycles? Does it have unique features?

7) The functional purpose of the planting, whether it is intended to provide visual screening, framing for a vista, spacial organization or a buffer is an important consideration.

8) Potential conflict with other civic projects planned for the site such as municipal engineering works should be considered.

9) While recognizing the need for species diversity consideration should be given to

maintaining the continuity of the streetscape by relating the design elements of each project as opposed to a haphazard planting of trees.

12.3 Landscape Design Philosophy

The following discussion describes the general design principles, site evaluations and thought processes that guided the development of the Conceptual Master Tree Planting Strategy. This section is divided into the following five design location categories: Ceremonial Routes, Gateways, Major Arterial Intersections (Priority One), Major Arterials (Priority One) and Regina's Market Square. Each category will be discussed with reference to:

a) the existing site context,
b) the potential for landscape enhancement,
c) suggested landscape design strategies.

Although each category lends itself to specific design strategies, the overall intent of the conceptual tree planting plan applies to all locations. The design guidelines are intended to create harmony within the urban landscape while defining a unique streetscape character that can aid in developing a city-wide wayfinding system. Within this system it is important to note and emphasize Regina's role as the capital city of Saskatchewan. This should manifest itself in the design strategies implemented in new streetscape and landscape developments. These design strategies could include identifying and highlighting points of interest unique to Regina, focusing and maintaining views to the legislature and other special attractions, and developing themes and images across the city that refer to the unique physical, social and cultural aspects of the city. Eventually, these streetscapes will provide a series of visual cues and boundaries that contribute to the form of the urban landscape and help to create a sense of place unique to Regina. This strategy refers primarily to plant material, but it should be noted that in many areas hardscape and architectural elements must be integrated into the landscape. This can include such elements as site furniture, information signage, paving, lighting and other related structures.

The seasonal aspect of each design exercise must also be carefully considered. Thoughtful selection of plant material in combination with architectural elements can create a successful landscape that displays well in all seasons, offering visual relief and interest in winter months as well as the growing season.

While not always visually apparent, there are a number of functions road right-of-ways serve that can conflict with potential landscape development. These include: the required setback for roadway safety and visibility; allowances for snow removal equipment access, snow storage and drifting, services and utilities (underground and overhead); drainage courses; salt spray radii; and safety fencing. These functions often limit the available planting space significantly. In some instances, the space available for

planting is limited to a narrow strip along the outside edge of the right-of-way. A good example of such a roadway is the Ring Road. In this situation, some sections of the road right-of-way have no suitable space for planting because there are numerous underground utilities, deep drainage ditches, underpasses and safety fencing. In addition, due to the high traffic speeds and volumes, greater setbacks are required for visibility, safety, and snow drifting.

Although this section of the strategy focuses primarily on tree planting in road right-of-ways, it should also be noted that parks and open space comprise a substantial portion of the urban forest. This type of landscape demands a different approach to design and planning as the function, aesthetics, constraints and opportunities of these spaces differ considerably from road right-of-ways. In passive and active recreational parks and open spaces there can be numerous features and uses, which must be organized according to compatibility and successful circulation. Plant material is often used to direct circulation internally and to help organize and define the space. Design strategies within parks can vary greatly; the space can be organized to give a naturalistic appearance and a pastoral quality or it can be organized geometrically and intentionally appear to be a built construct. There are endless design theories that can be put into practice to design a parkspace. Plant material plays a dominant or supporting role in most park space design and serves a variety of functional and aesthetic goals. There is a potential to use a greater variety of species, form, colour, and texture in parks as the concern for visual clutter and traffic safety is of less concern. The City of Regina Development Standards Manual provides some guidance in these matters.

At this stage the conceptual MTPS is a general interpretation of the following ideas; site specific exploration and design detailing are required before implementation is considered. Appendix "M", The MTPS provides a preliminary interpretation of this conceptual plan and projects a Tree Nursery Production Plan to respond to an anticipated need. Based on the knowledge of this strategy, the City Nursery Production Plan will serve to guide the nursery in growing the basic recommended tree species.

12.3.1 Ceremonial Routes

Ceremonial routes refer to street circuits within the city that link important locations or points of interest that are used for state, parade, or other ceremonial occasions. There are four Ceremonial Routes identified in the Development Plan for the City of Regina (City of Regina, 1994): Airport to Legislative Grounds, Downtown (Victoria Park) to Legislative Grounds, Downtown to Exhibition Park and Territorial Administration Area (RCMP and Government House) to Legislative Grounds. These routes should be reviewed for intention and purpose prior to any development in order to ensure that landscape treatment responds to the contemporary use of the corridor. There are a number of factors to be considered in the development of these routes as discussed in the Development Plan for the City of Regina (City of Regina, 1994). They include:

a) "roadway design,
b) boulevard landscaping including provision for flags, banners, lighting, etc.
c) treatment given to key nodes such as entrances to legislative grounds
d) traffic control plans and security during ceremonial functions
e) supporting facilities along the route such as viewing area and assembly areas
f) architectural and signage control."

12. 3.1.1 Site Context

Note: The following routes are illustrated in Map 3 of Appendix "M" Conceptual Master Tree Planting Plan

12.3.1.1 A: Airport to Legislative Grounds

This route runs along Regina Avenue from the airport to Albert Street and then south to the Legislature. There is a substantial planting scheme along the roadway into the airport that consists of a variety of ornamental, shade and coniferous trees and shrubs. The majority of the route travels through established residential neighbourhoods with stately homes and mature landscaping, including American Elms as street trees. The Legislative grounds themselves are ornately landscaped with extensive traditional annual beds and a view to Wascana Lake.

12.3.1.1 B: Downtown (Victoria Park) to Legislative Grounds

This route runs through the heart of Regina's prominent business and government district. Its starting point, Victoria Park, is an historical highlight of the city with war memorials and other historical monuments set in a classical 'urban green' parkspace. Other significant landmarks along the route include the Hotel Saskatchewan, City Hall, an historic apartment building, the Provincial Law Courts and the Royal Saskatchewan Museum. As the route runs south down Albert Street toward the legislature it crosses the Albert Street bridge. This structure boasts an international claim to fame as the longest structure to cross the narrowest waterway. The structure itself is an architectural gem with ornately detailed ceramic pilasters and obelisks. The view the bridge affords to Wascana Lake is perhaps the most celebrated view in the city. Mature elms line the route as it passes through the residential neighbourhood of Lakeview with elegant older homes.

* A portion of this route follows the southern boundary of Regina's Market Square, refer to Regina's Market Square design discussion.

12.3.1.1 C: Downtown to Exhibition Park

As noted above, this route passes by numerous landmarks in the downtown area. The remainder of the route (north along Albert Street, west on Saskatchewan Drive and north on Elphinstone Street, north on Lewvan Dr.) is relatively nondescript. Portions of the route pass through an unsightly light industrial zone along the railway. There is little landscape enhancement along this route once it leaves the Regina's Market Square district (with the exception of landscaping along the Lewvan Dr. portion and the very western end of Saskatchewan Dr.). The space available for landscape enhancement is limited along much of this route as the road right-of-way is narrow and the majority of the area is hard-surfaced.

12.3.1.1 D: Territorial Administration Area (RCMP and Government House) to Legislative Grounds

This route passes through a wide variety of areas with many different adjacent land uses. A large section of the route runs through residential neighbourhoods with traditional bungalows, corner stores and mature street tree planting. Other sections of the route pass through commercial areas with undistinguished office and retail buildings lining the roadway and little landscape development to note. The section of the route that runs south down Albert to the legislature has been described above.

12.3.1.2 Potential for Landscape Enhancement

The majority of the roadways that these routes follow either have existing street tree planting or the narrow road right-of-way and extensive hardscape may not allow for additional tree planting. One obvious deficiency in tree planting has been noted along a portion of Elphinstone Street. This deficiency is reflected in Map 3: Conceptual Master Tree Planting Plan on page 2 of Appendix “M”. The identified lack of available planting locations does not preclude the potential for replacing or renovating existing landscapes to respond to a new design strategy. Also, as noted previously, the Ceremonial Route landscape should include other elements and features in addition to tree planting.

A cursory review of existing plantings along ceremonial routes indicates the potential opportunity to plant approximately 40 ornamental flowering deciduous trees. (Refer to Appendix “M” The MTPS for more detailed projections). This number reflects only an obvious deficiency in existing planting, as discussed in section 12.1; a detailed site analysis and comprehensive design is required for all ceremonial routes. A separate funding distinct from the annual Streetscaping budget may be required to cover the significant costs that will be incurred in developing the Ceremonial Route landscape.

12.3.1.3 Design Strategy

The following points describe a general approach to creating the Ceremonial Route landscape:

- use distinct plant material from other street tree plantings, i.e.: different colour, form or texture
- tighter spacing /lower spreads (6 m)
- potential shrub use, highly decorative/ornamental planting
- flowering trees
- patterns should follow dynamics of the ceremony i.e.: have point and line patterns that respond to direction of movement and stopping points
- draw attention to city highlights/attractions with more intense planting schemes at these nodes
- allow for combination with hardscape elements and site furnishings
- possible use of temporary items such as planters/flags/signs/etc.

12.3.2 Gateways

There are six vehicular entries to the city defined as “Gateways to Regina” that greet traffic from the north, south, east and west. An additional gateway from the airport introduces air travelers to the city. All seven gateways lack true definition and a sense of entry. There are limited identifying features, landmarks or landscape treatments that appropriately identify these spaces as entry points. Regina’s geophysical location on the open plains ensures that any built structures or vertical elements feature prominently from a distance. There is potential to capitalize on this environment and create distinct physical gateways to the city that stand proud on the prairie landscape and announce the city to its audience. These gateways will require a combination of landscape architecture, architecture, traffic planning, lighting and signage to create a space that truly functions as a gateway. The major arterial segments that intersect at each gateway should be considered an extension of the gateway corridor landscape. The gateways should be designed to function successfully at night as well as in the daylight, and during the cold, leaf-less months as well as those seasons of full-leaf and blossom.

12.3.2.1 Site Context

12.3.2.1 A: Pasqua Street and Highway #11 (jurisdiction of Saskatchewan Department of Highways)

A major renovation of this intersection is currently underway to create an overpass over Highway #11. This structure will define a threshold of entry into Regina as it rises conspicuously from the surrounding prairie landscape. The prominent views at this location are the Regina skyline in the near distance and farmland in the immediate vicinity. These views are closely associated with the character of Regina and help to define the city's identity. The physical structure of the overpass provides an opportunity to build upon the impression of "sense of entry", or transition from one environment to another. Large, bold plant groupings can be installed in contrast to the open prairie, indicating a change in the nature and use of the landscape. With the cooperation of the

Saskatchewan Department of Highways, this intersection can act as a functional, aesthetically pleasing and well-defined physical introduction to the City of Regina.

12.3.2.1 B: Albert Street North and Ring Road

There is some existing tree planting in this area, some of the plantings are organized in large informal groupings and others are rather scattered individual plantings. There is a mix of coniferous and deciduous plantings. On Albert Street south of Ring Road there is extensive commercial strip development while the north side of Ring Road opens onto the edge of the city to the northernmost extents of existing residential developments. The residential developments are separated from Albert Street by broad right-of-ways and chain link fences.

12.3.2.1 C: Victoria Avenue and Prince of Wales Drive (Jurisdiction of the Saskatchewan Department of Highways)

This intersection has recently undergone significant redevelopment and is now a controlled intersection with Prince of Wales Drive widened to four lanes both north and south of Victoria Avenue. An interchange was orginally planned for this area and plant material was located with the future configuration of the roadway determining the layout of the plantings. A large number of trees have been relocated in response to the new roadway configuration. Further plant relocations from the original "ramplands" area will be required as land is sold and developed. The surrounding context of the site is wide open views to open fields. This will change significantly as planned development occurs including ‘Big Box’ commercial centres and extensions of new residential developments. At this time, the intersection will become a more defined entrance to the city as development expands in an easterly direction.

12.3.2.1 D: Albert Street South and Highway #1 Bypass (Jurisdiction of the Saskatchewan Department of Highways

This interchange is open to views in all directions. There are expansive views to the fields surrounding the city. The only built development that is in obvious view is a car dealership on one corner and residential development on the north side of the intersection that is far removed from the roadway. The road right-of-ways are broad and covered in coarse grass. There is some existing mature tree and shrub plantings scattered within and around the cloverleaf. The plantings do not relate to the roadway alignment. The residential developments on the north side are sheltered from the roadway with some existing mature tree planting. This planting relates to the residential lots and has little direct relevance to the roadway.

There is little sense of entry to the city and limited reference to Regina’s unique identity or distinguishing features.

12.3.2.1 E: Lewvan Drive and Highway #1 (Jurisdiction of the Saskatchewan Department of Highways)

This intersection is the first entry to the city for all traffic travelling from the west along the Trans Canada Highway. The relatively high speed intersection is controlled by a stop sign on Lewvan Drive. At this point the built development of the city is still fairly far removed from the intersection; there is more a sense of being in a rural setting than of approaching a major urban centre. Dominant views are open fields in all directions. One or two individual tree plantings dot the area and accentuate the grand horizontal scale of the prairie landscape. The dominant features on the landscape are the power poles and overhead lines.

There is little sense of entry to the city and limited reference to Regina's unique identity or distinguishing features.

12.3.2.1 F: Arcola Avenue at Southeast City Limits

This location, roughly at the intersection with Woodland Grove Dr., marks the current limit of residential development in this direction. Considerable traffic enters the city at this point from the southeast travelling along Highway #33. There is a very definite edge to the city as residential development borders both sides of the roadway and subdivision fences define the boundaries of distinct neighbourhoods, it is a very abrupt transition from the previously rural landscape. There is an obvious lack of any landscape enhancement along this corridor as the adjacent subdivisions are relatively new and offer no landscaping mature enough to read from Arcola. There appears to be ample opportunity for tree planting and other landscape enhancement. Currently, the dominant features on the landscape are the subdivision fences that frame Arcola as it heads northwest.

Other than the abrupt beginning of residential development, there is little sense of entry to the city and limited reference to Regina's unique identity or distinguishing features.

12.3.2.1 G: Regina Avenue and Lewvan Drive

This intersection is the primary entry to Regina from the airport. There is a substantial planting on the northeast corner that provides a backdrop to a "Welcome to Regina" sign. The planting is a large grouping of coniferous and deciduous trees. There appears to be some linear organization to this planting but no actual pattern or form determinant is evident. The other three corners of the intersection have minimal scattered plantings that are displaying limited growth. There is potential here to significantly enhance the intersection and better introduce visitors to the city with improved signage and landscape development. The road to the airport has a well established planting scheme that enhances the roadway.

Surrounding views are open to the airport and the Craig Golf Course and residential development on the west side. The change in the character of the landscape and built structures from west to east does help to provide a sense of entry to the city. Wide, shallow ditches border Lewvan drive on both sides and form part of the south storm channel. Preliminary discussions have taken place regarding potential future development of an additional storm channel in this area.

Long range plans for this intersection include an interchange, these plans are currently under review through the Transportation Strategy.

12.3.2.2 Potential for Landscape Enhancement

The majority of these gateways offer broad open spaces with limited existing landscape treatments. This allows ample opportunity to create a series of unique gateways around the city that relate both to their individual locations as well as to each other. The definite geometry of the roadways and interchanges provides clear form determinants to guide landscape development.

A cursory review of existing plantings in the gateway locations indicates the potential opportunity to plant approximately 2200 trees. (Refer to Appendix "M" The MTPS for more detailed projections.)

12.3.2.3 Design Strategy

The following points describe a general approach to creating the Gateway landscape:

- very large scale plants/tall trees
- bulk/mass planting in bold patterns
- follow geometry of surrounding roadway systems (both existing and planned)
- combine with architectural or hardscape elements
- distinct form, pattern, colour or texture from surrounding roadways
- design elements or organization thereof that impress upon the audience a sense of entry
- design elements that imply or carry themes or images which refer to the unique identity of Regina – Capital of Saskatchewan
  RCMP Training Headquarters
  Historic role of the railway
  "Pile of Bones" legend
  Wascana Centre Authority

12.3.3 Major Arterial Intersections (Priority One)

Major Arterial Intersections are locations where there is a confluence of two or more streams of large volumes of traffic. There are traffic control signals at most of these intersections (others are interchanges with an overpass system), thus the vehicular audience is often stopped for a period of time at these particular locations. These two factors combine to offer a large audience that, while stopped, is momentarily relieved of the need to pay close attention to the road. This provides an opportunity to create landscapes that can be appreciated at both high speeds and while stopped, allowing for a layering of scale and geometry. The landscape treatment can also be used to alert the driver of an approaching intersection by providing visual cues with a change in the form, colour and spacing of plant material. Care must be taken to complement a wayfinding system while not creating visual clutter. There are important safety considerations to be included in any landscape design for an intersection; sitelines and setbacks become particularly important in these locations.

12.3.3.1 Site Context

12.3.3.1 A: 9th Avenue North and McCarthy Boulevard

The dominant feature of this intersection is the Normanview Mall which sits fairly removed from the actual intersection. There is very little soft landscaping around the mall, the visual emphasis is on a large expanse of asphalt parking and the mall façade. The rest of the intersection is primarily coarse turf grass before the residential development starts. There is minimal tree planting on the road right-of-way, the primary landscaping is a broad expanse of coarse turf. Wood fences separate the residential development from the road right-of-way, there is mature landscaping associated with the residential area.

There is excess land in the north west, north east and south east sectors of this intersection which is open to development that is compatible with adjacent residential development. Future landscape design should address the possibility of such development.

12.3.3.1 B: 9th Avenue North/Ring Road and Pasqua Street

The dominant features of this intersection are the two water reservoir tanks on the northwest and southwest corners. Chain link fences surround the tanks and separate the residential areas from the road right-of-way. There is mature landscaping associated with the residential areas. There are several scattered tree plantings in coarse turf that dot the intersection. The trees are struggling with the competition from the turf. There is a wide turfed median on 9th Avenue North at this intersection.

Long range plans for the configuration of this intersection are still under review.

12.3.3.1 C: Argyle Street and Ring Road

The west half of this intersection has no landscaping other than coarse turf. There is some tree planting on the eastern right-of-ways. Currently, there is a broad right-of-way of coarse turf adjacent to residential development.

The topography of this intersection has attracted snowboarders and toboganners in the winter, causing a serious safety concern. Future landscaping could help alleviate this problem.

12.3.3.1 D: Rochdale Boulevard and Pasqua Street

There are plans underway to widen Pasqua Street to the city limits and Rochdale Boulevard to its intersection with Pasqua Street. There is a large scale commercial development planned for this corner. The surrounding context at this point in time is open fields with some new residential development. There is limited existing landscaping but the current road construction offers an opportunity to begin with a clean, open site. Views are open to the prairie beyond the city limits and Highway #11 is in visual and audible proximity.

12.3.3.1 E: Arcola Avenue and Ring Road

This interchange has some minimal scattered tree planting in the southeast quadrant. All other quadrants are devoid of vegetation other than coarse turf. The landscape buffers on all four corners have some mature trees that have nominal visual impact on the access lanes and the adjacent residential development. The residential developments that abut this intersection are separated from the roadway with chain link fences. The remainder of the area is covered in coarse turf that is on a low maintenance regime. A bike path runs along the south side of Arcola.

12.3.3.1 F: Victoria Avenue and Ring Road (Jurisdiction of the Saskatchewan Department of Highways)

As Ring Road passes over Victoria Avenue at this intersection the structure defines a point of transition from newer, more sprawling development to a denser, more established area of the city. The nature of the streetscape appears to change accordingly. The road right-of-ways narrow and the buildings move closer to the road. The interchange itself has some existing scattered plantings within the cloverleaf. There are more organized street tree and shrub plantings on Victoria west of Ring Road. Surrounding land uses on the west side of Ring Road include hospitality institutions such as hotels, motels, restaurants, other services and apartment residential. There is also a large religious institution. On the east side of Ring Road there is a trailer park and a large scale commercial development. Traffic lights force vehicles to slow and stop in this area.

The nature of the vehicular traffic audience in this intersection will change when a new Highway No.1 Bypass is built.

12.3.3.1 G: Ring Road and Wascana Parkway (jurisdiction of the Wascana Centre Authority)

The character of this intersection is pastoral and park-like as Ring Road passes through the Wascana Centre Authority greenspace. There is a variety of mature landscaping including coniferous and deciduous trees and shrubs. The plantings are organized in large informal groupings and appear well maintained. The intersection offers sweeping views of the The Saskatchewan Institute of Applied Science and Technology, the University of Regina in the distance, Wascana Park and the prairie landscape beyond the city limits. There is one quadrant of the interchange, the southeast, where existing plantings are minimal and the potential for plant material augmentation is greatest.

12.3.3.1 H: Albert Street North and Highway #11 (partial jurisdiction of the Saskatchewan Department of Highways)

The prominent feature at this intersection is the overpass connecting Highway #11 to Albert St.. Views from this point include the Ipsco steel manufacturing plant, adjacent agricultural fields and residential development in the distance at the city's edge. There is a limited amount of scattered plant material bounded by the access ramp to the overpass. An organized roadway planting scheme begins several hundred metres to the south of this intersection.

12.3.3.2 Potential for Landscape Enhancement

There is a significant area of open or undeveloped land in the right-of-ways of several of the above noted intersections. This offers room for some moderately scaled landscape developments that could begin to define some of our major intersections.

A cursory review of existing plantings at major arterial intersections indicates the potential opportunity to plant approximately 1800 trees. (Refer to Appendix "M" The MTPS for more detailed projections.)

12.3.3.3 Design Strategy

The following points describe a general approach to creating the Intersection landscape:

- introduce a new colour, texture, or form that distinguishes it from adjacent street trees
- retain simple, geometric patterns
- potential for shrub use if it does not interfere with vehicle/pedestrian sight lines
- create a visual/physical separation between vehicular, pedestrian and bicycle traffic

12.3.4 Major Arterials (Priority One)

The general intent of the major arterial streetscaping is to define the physical extent of the roadway and enhance its aesthetics. The major arterials direct a majority of the traffic in the city and as such have a wide vehicular audience. There is also a significant amount of pedestrian and bicycle traffic that uses these roadways. The landscaping should attempt to enhance the driving experience, potentially create some climate mitigation, offer some buffer effects to adjoining neighbourhoods as well as playing an important role in fixing air and soil pollutants.

A significant amount of travel time is spent on these roadways, demanding that the roadways function efficiently. Although not an integral aspect of the roadway's functionality, the sensory experience of driving can be enhanced significantly through landscape development.

12.3.4.1 Site Context

12.3.4.1 A: Albert St.

Albert Street is the primary north south arterial in Regina that links the northern and southern entrances to the city. The segments of this roadway that abutt a designated gateway should be considered an extension of the gateway corridor landscape. At both its north and south ends, the roadway runs through prime commercial areas of strip mall development and varied commercial enterprises. Landscaping varies from minimal tree and shrub planting as required through bylaws for private development to some fairly extensive landscape improvements of tree, shrub and annual planting in wide medians and boulevards.

* Albert Street forms the western boundary of Regina's Market Square, refer to Section 12.3.5.3 Regina's Market Square design discussion.

12.3.4.1 B: Arcola Avenue

Noise attenuation has been frequently requested by residents adjacent to this roadway and noise levels have been evaluated. Future landscaping of the right-of-way should consider land form and planting combinations to help alleviate this issue.

Arcola Avenue is a primary arterial that runs through a series of residential developments that are set back significantly from the roadway. The segments of this roadway that abutt a designated gateway should be considered an extension of the gateway corridor landscape. Some of these residential developments have concrete fences and/or berms which, among other functions, attenuate the noise levels coming from the roadway. No houses face directly onto the road. There is a wide grass median in some sections of the roadway, in other sections only a concrete strip. The landscaped boulevard on either side

of the roadway varies in width. In the newer developments to the east, the boulevard is broad and open but narrows significantly as the arterial moves west into the centre of the city. In this area the adjacent land uses change from residential to commercial including gas stations, convenience stores, and restaurants with direct access off the roadway. The boulevard has some existing tree planting. In some areas the plantings are organized in a linear fashion and relate to the geometry of the roadway. In other areas the tree plantings are more scattered. To the north of Victoria the character of Arcola changes significantly; there is little or no landscaped boulevard and numerous commercial enterprises have direct access to the roadway. There is some adjacent residential development that does not directly face Arcola. Long range plans may include roadway configuration changes between Victoria Avenue and Winnipeg Street.

12.3.4.1 C: Broad Street

In the south Broad Street begins at the end of the Wascana Parkway where the character of the streetscape changes from a parkway to an urban arterial. As it runs through the downtown area the street is bordered by office buildings and apartment blocks with some spotty tree planting or other soft landscaping. A concrete median runs through this section of Broad Street. Other sections of the roadway are lined with older stock residential developments with some established tree planting. Certain portions of the roadway pass through an industrial and commercial development where there is little or no soft landscaping and most ground surfaces are concrete. The north end of Broad Street runs through a residential suburb with a maturing landscape. In this section of the roadway, houses face directly onto the street and traffic diminishes giving Broad Street a more residential character. Broad Street has been designated as a future location for a bicycle route.

- Broad Street forms the eastern boundary of Regina's Market Square, refer to Section 12.3.5.3 Regina’s Market Square - Design Strategy.

12.3.4.1 D: Dewdney Avenue

Portions of Dewdney Avenue (to the west of Broad Street) have been designated an historic corridor and should be treated as a unique streetscape within the City of Regina, refer to the Heritage and Tourism Significance of Dewdney Avenue, Regina, Saskatchewan (City of Regina, 1995).[12]

The character of Dewdney Avenue changes significantly as it crosses the city from east to west. In some sections, the street runs through a dense industrial corridor where there is no landscaping and the majority of the ground surface is covered in concrete and asphalt. In one distinct section the surrounding context is commercial and light industrial in redeveloped historic buildings; an emerging area known as Regina's Old Warehouse District. The far western portion of the corridor is primarily residential development with some minor commercial establishments. Many of the houses date back 60 years or more

and face directly onto Dewdney with mature street trees lining the roadway. Significant establishments along this corridor include the CPR Intermodal Transfer Station, the RCMP National Training Headquarters, the historic Governor General's Residence and the historic Territorial Administration Buildings. The far eastern portion of the roadway passes through a variety of retail, strip commercial, light industrial and residential developments. Dewdney Avenue has been designated as a location for a bicycle route.

12.3.4.1 E: Lewvan Dr.

Lewvan Drive is a high volume arterial that runs north/south through the west side of the city. It is a primary connector for the airport and to Highway #1. The segments of this roadway that abutt a designated gateway should be considered an extension of the gateway corridor landscape. There is limited residential or commercial development that is accessed directly off the Lewvan. In some sections of the roadway there is a wide turfed median and chain link fencing preventing pedestrian access along the boulevards. There is a significant amount of mature
landscaping along the roadway.

Noise attenuation has been frequently requested by residents adjacent to this roadway and/or noise levels have been evaluated. Future landscaping of the right-of-way should consider land form and planting combinations to help alleviate this issue.

12.3.4.1 F: McCarthy Blvd.

This arterial runs along the edge of the city with wide boulevards in some locations which narrow as the roadway passes through residential development that faces the roadway. There are two creek crossings where views on either side of the road open up to linear greenspaces. The majority of the roadway has existing street tree planting excluding the north end of the street and one the intersection with 9th Avenue N.. The speed limit varies as the character of McCarthy changes from residential to arterial/commercial. In some sections of the roadway there is a landscaped median. McCarthy Boulevard is currently designated as a bicycle route.

12.3.4.1 G: 9th Avenue N.

9th Avenue North is the terminus of the Ring Road in the west end. The roadway has a wide boulevard that is primarily turf with little or no tree and shrub planting. This arterial divides residential developments to the north and south. This roadway is currently undergoing improvements to increase its ability to carry larger volumes of traffic. Adjacent residential developments are separated from the roadway by a wide boulevard and fencing. 9th Avenue North has both short term and long term roadway reconfiguration plans.

Noise attenuation has been frequently requested by residents adjacent to this roadway and

noise levels have been evaluated. Future landscaping of the right-of-way should consider land form and planting combinations to help alleviate this issue.

12.3.4.1 H: Pasqua St.

Pasqua St. connects with Lewvan Drive at Sherwood Drive. At this point the roadway changes character significantly. The street right-of-way narrows, the speed limit decreases and there is some residential and commercial development that access the street directly. The north end of the roadway has wider boulevards and the residential development is more removed from the street. The north end is currently being widened to accommodate for traffic entering the city from Highway #11. The segments of this roadway that abutt a designated gateway should be considered an extension of the gateway corridor landscape.

12.3.4.1 I: Prince of Wales Dr.

Prince of Wales Dr. runs north/south connecting Assiniboine Ave. to Dewdney Ave.. The roadway will extend to the north following development. Future plans for this roadway also include widening to two lanes in each direction as development demands. Prince of Wales cuts through residential developments on either side that range in character from brand new housing to housing stock that is approximately 35 year old. There is commercial development at major intersections. The road right-of-way is relatively wide and the residential development is fenced and does not address Prince of Wales. A significant portion of the west side of Prince of Wales Drive has been landscaped. The existing plantings include a mix of coniferous, deciduous and ornamental in organic-shaped beds. A pathway runs through these plantings.

12.3.4.1 I: **Ring Road** (Partial jurisdiction of the Saskatchewan Department of Highways)

Ring Road creates a significant boundary/barrier around the city as it is an enclosed entity for the most part, accessed only through large interchanges and access ramps. As such it creates a physical barrier to any surrounding land uses. No property is directly accessed off the Ring Road. Most of this arterial has fences and/or berms that act as buffers to the adjacent land uses in order to prevent direct access to the roadway and provide visual separation. There is a wide landscaped buffer on both sides of this roadway. In some instances this is course turf and in others it has some tree and shrub planting. Conditions for plant material are harsh as the speeds on this roadway are high and salt spray extends far into the landscaped buffer. The significant levels of high speed traffic also likely contribute to the pollution levels imposed on the surrounding landscape. Drainage swales frame the roadway to direct water flow into the sewer system. In some instances the slope off the road edge and across the landscaped buffer is extreme as Ring Road either rises over or ascends below perpendicular roadways to allow for flow of traffic. In some locations, development is on both sides of the roadway, in other locations it borders the edge of the city and open fields lie on the other side.

Noise attenuation has been frequently requested by residents adjacent to this roadway and noise levels have been evaluated. Future landscaping of the right-of-way should consider land form and planting combinations to help alleviate this issue.

12.3.4.1 J: Rochdale Blvd.

Rochdale Boulevard is a short arterial that runs through the newer residential subdivisions in the northwest corner of the city. The majority of the roadway is landscaped with trees, shrubs and turf. There is some commercial development along the road, primarily concentrated on the corner of Rochdale and McCarthy where there is a large retail mall. Some sections of the roadway have a landscaped median that disappears at the very eastern end that is not yet fully developed.

12.3.4.1 K: Saskatchewan Drive

The section of Saskatchewan Dr. from Winnipeg to Arcola is primarily industrial/commercial strip development with little or no landscaped boulevard. The general character of the space is predominantly a hard-surfaced environment with little visual relief and several unsightly commercial operations. As Saskatchewan Dr. passes through Regina's Market Square it changes character significantly. This section encompasses Casino Regina, a major hotel, Cornwall Centre and the main Post Office, among others. The landscaping varies at each location but closer attention has been paid to tree and shrub planting around the Casino. In some instances the sidewalk or associated hardscape is directly adjacent to the building façade. The section of Saskatchewan Dr. from Albert to Elphinstone passes through mixed commercial/industrial uses. There is little or no landscaped boulevard and little available space for planting. From Elphinstone to the Lewvan there is a wide landscaped buffer between the rail line to the north and a fenced parkspace to the south. There is an existing successful landscape on this boulevard that includes a variety of tree and shrub plantings. There are plans to widen portions of this roadway in the future.

- Saskatchewan Drive forms the northern boundary of Regina's Market Square, refer to Section 12.3.5.3 Regina’s Market Square – Design Strategy.

12.3.4.1 L: Victoria Ave.

Victoria Avenue is a primary east west arterial through the city and a main entryway into the downtown area. The segments of this roadway that abutt a designated gateway should be considered an extension of the gateway corridor landscape. This roadway changes character significantly; in some sections it runs through “Big Box” commercial development, in other sections it runs through old, established residential neighbourhoods with mature street trees, narrow boulevards and a landscaped median also lined with mature street trees. This creates a special streetscape in the city where the mature elms

reach across the entire roadway and their canopies meet over the street. There are few of these streetscapes remaining in the city, particularly few along major arterials. This type of mature landscaping with the majestic elm trees has been a defining image in prairie cities, one that is endangered by the effects of Dutch Elm Disease.

Where Victoria Avenue enters the downtown, high rise apartment, office and hotel towers dominate the landscape. The narrow boulevards are primarily hard-surfaced with street trees planted in tree wells in the sidewalk. Victoria Avenue also passes by Regina's oldest urban park with significant historical significance and monuments. There are many notable buildings of historic and development values that line Victoria Avenue in the downtown area.

- Victoria Avenue forms the southern boundary of Regina's Market Square, refer to Section 12.3.5.3 Regina's Market Square – Design Strategy.

12.3.4.1 M: Wascana Parkway (jurisdiction of The Wascana Centre Authority)

The name of this arterial accurately describes the character of the roadway. This is a winding road with a wide median and wide boulevards. Extensive tree, shrub and groundcover plantings of pastoral nature cover the area with a variety of plant material. The median and the boulevards are fully landscaped for the entire length of the parkway as it runs through Wascana Centre and the University of Regina Campus. The south end of the parkway borders residential developments where noise barrier fencing and planting attempt to alleviate the traffic noise levels. Wascana Parkway is currently designated as a bicycle route.

12.3.4.2 Potential for Landscape Enhancement

There is an abundance of possibilities and potential locations for landscape enhancement along Regina's major arterials. The variety of locations and different site conditions makes it difficult to discuss the enhancements in a general manner.

A cursory review of existing plantings along major arterials indicates the potential opportunity to plant the following approximately 9,000 trees. (Refer to Appendix "M" The MTPS for more detailed projections.)

12.3.4.3 Design Strategy

The following points describe a general approach to creating the landscape:

Arterials with significant pedestrian traffic, speeds 50 km/hr or less

- Deciduous canopy/shade trees, point and line patterns
- linear alignments

- simple/repetitive patterns
- double row if possible/desirable

Buffer areas with high volume traffic faster than 50 km/hr, little or no pedestrian traffic.

- deciduous/coniferous mix
- simple, geometric groupings
- follow alignment cues from roadways, interchanges, property lines
- bold groupings, greater spacing
- multiple rows if possible

12.3.5 Regina's Market Square

12.3.5.1 Site Context

Regina's Market Square has the greatest volume of activity in the city with the greatest mix of land uses. Regina's Market Square is the hub of shopping, entertainment and professional services in the city. There is a desire to increase the amount of residential development which will increase the 24 hour, 7 days a week population to the area. These activities are housed in a great variety of built structures including a mall, historic office and apartment buildings, modern glass and steel office towers, rows of small shop-front structures, and large institutional buildings. A large work-week population bustles through the streets on daily business and generates a unique environment where travel by foot is often the choice mode of transportation. In combination with this, there are two major public transit transfer areas within Regina's Market Square and a significant number of bicycle commuters.

Located within Regina's Market Square is the Victoria Park Heritage Conservation District, designated as such for the following reasons:

> " a) Victoria Park dates back to the founding of Regina, having been set aside as public open space in the original townsite plan;
> b) The 1800 Block Scarth Street contains the highest concentration of early commercial architecture in Regina;
> c) Many of the buildings in the district were designed by prominent local architects, for example, F. Chapman Clemesha, Storey and Van Egmond, and Francis Portnall."[13]

This designation demands that any proposed development responds in a carefully considered manner to the heritage character of the area. Any further development of the urban forest, an integral part of the physical environment, must also be required to respond accordingly.

As noted above, Regina's Market Square features two unique public spaces within the city; Victoria Park and The Frederick Hill Mall (1800 Block Scarth Street). Victoria Park is the oldest park in the city; identified as “Victoria Square” in the original townsite plan for Regina registered in 1884. Initially designated as a market area for farmers to sell their produce; today Victoria Park offers six shaded acres of greenspace with seating, pathways, a playground and historic memorials, all within Regina’s urban core. The park also hosts several cultural and artistic events throughout the summer and acts as a gathering place that attracts people from across the city. The Frederick Hill Mall is an open-air pedestrian mall in the heart of downtown that guides pedestrian traffic from Victoria Park and its surroundings to the Cornwall Centre. Intimate pedestrian-scaled spaces such as these offer unique opportunities and constraints with respect to the urban forest.

This diversity of activity, population, mode of transportation, and infrastructure provides both an opportunity and a challenge in urban design. The life and energy of the area combined with the existing infrastructure provide interest and excitement unequalled in any other sector of the city, but space limitations and expansive areas of hard surfaces may pose some difficulties for enhancement strategies. Special technical consideration is required to protect plantings and provide for the requisite metabolic needs of the plant material. Plant material selection in Regina's Market Square demands thoughtful consideration of the needs of the pedestrian, bicycle, car, bus and truck while responding to the particular challenges posed by the urban infrastructure.

12.3.5.2 Potential for Landscape Enhancement

A cursory review of existing plantings in Regina's Market Square indicates no immediate vacancies apparent. This may be due to the fact that there is a rapid response to tree vacancies in this district and replacements are installed expeditiously. There are, however, approximately 10,000 linear meters of roadway and pedestrian paths of travel that have potential for planting augmentation with the purpose of achieving a unique “plantscape”. There are certain design elements in the area that have been installed in an attempt to highlight the area. These include light standards, paving patterns and site furniture colour schemes distinct to Regina's Market Square. There remains significant potential to explore further enhancement schemes that augment the function and enrich the aesthetics of the space. Special attention should also be paid to the roadways that form the physical boundaries of Regina's Market Square in order to define the limits of the area as a unique area within the city, introduce the area and create a sense of entry while announcing the local attractions.

Although no obvious deficiency in existing planting has been identified in Regina’s Market Square, as discussed in section 12.1; a detailed site analysis and comprehensive design is required for this area. In order to address these issues, discussions will be required with Regina’s Market Square representatives and separate funding distinct from the annual Streetscaping budget will be necessary.

12.3.5.3 Design Strategy

The downtown area in Regina produces very specific technical, logistical and operational challenges with respect to streetscaping and landscape development. The dense urban infrastructure and extensive hardscape creates conditions adverse to plant growth. There are numerous techniques and products that can be applied as possible solutions to planting challenges. These include:

- explore alternate planting options i.e.: in planters, tree grates, raised beds, structural soils, porous paving, sub-surface wicks for drainage, watering and transporting nutrients
- use high headed canopy deciduous trees suitable for walking under
- pedestrian scale and spacing (5 m)
- use species suitable for close proximity to hardscapes (no poplars)
- follow routes of movement, simple linear patterns to define pedestrian and vehicular zones
- plan for shade in summer and protection from wind in winter
- standard specifications must be determined for size, species, and form
- clear or appropriately framed views to all businesses should be considered
- clear paths of travel, focused on pedestrian comfort, shall be maintained throughout the district.

12.3.6 Conclusion

Almost a hundred years ago, the City of Regina was built on an open treeless prairie along a meandering creek within the vast landscape of the great plains grasslands. Designated the capital of Saskatchewan, the city grew and became the home to an established population. During the times of extreme hardship, through the Great Depresssion and two world wars, the citizens of Regina had the foresight and commitment to plant trees throughout the city; along the expanding roadway system, along Wascana Creek and within public and private yards and greenspaces. As we approach our centennial, the trees that have been planted have grown to create a living, thriving urban forest that covers the majority of our city with 124,811 public trees. At this time in our history, as we enter the next millennium and move into our provincial and municipal centennaries, it is appropriate that we reflect on this accomplishment and consider our responsibility to this inheritance.

The urban forest has become the most prized asset in our municipal infrastructure. The trees within our built environment provide many healthful, functional and aesthetic benefits. This monumental accomplishment of Regina's pioneers and citizenry demands that the urban forest be cared for, maintained, protected, enhanced and augmented with careful consideration, ensuring that the integrity of the plantings are maintained and that the forest expands in an appropriate and meaningful manner as the city continues to grow.

12.4 The City Nursery Production Plan

The MTPS provides a comprehensive conceptual plan for new tree and replacement plantings for the City of Regina. The plan will allow tree planting to occur in a more systemic manner based upon design principles and criteria for prioritizing site development. Since the MTPS is a conceptual plan the specific number of trees or cultivars may change for new tree plantings when a detailed design plan is developed for each site. While the plan will provide the city nursery with general projections regarding the quantities and species of trees required, there are a number of specific issues that must be addressed before the nursery can develop a production plan.

12.4.1 Space Requirements

Based on a five year production cycle, trees planted in the year 2000 would be harvested in 2006 and the land placed back in production. Planting 1500 trees each year would require two acres of land. Allowing an extra two years in the five year production cycle for variables such as the longer growing cycle of some species and weather would mean an additional four acres of land would need to be prepared for planting space.

Before preparing any additional land The Urban Forestry Section should meet with Municipal Engineering Department to determine what areas, if any of the nursery are in its future expansion plans for the Sewage Treatment Plant.

12.4.2 Species to be Produced at the City Nursery

The City nursery will concentrate on growing the basic species most frequently used by the City. This would include the ash species (Black ash, Patmore, Bergeson, Manchurian), the linden species (American, Little-leaf, Dropmore, Norlin), coniferous (Colorado spruce and Blackhills), ornamentals (Schubert chokecherry and crabapples), poplar species (Plains cottonwood and Trembling aspen) and willow species (Laurel-leaf and white willow ‘Vitellina’). The exact percentage of each species to be grown each year will depend on the projects projected for the year the stock matures.

12.4.3 Quality Control

Plant specifications provided by The Design Section can be used to set a standard, which determines the level of quality expected of stock produced, by the City nursery. The standards should reference plant size, cultivar, form, vigour, health and hardiness. Specific project requirements can vary according to design and location, out-sourcing of plant material may be required accordingly.

12.4.4 Tree Removal Process

It will not be possible to remove the estimated 1500 trees per year from the City nursery by tree spade alone. The use of ball and wire basket will be required to meet the annual harvest projection. There are approximately 15 days in the spring and 25 days in the fall available for digging trees. It is estimated the City's three tree spades would be able to remove 960 trees each year. The remaining 540 treees would have to be ball and wire. At the rate of 45 ball and wire trees per day it would take approximately 12 days to prepare 540 trees. In order to ball and wire trees it is necessary that the nursery be given sufficient notice. Other growing methods such as the grow bag method could be considered to help alleviate this problem.

12.4.5 Tree Purchasing – Tendering Process

The proposed policy described in section 6.4 Plant Material that would require the City to purchase seedling stock and plant materials sourced, propagated and grown in zone 3a or hardier will have an impact on the availability of trees for purchase. This policy should be brought to the attention of the Canadian Nursery Trades Association and in particular the nurseries in the three western provinces. In order to ensure that the appropriate plant material is available for purchase, tenders could be extended over a few years with an option to renew. This would enable suppliers to line out appropriate stock knowing that their stock is committed and would ensure the City of Regina a source of supply.

12.4.6 Requisitioning Trees From The Nursery

To ensure that requisitions are filled out correctly, the person requisitioning the trees should walk through the nursery with the Nurseryman and tag the trees that are to be removed. Any substitutions to the requisition should be approved by the person requisitioning the trees.

12.4.7 Summer Planting by Support Services

Due to the timelines for completing capital projects, Support Services have been planting trees during the summer non-planting season. The City nursery adheres to the planting periods of approximately May 15 to June 30 and September 15 to October 31. In order to reduce the mortality rate of trees planted during this period and still accommodate Support Services timelines demands, the City nursery will provide balled and burlapped trees to Support Services for summer planting. To enable the City nursery time to undertake the necessary preparatory work, The Design Section must advise them in March of each year which trees should be balled and burlapped for planting that summer.

12.4.8 The Existing Inventory

The City nursery began laying out liner stock again in 1996. Some of this stock will be available for sites identified in The Master Tree Planting Strategy in the year 2000. Every effort should be made to utilize as much of this stock as possible. Both the new capital

planting and the replacement tree plantings identified in the MTPS have attempted to utilize the current inventory where appropriate. However, some flexibility in applying the criteria for prioritizing the order sites should be developed may be required in the first five years so that liner stock currently at the nursery can be removed as it matures. In other words from a cost-effectiveness standpoint it is important to utilize as much of the existing inventory at the City nursery as possible even if this requires some relaxation of the criteria for prioritizing the order in which sites should be developed.

13.0 A MODEL OF URBAN FOREST SUSTAINABILITY

Urban forests are essential to the sustainability of modern cities. Sustainability of the urban forest should be viewed as a process rather than a goal. It involves managing our urban forest in an aboriculturally sound manner to meet the needs of the present without compromising the benefits for future generations. Management of a sustainable urban forest requires: a comprehensive management strategy; community support and involvement, and a viable resource base.

The RUFMS provides a model for sustainability.

1. A Comprehensive Management Strategy

The RUFMS contains the programs, policies, standards and guidelines which together form a comprehensive strategy for managing the urban forest.

- An inventory for planning and managing the urban forest.
- Species diversity requirements.
- Species and site selection criteria.
- A policy for purchasing plant material.
- Tree spacing standards that provide the appropriate degree of canopy cover.
- Standards for tree care.
- A policy for protecting existing trees.
- Tree planting priorities, requirements, procedures and specifications.
- Root pruning guidelines.
- Criteria and processes for removing hazardous or infected trees or those approved for removal to accommodate development projects.
- Integrated Pest Management services.
- A storm response plan.
- Safety requirements for protecting personnel involved in tree care and the general public.
- A Master Tree Planting Strategy.
- Cooperation and interaction among civic departments and divisions involved in tree care.

2. Community Support and Involvement

The RUFMS contains several programs designed to educate the public and elicit their support in preserving and enhancing the urban forest.

- Participatory and educational programs and services to educate the general public and involve them in preserving and enhancing the urban forest.
- Protection of trees on public and private property from Dutch Elm Disease and hazardous trees that pose a threat to the public.
- A Tree Donation Program to encourage public involvement in enhancing the urban forest.
- A Heritage Trees of Regina Program to locate, designate, catalogue and preserve the heritage trees of Regina.

3. A Viable Resource Base

The RUFMS contains several recommendations that should help maximize the benefits of both the City's financial and manpower resources.

- The guidelines, specifications, priorities, standards, policies and programs proposed in the RUFMS form a comprehensive strategy that will enable the optimum use of available resources.
- Establishing consistent planting procedures for the divisions involved in tree planting should reduce tree mortality rates and the additional costs associated with replacing the trees.
- The MTPS will enable the nursery to develop a five year production plan that should better meet the planting needs of the City and make the nursery more economically viable.
- Establishing a charge-out inventory value for trees transferred out of the nursery could make the nursery more cost efficient.
- The tree maintenance and root pruning policies described in the RUFMS should contribute to a healthy urban forest which is less susceptible to tree diseases and insect pests.
- The tree protection policy described in the RUFMS should reduce the cost of damage to trees as well as the potential public liability that could result.
- Annual in-service seminars on tree planting, tree maintenance and identifying tree diseases and insect pests for all staff involved in the care of the urban forest should contribute to greater efficiency and the early detection and prevention of infestations.
- Establishing threshold indicators for those tree diseases and insect pests common to Regina should enable the Integrated Pest Management Section to utilize its resources where they are most needed and rationalize the need for additional resources to prevent an infestation if indicated.

14.0 IMPLEMENTATION

The final stage in the process is the development of an implementation plan to ensure that the RUFMS is implemented, evaluated and updated in a coordinated manner.

14.1 The Policies and Procedures Manual

Each of the appendices attached to the RUFMS deals with a major program area necessary for sustaining the urban forest. The appendices have been written and formatted to serve as practical working documents to assist staff and contractors involved in tree care on public land in their day-to-day operations. Together the appendices form a Policies and Procedures Manual. It is important to recognize that the standards, procedures and specifications contained in the RUFMS should be reviewed regularly and revised as new information becomes available.

14.2 Orientation of Staff

An orientation for those staff involved in caring for the urban forest is critical to the success of the strategy. Urban Forestry Section should assume responsibility for ensuring that staff involved in tree care are familiar with The Policies and Procedures Manual.

14.3 Distribution to Internal and External Stakeholders

The Urban Forestry Section should ensure that the relevant sections of the RUFMS are distributed to both the internal and external stakeholders impacted by the strategy. For example, the Tree Protection, Root Pruning, Tree Removal and Safety Requirements policies should be distributed to City staff or contractors undertaking construction work near trees on public land. The Tree Planting Priorities, Requirements, Procedures and Specifications should be distributed to the civic divisions and private developers involved in tree planting on public land.

14.4 Bylaw Changes

Zoning Bylaw #9250 and *Forestry Bylaw #9607* should be reviewed to ensure they are in alignment with the RUFMS.

14.5 The Implementation Plan

A number of steps are involved in implementing the RUFMS. It is therefore useful to develop an implementation schedule. Urban Forestry Section shall be responsible for developing an implementation plan for the RUFMS that specifies the task to be performed, the person responsible for completing the task, and the time frame within which the task should be completed. The tasks would include but are not limited to the following:

1) Orienting staff to the RUFMS;

2) Redrafting *Forestry Bylaw #9607*;

3) Including the species selection list in *Zoning Bylaw #9250*;

4) Establishing a Work Group to review the operational procedures for requisitioning plant material from the City nursery;

5) Annually reviewing the City nursery production plan with The Design Section to identify more specifically the species and quantities of plant material that will be required in five years;

6) Publicizing The Heritage Trees of Regina Program and The Tree Donation Program;

7) Developing an inventory of the heritage trees of Regina;

8) Integrating the standards, the plant material requirements, the species selection list and species diversity requirements into the Open Space Development Standards Manual;

9) Developing on-going monitoring techniques to ensure that the RUFMS is implemented and revised when necessary based on new information.

Specific to the implementation of the Master Tree Planting Plan; the Design Section has developed an implementation matrix that, in general, competitively adjudicates each target site using a predetermined set of criteria. Each criteria category is eligible for a range of values that, when tallied, result in a ranked list of prioritized target sites. Some categories are discretionary in order to respond to the dynamics of land development, funding opportunities or other emerging variables. Consideration is also given to the development of a cross section of the six design location categories discussed in Section 12.2. For the purposes of this matrix, the target sites located along Ceremonial Routes and within Regina's Market Square have been removed. The Ceremonial Route landscape, as discussed in Section 12.3.1, is expected to cost significantly more than simple tree plantings associated with typical arterial roadway streetscaping. The issues associated with properly developing the ceremonial routes (seating, vistas, banner poles, hard surfacing, etc.) will be analyzed and presented within the budget process on the merit of each individual project. Streetscaping opportunities within Regina's Market Square (discussed in Section 12.3.5) are categorized separately because of its unique context. The determination of projects within Regina's Market Square would be subject to approval processes and funding sources that are distinct from the other streetscape target areas.

14.6 Monitoring and Evaluation

Even a successfully implemented management strategy must be monitored to ensure that progress is being made and standards are being met. Evaluation provides the feedback necessary to determine if the strategy is working. Providing for periodic evaluation as part of the management process means that problems can be identified and changes made before a crisis develops.

The Urban Forestry Section shall assume responsibility for monitoring and evaluating the RUFMS.

The purpose of the monitoring is to:

1) Ensure that the various components of the RUFMS are implemented by the divisions involved in tree care.

2) Regularly review and revise the standards, procedures and specifications contained in the RUFMS as new information becomes available.

3) Identify problems in the strategy and take correction action.

4) Collect the information needed to conduct a formal evaluation of the strategy.

5) Ensure that the relevant sections of the RUFMS are incorporated into:

    i) The Open Space Management Division Action Plan
    ii) The Capital Budget Program
    iii) The Tree Management Information System

The RUFMS should be annually evaluated by The Urban Forestry Section in order to:

1) Determine if the strategy is meeting its stated objectives.

2) Assess whether the strategy is being applied consistently by divisions involved in tree care.

3) Identify any changes required to the strategy.

4) Annually review the MTPS with The Design Section to update and if necessary revise the projections for new tree plantings.

Performance indicators are tangible goals that the RUFMS seeks to achieve. To be realistic the indicators must be:

1) Quantifiable so that progress toward the goal can be monitored and measured.
2) Achievable in the sense that the goal is practical and within the City's means to

achieve.

3) Affordable in that the City has the resources both financial and human to accomplish the goal.

The following performance indicators shall be used to assess the performance of the RUFMS:

1) Pruning Cycle

The City of Regina is currently on a 6 to 7 year pruning cycle for elms. All other trees over 9 meters in height are on a 5 year cycle and trees under 9 meters are on a 1 - 2 years cycle.

Evaluation Method

Adherence to the pruning cycle can be measured by maintaining work records that indicate the number of trees pruned annually in each category and the time required. Once this information is tabulated the average time required to prune a tree in each category can be established and this figure used to determine whether staff are on track to achieve the pruning cycle.

2) Dutch Elm Disease

The Saskatchewan Dutch Elm Disease Association has established an annual goal of keeping losses from DED to less than 2 per cent of the elm population.

Evaluation Method

Statistics shall be kept on the number of public and private elm trees in Regina lost annually to DED. This percentage should be compared to the acceptable goal of 2 per cent.

3) Monitoring Elm Trees

The Integrated Pest Management Section has established a goal of monitoring all public and private elm trees in Regina every two weeks during the period when leaves are on the trees which is usually from middle of June until the end of September.

Evaluation Method

This goal can be evaluated by maintaining records of whether all elm trees were monitored during each of the two week cycles. If this goal was not achieved it should be explained what percentage of the elm trees were monitored and what the reason was for failing to achieve the goal.

4) Species Diversity

The RUFMS establishes a preferred species diversity percentage for parks and open space and residential sites based upon the number of trees to be planted in each type of site.

Evaluation Method

Statistics of the number of trees and percentage of genus planted annually in each type of site shall be maintained in order to determine whether the plantings adhere to the preferred species diversity percentages.

5) Net Planting Level

The City's total tree planting from all resources is projected to be about 2,000 annually. During the period 1994 to 1998 the City removed an average of 595 trees a year. Therefore the net planting increase is estimated to be about 1,405 trees per year. Because the total tree plantings may vary from year to year depending upon when new development projects occur, it is more realistic to consider variances in achieving the net planting level of 1,400 over a five year period.

Evaluation Method

Statistics shall be maintained of the number of trees planted and the number of trees removed each year. If the City falls below the net planting level of 1,400 over a number of years consideration should be given to increasing the annual planting rate.

6) Response Times For Pruning Priorities

The RUFMS establishes response times for responding to situations requiring emergency or priority pruning. Emergency prunes or situations that pose a threat to life or property should be responded to as soon as possible depending upon the availability of staff and resources and the magnitude of the problem. Priority prunes or trees that have the potential to become safety hazards if not corrected should be responded to within two weeks.

Evaluation Method

Records should be kept of the number of requests each year for emergency or priority prunes and the response time (the time from when the request was received until the problem was corrected) to correct the situation.

7) Nursery Production

Based on the estimated planting rate of 2,000 trees per year it is anticipated that approximately 1,500 trees will be provided by the City nursery and 500 purchased from private nurseries.

Evaluation Method

Statistics shall be maintained of the total number of trees planted annually including the number provided by the City nursery and those acquired from private sources. If the number of trees provided by the City nursery consistently falls below the 1,500 level or if the number of trees being purchased from private sources consistently exceeds the 500 level the situation should be reviewed.

8) Tree Mortality

Tree mortality is dependent on a variety of factors. Mortality may vary according to the hardiness zone or the particular site where the tree is to be planted. Trees planted in hardscape where they are subjected to the urban stress of vehicular and pedestrian traffic will have a higher mortality rate than those planted in parks. Selecting the appropriate species of trees for the hardiness zone and the site as well as employing proper planting and maintenance procedures are important factors in reducing tree mortality. Natural phenomenal such as storms, severe cold or insect pests and tree diseases can also affect the life span of urban trees. Because there are so many variables there are no recognized standards for tree mortality. However, it would be useful to maintain annual statistics on tree mortality so that any significant increases or decreases in the mortality rate can be identified and corrective action taken.

Evaluation Method

Statistics on the number of trees lost annually shall be maintained and any significant increase or decrease in the mortality rate should be reviewed with a view to determining the underlying cause and initiating corrective action.

A report included in the annual budget concerning the above noted performance indicators shall be provided annually to the Parks and Recreation Board.

The Planning and Design Division shall undertake a comprehensive evaluation of the RUFMS to update and improve it every five years.

15.0 CONCLUSION

The adoption of a comprehensive urban forest management strategy is an important event for the City of Regina. The RUFMS proposes a body of programs, policies, standards, procedures and specifications designed to enable the effective management of Regina's urban forest. It is intended to guide managers in setting priorities and in allocating human and financial resources to achieve sustainability of the urban forest. It is important to recognize that the RUFMS is a continual planning process and as such its standards, procedures and specifications may require change as new information becomes available. It is also important to recognize that the cooperation and commitment of a broad range of civic divisions involved in tree care, as well as the general public and the private sector, is essential to the success of the strategy. Without a community commitment to preserving and enhancing our urban forest, the strategy's goal of sustainability will not be achieved. While civic ordinances play a role in managing and protecting the urban forest, community commitment cannot be legislated, it is more a function of public education and awareness. This represents our most serious challenge – acquiring the commitment of the general public and the private sector to protecting and enhancing Regina's urban forest.

BIBLIOGRAPHY

1. Cooperative Forestry, Urban and Community Forestry, United States Department of Agriculture Forest Service, First Canadian Urban Forest Conference, May 1993.

2. "The Contribution of Trees and Green Spaces to a Town Climate", by Aloys Bernatzky, Energy and Buildings, May 1982.

3. "More Green for Research", by Phillip Robell, Urban Forests, June/July, p.17

4. "Do Trees Strengthen Urban Communities, Reduce Domestic Violence?", by W. C. Sullivan & F.E. Kuo, Human-Environment Research Laboratory,Department of Natural Resources, University of Illinois at Urbana-Champaign.

5. "Measuring the Value of Trees", by Sara Ebenreck, American Forests, July/August, 1988 p.31.
   "The Worst Beach Pollution," New York Times, September 18, 1988 (After information from Dr. R. Lawrence Swanson, director of the Waste Management Institute at SUNY Stonybrook).
   "Urban Forestry Canopy Effects on Water Quantity and Quality," by John Flynn, Feb. 1981
   "Storm Sewage is a Worsening Shore Threat," New York Times, September 5, 1989 (After information from Eric Evanson, deputy director of the Division of Water Resources in the State Department of Environmental Protection).
   "A New Look at the Urban Forest", by Phillip Rodbell, Urban Forests, August/September, p.15.

6. "The Economic Contribution of Trees to Urban Communities," by John F. Dwyer, USDA Forest Service, North Central Forest Experiment Station, 1992, p.44.

7. Sustainable Forests in Urban Ontario, A Report of the Urban Forest Working Group, published by the Queens Printer for Ontario, 1995.

8. "Measuring the Value of Trees," by Sara Ebenreck, American Forests, July/August, 1988, p.31

9. Trees in Urban Design, by Henry F. Arnold, New York, Van Nostrand Reinhold Company, 1993.

10. Development Standards Manual, City of Regina, (Regina Saskatchewan: City of Regina)
11. The Development Plan for the City of Regina, City of Regina. (Regina, Saskatchewan: City of Regina 1994), p.33.

12. Heritage and Tourism Significance of Dewdney Avenue, City of Regina. (Regina, Saskatchewan: City of Regina, 1995)

13. City of Regina Bylaw No. 9656.

APPENDIX "A"

RESPONSIBILITY FOR THE

URBAN FOREST

The following are the specific responsibilities of the various stakeholders involved in caring for the urban forest.

1.0 Urban Forest Section

- Maintain an up-to-date inventory of the urban forest required for managing, planning and budgeting.
- Install trees.
- Protect and maintain the urban forest.
- Structural maintenance of the urban forest.
- Remove hazardous, diseased and dead trees.
- Coordinate the tree planting and replacement program.
- Ensure that suitable stock is available for the urban forest
- Implement *Forestry Bylaw #9607*.
- Ensure that traffic sightlines are not obstructed.
- Train staff in the proper techniques of tree pruning, installation and the operation of forestry related equipment.
- Conduct inspections, assessments and valuations related to the structural integrity of the Urban Forest.
- Develop procedures and specifications for managing and sustaining the urban forest in an aboriculturally sound manner.
- Provide inspections for imported plant stock on all municipal lands and inspections at construction completion or substantial performance of a contract.
- Provide input into the review of applicable development applications and landscape plans.
- Knowledge of other civic policies that affect the management of the urban forest.
- Report tree disease and insect pest problems encountered during their regular activities.
- Inspect and certify imported plant material.
- Assist the Horticultural Extension Officer in providing educational services to residents and other civic departments to increase awareness of urban forest issues.

2.0 The Parks Maintenance and Open Space Services Sections

- Install and replace shrub material and water.
- Prune smaller trees, water and cultivate trees and shrub beds.
- Assist in protecting trees from rodents and mechanical damages.
- Assist in control of pests in trees and shrub beds.
- Remove any park trees under five meters which are dead.
- Safety maintenance of all park trees under five meters.
- Report any tree work requiring forestry staff expertise and/or equipment to The Urban Forestry Section.
- Report pest infections to The Integrated Pest Management Section.
- Identify tree vacancies in parks and open space areas and report them to The Urban Forestry Section.

- Provide input into the review of applicable development applications and landscape plans.

3.0 The Integrated Pest Management Section

- Detect and manage pests and diseases.
- Implement management programs for the control of tree pests and diseases.
- Implement *Forestry Bylaw #9607*.
- Participate in inspections for imported plant stock on all municipal lands and inspections at construction completion or substantial performance of a contract.
- Knowledge of other civic policies that affect the management of the urban forest.
- Provide input into the review of applicable development applications and landscape plans when appropriate.
- Assist the Horticultural Extension Officer and provincial agencies in providing educational services to residents and other civic departments intended to increase their awareness of pest management issues.
- Enforce the provisions of the Dutch Elm Disease Control Regulations.

4.0 The Planning and Design Division

- Coordinate the development of the Five Year Capital Budget for the Streetscape Program.
- Ensure that the landscape designs of both internal and external developers comply with the City of Regina's *Zoning Bylaw #9250*, *Traffic Bylaw #9900* and sightline requirements and the Open Space Development Standards Manual.
- Ensure that forestry guidelines, policies and procedures are reflected and enforced in landscape plans submitted by internal and external developers.
- Provide research and analysis for design issues related to the urban forest.
- Coordinate the review of development applications and landscape plans.
- Coordinate inspections and certification of planning projects.
- Provide design expertise and project management for the annual planting programs.
- Provide landscape design expertise for open space improvements driven by the five year capital plan.
- Implementation of *Forestry Bylaw #9607*.
- Facilitate inspections for construction work related to Servicing Agreements (Construction Completion Certification, Final Acceptance Certification) and provide written authorization for municipal Servicing Agreement Administrators to issue those certificates (Municipal Engineering). Also facilitate inspections for construction work not related to Servicing Agreements (Substantial Performance of the Contracts, Total Performance of the Work).
- Knowledge of other civic policies that affect the management of the urban forest.
- Review applicable development applications and landscape plans.

5.0 The Support Services Department - Park Development Division

- Install plant material as per specifications and plans.
- Acquire plant material as per specifications and plans.

- Maintain plant material until acceptance by owner.
- Provide labour to extract trees from the nursery on a contract basis.
- Provide on site services such as inspection and collaboration on design plans.
- Water all newly installed planting on public land for the capital streetscape program.

6.0 The Development Industry

- Protect any trees on public land during construction by following the City's Tree Protection Procedures.
- Contact the City of Regina, Superintendent of Urban Forestry for plant material inspection upon delivery and prior to planting.
- Follow the City of Regina's standards with respect to planting, staking and maintenance.
- Water all newly installed plantings until the project is taken over by the City.

MAINTENANCE NEEDS

Crisis

Trees given a crisis designation are those which have a hanging limb greater than seven 7.5 centimeters in diameter and are in immediate danger of falling or trees which have split trunks.

Hazard

Trees assigned this maintenance designation could pose a potential risk to public safety or property. They are not in need of immediate work but are cause for concern. They possess one or all of the following characteristics.

- 30 to 50 per cent dead wood
- a hanging limb under 7.5 centimeters in diameter that is not stable in the crown
- a hanging limb or broken limb stable in the crown
- a split trunk exhibiting grey wood or decay
- 5 or more fungal bodies in diverse locations on the tree

Interference

Trees that interfere with signs, overhead wires, roads or other trees.

Removal

Trees listed for removal have greater than 50 per cent dead wood or are growing in an inappropriate location (eg: in the middle of the sidewalk). Stumps with shoot growth over 1 meter tall and 2.5 centimeters in diameter are also classified as removals because there is still a large amount of living material.

Prune

This designation is used to denote the need for routine maintenance. It is used in cases in which pruning is for aesthetic reasons rather than tree health. A tree in this designation has less than 10 per cent dead wood.

Ground Prune

Indicates all trees that are under 35 meters tall which need only routine maintenance and require at most a pole pruner. The primary purpose for the inclusion of this designation is to better define crew and equipment requirements for this specific location.

Planting

Identify species, size, location and number of trees.

Stump

Stump is a tree stump that does not have any significant shoot growth.

Other

Any other maintenance requirements not identified above.

Crew and Equipment

Define the crew and equipment requirements for this specific location.

SECTOR PROFILES

The following is a descriptive analysis of Regina's 77 forestry sectors. Trees along streets dividing one sector from another have been included in the sector of the lower number. Therefore, trees along a street dividing Sector 1 from Sector 2 have been included in the total for Sector 1. This method of counting is explained by the fact that when Forestry staff prune a street, for practical reasons, they do both sides. Sectors 41 – 49 and 75 – 79 are not included in the profiles. These numbers have been left open to allow for the future expansion of the city.

Definitions

Anthracnose is caused by many forms of the fungal groups Deuteromycotina/Coelomycetes. The symptoms include yellowing of leaves which during a wet/moist spring can cause the complete loss of the first generation leaves. Severe defoliation over several years may cause dieback in the lower crown. This malady normally does not cause tree death.

Black Knot is caused by Apiosporina morbosa fungus and causes damage in fruit and ornamental trees. The disease symptoms include elongated swelling or knots in the limbs. The knots grow and turn black causing reduced fruit production and will infect an entire tree area if no sanitation measures are in place. Tree death is usually not associated with this disease but sanitation (ie removal of the knot) usually results in tree removal.

Chlorosis is a nutrient deficiency induced by the soils of the prairies. The most common symptom is the yellowing of leaves with bright green veins. Many types of trees are susceptible to chlorosis including elm, maple, oak, birch etc. Symptoms may be uniform throughout the tree or patchy.

Dothiorella is caused by the fungus, Dothiorella ulmi. It is seen in American Elm trees and is often confused with Dutch elm disease (DED). Dothiorella wilt symptoms include wilting, curling, and yellowing of foliage followed by defoliation and gradual dieback of branches. The disease cannot be visually differentiated without isolation methods on agar.

Dutch Elm Disease is caused by the fungus Opistostoma ulmi and is seen in both American and Manchurian elms. DED symptoms include wilting, curling, and yellowing of foliage followed by defoliation and gradual to rapid dieback of branches. The disease is transmitted via the primary vector, the native or European elm bark beetle. The disease cannot be visually differentiated from Dothiorella or Verticillium without isolation methods on agar. This disease is always fatal to the elm tree.

Elm Yellows is caused by a mycoplasmalike organism (MLO) which is transmitted by leaf hoppers and other homopteran insects. Elm Yellows symptoms usually develop in mid June to mid September and include drooping, yellowing, and premature casting of foliage. The entire sequence of events occurs over a few weeks. All branches show the symptoms at the same time. Elm Yellows infected trees can show symptoms over several years. In American elms death is usually within the same season.

Fire Blight is caused by the bacterium Erwinia amylovora. It mainly affects fruit and ornamental tree species. The bacterium's symptoms infect the blossoms and leaves near the growing tips. Leaves will quickly wilt, yellow, and turn black but usually remain attached to the infected branches. Scorched like branches are the most recognizable symptoms. In windy and wet times it is very easily spread to other surrounding trees. Death of the tree usually occurs over several seasons.

Phytophtohora is caused by Phytophtohora fungus and is commonly known as a plant destroyer. The fungus reduces the amount of foliage over time and can cause the death of the tree. The symptoms include the production of a large canker that reduces the overall fitness of the tree and eventually results in dieback and death.

Scab is caused by the fungus group Pyracantha. The fungus causes succulent leaves and shoots to become swollen and distorted with spots or blight. In fruit or ornamental plants the blight or spots also infect the fruit and fruiting bodies reducing the yield of fruits. The fungus is passed to the next generation via the previous years leaf fall. This malady does not kill the tree it infects.

Tar Spot is caused by the fungus species Rhytisma and affects many different types of tree hosts. Greenish yellow spots are the indication of an early infection. Black tar spots are indicative of a late infection and yellowing (chlorotic areas). The previous year's leaves transmit the fungus to the next generation of foliage. Tar spot is not known to kill trees but is mainly an aesthetic problem.

Verticillium is caused by the fungus Verticillium albo-atrum and V. dalhiae. It is seen in many plants and trees including the American elm and is also confused with DED. Verticillium symptoms include rapid wilting curling, and yellowing of foliage followed by defoliation and rapid dieback of branches. Other external symptoms include reduced twig growth, dieback of twigs, and sparseness in the crown. The disease cannot be visually differentiated from DED without isolation methods on agar.

Wet Wood is a discoloured, water soaked condition of the heartwood of some trees caused by bacterial fermentation. It's often associated with a bad odour, gas and small wire worms. It is not known to cause death in trees.

Sector 1

Sector 1 is bounded by 4th Avenue on the north, Dewdney Avenue on the south, Elphinstone Street on the west and Albert Street on the east. It has a total of 1,549 trees. Elm trees constitute 74 per cent of the total tree population, ash 20 percent, other deciduous five per cent and coniferous one per cent. The majority of the trees (52 per cent) in this sector are large from 12.6 to 18.5 meters in height, 35 per cent are of medium height between 6.1 to 12.5 meters and 13 per cent are small trees up to 6 meters. The average diameter of the trees is 31.37 cm. In terms of maintenance needs, no trees required an emergency prune and 25 trees or two per cent required a priority prune. The inventory identified 33 vacant planting sites which constitute two per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had ten elms test positive for Dothiorella and two elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the older age of the trees and the moderate incidence of tree diseases, this sector is a moderate priority.

Sector 2

Sector 2 is bounded by 4th Avenue on the north, Dewdney Avenue on the south, Lewvan Drive on the west and Elphinstone Street on the east. It has a total of 1,144 trees. Elms constitute 76 per cent of the total tree population, ash 18 per cent, coniferous three per cent, ornamentals two per cent and other deciduous one per cent. Almost two-thirds (64 per cent) of the trees in this sector are of medium height between 6.1 and 12.5 meters, 19 per cent are large between 12.6 and 18.5 meters and 17 per cent are small trees up to 6 meters. The average diameter of the trees in this sector is 32.30 cm. In terms of maintenance needs, no trees required an emergency prune and five trees or .4 per cent required a priority prune. The inventory identified three vacant sites which constitute only .26 per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the Dutch Elm Disease (DED) monitoring program had five elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the older age of the trees and the moderate incidence of tree diseases, this sector is a moderate priority.

Sector 3

Sector 3 is bounded by McKinley Avenue on the north, 4th Avenue on the south, Elphinstone Street on the west and Albert Street on the east. It has a total of 1,475 trees. Elms constitute 68 per cent of the total tree population, ash 20 per cent, other deciduous trees ten per cent and coniferous two per cent. Two-thirds (66 per cent) of the trees in this sector are of medium height 6.1 to 12.5 meters, 33 per cent are small trees up to 6 meters and one per cent are large trees 12.6 to 18.5 meters in height. The average diameter of the trees in this sector is 22.63 cm. In terms of maintenance needs, no trees required an emergency prune, and only two trees or .14 per cent required a priority prune. The inventory identified 99 vacant sites which constitute six per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the Dutch Elm Disease (DED) monitoring program had seven elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the older age of the trees and the moderate incidence of tree diseases, this sector is a moderate priority.

Sector 4

Sector 4 is bounded by McKinley Avenue on the north, 4th Avenue on the south, Lewvan Drive on the west and Elphinstone Street on the east. It has a total of 2,727 trees. Elms constitute 68 per cent of the total tree population, ash 11 per cent, other deciduous 13 per cent, coniferous six per cent and ornamentals two per cent. Sixty-four per cent of the trees in this sector are of medium height 6.1 to 12.5 meters while the remaining 36 per cent are small trees up to 6 meters. The average diameter of the trees in this sector is 25.77 cm. In terms of maintenance needs, no trees required an emergency prune and 101 trees or four per cent required a priority prune. The inventory identified 66 vacant sites which constitute two per cent of the total tree planting sites in the sector. One hundred trees located on the Regent Park Par 3 Golf Course were identified for removal.

From 1992 to 1999 inclusive the Dutch Elm Disease (DED) monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the older age of the trees and the moderate incidence of tree diseases, this sector is a moderate priority.

Sector 5

Sector 5 is bounded by Woodward Avenue on the north, Avonhurst Drive on the south, Argyle Street North on the west and Albert Street on the east. It has a total of 1,331 trees. Elms constitute 72 per cent of the total tree population, ash 14 per cent, coniferous seven per cent, other deciduous four per cent and ornamentals three per cent. Most of the trees (82 per cent) in this sector are of medium height 6.1 to 12.5 meters, 16 per cent are small trees up to 6 meters with two per cent very large trees over 18.5 meters. The average diameter of the trees in this sector is 24.71 cm. In terms of maintenance needs, no trees required an emergency prune and 8 trees or .60 per cent required a priority prune. The inventory identified 12.58 vacant site which constitute nine per cent of the total tree planting sites in the sector. Two trees required removal.

From 1992 to 1999 inclusive the Dutch Elm Disease (DED) monitoring program had 45 elms test positive for Dothiorella and three elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the moderate age of the trees and the high incidence of tree diseases, this sector is a high priority.

Sector 6

Sector 6 is bounded by McCaul Crescent on the north, Sherwood Drive on the south, Pasqua Street on the west and Argyle Street North on the east. It has a total of 901 trees. Elms constitute 47 per cent of the total tree population, ash 36 per cent, other deciduous eight per cent, coniferous five per cent and ornamentals four per cent. Small trees up to 6 meters in height comprise 39 per cent of the trees in this sector, medium sized trees 6.1 to 12.5 meters 26 per cent and large trees 12.6 to 18.5 meters in height 35 per cent. The average diameter for the trees in

this sector is 27.91 cm. In terms of maintenance needs, one emergency prune was identified and eight trees or .88 per cent required a priority prune. The inventory identified 12.54 vacant sites which constitute 12.5 per cent of the total tree planting sites in the sector. One tree required removal.

From 1992 to 1999 inclusive the Dutch Elm Disease (DED) monitoring program had eight elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids, ash plant bug and ash borers. In general due to the moderate age of the trees and the low to moderate incidence of fungal diseases, this sector is a high priority.

Sector 7

Sector 7 is bounded by Ring Road on the north, 6th Avenue North on the south, Argyle Street North on the west and Albert Street on the east. It has a total of 2,586 trees. Elms constitute 33 per cent of the total tree population, ash 22 per cent, coniferous 17 per cent, other deciduous 17 per cent and ornamentals 11 per cent. Small trees up to 6 meters in height comprise 53 per cent of the trees in this sector, medium sized trees from 6.1 to 12.5 meters comprise 43 per cent and large trees 12.6 to 18.5 meters in height four per cent. The average diameter of the trees in this sector is 23.45 cm. In terms of maintenance needs, no trees required an emergency or a priority prune. The inventory identified 152 vacant sites which constitute six per cent of the total tree planting sites in the sector. Two trees required removal.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive the Dutch Elm Disease (DED) monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids, ash plant bug and ash borers. In general due to the moderate age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 8

Sector 8 is bounded by Carnegie Place and Partridge Crescent on the north, Ring Road on the south, Argyle Street North on the west and Albert Street on the east. It has a total of 1,224 trees. Ash constitute 45 per cent of the total tree population, other deciduous 22 per cent, coniferous 15 per cent, elms 11 per cent and ornamentals seven per cent. Half (50 per cent) of the trees in this sector are small trees up to 6 meters in height. The other half (50 per cent) are medium sized trees 6.1 to 12.5 meters in height. The average diameter of the trees in this sector is 19.16 cm. In terms of maintenance needs, no trees required an emergency or a priority prune. The inventory identified 94 vacant sites which constitute seven per cent of the total tree planting sites in the sector. Ten trees required removal.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive the Dutch Elm Disease (DED) monitoring program had no

elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the monitoring and control of ash plant bug and ash borers. In general due to the moderate age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 9

Sector 9 is bounded by Trifunov Crescent on the north, the Ring Road on the south, Pasqua Street on the west and Argyle Street North on the east. It has a total of 1,146 trees. Ash constitute 34 per cent of the total tree population, elm 25 per cent other deciduous 22 per cent, coniferous 16 per cent and ornamentals three per cent. The majority of trees in this sector (64 per cent) are of medium height 6.1 to 12.5 meters, 30 per cent are small trees up to 6 meters, four per cent are large trees 12.6 to 18.5 meters and two per cent are very large trees over 18.5 meters in height. The average diameter of the trees in this sector is 26.40 cm. In terms of maintenance needs, no trees required an emergency or a priority prune. The inventory identified 45 vacant sites which constitute four per cent of the total tree planting sites in the sector. One tree required removal.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive the Dutch Elm Disease (DED) monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the monitoring and control of DED, cankerworms, aphids, ash plant bug and ash borers. In general due to the moderate age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 10

Sector 10 is bounded by 4th Avenue on the north, Dewdney Avenue on the south, Campbell Street on the west and Lewvan Drive on the east. It has a total of 3,208 trees. Elms constitute 56 per cent of the total tree population, ash 28 per cent, coniferous eight per cent, other deciduous six per cent and ornamentals two per cent. Medium size trees 6.1 to 12.5 meters in height comprise 70 per cent of the total trees in this sector, small trees up to 6 meters comprise 28 per cent and large trees 12.6 to 18.5 meters in height two per cent. The average diameter of the trees in this sector is 27.46 cm. In terms of maintenance needs, no trees required an emergency prune and 13 or .40 per cent required a priority prune. The inventory identified 87 vacant sites which constitute three per cent of the total tree planting sites in the sector. Two trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 12.5 elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. Due to the recent discovery of DED in a neighbouring sector in 1999, this sector is a high priority for DED monitoring and control.

Sector 11

Sector 11 is bounded by a line which cuts across the storm channel joining 4th Avenue and Courtney Street on the north, Dewdney Avenue on the south, Courtney Street on the west and McCarthy Boulevard on the east. It has a total of 2,504 trees. Ash constitute 31 per cent of the total tree population, coniferous 27 per cent, other deciduous 23 per cent, elms 15 per cent and ornamentals four per cent. Small trees up to 6 meters in height comprise 64 per cent of the tree population, medium sized trees 6.1 to 12.5 meters comprise 34 per cent and large trees 12.6 to 18.5 meters two per cent. The average diameter of the trees in this sector is 16.85 cm. In terms of maintenance needs, no trees required an emergency prune and only six or .23 per cent required a priority prune. The inventory identified 182 vacant sites which constitute seven per cent of the total tree planting sites in the sector. Ten trees required removal.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive the Dutch Elm Disease (DED) monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the monitoring and control of ash plant bug and ash borers. In general due to the moderate age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 12

Sector 12.5 is bounded by McKinley Avenue on the north, 4th Avenue on the south, Campbell Street on the west and Lewvan Drive on the east. It has a total of 2,552 trees. Elms constitute 53 per cent of the total tree population, ash 35 per cent, other deciduous six per cent, coniferous four per cent and ornamentals two per cent. Medium sized trees from 6.1 to 12.5 meters in height comprise 78 per cent of the tree population, small trees up to 6 meters comprise 21 per cent and large trees 12.6 to 18.5 meters in height, one per cent. In terms of maintenance needs, no trees required an emergency prune and 12.5 trees or .47 per cent required a priority prune. The inventory identified 39 vacant sites which constitute one per cent of the total tree planting site in the sector. Four trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 11 elms test positive for Dothiorella and no elms test postive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids, ash plant bug and ash borers. In general due to the moderate age of the trees and the moderate incidence of tree diseases, this sector is a moderate priority.

Sector 13

Sector 13 is bounded by 1st Avenue North on the north, a line across the storm channel joining 4th Avenue and Courtney Street on the south, Courtney Street on the west and McCarthy Boulevard on the east. It has a total of 1,839 trees. Ash constitute 61 per cent of the tree population, elms 16 per cent, other deciduous ten per cent, coniferous ten per cent and ornamentals three per cent. Small trees up to 6 meters in height comprise 64 per cent of the trees in this sector, medium sized trees 6.1 to 12.5 meters comprise 35 per cent and large trees 12.6 to

18.5 meters in height one per cent. The average diameter of trees in this sector is 16.86 cm. In terms of maintenance needs, no trees required emergency prune and 29 or 15 per cent required a priority prune. The inventory identified 88 vacant sites which constitute five per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED, ash plant bug, ash borers, cankerworms and aphids. In general due to the moderate age of the trees and the low incidence of tree diseases, this sector is a low priority.

Sector 14

Sector 14 is bounded by Sherwood Drive on the north, 1st Avenue North on the south, McIntosh Street and Pasqua Street on the eat. It has a total of 599 trees. Elms constitute 44 per cent of the tree population, ash 35 per cent, other deciduous 19 per cent and coniferous two per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 80 per cent of the trees in this sector, large trees 12.6 to 18.5 meters comprise 13 per cent and small trees up to 6 meters in height seven per cent. The average diameter for the trees in this sector is 27.65 cm. In terms of maintenance needs, no trees required an emergency prune and three trees or .52 per cent required a priority prune. The inventory identified 12.58 vacant sites which constitute 18 per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had six elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids, ash plant bug and ash borers. In general due to the moderate age of the trees and the moderate incidence of tree diseases, this sector is a moderate priority.

Sector 15

Sector 15 is bounded by Sherwood Drive on the north, 1st Avenue North on the south, McCarthy Boulevard on the west and McIntosh Street on the east. It has a total of 1,200 trees. Ash constitute 45 per cent of the trees in this sector, elms 28 per cent, other deciduous 13 per cent, coniferous ten per cent and ornamentals four per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 67 per cent of the tree population, small trees up to 6 meters comprise 32 per cent and large trees 12.6 to 18.5 meters in height one per cent. The average diameter for the trees in this sector is 21.11 cm. In terms of maintenance needs, no trees required an emergency prune and only one tree or .08 per cent required a priority prune. The inventory identified 106 vacant sites which constitute eight per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED, ash plant bug, ash borers, cankerworms and aphids. In general

due to the moderate age of the trees and the low incidence of tree diseases, this sector is a low priority.

Sector 16

Sector 16 is bounded by the Ring Road on the north, Sherwood Drive on the south, McIntosh Street on the west and Pasqua Street on the east. It has a total of 932 trees. Elms constitute 72 per cent of the trees in this sector, ash 16 per cent, coniferous six per cent, other deciduous five per cent and ornamentals one per cent. Large trees 12.6 to 18.5 meters in height comprise 56 per cent of the tree population, medium sized trees 6.1 to 12.5 meters comprise 41 per cent and small trees up to 6 meters three per cent. The average diameter of the trees in this sector is 32.77 cm. In terms of maintenance needs, no trees required an emergency prune and only one or .10 per cent required a priority prune. The inventory identified 103 vacant sites which constitute ten per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had three elms test positive for Dothiorella and no elms tested positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids, ash plant bug and ash borers. In general due to the moderate age of the trees and the low to moderate incidence of tree diseases, this sector is a low priority.

Sector 17

Sector 17 is bounded by the Ring Road on the north, Sherwood Drive on the south, McCarthy Boulevard on the west and McIntosh Street on the east. It has a total of 1,316 trees. Ash constitute 57 per cent of the trees in this sector, elms 30 per cent, coniferous eight per cent, other deciduous three per cent and ornamentals two per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 68 per cent of the tree population, small trees up to 6 meters in height comprise 18 per cent and large trees 12.6 to 18.5 meters 14 per cent. The average diameter of the trees in this section is 32.25 cm. In terms of maintenance needs, no trees required an emergency prune and only two or .15 per cent required a priority prune. The inventory identified 71vacant sites which constitute five per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 no elms tested positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for ash plant bug and ash borers. Other priorities consist of the monitoring of DED as well as the continued monitoring and control of cankerworms and aphids. In general due to the moderate age of the trees and the low incidence of tree diseases, this sector is a low priority.

Sector 18

Sector 18 is bounded by Rochdale Boulevard on the north, 1st Avenue North on the south, McIntosh Street on the west and Pasqua Street on the east. It has a total of 1,663 trees. Elms constitute 47 per cent of the trees in the sector, ash 22 per cent, other deciduous 18 per cent,

coniferous 11 per cent and ornamentals two per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 55 per cent of the tree population, large trees 12.6 to 18.5 meters in height comprise 30 per cent and small trees up to 6 meters 15 per cent. The average diameter of the trees in this sector is 25.56 cm. In terms of maintenance needs, no trees required an emergency prune and 4 trees or .24 per cent required a priority prune. The inventory identified 59 vacant sites which constitute three per cent of the total tree planting sites in the sector. Nine trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had one elm test positive for Dothiorella and one elm test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids, ash plant bug and ash borers. In general due to the moderate age of the trees and the low incidence of tree diseases, this sector is a low priority.

Sector 19

Sector 19 is bounded by Rochdale Boulevard on the north, 1st Avenue North on the south, McCarthy Boulevard on the west and McIntosh Street on the east. It has a total of 2,019 trees. Ash constitute 35 per cent of the trees in this sector, elms 28 per cent, other deciduous 19 per cent, coniferous 14 per cent and ornamentals four per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 56 per cent of the tree population, small trees up to 6 meters in height comprise 27 per cent and large trees 12.6 to 18.5 meters in height 17 per cent. The average diameter of the trees in this sector is 23.88 cm. In terms of maintenance needs, no trees required an emergency prune and six trees or .29 per cent required a priority prune. The inventory identified 70 vacant sites which constitute three per cent of the total tree planting sites in the sector. No trees required removal.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive the DED monitoring program had three elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the monitoring and control of DED,cankerworms, aphids, ash plant bug and ash borers. In general due to the moderate age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 20

Sector 20 is bounded by Ring Road on the north, 1st Avenue North on the south, CNR tracks on the west and McCarthy Boulevard on the east. It has a total of 1,252 trees. Ash constitute 64 per cent of the trees in the sector, coniferous 16 per cent, other deciduous 11 per cent, elms seven per cent and ornamentals two per cent. Small trees up to 6 meters in height comprise 76 per cent of the tree population, medium sized trees 6.1 to 12.5 meters in height comprise 23 per cent and large trees 12.6 to 18.5 meters one per cent. The average diameter of trees in this sector is 18.83 cm. In terms of maintenance needs, no trees required an emergency prune and three trees or .23 per cent required a priority prune. The inventory identified 31 vacant sites which constitute two per cent of the total tree planting sites in the sector. One tree required removal.

From 1992 to 1999 inclusive the DED monitoring program had one elm test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED, ash plan bug, ash borers, cankerworms and aphids. In general due to the moderate age of the trees and the low incidence of tree diseases, this sector is a low priority.

Sector 21

Sector 21 is bounded by 9th Avenue North on the north, 1st Avenue North on the south, Courtney Street on the west and the CNR tracks on the east. It has a total of 1,341 trees. Other deciduous constitute 34 per cent of the trees in this sector, ash 26 per cent, coniferous 17 per cent, elms 17 per cent and ornamentals six per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 58 per cent of the tree population, small trees up to 6 meters comprise 38 per cent and large trees 12.6 to 18.5 meters in height four per cent. The average diameter of the trees in this sector is 21.10 cm. In terms of maintenance needs, no trees required an emergency prune or a priority prune. The inventory identified 55 vacant sites which constitute four per cent of the total tree planting sites in the sector. No trees required removal.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the monitoring and control of DED, cankerworms, aphids, ash plant bug and ash borers. In general due to the young age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 22

Sector 22 is bounded by Rochdale Boulevard on the north, 1st Avenue North on the south, the CNR tracks on the west and McCarthy Boulevard on the east. It has a total of 2,480 trees. Ash constitute 36 per cent of the trees in the sector, other deciduous 23 per cent, coniferous 16 per cent, elms 16 per cent and ornamentals nine per cent. Small trees up to 6 meters in height comprise 52 per cent of the tree population, medium sized trees 6.1 to 12.5 meters in height comprise 43 per cent and large trees 12.6 to 18.5 meters five per cent. The average diameter of the trees in this sector is 20.39 cm. In terms of maintenance needs, no trees required an emergency or priority prune. The inventory identified 25 vacant sites which comprise one per cent of the total tree planting sites in the sector. No trees required removal.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella and one elm test positive for Verticilium. No elms were found to have DED. Priorities consist of the monitoring and control of DED, cankerworms, aphids, ash plant bug and ash borers. In general due to the young age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 23

Sector 23 is bounded by Rochdale Boulevard on the north, 1st Avenue North on the south, Courtney Street on the west and the CNR tracks on the east. It has a total of 1,800 trees. Ash constitute 40 per cent of the trees in the sector, other deciduous 21 per cent, coniferous 18 per cent, elms 16 per cent and ornamentals five per cent. Small trees up to 6 meters in height comprise 67 per cent of the tree population, medium sized trees 6.1 to 12.5 meters in height comprise 29 per cent and large trees 12.6 to 18.5 meters four per cent. The average diameter for a tree in this sector is 17.72 cm. In terms of maintenance needs, no trees required an emergency prune and 460 trees or 25 per cent required a priority prune. The inventory identified 138 vacant sites which constitute two per cent of the total tree planting sites in the sector. Five trees required removal.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the monitoring and control of DED, cankerworms, aphids, ash plant bug and ash borers. In general due to the young age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 24

Sector 24 is bounded by the city limits on the north, Rochdale Boulevard on the south, Courtney Street on the west and CNR tracks on the east. It has a total of 1,055 trees. Coniferous constitute 41 per cent of the trees in the sector, ash 22 per cent, other deciduous 22 per cent, ornamental 14 per cent and elms one per cent. Small trees up to 6 meters in height comprise 75 per cent of the tree population, medium sized trees 6.1 to 12.5 meters in height comprise 24 per cent and large trees 12.6 to 18.5 meters in height one per cent. The average diameter of the trees in this sector is 16.35 cm. In terms of maintenance needs, no trees required an emergency prune and 72 trees or seven per cent required a priority prune. The inventory identified 94 vacant sites which constitute eight per cent of the total tree planting sites in the sector. Seven trees required removal.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the monitoring and control of ash plant bug and ash borers. In general due to the young age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 25

Sector 25 is bounded by the city limits on the north, Rochdale Boulevard on the south, the CNR tracks on the west and McCarthy Boulevard on the east. It has a total of 1,563 trees. Other deciduous trees constitute 39 per cent of the trees in the sector, ash 34 per cent, coniferous 20 per cent and ornamentals seven per cent. Small trees up to 6 meters in height comprise 76 per cent of the tree population, medium sized 6.1 to 12.5 meters comprise 21 per cent and large trees

12.6 to 18.5 meters in height three per cent. The average diameter of the trees in this sector is 14.60 cm. In terms of maintenance needs, no trees required an emergency prune but 176 trees or 11 per cent required a priority prune. The inventory identified 266 vacant sites which constitute 15 per cent of the total tree planting sites in the sector. Six trees required removal.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the monitoring and control of ash plant bug and ash borers. In general due to the young age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 26

Sector 26 is bounded by a line extending 9th Avenue North past the city limits on the north, the CNR tracks on the south, Pinkie Road on the west and Courtney Street on the east. It has a total of 3,115 trees. Other deciduous trees constitute 46 per cent of the trees in the sector, coniferous 26 per cent, ash 22 per cent, ornamentals five per cent and elms one per cent. Small trees up to 6 meters in height comprise 86 per cent of the tree population, medium sized trees 6.1 to 12.5 meters in height comprise 12.5 per cent and large trees 12.6 to 18.5 meters two per cent. The average diameter of the trees in the sector is 12.5.31 cm. In terms of maintenance needs, no trees required an emergency prune and 667 trees or 21 per cent required a priority prune. The inventory identified 163 vacant sites which constitute five per cent of the total tree planting sites in the sector. Two hundred and thirty-two trees located on the Joanne Goulet Golf Course were identified for removal. These trees were part of a natural stand of trees that had deteriorated over the years.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the monitoring and control of ash plant bug and ash borers. In general due to the young age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 27

Sector 27 is bounded by the city limits on the north, Rochdale Boulevard on the south, McCarthy Boulevard on the west and Pasqua Street on the east. It has a total of 1,111 trees. Coniferous trees constitute 34 per cent of the trees in the sector, ash 25 per cent, other deciduous 21 per cent and ornamentals 20 per cent. Small trees up to 6 meters in height comprise 92 per cent of the tree population and medium sized trees 6.1 to 12.5 meters in height eight per cent. The average diameter of the trees in the sector is 11.21 cm. In terms of maintenance needs, no trees required an emergency prune and 36 trees or three per cent required a priority prune. The inventory identified 333 vacant sites which constitute 23 per cent of the total tree planting sites in the sector. No trees required removal.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive the DED monitoring program had no elms test positive

for Dothiorella or for Verticilium. No elms were found to have DED. Priorities consist of the monitoring and control of ash plant bug and ash borers. In general due to the young age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 30

Sector 30 is bounded by the CNR tracks on the north, Dewdney Avenue on the south, Albert Street on the west and Broad Street on the east. It has a total of 2,272 trees. Ash constitute 63 per cent of the trees in the sector, coniferous 18 per cent, elms 17 per cent, other deciduous one per cent and ornamentals one per cent. Large trees 12.6 to 18.5 meters in height comprise 51 per cent of the tree population, medium sized trees 6.1 to 12.5 meters comprise 38 per cent, small trees up to 6 meters nine per cent and very large trees over 18.5 meters two per cent. The average diameter of the trees in this sector is 38.19 cm. In terms of maintenance needs, no trees required either an emergency or a priority prune. The inventory identified 64 vacant sites which constitute three per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had two elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, cankerworms and ash borers. In general due to the older age of the trees and the moderate incidence of tree diseases, this sector is a moderate priority.

Sector 31

Sector 31 is bounded by the CNR tracks on the north, Dewdney Avenue on the north, Broad Street on the west and Winnipeg Street on the east. It has a total of 210 trees. Ash constitute 40 per cent of the trees in the sector, coniferous 29 per cent, elms 21 per cent, other deciduous five per cent and ornamentals five per cent. Small trees up to 6 meters in height comprise 65 per cent of the tree population and medium sized trees 6.1 to 12.5 meters in height comprise 35 per cent. The average diameter of the trees in the sector is 20.06 cms. In terms of maintenance needs, no trees required an emergency or priority prune. The inventory identified no vacant tree planting sites. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, cankerworms, aphids and ash borers. In general due to the young age of the trees and the low incidence of tree diseases, this sector is a low priority.

Sector 32

Sector 32 is bounded by the Ring Road on the north, the CNR tracks on the south, Albert Street on the west and Broad Street on the east. It has a total of 2,086 trees. Elms constitute 47 per cent of the trees in the sector, ash 21 per cent, other deciduous 19 per cent, coniferous 10 per cent and ornamentals three per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 58 per cent of the tree population, small trees up to 6 meters in height comprise 41 per cent and large

trees 12.6 to 18.5 meters one per cent. The average diameter of the trees in the sector is 23.87 cm. In terms of maintenance needs, no trees required an emergency prune and 24 trees or one per cent required a priority prune. The inventory identified 167 vacant sites which constitute seven per cent of the total tree planting sites in the sector. Seven trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 28 elms test positive for Dothiorella and one elm test positive Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, cankerworms, aphids and ash borers. In general due to the moderate age of the trees and the high incidence of tree diseases, this sector is a high priority.

Sector 33

Sector 33 is bounded by the Ring Road on the north, the CNR Tracks on the south, Broad Street on the west and Winnipeg Street on the east. It has a total of 1,927 trees. Elms constitute 58 per cent of the trees in the sector, ash 20 per cent, other deciduous 11 per cent, coniferous nine per cent and ornamentals two per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 57 per cent of the tree population, small trees up to 6 meters in height comprise 42 per cent and large trees 12.6 to 18.5 meters one per cent. The average diameter of the trees in the sector is 22.17 cm. In terms of maintenance needs, no trees required an emergency prune and 14 trees or .72 per cent required a priority prune. The inventory identified 61 vacant sites which constitute three per cent of the total tree planting sites in the sector. Seven trees required removal.
From 1992 to 1999 inclusive the DED monitoring program had 40 elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the moderate age of the trees and the high incidence of fungal diseases, this sector is a high priority.

Sector 34

Sector 34 is bounded by Catherwood Drive on the north, the Ring Road on the south, Albert Street on the west and Broad Street on the east. It has a total of 1,937 trees. Ash constitute 47 per cent of the trees in the sector, elm 22 per cent, other deciduous 16 per cent, coniferous 12.5 per cent and ornamentals three per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 62 per cent of the tree population, small trees up to 6 meters in height comprise 37 per cent and large trees 12.6 to 18.5 meters one per cent. The average diameter of the trees in the sector is 19.68 cm. In terms of maintenance needs, no trees required an emergency prune and 14 trees or .72 per cent required a priority prune. The inventory identified 176 vacant sites which constitute eight per cent of the total planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had two elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms and aphids. As this sector borders Sector 35 which had a positive DED identification in 1997, it is a priority for monitoring.

Sector 35

Sector 35 is bounded by the city limits on the north, the Ring Road on the south, Broad Street on the west and Winnipeg Street on the east. It has a total of 1,509 trees. Ash constitute 54 per cent of the trees in the sector, other deciduous 18 per cent, coniferous 15 per cent, elms ten per cent and ornamentals three per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 54 per cent of the tree population, small trees up to 6 meters in height comprise 42 per cent and large trees 12.6 to 18.5 meters four per cent. The average diameter of the trees in the sector is 18.67 cm. In terms of maintenance needs, no trees required an emergency prune and 36 trees or two per cent required a priority prune. The inventory identified 93 vacant sites which constitute six per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had one elm test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms and aphids. This sector had a positive DED identification in 1997 and as a result is considered a priority for monitoring.

Sector 36

Sector 36 is bounded by the CNR tracks on the north, Dewdney Avenue on the south, Winnipeg Street on the west and Park Street on the east. It has a total of 1,901 trees. Ash constitute 35 per cent of the trees in the sector, elms 33 per cent, coniferous 19 per cent, other deciduous 11 per cent and ornamentals two per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 52 per cent of the tree population, small trees up to 6 meters in height comprise 47 per cent and large trees 12.6 to 18.5 meters in height one per cent. The average diameter of the trees in the sector is 25.89 cm. In terms of maintenance needs, no trees required an emergency prune and 22 trees or one per cent required a priority prune. The inventory identified 24 vacant sites which constitute one per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had six elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms and aphids. In general due to the moderate age of the trees and the low to moderate incidence of fungal diseases, this sector is a low priority.

Sector 37

Sector 37 is bounded by the CNR tracks on the north, Dewdney Avenue on the south, Park Street on the west and the Ring Road on the east. It has a total of 447 trees. Ash constitute 53 per cent of the trees in the sector, elms 36 per cent, other deciduous nine per cent and coniferous two per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 87 per cent of the tree population, small trees up to 6 meters in height comprise 11 per cent and very large trees over 18.5 meters two per cent. The average diameter of the trees in the sector is 22.19 cm. In terms of maintenance needs, no trees required an emergency prune and five trees or one per cent

required a priority prune. The inventory identified 82 vacant sites which constitute 16 per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had one elm test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms and aphids. In general due to the moderate age of the trees and the low incidence of tree diseases, this sector is a low priority.

Sector 38

Sector 38 is bounded by Ross Avenue on the north, Dewdney Avenue on the south, the Ring Road on the west and Fleet Street on the east. It has a total of 2,485 trees. Ash constitute 51 per cent of the trees in the sector, elms 22 per cent, other deciduous 15 per cent, coniferous nine per cent and ornamentals three per cent. Small trees up to 6 meters in height comprise 80 per cent of the tree population, medium sized trees 6.1 to 12.5 meters comprise 19 per cent and large trees 12.6 to 18.5 meters one per cent. The average diameter of the trees in the sector is 14.66 cm. In terms of maintenance needs, no trees required an emergency prune and nine trees or .36 per cent required a priority prune. The inventory identified 203 vacant sites which constitute eight per cent of the total tree planting sites in the sector. One tree required removal.

From 1992 to 1999 inclusive the DED monitoring program had one elm test positive for Dothiorella and one elm test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms and aphids. In general due to the young age of the trees and the low incidence of tree diseases, this sector is a low priority.

Sector 39

Sector 39 is bounded by 9th Avenue North on the north, the CNR tracks on the south, Winnipeg Street on the west and Fleet Street on the east. It has a total of 1,113 trees. Ash constitute 48 per cent of the trees in the sector, other deciduous 27 per cent, coniferous 12.5 per cent, elms seven per cent and ornamentals six per cent. Small trees up to 6 meters in height comprise 79 per cent of the tree population in the sector and medium sized trees 6.1 to 12.5 meters comprise 21 per cent. The average diameter of the trees in the sector is 17.74 cm. In terms of maintenance needs, no trees required either an emergency or a priority prune. The inventory identified 344 vacant sites which constitute 24 per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms and aphids. In general due to the young age of the trees and the low incidence of tree diseases, this sector is a low priority.

Sector 40

Sector 40 is bounded by the CPR tracks on the north, Dewdney Avenue on the south, Fleet Street on the west and the city limits on the east. It has a total of 1,739 trees. Ash constitute 38 per cent of the trees in the sector, coniferous 24 per cent, other deciduous 20 per cent, ornamentals 16 per cent and elms two per cent. Small trees up to 6 meters in height comprise 90 per cent of the tree population and medium sized trees 6.1 to 12.5 meters comprise 10 per cent. The average diameter of the trees in the sector is 91.2 cm. In terms of maintenance needs, no trees required either an emergency or a priority prune. The inventory identified 379 vacant sites which constitute 18 per cent of the total planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella and one elm test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms and aphids. In general due to the young age of the trees and the low incidence of tree diseases, this sector is a low priority.

Sector 50

Sector 50 is bounded by Dewdney Avenue on the north, Victoria Avenue on the south, Albert Street on the west and Broad Street on the east. This area encompasses Regina's Market Square. It has a total of 1,107 trees. Ash constitute 35 per cent of the trees in the sector, elms 21 per cent, other deciduous 19 per cent, coniferous 14 per cent and ornamentals 11 per cent. Small trees up to 6 meters in height comprise 50 per cent of the tree population, medium sized trees 6.1 to 12.5 meters comprise 32 per cent, large trees 12.6 to 18.5 meters in height 16 per cent and trees over 18.5 meters two per cent. The average diameter of the trees in the sector is 10.41 cm. In terms of maintenance needs, no trees required either an emergency or a priority prune. The inventory did not identify any vacant tree planting sites. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms and aphids. In general due to the young age of the trees and the low incidence of tree diseases, this sector is a low priority. However, because of its high public visibility Victoria Park is considered a priority.

Sector 51

Sector 51 is bounded by Dewdney Avenue on the north, Victoria Avenue on the south, Broad Street on the west and Winnipeg Street on the east. It has a total of 932 trees. Elms constitute 89 per cent of the trees in the sector, ash eight per cent, coniferous two per cent and other deciduous one per cent. Large trees 12.6 to 18.5 meters in height comprise 72 per cent of the tree population, medium sized trees 6.1 to 12.5 meters comprise 24 per cent and small trees up to 6 meters four per cent. The average diameter of the trees in the sector is 45.75 cm. In terms of maintenance needs, no trees required either an emergency or a priority prune. The inventory did not identify any vacant tree planting sites. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had nine elms test positive for Dothiorella and two elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fundal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the older age of the trees and the moderate incidence of tree diseases, this sector is a moderate priority.

Sector 52

Sector 52 is bounded by Victoria Avenue on the north, College Avenue on the south, Albert Street on the west and Broad Street on the east. It has a total of 1,335 trees. Elms constitute 60 per cent of the trees in the sector, ash 21 per cent, other deciduous eight per cent, ornamentals seven per cent and coniferous four per cent. Small trees up to 6 meters in height comprise 72 per cent of the tree population, large trees 12.6 to 18.5 meters comprise 18 per cent and medium sized trees 6.1 to 12.5 meters ten per cent. The average diameter of the trees in the sector is 27.58 cm. In terms of maintenance needs, no trees required an emergency prune and 60 trees or four per cent required a priority prune. The inventory did not identify any vacant tree planting sites. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had nine elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the old large trees, the moderate incidence of tree diseases, and the close proximity to Wascana Centre this sector is a high priority.

Sector 53

Sector 53 is bounded by Victoria Avenue on the north, College Avenue on the south, Broad Street on the west and Winnipeg Street on the east. It has a total of 1,628 trees. Elms constitute 70 per cent of the trees in the sector, ash 22 per cent, other deciduous four per cent, coniferous three per cent and ornamentals one per cent. Large trees 12.6 to 18.5 meters in height comprise 57 per cent of the tree population, medium sized trees 6.1 to 12.5 meters comprise 37 per cent and small trees up to 6 meters six per cent. The average diameter of the trees in the sector is 37.79 cm. In terms of maintenance needs, no trees required an emergency prune and 65 trees or four per cent required a priority prune. The inventory did not identify any vacant tree planting sites. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 26 elms test positive for Dothiorella and two elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the old large trees, the moderate incidence of tree diseases, and the close proximity to Wascana Centre this sector is a high priority.

Sector 54

Sector 54 is bounded by College Avenue on the north, Quinn Drive on the south, Broad Street on the west and Winnipeg Street on the east. It has a total of 677 trees. Ash constitute 72 per cent of the trees in the sector, elms 24 per cent, coniferous three per cent and other deciduous one per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 82 per cent of the tree population, large trees 12.6 to 18.5 meters comprise 12.5 per cent and small trees up to 6 meters six per cent. The average diameter of the trees in the sector is 26.25 cm. In terms of maintenance needs, no trees required either an emergency or priority prune. The inventory identified 12.5 vacant sites which constitute two per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had one elm test positive for Dothiorella and none for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms, aphids. In general due to the moderate age of the trees, the low incidence of tree diseases, and the close proximity to Wascana Centre this sector is a moderate priority.

Sector 55

Sector 55 is bounded by 23rd Avenue on the north, Parliament Avenue on the south, Albert Street on the west and Hillsdale Street on the east. It has a total of 1,672 trees. Elms constitute 49 per cent of the trees in the sector, ash 37 per cent, coniferous five per cent, ornamentals five per cent and other deciduous per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 50 per cent of the tree population, large trees 12.6 to 18.5 meters comprise 38 per cent and small trees up to 6 meters 12.5 per cent. The average diameter of the trees in the sector is 26.96 cm. In terms of maintenance needs, two trees required an emergency prune and 60 trees or four per cent required a priority prune. The inventory identified 56 vacant sites which constitute three per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 21 elm test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees, the high incidence of fungal diseases, and the close proximity to Wascana Centre this sector is a high priority.

Sector 56

Sector 56 is bounded by the Wascana Parkway on the north and east, Kramer Boulevard on the south and Hillsdale Street on the west. It has a total of 920 trees. Elms constitute 66 per cent of the trees in the sector, other deciduous 13 per cent, ash 11 per cent, coniferous seven per cent and ornamentals three per cent. Large trees 12.6 to 18.5 meters in height comprise 61 per cent of the tree population, medium sized trees 6.1 to 12.5 meters comprise 27 per cent and small trees up to 6 meters 12.5 per cent. The average diameter of the trees in the sector is 31.04 cm. In terms of maintenance needs, no trees required either an emergency or a priority prune. The inventory

identified 16 vacant sites which constitute two per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 18 elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees, the high incidence of fungal diseases, and the close proximity to Wascana Centre this sector is a high priority.

Sector 57

Sector 57 is bounded by Parliament Avenue on the north, Gordon Road on the south, Albert Street on the west and Massey Road on the east. It has a total of 2,034 trees. Elms constitute 51 per cent of the trees in the sector, ornamentals 15 per cent, coniferous 12.5 per cent, other deciduous 11 per cent and ash 11 per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 62 per cent of the tree population, small trees up to 6 meters comprise 36 per cent and large trees 12.6 to 18.5 meters two cent. The average diameter of the trees in the sector is 19.93 cm. In terms of maintenance needs, seven required an emergency prune and 154 trees or eight per cent required a priority prune. The inventory identified 94 vacant sites which constitute four per cent of the total tree planting sites in the sector. Twelve trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 19 elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees, and the high incidence of fungal diseases, this sector is a high priority.

Sector 58

Sector 58 is bounded by McPherson Avenue on the north Academy Park Road on the south, Massey Road on the west and the Wascana Parkway on the east. It has a total of 1,826 trees. Elms constitute 65 per cent of the trees in the sector, ash 15 per cent, coniferous 11 per cent, ornamentals six per cent and other deciduous three per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 75 per cent of the tree population, small trees up to 6 meters comprise 21 per cent, large trees 12.6 to 18.5 meters three per cent and very large trees over 18.5 meters in height one per cent. The average diameter of the trees in the sector is 18.92 cm. In terms of maintenance needs, 11 trees required an emergency prune and 146 trees or eight per cent required a priority prune. The inventory identified 349 vacant sites which constitute 16 per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 30 elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees and the high incidence of fungal diseases, this sector is a high priority.

Sector 59

Sector 59 is bounded by Grant Drive on the north and Grand Drive on the south, west and east. It has a total of 1,729 trees. Elms constitute 62 per cent of the trees in the sector, ash 25 per cent, coniferous nine per cent, other deciduous two per cent and ornamentals two per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 81 per cent of the tree population, small trees up to 6 meters comprise 15 per cent and large trees 12.6 to 18.5 meters four per cent. The average diameter of the trees in the sector is 20.91 cm. In terms of maintenance needs, 18 trees required an emergency prune and 71 trees or four per cent required a priority prune. The inventory identified 60 vacant sites which constitute three per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 25 elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees and the high incidence of fungal diseases, this sector is a high priority.

Sector 60

Sector 60 is bounded by Grant Road on the north, Highway No. 1 on the south and east and Albert Street on the west. It has a total of 1,962 trees. Elms constitute 52 per cent of the trees in the sector, ash 21 per cent, coniferous 15 per cent, other deciduous eight per cent and ornamentals four per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 78 per cent of the tree population, small trees up to 6 meters comprise 20 per cent and large trees 12.6 to 18.5 meters two per cent. The average diameter of the trees in the sector is 18.34 cm. In terms of maintenance needs, four trees required an emergency prune and 95 trees or five per cent required a priority prune. The inventory identified 11 vacant sites which constitute .55 per cent of the total tree planting sites in the sector. Two trees require removal.

From 1992 to 1999 inclusive the DED monitoring program had 26 elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees and the high incidence of fungal diseases, this sector is a high priority.

Sector 61

Sector 61 is bounded by Dewdney Avenue on the north, Arcola and Victoria Avenue on the south, Winnipeg Street on the west and Park Street on the east. It has a total of 204 trees. Ash constitute 56 per cent of the trees in the sector, elms 16 per cent, other deciduous 12.5 per cent, coniferous ten per cent and ornamentals six per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 69 per cent of the tree population and small trees up to 6 meters comprise 31 per cent. The average diameter of the trees in the sector is 29.69 cm. In terms of maintenance needs, no trees required either an emergency prune or a priority prune. The inventory identified

six vacant sites which constitute three per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms and aphids. In general due to the small number of trees and the low incidence of tree diseases, this sector is a low priority.

Sector 62

Sector 62 is bounded by Arcola Avenue on the north and east, College Avenue on the south and Winnipeg Street on the west. It has a total of 722 trees. Ash constitute 50 per cent of the trees in the sector, elms 25 per cent, other deciduous 14 per cent, coniferous eight per cent and ornamentals three per cent. Large trees 12.6 to 18.5 meters in height comprise 39 per cent of the tree population, small trees up to 6 meters comprise 31 per cent and medium sized trees 6.1 to 12.5 meters 30 per cent. The average diameter of the trees in the sector is 36.30 cm. In terms of maintenance needs, no trees required either an emergency or a priority prune. The inventory identified 231 vacant sites which constitute 24 per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had ten elms test positive for Dothiorella and two elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms and aphids. In general due to the moderate age of the trees and the low to moderate incidence of tree diseases, this sector is a moderate priority.

Sector 63

Sector 63 is bounded by College Avenue on the north, Douglas Avenue on the south, Winnipeg Street on the west and Park Street on the east. It has a total of 2,064 trees. Elms constitute 48 per cent of the trees in the sector, ash 47 per cent, ornamentals three per cent, other deciduous one per cent and coniferous one per cent. Large trees 12.6 to 18.5 meters in height comprise 73 per cent of the tree population, medium sized trees 6.1 to 12.5 meters comprise 14 per cent and small trees up to 6 meters 13 per cent. The average diameter of the trees in the sector is 36.32 cm. In terms of maintenance needs, no trees required an emergency prune and two trees or .09 per cent required a priority prune. The inventory identified 149 vacant sites which constitute seven per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 15 elms test positive for Dothiorella and two elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees, the high incidence of fungal diseases and the close poximity to the Wascana Centre, this sector is a high priority.

Sector 64

Sector 64 is bounded by Dewdney Avenue on the north, Victoria Avenue on the south, Park Street on the west and Ring Road on the east. It has a total of 536 trees. Elms constitute 49 per cent of the trees in the sector, ash 33 per cent, coniferous 16 per cent, other deciduous one per cent and ornamentals one per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 68 per cent of the tree population and small trees up to 6 meters comprise 32 per cent. The average diameter of the trees in the sector is 24.35 cm. In terms of maintenance needs, no trees required either an emergency or a priority prune. The inventory identified 67 vacant sites which constitute 11 per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had six elms test positive for Dothiorella and two elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the moderate age of the trees and the low incidence of fungal diseases, this sector is a moderate priority.

Sector 65

Sector 65 is bounded by Dewdney Avenue on the north, Victoria Avenue on the south, the Ring Road on the west and the Eastpointe Estates on the east. It has a total of 2,339 trees. Ash constitute 54 per cent of the trees in the sector, elms 19 per cent, coniferous 12.5 per cent, other deciduous 12.5 per cent and ornamentals three per cent. Small trees up to 6 meters in height comprise 62 per cent of the tree population, medium sized trees 6.1 to 12.5 meters comprise 37 per cent and large trees 12.6 to 18.5 meters one per cent. The average diameter of the tree in the sector is 16.02 cm. In terms of maintenance needs, no trees required either an emergency or a priority prune. The inventory identified 117 vacant sites which constitute five per cent of the total tree planting sites in the sector. Ten trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had three elms test positive for Dothiorella and elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms and aphids. Even though this sector has had a low to moderate incidence of tree diseases, one tree was found to be positive for DED in 1994, as a result this sector is a high priority.

Sector 66

Sector 66 is bounded by Victoria Avenue on the north, Arcola Avenue on the south and west and the Ring Road on the east. It has a total of 688 trees. Elms constitute 57 per cent of the trees in the sector, ash 21 per cent, other deciduous nine per cent, coniferous seven per cent and ornamentals six per cent. In terms of height, the sector's trees are distributed evenly with small trees up to 6 meters in height comprising 33 per cent, medium sized trees 6.1 to 12.5 meters comprising 33 per cent and large trees 12.6 to 18.5 meters 34 per cent. The average diameter of the trees in the sector is 24.80 cm. As concerns maintenance needs, no trees required an emergency prune and one tree or .14 per cent required a priority prune. The inventory identified

66 vacant sites which constitute nine per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had nine elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees and the low incidence of fungal diseases, this sector is a moderate priority.

Sector 67

Sector 67 is bounded by Arcola Avenue on the north, the Ring Road on the south and east and Park Street on the west. It has a total of 1,003 trees. Elms constitute 73 per cent of the trees in the sector, ash 13 per cent, coniferous seven per cent, other deciduous six per cent and ornamentals one per cent. Large trees 12.6 to 18.5 meters in height comprise 58 per cent of the trees in the sector, medium sized trees 6.1 to 12.5 meters comprise 36 per cent and small trees up to 6 meters six per cent. The average diameter of the trees in the sector is 30.59 cm. In terms of maintenance needs, no trees required either an emergency prune or a priority prune. The inventory identified 77 vacant sites which constitute seven per cent of the total tree planting sites in the sector. Three trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had five elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees, the low to moderate incidence of fungal diseases and the close proximity to Wascana Centre, this sector is a high priority.

Sector 68

Sector 68 is bounded by Victoria Avenue on the north, Arcola Avenue on the south, the Ring road on the west and the storm channel on the east. It has a total of 1,199 trees. Ash constitute 26 per cent of the trees in the sector, other deciduous 26 per cent, coniferous 21 per cent, ornamentals 20 per cent and elms seven per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 55 per cent of the tree population, small trees up to 6 meters comprise 35 per cent and large trees 12.6 to 18.5 meters ten per cent. The average diameter of the trees in the sector is 19.92 cm. In terms of maintenance needs, no trees required an emergency prune and one tree or .08 per cent required a priority prune. The inventory identified 45 vacant sites which constitute four per cent of the total tree planting sites in the sector. No trees required removal.

Since this site is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the young age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 69

Sector 69 is bounded by Victoria Avenue on the north, Arcola Avenue on the south, the storm channel on the west and Prince of Wales Drive on the east. It has a total of 2,308 trees. Coniferous comprise 30 per cent of the trees in the sector, other deciduous 25 per cent, ash 24 per cent, ornamental 17 per cent and elms four per cent. Small trees up to 6 meters in height comprise 74 per cent of the tree population and medium sized trees 6.1 to 12.5 meters comprise 26 per cent. The average diameter of the trees in the sector is 14.23 cm. In terms of maintenance needs, no trees required an emergency prune and one tree or .04 per cent required a priority prune. The inventory identified 12.51 vacant sites which constitute five per cent of the total tree planting sites in the sector. No trees required removal.

Since this site is not a monoculture the chances of any one pest doing major damage is reduced. Priorities consist monitoring and control of ash plant bug as well as ash borers. In 1996 one elm was found to be positive for DED, as a result this area is a high priority.

Sector 70

Sector 70 is bounded by Arcola Avenue on the north, the Wascana Waterfowl Park boundary on the south, the Ring Road on the west and the storm channel on the east. It has a total of 4,354 trees. Ash constitute 48 per cent of the trees in the sector, elms 25 per cent, coniferous 16 per cent, other deciduous nine per cent and ornamentals two per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 66 per cent of the tree population, small trees up to 6 meters comprise 22 per cent and large trees 12.6 to 18.5 meters 12.5 per cent. The average diameter of the trees in the sector is 26.77 cm. In terms of maintenance needs, no trees required an emergency prune and four trees or .09 per cent required a priority prune. The inventory identified 52 vacant sites which constitute one per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had nine elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms and aphids. In general due to the moderate age of trees and the moderate incidence of fungal diseases, this sector is a moderate priority.

Sector 71

Sector 71 is bounded by Arcola Avenue on the north, the storm channel on the south and west, and Prince of Wales Drive on the east. It has a total of 2,873 trees. Coniferous constitute 30 per cent of the trees in the sector, ash 25 per cent, other deciduous 24 per cent, ornamentals 19 per cent and elms two per cent. Small trees up to 6 meters in height comprise 75 per cent of the tree population, medium sized trees 6.1 to 12.5 meters comprise 23 per cent and large trees 12.6 to 18.5 meters two per cent. The average diameter of the trees in the sector is 10.58 cm. In terms of maintenance needs, no trees required an emergency prune and one tree or .03 per cent required a priority prune. The inventory identified 106 vacant sites which constitute four per cent of the total tree planting sites in the sector. No trees required removal.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. Priorities consist of the monitoring and control of ash plant bug and ash borers. In general due to the young age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 72

Sector 72 is bounded by Arcola Avenue on the north, the city limits on the south and east, and Prince of Wales Drive on the west. It has a total of 1,467 trees. Coniferous constitute 46 per cent of the trees in the sector, other deciduous 18 per cent, ornamentals 18 per cent and ash 18 per cent. Small trees up to 6 meters in height comprise 96 per cent of the tree population and medium sized trees 6.1 to 12.5 meters comprise four per cent. The average diameter of the trees in the sector is 7.93 cm. In terms of maintenance needs, no trees required either an emergency prune or a priority prune. The inventory identified 185 vacant sites which constitute 11 per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. This area is a low priority.

Sector 73

Sector 73 is bounded by Victoria Avenue on the north, Arcola Avenue on the south, Prince of Wales Drive on the west and city limits on the east. It has a total of 805 trees. Ash constitute 51 per cent of the trees in the sector, other deciduous 22 per cent, coniferous 17 per cent and ornamentals ten per cent. Small trees up to 6 meters in height comprise 97 per cent of the tree population and medium sized trees 6.1 to 12.5 meters comprise three per cent. The average diameter of the trees in the sector is 11.30 cm. In terms of maintenance needs, no trees required either an emergency prune or a priority prune. The inventory identified 191 vacant sites which constitute 19 per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had no elms test positive for Dothiorella or Verticilium. No elms were found to have DED. This area is a low priority.

Sector 74

Sector 74 is bounded by Dewdney Avenue on the north, Victoria Avenue on the south, the storm channel on the west and the city limits on the east. It has a total of 46 trees. Coniferous constitute 65 per cent of the trees in the sector, ornamentals 24 per cent and ash 11 per cent. The total tree population in this sector is comprised of small trees up to 6 meters in height. The average diameter of the trees is 15.67 cm. In terms of maintenance needs, no trees required an emergency prune and 11 trees or 24 per cent required a priority prune. The inventory identified 58 vacant sites which constitute 56 per cent of the total tree planting sites in the sector. No trees required removal.

Sector 80

Sector 80 is bounded by Dewdney Avenue on the north, Saskatchewan Drive on the south, Lewvan Drive on the west and Elphinstone Street on the east. It has a total of 1,512.5 trees. Ash constitute 29 per cent of the trees in the sector, elms 25 per cent, coniferous 24 per cent, other deciduous 18 per cent and ornamentals four per cent. Small trees up to 6 meters in height comprise 48 per cent of the tree population, medium sized trees 6.1 to 12.5 meters comprise 37 per cent and large trees 12.6 to 18.5 meters 15 per cent. The average diameter of the trees in the sector is 34.89 cm. In terms of maintenance needs, no trees required an emergency prune and three trees or .19 per cent required a priority prune. The inventory identified six vacant sites which constitute .39 per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 13 elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring for DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the older age of the elm trees and the moderate incidence of tree diseases, this sector is a moderate priority.

Sector 81

Sector 81 is bounded by Dewdney Avenue on the north, the floodplain on the south and west and Lewvan Drive on the east. It has a total of 1,548 trees. Elms constitute 37 per cent of the trees in the sector, ash 29 per cent, other deciduous 19 per cent, coniferous 14 per cent and ornamentals one per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 67 per cent of the tree population, small trees up to 6 meters comprise 29 per cent and large trees 12.6 to 18.5 meters four per cent. The average diameter of the trees in the sector is 19.21 cm. In terms of maintenance needs, no trees required an emergency prune and 16 trees or one per cent required a priority prune. The inventory identified 13 vacant sites which constitute .83 per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had seven elms test positive for Dothiorella and two elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees, the moderate incidence of fungal diseases and the presence of one DED infected tree in 1999, this sector is a high priority.

Sector 82

Sector 82 is bounded by Saskatchewan Drive on the north, College Avenue on the south, Elphinstone Street on the west and Albert Street on the east. It has a total of 2,663 trees. Elms constitute 77 per cent of the trees in the sector, ash ten per cent, other deciduous ten per cent, ornamentals two per cent and coniferous one per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 50 per cent of the tree population, large trees 12.6 to 18.5 meters comprise 41

per cent and small trees up to 6 meters nine per cent. The average diameter of the trees in the sector is 33.24 cm. In terms of maintenance needs, no trees required an emergency prune and 29 trees or one per cent require a priority prune. The inventory identified two vacant sites which constitute .07 per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 25 elms test positive for Dothiorella and two elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees, the moderate incidence of fungal diseases, this sector is a moderate priority.

Sector 83

Sector 83 is bounded by Saskatchewan Drive on the north, 17th Avenue on the south, Lewvan Drive on the west and Elphinstone Street on the east. It has a total of 2,837 trees. Ash constitute 33 per cent of the trees in the sector, elms 24 per cent other deciduous 20 per cent, coniferous 13 per cent and ornamentals ten per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 47 per cent of the tree population, small trees up to 6 meters comprise 40 per cent and large trees 12.6 to 18.5 meters 13 per cent. The average diameter of the trees in the sector is 15.95 cm. In terms of maintenance needs, no trees required an emergency prune and 105 trees or four per cent required a priority prune. The inventory did not identify any vacant tree planting sites. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had four elms test positive for Dothiorella and one elm test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees and the moderate incidence of fungal diseases, this sector is a moderate priority.

Sector 84

Sector 84 is bounded by College Avenue on the north, Regina Avenue on the south, Elphinstone Street on the west and Albert Street on the east. It has a total of 2,399 trees. Elms constitute 56 per cent of the trees in the sector, ash 18 per cent, coniferous 13 per cent, other deciduous ten per cent and ornamentals three per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 44 per cent of the tree population, large trees 12.6 to 18.5 meters comprise 35 per cent and small trees up to 6 meters 21 per cent. The average diameter of the trees in the sector is 17.35 cm. In terms of maintenance needs, no trees required either an emergency prune or a priority prune. The inventory did not identify any vacant tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had four elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of monitoring and control of cankerworms, aphids and ash borers. In general due to the

age of the trees, the moderate incidence of fungal diseases and the close proximity to Wascana Centre, this sector is a high priority.

Sector 85

Sector 85 is bounded by 17th Avenue on the north, Regina Avenue on the south, Lewvan Drive on the west and Elphinstone Street on the east. It has a total of 991 trees. Elms constitute 59 per cent of the trees in the sector, ash 19 per cent, ornamentals 16 per cent, other deciduous four per cent and coniferous two per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 75 per cent of the tree population, small trees up to 6 meters comprise 24 per cent and large trees 12.6 to 18.5 meters one per cent. The average diameter of the trees in the sector is 24.82 cm. In terms of maintenance needs, no trees required an emergency prune and four trees or .40 per cent required a priority prune. The inventory did not identify any vacant tree planting sites. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had nine elms test positive for Dothiorella and no elms test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees, the moderate incidence of fungal diseases, this sector is a moderate priority.

Sector 86

Sector 86 is bounded by Regina Avenue on the north, Hill Avenue on the south, Montague Street on the west and Albert Street on the east. It has a total of 1,444 trees. Elms constitute 82 per cent of the trees in the sector, ash 14 per cent, coniferous three per cent and other deciduous one per cent. Large trees 12.6 to 18.5 meters in height comprise 49 per cent of the tree population, medium sized trees 6.1 to 12.5 meters comprise 48 per cent and small trees up to 6 meters three per cent. The average diameter of the trees in the sector is 37.75 cm. In terms of maintenance needs, no trees required either an emergency prune or a priority prune. The inventory identified four vacant sites which constitute .27 per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 17 elms test positive for Dothiorella and one elm test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees, the moderate incidence of fungal diseases and the close proximity to Wascana Centre, this sector is a high priority.

Sector 87

Sector 87 is bounded by Regina Avenue on the north, Hill Avenue on the south, Lewvan Drive on the west and Montague Street on the east. It has a total of 2,557 trees. Elms constitute 43 per cent of the trees in the sector, ash 29 per cent, coniferous16 per cent, other deciduous 11 per cent, and ornamentals one per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 83 per

cent of the tree population, large trees 12.6 to 18.5 meters 9 per cent and small trees up to 6 meters eight per cent. The average diameter of the trees in the sector is 26.43 cm. In terms of maintenance needs, no trees required an emergency prune and three trees or .1 per cent required a priority prune. The inventory did not identify any vacant tree planting sites. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had seven elms test positive for Dothiorella and one elm test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees and the moderate incidence of fungal diseases, this sector is a moderate priority.

Sector 88

Sector 88 is bounded by Hill Avenue on the north, 25th Avenue on the south, Argyle Road on the west and Albert Street on the east. It has a total of 1,359 trees. Elms constitute 48 per cent of the trees in the sector, ash 37 per cent, other deciduous eight per cent, coniferous five per cent and ornamentals two per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 75 per cent of the tree population and small trees up to 6 meters comprise 25 per cent. The average diameter of the trees in the sector is 22.06 cm. In terms of maintenance needs, no trees required either an emergency prune or a priority prune. The inventory identified 42 vacant sites which constitute three per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had five elms test positive for Dothiorella and one elm test positive for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees, the moderate incidence of fungal diseases and the close proximity to Wascana Centre, this sector is a high priority.

Sector 89

Sector 89 is bounded by Hill Avenue on the north, 25th Avenue on the south, Lewvan Drive on the west and Argyle Road on the east. It has a total of 2,12.59 trees. Elms constitute 49 per cent of the trees in the sector, ash 31 per cent, coniferous 14 per cent, other deciduous four per cent and ornamentals two per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 67 per cent of the tree population, small trees up to 6 meters comprise 29 per cent and large trees 12.6 to 18.5 meters four per cent. The average diameter of the trees in the sector is 12.67 cm. In terms of maintenance needs, no trees required either an emergency prune or a priority prune. The inventory identified 147 vacant sites which constitute six per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had 12.5 elms test positive for Dothiorella and none for Verticilium. No elms were found to have DED. Priorities consist of the continued the monitoring of DED and other fungal diseases. Other priorities consist of

monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees and the moderate incidence of fungal diseases, this sector is a moderate priority.

Sector 90

Sector 90 is bounded by 25th Avenue on the north, Gordon Road on the south, Montague Street on the west and Albert Street on the east. It has a total of 1,635 trees. Elms constitute 69 per cent of the trees in the sector, other deciduous 11 per cent, ash ten per cent, coniferous eight per cent and ornamentals two per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 81 per cent of the tree population, small trees up to 6 meters comprise 13 per cent, large trees 12.6 to 18.5 meters five per cent and very large trees over 18.5 meters one per cent. The average diameter of the trees in the sector is 21.20 cm. In terms of maintenance needs, no trees required an emergency prune and seven trees or .42 per cent required a priority prune. The inventory identified 159 vacant sites which constitute nine per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had four elms test positive for Dothiorella and none for Verticilium. No elms were found to have DED. Priorities consist of the continued the monitoring of DED and other fungal diseases. Other priorities consist of monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees the moderate incidence of fungal diseases, this sector is a moderate priority.

Sector 91

Sector 91 is bounded by 25th Avenue on the north, Gordon Road on the south, Pasqua Street on the west and Montague Street on the east. It has a total of 1,552 trees. Ash constitute 36 per cent of the trees in the sector, elms 32 per cent, other deciduous 16 per cent, coniferous nine per cent and ornamentals seven per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 49 per cent of the trees in the sector, small trees up to 6 meters comprise 47 per cent and large trees 12.6 to 18.5 meters four per cent. The average diameter of the trees in the sector is 16.49 cm. In terms of maintenance needs, no trees required either an emergency prune or a priority prune. The inventory identified 69 vacant sites which constitute four per cent of the total tree planting sites in the sector. No trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had six elms test positive for Dothiorella and none for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED and other fungal diseases. Other priorities consist of the monitoring and control of cankerworms, aphids and ash borers. In general due to the age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 92

Sector 92 is bounded by Regina Avenue on the north, Gordon Road on the south, Lewvan Drive on the west and Pasqua Street on the east. It has a total of 309 trees. Coniferous constitute 43 per cent of the trees in the sector, ash 29 per cent, other deciduous 14 per cent, elms 13 per cent and ornamentals one per cent. Small trees up to 6 meters in height comprise 93 per cent of the

tree population and medium sized trees 6.1 to 12.5 meters seven per cent. The average diameter of the trees in the sector is 16.87 cm. In terms of maintenance needs, no trees required either an emergency or a priority prune. The inventory identified 209 vacant sites which constitute 40 per cent of the total tree planting sites in the sector. No trees required removal.

Since this sector is not a monoculture the chances of any one pest doing major damage is reduced. From 1992 to 1999 inclusive no elm trees in this sector have shown symptoms of DED. Priorities consist of the monitoring and control of ash plant bug and ash borers. In general due to the young age of the trees and the low incidence of fungal diseases, this sector is a low priority.

Sector 93

Sector 93 is bounded by Gordon Road on the north, Highway #1 on the south, Lewvan Drive on the west and Albert Street on the east. It has a total of 2,213 trees. Ash constitute 48 per cent of the trees in the sector, coniferous 17 per cent, elms 14 per cent, other deciduous 14 per cent and ornamentals seven per cent. Medium sized trees 6.1 to 12.5 meters in height comprise 60 per cent of the tree population, small trees up to 6 meters comprise 35 per cent and large trees 12.6 to 18.5 meters five per cent. The average diameter of the trees in the sector is 18.62 cm. In terms of mainteance needs, no trees required an emergency prune and eight trees or .36 per cent required a priority prune. The inventory identified 42 vacant sites which constitute two per cent of the total tree planting sites in the sector. Three trees required removal.

From 1992 to 1999 inclusive the DED monitoring program had one elm test positive for Dothiorella and none for Verticilium. No elms were found to have DED. Priorities consist of the continued monitoring of DED, ash plant bug, ash borers, cankerworms and aphids. In general due to the moderate age of the trees and the low incidence of fungal diseases, this sector is a low priority.

APPENDIX “C”

SECTOR PROFILES

APPENDIX “D”

TREE PLANTING PRIORITIES,

REQUIREMENTS, PROCEDURES

AND SPECIFICATIONS

TABLE OF CONTENTS

Tree planting needs to be supported by planting, priorities, requirements, procedures and specifications that provide for the consistent management of trees on public property.

1.0 PURPOSE

The purpose of this document is to make available in one reference all the various aspects of tree planting. The priorities, requirements, procedures and specifications outlined are to be adhered to when planting all public trees. They apply whether the work is performed by the City or contractually by private companies. Where a conflicts exists with either the priorities, requirements, procedures or specifications outlined in this document, it is the responsibility of the proponent to justify the need for an exception and obtain written approval from the Director of Community Services.

2.0 SPECIES DIVERSITY

A major concern for the tree planting program is the need for species diversity. Diversity is an important element in the long-term health of the urbanforest. The effects of Dutch Elm Disease (DED) on Canadian cities is a tragic example of the need for species diversity. In December 1996, 36 per cent of Regina's public tree population is elm and 32 per cent ash. As a consequence they comprise 68 per cent of Regina's public trees.

Regina must proactively manage the species composition of its tree population to attain an acceptable species diversity. The following table shows the preferred species diversity percentage for parks and open space and residential sites.

Table 1: Species Diversity

Parks & Open Space	
Number of Trees On Site	Maximum Percentage of Any One Genus
1 – 15	75%
16 – 50	50%
51 – 100	25%
100+	20%
Residential Sites	
Number of Trees at Site	Maximum Percentage of Any One Genus
1 – 15	100%
16 – 50	75%
51 – 100	50%
100+	25%

In general there should be no more than:

- 25 per cent of any one genus for the city as a whole.

- 25 per cent of any one genus per sector.
- 20 per cent of any one genus in each park.
- 30 per cent of any one genus on residential streets per sector.

Genus is defined as a category of biological classification ranking between the family and the species comprising structurally or genetically related species.

3.0 SPECIES SELECTION

Table 2 constitutes the official tree species list for the City of Regina. No species other than those included in this table may be planted on public land without the written permission of the Director of Community Services.

NOTES & CODES

[1] Open Space includes neighbourhood, zone and municipal parks; elementary and secondary school sites, golf courses and cemeteries, as well as the following Special Use Areas as defined in the Open Space Development Standards: buffer strips, pipeline ROW, utility parcels, flood plains, storm water channels/watercourses, storm water retention/detention areas and municipal reserves. The physical context of each open space, as well as the goals/purpose of the proposed planting must be taken into consideration in combination with the above guidelines, as every potential planting site has site specific constraints and opportunities with respect to the location, species, configuration and density of trees which may be used.

[2] All Elm species have been shown to be susceptible to Dutch elm disease (DED). The planting of all elms is subject to the Dutch Elm Disease Control Regulations as stipulated by the Province of Saskatchewan.

[3] Poplar species have shallow and aggressive root systems and are generally not as long lived as other hardwoods; however, they are fast growing. They are not to be planted within 15m of private property or hard surfaces such as asphalt, concrete or brick pavers.

[X] EXPERIMENTAL TREE: Trial only; requires protected site. Hardiness is questionable.

[P] PROBLEM TREE Silver Maple/Chokecherry - suckering

Manitoba maple produces an abundance of seedlings, has weak crotches and is a favourite of aphids which produce a sticky excrement that damages the surface of anything below. The cultivar Baron is a seedless male selection.

Siberian elm produces an abundance of seedlings, has weak crotches, and is generally high maintenance. However, it grows very quickly and is well adapted to a variety of conditions.

Mayday tree has a tendency to produce forking branches which cause branch splitting; is subject to attack from the forest tent caterpillar and aphids; and produces a very sticky fruit that is dropped when ripe.

[H?] HARDINESS CAUTION: Trees with this symbol are less hardy than others listed in the same grouping or site type and may require a protected micro-climate to survive.

[PS] PROTECTED SITE: Trees with this code should only be used in a protected site.

[ST] SALT TOLERANT: Trees with this code have a demonstrated tolerance to road salt.

[DT] DROUGHT TOLERANT: Trees with this code are likely to do better in unirrigated and/or exposed sites than those trees listed in the same category without the code. Only trees with this code should be used in unirrigated areas.

[IRR] Tree to be used in irrigated areas only.

CVs Cultivars

Table 2: Tree Species and Site Suitability

TREE TYPE		SITE SUITABILITY			
		OPEN SPACE[1] Includes parks, schools, golf courses, cemeteries and special use areas.	**STREET TREES** RESIDENTIAL STREETS / PUBLIC WALKWAYS	Turf Areas or Planting Beds on BOULEVARDS / MEDIANS (>10m WIDTH) & TRAFFIC ISLANDS (>75m5)	TREE WELLS/HARDSCAPE (in hard surface areas such as sidewalks, plazas, ie: concrete, paving stone)
DECIDUOUS TREES	**SHADE TREES**	Ash species [DT] Birch species [IRR] Black walnut [X] [IRR] Butternut [X] [IRR] Elm species[2] Delta hackberry Horse chestnut [X] [IRR] Linden species Maple species Oak species Ohio buckeye[(X) Poplar species[3][DT] Russian Olive (PS) Willow species Honey Locust (X)	Ash species [DT] Bur oak [DT] Elm species [DT] Delta Hackberry Linden species	Ash species [DT] Bur oak [DT] Elm species [DT] Delta Hackberry[H?] Linden species Poplar species[3][DT] Silver maple[H?]	Ash species [DT] Elm species [DT] Linden species
	ORNAMENTAL TREES	Mountain ash species Amur maple [DT] Cherry species [DT] Japanese tree lilac [DT] Rosybloom crabapples [DT] Russian olive [ST] [DT] >Snowbird= hawthorn [DT] Ussurian pear [DT] Mountain Alder (X)	American mountain ash Amur cherry Japanese tree lilac [DT] Mayday cherry [DT] [P] Rosybloom crabapples [DT] Schubert chokecherry [DT]	American mountain ash Amur cherry[H?] Amur maple [DT] Japanese tree lilac [DT] Mayday cherry [DT] [P] Rosybloom crabapples [DT] Schubert chokecherry [DT]	Japanese tree lilac [DT] Schubert chokecherry [DT]
CONIFEROUS TREES		Pine species [DT] Siberian larch [DT] [ST] Spruce species Sub-alpine fir Tamarack Douglas fir (X)	Scots pine [DT]	Colorado spruce [DT] Scots pine [DT] White spruce Norway Spruce	Scots pine [DT]

Table 3 provides a more detailed description of the recommended species and cultivars.

Table 3: Species and Cultivars

GENUS	RECOMMENDED SPECIES and CULTIVARS
ALDER (Alnus)	'Mountain Alder'(X)
APPLE (Malus; ROSYBLOOM CRABAPPLE) (DT)	'Almey' (rose), 'Hopa' (purplish-pink), 'Kelsey' (purplish-red), 'Makamik', 'Pygmy' (deep purplish-red), 'Red Splendor' (light pink), 'Rudolph' (deep rose) 'Selkirk' (pink), 'Thunderchild' (pink), Radiant crab (X) 'Strathmore' (pink) (X), 'Snowdrift', (X)
ASH (Fraxinus) [DT] [ST]	Green ash [DT] [ST]+ CV=s/selections: >Patmore', >Bergeson', >Prairie Dome', >Autumn Blaze' White ash [X], Black ash+ CV=s: >Fallgold' , >Mancana' Manchurian ash, 'Prairie Spire', Northern Blaze
BIRCH (Betula) [IRR]	Chinese paper birch, Paper birch +CV=s: >Chickadee=, European birch
BUCKEYE (Aesculus)	Ohio buckeye Horse Chestnut
CHERRY (Prunus) [DT]	Amur cherry, Canada plum, Mayday tree [P], Pincherry [ST], Chokecherry [ST]+ CV: >Schubert=, Jumping Pound
ELM [2](Ulmus) [DT] [ST]	American (White) elm, Siberian elm, Brandon elm.
Hackberry (Celtis)	Hackberry+ CV's: Delta
Hawthorne (Crataegus)	Hawthorne+ CV's: Snowbird, Toba.
LINDEN (Tilia)	American Linden, Little-leaf linden + CV=s: Greenspire/Norlin, Dropmore linden + CV=s: `Wascana', Mongolian linden, Boulevard (X),
MAPLE (Acer)	Amur maple, Manitoba maple [DT]+ CV=s: >Baron', Tartarian maple, Silver maple[H?] [DT] + CV=s: `Northline'[H?], Silver Cloud, Northwood; Norway maple [X] + CV=s: >Schwedleri'[X], >Crimson King'[X], Sugar maple [X].
OAK (Quercus)	Burr oak [DT], Northern red oak[X], Mongolian oak[H?], Scarlet oak [X], White Oak
OLEASTER (Elaeagnus)	Russian Olive
PEAR (Pyrus) [DT]	Ussurian pear + CV: >Ure= [DT]
PINE (Pinus) [DT]	Scots pine, Lodgepole pine, Swiss stone pine, Jack pine [ST], Mugho pine, Ponderosa pine[H?] White Pine?
POPLAR (Populus) [DT]	European columnar aspen, Plains cottonwood + CV=s, Tower poplar, Northwest poplar, Russian poplar cultivars, Trembling aspen, Berlin poplar, Silver poplar[H?], Balsam poplar. Assiniboine poplar, Manitou poplar
SORBUS	Mountain Ash and CV's: American fastigrata P, Rossica, Showy, European
SPRUCE (Picea) [DT]	Norway spruce, White spruce, Colorado (Blue) spruce [DT], Black Hills.
SYRINGA	Japanese tree lilac+ CV's : Ivory Silk
WALNUT (Juglans)	Black walnut (X), butternut (X).
WILLOW (Salix)	Laurel-leaf willow, Peach leaf willow [DT] [ST], White willow + CV=s: `Chermesina' (Red-barked white willow), `Sericea' (Siberian white willow), `Vitellina' (Golden willow') (X) 'Tritis' (Prairie Cascade)

4.0 TREE SPACING AND SETBACK REQUIREMENTS

Listed below are the minimum distances required between trees and setbacks from various infrastructure elements. The Superintendent of Urban Forestry may consider alternatives to or relaxations of these requirements when the developer, contractor or their agents provide a written submission outlining the reasons for waiving the requirements.

4.1 Spacing Between Trees

- Spacing between trees shall reflect the chosen species' ultimate width, the site conditions and design criteria.

- Spacing between crab apples, cherries (prunus), spruce, willows and any other ornamental tree species on residential streets - 8 meters.

- Spacing between shade trees such as maple, ash, elm, linden, willows, poplar and birch on residential streets - 10 meters

- Boulevard width for a single tree row - 6 meters

- Bouelvard width for a double row of trees - 10 meters
  minimum from curb - 3 meters

- Back of walk residential street tree plantings - 1.5 meters minimum

4.2 Setbacks From Infrastructure Elements

- The Public Works Department, Municipal Engineering Department and Urban Planning Division shall meet with The Urban Forestry Section prior to any major arterial plantings in order to establish an agreement on setbacks. Trees should be planted in accordance with the sightline controls described in Section 69 of *The Regina Traffic Bylaw No. 9900* and the safety considerations described in the Geometric Design Guide for Canadian Roads issued by the Transportation Association of Canada.

- Underground utilities – minimum 2 meters (sewer, water, gas lines, secondary cables – 240 volts and telephone lines)

- Major underground utilities - 5 meters (ie: main gas lines, primary cables – 14,000 volts and concrete ducts).

- Street light cables – 1 meter

- Concrete, asphalt driveways/sidewalks – setback should be sufficient to allow for the full spread of the

tree's canopy at maturity.

- Alleys - 4.5 meters
- Buildings or structures - same as tree spacing guidelines
- Street lights - 5 meters
- Regulatory traffic signs - 5 meters
- Fire hydrants/bus stops - 2 meters
- Overhead powerlines - 10 meters offset for trees that grow to a mature height of 10 meters
  - 5 meters offset for trees that grow to a mature height of less than 10 meters.
- Adjacent private property - 5 meters except poplars which are 10 meters
- Intersection curb -10 meters
  - In the vicinity of intersections a minimum vertical clearance to the canopy of 2.4 meters is desirable to provide clear sightlines for motorists.

4.3 Trees Should Not Be Planted In The Following Areas

- So as to obstruct the stopping sightline distance for motorists approaching a traffic sign or signal.
- So as to obstruct the clear line of sight of motorists or pedestrians approaching a street intersection or exiting a curb crossing, walkway or alley on the street. (See Schedule "H" *The Regina Traffic Bylaw No. 9900).*
- Large trees should not be planted in close proximity to vehicular traffic lanes such as within boulevards less than 2.0 meters and medians less than 4.5 meters in width.
- The use of coniferous trees which block sightlines for both drivers and pedestrians should be avoided in boulevard areas.
- Under canopies or overhead signs except for certain small species.
- In loading, taxi, bus, police or handicap zones.
- In storm channel floodways and stormwater swales/ditches and on top of flood protection dikes.
- On the reading side of regulatory signs ie: stop signs, no parking signs.
- In front of doorways, entrance walkways, show windows, unless spacing requirements permit.
- So as to obstruct parking meters.

- On major arterial roadways where the boulevard is less than 6 meters wide.

5.0 PLANTING PROCEDURES

It is essential that proper planting procedures be employed to protect the safety of employees and the City's investment in the urban forest.

- The safety of employees is important to the City. Employees must follow established safety requirements to minimize the chance of injury.

- The City maintains a significant investment in time, money, materials and equipment to produce and manage Regina's urban forest.

- Healthy plant materials are critical for successful urban forest growth. Unhealthy or damaged material is not likely to grow and mature into a healthy, vigorous tree.

5.1 Safety Requirements

All workers are required to follow the safety procedures outlined in Appendix "J" Safety Requirements.

5.2 Protection

The following requirements shall be adhered to when transporting and planting trees. (See Appendix "G" Tree Protection for a more detailed description of the requirements for protecting public trees.)

- Protect all plant material from damage and breakage. **Protect all parts of the plant material from drying out from the time of digging until the time of planting.**

- Ensure that transported plant material is adequately protected from sun and wind. Trees that are moved by truck shall be moistened with a gentle spray and covered with a tarp.

- Trees shall be planted immediately after removal from the nursery. All plants not installed by the end of the shift will be watered.

5.3 Marking the Site

- Usually the Forestry Technician marks the site. However, this task may be delegated.

- Leaflets describing trees to be planted and planting information are dropped off at all houses where residential planting is to occur.

- When marking a site, consideration must be given to the following factors:
    - existing trees/species of trees

- sightline bylaw
- overhead power lines
- utility setbacks (Call all companies locations prior to planting)
- building and fence set back
- street setbacks (signage)
- street light and train utilities setbacks
- bus stop setback
- amenity setbacks (i.e. tennis courts, bench, playground)
- private property setbacks
- irrigation lines
- water and service lines

- When marking tree holes, use one or a combination of the methods listed below:

1. Spray Paint (pink)
   - convenient
   - will last 3 - 4 weeks when grass is not growing vigorously
   - does not work well if the site has no turf
   - use pink
   - use a mark such as an "X" to avoid confusion with utility locations
   - mark dot on sidewalk adjacent to the location.

2. Stakes
   - convenient
   - visible from a distance
   - ideal in loamed areas
   - subject to removal by public
   - pose a potential hazard near play toys or athletic field

5.4 Tree Staking

Staking a tree may be required for the following reasons:
- To provide anchorage for roots while they become established.
- To maintain a trunk in vertical position.
- To provide support for the trunk and crown.
- To provide protection to the trunk.

A stake is used to support a tree, not to straighten a crooked one. In most cases, tree staking is not necessary with wire basket planting. However, if the tree will not support itself, staking will be required. The following procedures should be followed when staking a tree.

- Use steel stakes instead of wood.
- Stakes must be imbedded in firm ground.
- Stakes should not be put through the root ball.
- Stakes are to be tied to the tree at one-half to two-thirds of the tree's height.
- Use a rubber hose on all guy wires to protect the tree at the point of contact.
- Three stakes are used to secure the tree (or guy wire).
- Put one stake on northwest side of the tree.

- Tree stakes can be removed after two years.

5.5 Watering

Trees shall be watered immediately after planting. Water must be applied slowly to avoid creating air pockets and eroding soil from the roots. Tree wells shall be made to hold water. They shall be no larger than the circumference of the tree spade hole and maintained for a minimum of one year regardless of whether the planting is in an irrigated or unirrigated site.

5.6 Planting Procedures

The City currently uses four procedures for planting trees.

5.6.1 Wire Basket
5.6.2 Hand Plants
5.6.3 Tree Spade
5.6.4 Contract Planting

5.6.1 Wire Basket

This procedure refers to dormant trees that are dug by tree spade or a tree baller and placed into wire baskets. Basketing of trees is done at the nursery by nursery staff or by the supplier. Wire basket trees are usually larger trees with a caliper of 50 mm to 100 mm.

Procedures

1) **Confirm** arrangements for delivery or pick-up of trees from the nursery through supervisor.

2.) **Ensure** you bring a proper invoice or requisition (completed and authorized) to the nursery to pick up trees for that day's planting.

3) **Open** prepared tree holes by tree spade or shovel as indicated on the tree planting map.

4) **Place t**he tree ball in the open hole at the same height as it was in the nursery and **PLUMB** the tree straight.

5) **Remove** the top ring of the basket and cut the second ring in three or four places. **Don't leave sharp edges.**

6) **Remove** all strapping and burlap from around the base of the tree trunk. To prevent wicking, burlap must be either cut off or peeled back below the soil surface from the top one/third of the root ball.

7) **Backfill** around tree root ball and tamp. (Root ball should be 100 mm to 150 mm below surrounding grade and add topsoil). Avoid creating air pockets.

8) **Form** the tree well.

9) **Stake** the tree if necessary (see staking detail)**.**

10) **Arrange** for watering immediately. If it is necessary to fertilize in the first year for example due to poor soil conditions, a fertilizer formulated to suit the soil condition should be used to prevent damage to the tree roots.

11) **Recheck** backfilling and add loam where necessary following waterings.

12) **Remove** or prune broken branches.

13) **Clean** up site.

14) **Record** all plantings as they are completed in the tree inventory.

5.6.2 Hand Plants

Hand plants are trees primarily dug at the nursery by nursery staff that are bare root in their dormant stage. They are usually smaller trees with a caliper of 25 mm - 50 mm.

Procedures

1) **Confirm** arrangements for delivery or pick-up of trees from the nursery through your supervisor. All bare root maintenance is to be tarped during transportation and on site when planting.

2) **Ensure** you bring a proper invoice or requisition (completed and authorized) to the nursery to pick up trees for that day's planting.

3) **Open** prepared tree holes by auger or a sharp shovel as indicated on the tree planting map. Score holes where an auger or spade is used. The tree hole must be larger than tree roots. Do not cut the tree’s roots to fit the hole.

4) **Prune** off all damaged roots and branches before planting.

5) **Spread** out roots in the hole. Holes should fit the tree roots not vice versa. If necessary, enlarge the hole to accommodate the roots. Do not bend or cut roots to fit hole.

6) **Hold** the tree trunk in a vertical position while the helper backfills the tree hole. Top soil shall be used to backfill the hole. While the tree is being backfilled, the person holding the tree shall gently shake the tree up and down to settle loam around the tree roots. Tamp the loam frequently to remove air spaces being careful not to damage the roots. Care must be taken to ensure the tree is planted at the same soil level as it was grown in the nursery. The final soil level in the tree well must be 100 mm - 150 mm below the surrounding grade.

7) **Form** the tree well (minimum 150 mm depth and 1 meter diameter).

8) **Stake** tree (steel stakes).

9) **Arrange** for watering immediately (fertilize if necessary).

10) **Recheck** backfilling and tree well, adding loam where needed.

11) **Clean** up site.

12) **Record** all plantings as they are completed.

5.6.3 Tree Spade

This method utilizes a tree spade to perform all the functions of tree planting – 1) digging up the tree, 2) digging the hole to plant it in and 3) planting the tree in the hole.

Procedure

1. **Locate** all utilities and follow proper setbacks from these utilities (see "Utility Markings").

2. **Plant** the tree. (See Section 6.0 Planting Specifications).

3. **Stake** the tree if necessary. Conifers are to be protected from rotation by staking or guying depending on the size of the tree and the context of the site.

4. **Water** the tree and fertilize if necessary.

5.6.4 Digging With A Tree Baller and Tree Spade

The following tables show the appropriate size of tree baller or tree spade to be used in relationship to the size of the tree.

Table 4: Tree Digging With A Tree Baller – Size Relationships

BALLER SIZE (CENTIMETERS)	TRUNK DIAMETER DECIDUOUS TREES (CENTIMETERS)	HEIGHT OF CONIFEROUS TREES (METERS)
61	Up to 4 cm.	Up to 1.5 m
71	4 to 6 cm	1.5 to 1.8 m
81	6 – 8 cm	1.8 to 2.4 m
91	8 - 10 cm	2.4 to 3.0 m

***** Greater than 3 meters refer to Table 5 below.

Table 5: Tree Spade Transplanting – Size Relationships

TREE SPADE SIZE (CENTIMETERS)	TRUNK DIAMETER DECIDUOUS TREES (CENTIMETERS)	HEIGHT OF CONIFEROUS TREES (METERS)
112	Up to 8 cm	Up to 2.1 m
137	8 to 11 cm	2.1 to 3.0 m
152	8 to 13 cm	2.1 to 3.7 m
213	13 to 20 cm	3.7 to 6.1 m

Note 1: Trunk diameter is measured at caliper (diameter): 15 centimeters above the ground for trees 10 centimeters in diameter or smaller; and 30 centimeters above the ground for trees with diameters greater than 10 centimeters.

Note 2: The tables shown above are guidelines to consider when matching tree size to tree spade or tree baller size. The tree size may be increased depending upon the individual species needs and the season of transplant.

5.6.5 Contract Planting

Contract planting is usually used for prearranged projects. The contractor has signed a contract with the City of Regina and is only required to do what is in the contract as per the Tree Planting Priorities, Requirements, Procedures and Specifications. In contract planting, it is necessary to thoroughly understand the relevant parts of the contract that define the duties and responsibilities of the City of Regina Community Services personnel and the contractor.

5.6.6 Key Points to Remember

1) Inspect all trees prior to planting. Inform your supervisor if you notice any of the following:

- die-back of main branches
- signs of insect and disease problems
- discoloration of bark and shrivelled branch texture
- signs of poor or damaged root system
  - wire basket not firm - loose root ball
  - tree trunk moves independently of root ball
  - root ball is very dry

2) Spade trees are staked for one year, ball and burlap trees for two years. Stakes are colour coded annually as per Forestry colours.

3) Watering personnel shall check each site within a few days of planting for:

- leaning trees
- exposed roots
- soil settling
- moisture
- stakes and ties
- string around the trunk
- broken branches

6.0 PLANTING SPECIFICATIONS

The following planting specifications are intended to provide a consistent city method for planting trees.

APPENDIX “E”

ROOT PRUNING

1.0 PURPOSE

The purpose of the Root Pruning policy is twofold:

1.1. To provide guidelines for root pruning that will protect the health of the tree; and

1.2 To reduce safety hazards and damage to property caused by aggressive tree roots.

2.0 OBJECTIVES

The objectives of the policy are as follows:

2.1 To reduce future root problems by implementing a proper planning and assessment process.

2.2 To develop root pruning practises and guidelines.

2.3 To control the growth of fast growing root systems through a pro-active root pruning program.

2.4 To provide a process for correcting existing root problems that are a threat to public safety or are causing property damage.

2.5 To train and instruct staff in the methods of root growth control.

2.6 To develop a communication link with other City departments whose operations are affected by aggressive tree roots.

2.7 To develop an inventory of public open space sites where tree roots are causing safety problems and/or property damage.

3.0 DEFINITIONS

Root Pruning - The practice of removing a portion of a tree's root system.

Root Pruner - A machine that cuts roots up to a depth of half a meter below grade level.

Tree - A woody plant with one or more stems and a minimum calliper width of 2.5 centimetres and a minimum height of 1.5 meters.

Aggressive Root - A tree root that because of its growth patterns may be a safety hazard to either the public or property.

4.0 RESPONSIBILITY

4.1 The Superintendent of Urban Forestry has the overall responsibility for implementing the root pruning guidelines.

4.2 The Arborist is responsible for coordinating the root pruning operations.

4.3 The Forestry Technician assisted by the Open Space District Foreman is responsible for inspecting and developing an inventory of public open space sites with root problems.

4.4 The Horticultural Extension Officer and The Public Affairs Department are responsible for developing and implementing a public information and communication strategy.

4.5 The Arborist and the Community Services Department Training Officer are responsible for training staff.

4.6 Approval of the Superintendent of Urban Forestry is required before any tree root over ten centimetres in diameter is pruned. Any tree root with a diameter of less than ten centimetres can be pruned with the approval of the Arborist.

4.7 Approval of the Arborist is required before any tree deemed a hazard because of problems caused by its root system can be removed or relocated by tree spade.

5.0 PROCESS

5.1 The Urban Forestry Section shall develop an inventory of existing problem sites and determine the appropriate corrective measures, if any, for each particular location.

5.2 All new planting locations shall be assessed by the appropriate Urban Forestry personnel to avoid creating future root problems for the site. In order to prevent tree root problems created by using inappropriate trees for the site, The Tree Species Selection Guidelines and The Tree Spacing and Setback Requirements described in Appendix “D” Tree Planting Priorities, Requirements, Procedures and Specifications shall be followed by all persons planting trees on public land.

5.3 Applicants applying for a building permit whose construction activities will require a public tree to be root pruned shall be advised to contact the Superintendent of Urban Forestry.

5.4 All new construction projects shall be jointly assessed by the Superintendent of Urban Forestry and the contractor to determine if there is a need to do any root pruning before work commences. The contractor is required to notify The Urban Forestry Section as far in advance as is possible so that any root pruning can be completed before the work commences.

5.5 A schedule of root pruning projects shall be developed annually prior to the work season by the Forestry Technician.

5.6 The Superintendent of Urban Forestry together with either the Technician or Arborist shall conduct an on-site assessment of the root pruning work required.

5.7 The Arborist shall schedule a crew to do the root pruning required. The work shall be done in accordance with the root pruning guidelines described in Section 7.0.

5.8 The Forestry Technician is responsible for conducting ongoing site assessments while the project is occurring. This is to ensure that no additional roots are cut by the contractor without the approval of The Urban Forestry Section.

5.9 In cases where a tree on public property must be root pruned to accommodate a private development, the cost of the root pruning shall be billed to the proponent of the project.

5.10 Contractors or private property owners performing unauthorized root pruning on public trees resulting in instability to the tree or its subsequent demise shall be billed for any expenses incurred in remedying the situation or replacing the tree.

5.11 An assessment of all affected trees shall be conducted within two years of the project completion to determine the effectiveness of the root pruning and if any additional work will be required.

5.12 The Forestry Technician will determine any follow-up work needed.

6.0 WORK ASSIGNMENTS

6.1 The Superintendent of Urban Forestry shall contact the various City departments involved with infrastructure construction projects during the off season to determine well in advance sites that will require root pruning.

6.2 The Forestry Technician shall conduct routine site inspections during and after the work is done. The Forestry Technician shall also keep a computerized record of project sites and the root work done at each site along with any required follow up maintenance. All sites

requiring root pruning shall be forwarded to the Forestry Arborist for scheduling.

6.3 The Arborist shall conduct training sessions for forestry personnel in the use of root pruning equipment and methods of root control. The Arborist shall also provide on-site supervision of the root pruning work being undertaken by Forestry personnel.

6.4 The Forestry Technician shall notify the contractor once all preliminary root work is completed.

7.0 ROOT PRUNING GUIDELINES

Root pruning is done:

1) to prevent serious damage to a tree's root system by construction;

2) to alleviate root invasion to drains and sewers;

3) to eliminate a safety hazard; and

4) to alleviate or prevent damage to public property.

Root pruning should be employed as a last resort when viable alternatives to severing the roots cannot be found. The following guidelines shall be employed for root pruning.

7.1 All root pruning work associated with City trees shall be done by Urban Forestry Section staff.

7.2 All root pruning requires the approval of the Superintendent of Urban Forestry.

7.3 Root pruning shall be done when below ground construction work is occurring within five meters of a city tree. The root pruning will be done to a depth of half a meter below ground. The following root pruning table shall act as a guide for the distance to prune away from the base of a tree.

TRUNK DIAMETER	DISTANCE FROM TREE BASE
0 – 10 centimetres	1 meter
11 – 15 centimetres	2 meters
16 – 20 centimetres	2.5 meters
21 – 25 centimetres	3.0 meters
26 – 30 centimetres	3.5 meters

31 – 35 centimetres	4.0 meters
36 – 40 centimetres	4.5meters
41 – 45 centimetres	5.0 meters
46 – 50 centimetres	5.5 meters

7.4 All roots shall be cut clean with a root pruner, a sharp saw and/or hand pruners.

7.5 No more than one third of a tree's root system shall be removed without the approval of the Superintendent of Urban Forestry.

7.6 Roots must not be removed from more than one side of the tree in any given year.

7.7 All excavation holes are to be covered with a wet tarp and kept moist for the duration of the construction project to protect the roots from dessication.

7.8 Root barriers shall be used in association with root problems adjacent to concrete and asphalt walkways.

7.9 Should the Superintendent of Urban Forestry determine that root pruning will not alleviate the problem then the tree may be rated as a hazard tree as specified in *Urban Forestry Bylaw #9607* and subsequently removed in accordance with that Bylaw.

7.10 Root control barriers may be used in those sites deemed appropriate.

7.11 Severe root pruning of American Elm trees is not recommended as they are intolerant to major root loss.

7.12 All trees that have been root pruned shall receive deadwood removal in the year after the root pruning occurred.

7.13 Top soil shall be used to backfill the excavation area.

7.14 Root pruning of surface roots shall only occur if the level of the surrounding surface cannot be raised.

7.15 No root pruning will occur within two meters of a tree without the approval of the Superintendent of Urban Forestry. The installation of any utilities within the two meter zone shall be by auguring a trench under the tree.

TREE REMOVAL

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1.0 PURPOSE

The purpose of the Tree Removal policy is to establish the criteria, processes and authorities for removing public trees.

2.0 OBJECTIVES

The objectives of the policy are as follows:

2.1 To create a safe urban forest environment by removing trees that pose a threat to persons or property.

2.2 To assist in maintaining the health of the urban forest by managing tree diseases and pests through the removal of hazard, infected or nuisance trees.

2.3 To accommodate civic or private development projects by removing trees that impede the development.

2.4 To facilitate public maintenance by removing trees that impede on-going access or interfere with maintenance work.

2.5 To protect motorists and pedestrians by removing trees that obstruct sight-lines.

2.6 To remove trees that have been severely damaged by a storm, fire or other natural or man inflicted causes that have the potential to become dangerous trees.

3.0 DEFINITIONS

Tree - means a woody plant with one or more stems and a minimum calliper width of 2.5 centimetres and a minimum height of 1.5 meters.

Director - means the Director of Community Services of the City of Regina and anyone acting or authorized by the Director to act in his/her behalf.

Officer - means a person appointed under Section 13 (1) of *The Pest Control Act* by City Council for the purpose of enforcing *The Pest Control Act*.

Pest - means any animal, insect pest or tree disease so declared under Section 3 of *The Pest Control Act* to be a pest.

Owner - means any person who owns, occupies or controls land in the City.

Public Land - means any real property owned or controlled by the City of Regina including, but without limiting the generality of the foregoing, any real property the City of Regina is granted access to under a tree planting easement.

Relocation – means a tree that is sufficiently small enough that it can be dug up by a tree spade or by hand and moved to another site for planting.

Removal – means a tree that because of its size or other considerations cannot be relocated to another site and therefore must be cut down and disposed of.

Hazard Tree - means any elm tree that:

(i) in the opinion of an officer within the meaning of *The Pest Control Act* for the purpose of enforcing the provisions of the Act, has deteriorated to the point that it is capable of supporting elm bark beetle habitation and breeding making that elm tree a hazard that may promote the spread of Dutch elm disease; and

(ii) has been identified to the owner as a hazard tree, by

a) written notice sent by regular mail to the owner by an officer; and

b) a clear marking placed on the elm tree by an officer that distinguishes the elm tree from other elm trees that are not hazard trees or infected trees.

Infected Tree - means any elm tree that:

(i) has been determined by an officer to be infected with Dutch elm disease; and

(ii) has been identified to the owner as an infected elm tree by:

a) written notice sent by regular mail to the owner by an officer; and

b) a clear marking placed on the elm tree by an officer that distinguishes the elm tree from other elm trees that are not infected trees or hazard trees;

Nuisance Tree - means any tree that:

(i) is infected with an insect pest or tree disease;

(ii) the particular tree disease or insect pest has the potential to spread and infect the urban forest; and

(iii) the problem cannot be corrected by pruning or other treatments and removal of the tree is deemed necessary by the Superintendent of Urban Forestry.

Dangerous Tree - means any tree that:

(i) is in danger of falling, breaking, uprooting or collapsing; and

(ii) in the opinion of the Director of Community Services is likely to cause injury to

persons or damage to property.

Interfering Tree - means any tree growing in a location that:

(i) impedes access or interferes with public maintenance work; or

(ii) is causing or has the potential to cause damage to public infrastructure; and

(iii) in the opinion of the Director of Community Services the problem can only be cost-effectively corrected by removing the tree.

Obstructing Tree - means any tree that:

(i) obstructs a clear line of sight for motorists or pedestrians approaching a street intersection or exiting curb-crossing, walkway or alley onto the street; and

(ii) in the opinion of the Director of Community Services the problem cannot be corrected by pruning and the tree must be removed.

Sight-line triangles are measured from:

- The intersection of curb line projections to 10.0 meters along those lines.
- The intersection of back of the walk and property line projections to 4.61 meters

Structurally Damaged Tree - means any tree that:

(i) has been severely damaged by a storm, fire or other natural or man inflicted cause;

(ii) while the tree does not pose an immediate threat to persons or property, it has the potential to become a dangerous tree; and

(iii) in the opinion of the Director of Community Services there is no possibility of repairing the tree and removal is deemed necessary.

4.0 STATUTORY AUTHORITY

The following identifies the statutory authority for the various types of tree removals:

Type of Removal	Statutory Authority
Hazard Tree	*The Pest Control Act* Section 2 (d)
Infected Tree	*The Pest Control Act* Section 2 (e)
Nuisance Tree	*The Urban Municipality Act* Section 127
Dangerous Tree	*Forestry Bylaw No. 9607*
Interfering Tree	*Traffic Bylaw No. 9900* Section 92 *Forestry Bylaw No. 9607*

Obstructing Tree	*Traffic Bylaw No.9900* Section 69 *Forestry Bylaw No. 9607*
Structurally Damaged Tree	*Forestry Bylaw No. 9607*

5.0 RESPONSIBILITY

5.1 The Director of Municipal Engineering and anyone authorized to act on his behalf may authorize the removal of an obstructing or interfering tree on any public highway, boulevard or sidewalk under *Traffic Bylaw No. 9900.*

5.2 The Director of Community Services may authorize the removal of a nuisance, dangerous or interfering tree that is not already covered under *Traffic Bylaw No.9900* on public or private land. The Director may also authorize the removal of a structurally damaged tree on public land.

5.3 The Director of Community Services may authorize the removal or relocation of trees in the management of the City nursery.

5.4 The Superintendent of Urban Forestry or the Arborist is responsible for determining if a tree on public or private land is a dangerous or obstructing tree. The Superintendent of Urban Forestry is also responsible for determining if a tree on public land is structurally damaged.

5.5 The Supervisor of Integrated Pest Management is responsible for determining if a tree on public or private land is a hazard, infected or a nuisance tree.

5.6 A Pest Control Officer may order the removal of an infected or hazard tree on public or private land.

5.7 The Parks and Recreation Board is responsible for hearing appeals from private applicants whose request for removing a tree on public land has been denied. Only those cases where there is a dispute between the City and the private landowner or in cases where the removal of a tree or trees could impact the surrounding residents should be forwarded to the Parks and Recreation Board for their consideration. Trees which may be removed by a tree spade and relocated to another area for planting should be considered a relocation and not a removal.

5.8 Maintenance and Open Space Services staff are responsible for notifying The Urban Forestry Section of any trees requiring removal in the areas under their jurisdiction.

5.9 The Arborist is responsible for training all staff involved in tree removals.

6.0 TREE REMOVAL CRITERIA

The following criteria are intended to prevent the indiscriminate removal of public trees.

Public trees may be removed only when one or more of the following criteria apply:

1) The tree is infected with an insect pest or tree disease that could cause an epidemic and removal is the recommended action to prevent transmission.

2) The tree is dead or suffering from major decay which cannot be treated successfully and is therefore susceptible to DED or poses a threat to public safety or property.

3) The tree poses a threat to persons or property which cannot be corrected by pruning, transplanting or other treatments.

4) Removal of the tree is required to accommodate private development or civic projects such as sewers, roadways, utilities, buildings or driveways and there is no cost-effective alternative to save the tree.

5) Removal of the tree is required to mitigate conflicts such as the obstruction of motorist or pedestrian sight-lines; roof damage to buildings; sidewalks or underground water or utility lines; or interference with overhead utility lines or public maintenance work; and there is no cost-effective alternative to save the tree.

6) The tree has been severely damaged in a storm, fire or other natural or man inflicted cause, and there is no possibility of repairing it.

7) The tree interferes with the growth and development of a more desirable tree.

7.0 THE TREE REMOVAL PROCESS

7.1 Trees on Public Land

7.1.1 Hazard, Infected and Nuisance Trees

- The Integrated Pest Management Section will determine whether a tree is a hazard, infected or a nuisance tree.

- If the tree cannot be successfully treated by other alternatives and removal is necessary to prevent transmission, The Urban Forestry Section will remove the tree.

- Hazard, infected or nuisance trees on public land should be removed as soon as possible.

- Written notification stating the reasons and authority for the removal will be provided to the homeowner whose property is adjacent to the tree.

7.1.2 Dangerous, Interfering, Obstructing and Structurally Damaged Trees

- The Director of Community Services may authorize the removal of a tree from public land where, in the Director's opinion, the tree is a dangerous, interfering (not covered under *Traffic Bylaw No. 9900)* or a structurally damaged tree.

- The Director of Municipal Engineering may authorize the removal of an obstructing tree or interfering tree on any public highway, boulevard or sidewalk.

- All dangerous, interfering, obstructing or structurally damaged trees considered for removal shall be referred to The Urban Forestry Section for inspection. Each tree shall be assessed by the Arborist or Forestry Technician in order to determine if it meets the tree removal criteria outlined in section 6.0 of this policy. An evaluation form shall be provided for this purpose which identifies the reason and the authority for the removal.

- A copy of the completed evaluation form and action proposed shall be left with the property owner whose house is adjacent to the tree.

- Those trees that meet the tree removal criteria shall be scheduled for removal. Those that do not shall be referred to the Superintendent of Urban Forestry for remedial action.

- Dangerous trees shall be removed as soon as possible when they are reported. While the expectation is that staff would respond to a dangerous tree as soon as they become aware of it, this may not always be possible after normal work hours or on week-ends. Interfering trees may be removed as they are encountered. Obstructing trees shall be removed within three days. Structurally damaged trees shall be removed within two months. All trees that are removed shall have a posting that states the reason for the removal, the section of the bylaw or act under which the tree was or is being removed, and the phone number for City Central in the event the residents have questions related to the removal.

7.1.3 Removals to Accommodate Civic or Private Development Requests

- In those cases where the City receives a request for the removal of a tree on public land that is not a hazard, infected or nuisance tree, the Superintendent of Urban Forestry will conduct a site assessment to determine if removal is the preferred option.

- The following mechanisms for reporting to Parks and Recreation Board shall be adopted:

1) Civic Development Projects

   A preliminary report shall be submitted to Parks and Recreation Board each year prior to the beginning of construction season. The report shall describe the specific projects, the approximate number of trees to be removed or relocated and the site(s)

to which the trees may be relocated. Any civic projects that arise unexpectedly after the preliminary report has been submitted shall be presented in an interim report to Parks and Recreation Board for their consideration. At the end of the construction season a reconciliation report shall be provided to Parks and Recreation Board providing accurate numbers on the trees actually removed or relocated and the sites to which they were relocated.

2) Private Development Projects

Requests for tree removals or relocations to accommodate private development projects such as garages or driveways will continue to be considered by Parks and Recreation Board on an individual basis. An information report shall be provided to Parks and Recreation Board at the end of construction season describing the number of trees relocated to accommodate private development projects and where they were relocated.

The advantages of these reporting mechanisms are as follows:

1) Costly delays in civic department projects will be avoided.

2) Public trees that might otherwise be lost will be saved by relocating them during the appropriate transplanting periods.

3) While the Administration will still be accountable to Parks and Recreation Board for reporting tree removals and relocations, the number of reports will be significantly reduced and the information contained in the reports at the end of construction season will be more accurate.

The Parks and Recreation Board shall continue to exercise the option of charging the person requesting the removal of a public tree, the costs of removing the tree and either:

a) the cost of a replacement tree having a caliper width of seven and one-half (7.5) centimeters, taken at a height of one and one-half (1.5) metres; or

b) the inventory cost of the tree being removed, as determined by the Director in accordance with the standards as established by the International Society of Arboriculture, from time to time;

as determined by the Parks and Recreation Board, at their sole discretion. In cases where a significant number of trees are impacted or trees of significant value ($2,500 or more) are affected, the Board shall consider charging the inventory cost of the trees or consider the option of having the applicant pay the cost of two or more replacement trees for each tree of significant value to be removed.

7.1.4 Emergency Situations

- In cases where a gas leak poses an immediate threat to public safety as determined by the utility company and the corrective work required may impact public trees, the utility company shall notify the Superintendent of Urban Forestry. Depending upon the urgency of the situation, the notification may occur before or after the work commences.

- In situations where Public Works or a utility company must respond quickly such as a sewer, water or gas line break and there is not time to arrange a site visit prior to commencing work, they should phone the Superintendent of Urban Forestry or designate for approval if their activities are likely to affect public trees. The Superintendent of Urban Forestry will follow up their phone conversation with a letter confirming their agreement.

7.2 Trees On Private Land

7.2.1 Hazard, Infected and Nuisance Trees

- Pest Control Officers currently monitor elm trees for Dutch elm disease on both public and private land. Urban Forestry personnel also monitor street trees including boulevard trees in the course of their regular maintenance activities. As a consequence, Pest Control Officers and Urban Forestry personnel may come across nuisance trees or trees other than elm trees that are infected on private land. The intent of this policy is not to actively seek out nuisance trees on private land, but rather when City staff encounter them during the course of their regular duties, to set out procedures for notifying homeowners so that they can take corrective action and prevent a possible infestation in the urban forest.

- Where Urban Forestry personnel suspect a tree is a hazard, infected or a nuisance, they shall make a referral to the Supervisor of Integrated Pest Management for an inspection.

- Where a Pest Control Officer determines that a privately owned tree is a hazard, infected or a nuisance tree, they shall first confer with the owner regarding the method of destruction or control and attempt to enter into a written agreement setting out the arrangements made.

- If agreement cannot be reached, or if the officer goes to the residence on two different days and fails to make contact with the owner, they may issue an order under subsection 19 a (1) of *The Pest Control Act.* The order must:
    1) describe the land or premises with respect to which the order is issued;
    2) describe the disease or pest which the order is intended to control;
    3) describe the action required to comply with the order;
    4) specify the time within which the order must be complied with.
    5) clearly mark the tree to distinguish it from other trees on the property.

- Such an order is properly served if left at the residence with a person 21 years of age or more or if sent by registered mail to the last known address of the owner. The person must be allowed five days from the date of service or mailing to commence the work.

- Where the person resides outside Saskatchewan, the order must be sent by registered mail by the Clerk's Office to the persons last known address and allowed ten days from the date of mailing to commence the work.

- If the owner fails to complete the work within the time specified in the order or to carry out the work to the satisfaction of the officer, the officer may do whatever is necessary to carry out the work required. Within thirty days of incurring the expenses, the officer must submit to the Clerk a certified statement of expenses together with a description of the land. The municipality must pay the expenses and may recover them from the owner in the same manner as rates and taxes. The Clerk must then send a notice by mail to the owner setting out the expenses together with a description of the land advising that if the owner does not pay the amount by December 31 of the same year, it shall be added to their taxes of the property.

7.2.2 Dangerous and Interfering Trees

- Where in the course of their regular duties Urban Forestry or Integrated Pest Management staff encounter a tree on private land that poses a danger to public safety or public property, they shall report the tree to the Superintendent of Urban Forestry. The Director of Community Services shall take steps to eliminate the danger. Written notification stating: 1) the reason for the removal; 2) the statutory authority; and 3) the time specified for the removal shall be provided to the owner of the tree. If the owner fails to comply within 48 hours, the Director of Community Services may have the tree removed and the cost added to the taxes of the property. Three estimates for removing the tree will be obtained from qualified tree service companies with the lowest bid being successful.

  It should be noted that the City's interest is in protecting public safety and public property. If during the normal course of their duties, City staff encounter a dangerous tree on private land that poses a danger to the homeowner or to private property, they will notify the homeowner of the threat. In this case, it is the responsibility of the homeowner to take corrective action to eliminate the danger.

- Where a private tree interferes with public maintenance work, the Director of Community Services may order the owner to remove the tree within seven days. Written notification stating: 1) the reason for the removal; 2) the statutory authority; and 3) the time specified for removal shall be provided to the owner of the tree. If the owner fails to comply within seven days, the Director of Community Services may have the tree removed and the cost added to the taxes of the property. Three estimates for removing the tree will be obtained from qualified tree service companies with the lowest bid being successful.

The following table illustrates the tree removal process.

Table 1: THE TREE REMOVAL PROCESS

Criteria	**Dangerous, Interfering, Obstructing and Structurally Damaged Trees**	**Dangerous and Interfering Trees**	**Removals to Accommodate Development**	**Hazard, I**
	Public Land	**Private Land**	**Public Land**	**Public Land**
1. Statutory Authority	Forestry Bylaw #9607 Traffic Bylaw #9900	Forestry Bylaw # 9607	Forestry Bylaw #9607	The Pest Control The Urban Municip Act
2. Approval Authority	Director of Community Services Director of Municipal Engineering	Director of Community Services	Parks & Recreation Board	Pest Control Officer Director of Commun Services
3. Enforcement	City	City	City	City
4. Costs Paid By	City	Homeowner	Petitioner	City
5. Process Initiated By	City	City/Homeowner	Private or Civic Contractor	City
6. Work Done By	City	City or Homeowner	City	City
7. Disposal	City	City or Homeowner	City	City
8. Removal	Dangerous trees shall be removed within 48 hours; interfering trees as encountered; obstructing trees within 3 days; structurally damaged trees within 2 months.	Dangerous trees shall be removed within 48 hours; interfering trees within 7 days.	Once approval is received from Parks and Recreation Board	As soon as possi
9 Penalty	N/A	Forestry Bylaw #9607	Forestry Bylaw #9607	N/A
10. Follow Up	Stump removal/replanting	Inspection to confirm completion	Stump removal/replanting	Stump removal/repla

7.2.3 Enforcement

In cases involving infected or nuisance trees on private land the Pest Control Officer will make the initial contact with the homeowner and attempt to reach a voluntary agreement to have the homeowner remove the tree or failing that will issue an order under *The Pest Control Act* to have the tree removed. In cases of dangerous or obstructing trees on private land Urban Forestry personnel will make the initial contact. In both cases if the homeowner fails to undertake the necessary work within the specified time or to complete the work to the satisfaction of the Pest Control Officer or the Urban Forestry personnel, the matter will be referred to Bylaw Enforcement for follow-up and possible legal action. The final wording of the correspondence to the homeowner shall be reviewed by the Legal Department

7.3 Penalty Provision

Any person who contravenes any provision of *Forestry Bylaw No.9607* is guilty of an offence punishable on summary conviction by a fine in an amount not exceeding:

(a) Two Thousand ($2,000.00) Dollars in the case of an individual;

(b) Five Thousand ($5,000.00) Dollars in the case of a corporation;

or in default of payment by an individual, by imprisonment for a term of not more than ninety days.

8.0 COMMUNICATION

8.1 The Arborist is responsible for notifying the resident of a hazardous tree removal occurring on city property adjacent to their residence.

8.2 The Arborist shall notify City Central of any tree removals taking place.

8.3 The Horticultural Extension Officer and the Public Affairs Department are responsible for developing public information packages related to tree removal.

8.4 In the event Integrated Pest Management discovers a tree that meets the tree removal criteria but is not diseased or infected, they shall refer the tree to Urban Forestry Section for follow up action.

8.5 The Superintendent of Urban Forestry shall review all development permits that may impact the urban forest.

8.6 The Forestry Technician shall inspect the sites and the relationship of the trees to the proposed construction on the property.

8.7 The Forestry Technician shall inspect the sites and the relationships of the trees to the

proposed construction on the property.

8.8 Prior to the construction season, the Urban Forestry Section, Public Works and Municipal Engineering Departments shall meet to identify any projects that may involve tree removals.

TREE PROTECTION

1.0 PURPOSE

The purpose of the Tree Protection policy is twofold:

1.1 To prevent or minimize damage to public trees during construction work, maintenance activities and snow removal operations; and

1.2 To protect trees while they are being transported from one site to another.

2.0 OBJECTIVES

The objectives of the policy are as follows:

2.1 To provide efficient and sensitive construction management that will minimize damage to trees from construction activities.

2.2 To provide a process for determining protective requirements for trees on construction sites.

2.3 To provide guidelines for protecting trees in and around construction sites.

2.4 To protect the public from possible injury from trees located on construction sites.

2.5 To provide guidelines for protecting trees during maintenance work.

2.6 To train City staff in the proper maintenance practices around trees.

2.7 To provide guidelines for protecting trees during snow removal operations.

2.8 To provide guidelines for protecting trees while they are being transported from one site to another.

3.0 DEFINITIONS

Tree - A woody plant with one or more stems and a minimum calliper width of 2.5 centimetres and a minimum height of 1.5 meters.

Public Land - Any real property owned or controlled by the City of Regina including, but without limiting the generality of the foregoing, any real property the City of Regina is granted access to under a tree planting easement.

Public Tree - Any tree located on public land including parks, boulevards, medians, bufferstrips and naturalized areas.

Private Tree - Any tree located on private property.

Contractor - Includes any private contracting firm or City department.

Calliper – The diameter of the tree trunk at a height of 1.37 meters from the ground. Calliper must be the determining measurement when the calliper exceeds 40 mm. It must be measured no less than 15 cms above grade level for trees with a calliper of up to 100 mm. Trees 100 mm and larger calliper are to be measured 30 cms above ground.

Root Pruner - A specialized mechanical device that cuts roots to a depth of 0.5 meters below grade.

4.0 RESPONSIBILITY

4.1 The Superintendent of Urban Forestry is responsible for ensuring the application of the Tree Protection Policy .

4.2 The Arborist is responsible for coordinating field operations involving City staff.

4.3 The Forestry Technician is responsible for conducting preliminary and follow-up site inspections.

4.4 The Integrated Pest Management Section is responsible for monitoring the urban forest for pests and diseases and for implementing programs to control their impact.

4.5 The Bylaw Enforcement Division is responsible for enforcing the related provisions of *Forestry Bylaw #9607*.

4.6 The approval of the Superintendent of Urban Forestry is required before any exposed root over ten centimetres is cut or removed. Roots smaller than ten centimetres may be removed with the approval of the Forestry Technician or Arborist.

4.7 The Superintendent of Urban Forestry or the Arborist shall approve the removal of any hazardous tree within a construction zone. Tree removals must follow the process outlined in the Tree Removal Policy.

4.8 The approval of the Parks and Recreation Board is required before any live tree not deemed a hazard is removed.

5.0 MANAGING CONSTRUCTION IMPACT ON PUBLIC TREES

When land is developed the existing trees on the site may be affected. With early planning and some precautions, many trees can be saved with little effort or expense. There are three types of construction projects that could impact trees on public land: 1) civic projects conducted on public land; 2) private projects that impact trees on public land; and 3) provincial or federal projects that impact trees on public land. Every attempt should be made to preserve and protect trees on public land during construction. Trees should only be removed to accommodate development when no cost-effective alternative is available. The

City's expectations for tree preservation should be clearly defined to developers and become an integral part of the project planning process. The following process is to be followed for construction projects working near trees on public land.

5.1 Pre-Construction Planning and Site Evaluation

5.1.1 The Urban Forestry Section, Municipal Engineering and Public Works Departments shall meet in the off season (November - February) to discuss the one to three year schedule for City projects. This meeting will determine which sites require advance work (pruning, tree removal or root pruning) prior to the commencement of construction work.

5.1.2 During the planning stage of a proposed development Public Works, Municipal Engineering or the utility company undertaking the project shall contact the Superintendent of Urban Forestry to arrange an on-site evaluation of those sites where public trees could be impacted. (See Appendix "F" Tree Removal for the procedures to follow for tree removals.)

5.1.3 Applicants applying for a building permit whose construction activities will impact public trees shall be advised to contact The Urban Forestry Section for a copy of the Tree Protection Requirements described in section 6.0. It is the responsibility of applicants to notify The Urban Forestry Section in advance of any site where construction will occur closer than five meters to a public tree.

5.1.4 All preliminary and final construction plans for City-contracted projects and permit requests for utility or private construction projects in the public rights-of-way that may impact public trees shall be routed through The Urban Forestry Section for review.

The developer shall provide a Tree Preservation Plan for the site that incorporates the Requirements for Construction Near Trees on Public Land outlined in section 6.1.5. The Tree Preservation Plan shall be approved by The Urban Forestry Section prior to issuing the building permit to ensure the protection of the trees during construction. The plan shall:

1) Show the location of all existing trees on the site.
2) Determine the viable alternatives for preserving the existing trees.
3) Determine the tree protection requirements for the site.
4) Determine any possible conflicts especially those requiring tree removal, relocation or new plantings on boulevards.
5) Identify the access roadway to the site.
6) Determine if clearance pruning is required prior to the commencement of construction work.

5.1.5 The Urban Forestry Section shall conduct a site inspection with the developer to review the proposed Tree Preservation Plan for the project. Based on The Urban Forestry Section's assessment of the site, the Tree Preservation Plan may be sent back to the applicant for revision.

5.1.6 The revised Tree Preservation Plan shall be reviewed by the Municipal Engineering Department and the Urban Forestry Section for final sign-off.

5.1.7 The Tree Preservation Plan should not be approved until the building permit has been approved. Then it should be forwarded to The Building Division for inclusion with the building permit when it is issued.

5.1.7 Sites requiring pruning, tree removal or root pruning shall be forwarded to the Arborist for scheduling.

5.2 Construction Activities

5.2.1 The Urban Forestry Section shall verify installation of the protective materials as per the Tree Preservation Plan before the Building Division releases the building permit to the applicant.

5.2.2 The Urban Forestry Section shall conduct periodic inspections of the construction site to ensure compliance with the Requirements for Construction Near Trees on Public Land. In cases where the developer has failed to comply with the requirements, Urban Forestry Section shall request the developer to correct the situation. If the developer fails to comply within a reasonable period as determined by The Urban Forestry Section, a referral shall be made to The Bylaw Enforcement Division to enforce compliance.

5.2.3 The contractor shall contact The Urban Forestry Section within 24 hours of damage occurring to public trees and may be liable for these damages as stated in *Forestry Bylaw #9607*. Any repair work will be done by Urban Forestry staff.

5.2.4 In those cases where the Requirements for Construction Near Trees on Public Land or *Forestry Bylaw #9607* are contravened, Bylaw Enforcement Division shall be contacted for follow- up action.

5.3 Post Construction, Evaluation and Remediation

5.3.1 The Urban Forestry Section shall conduct a final site inspection when the project is completed. The inspection shall:

1) Determine the corrective work required to trees damaged during construction.
2) List the damaged trees and notify the responsible parties.
3) Determine the costs to remedy the damaged trees and bill accordingly. The costs may include:
   i) Personnel, equipment and material costs for remedial action.
   ii) The value lost when trees suffer excessive root cambium, and/or crown loss.
   (iii) The assessed value of trees that were entirely lost or destroyed.
   (iv) The cost of replacement plantings.
   (v) The cost of any required follow-up work.

A copy of the inspection results shall be forwarded to the Building Division.

5.3.2 The Urban Forestry Section and the Building Division sign-off after final inspection verifying that all work has been completed according to plan.

5.4 Construction on Private Land

In those cases where the proposed construction is on private property but may impact a nearby tree on public land, the owner should contact The Urban Forestry Section to conduct a site inspection. The Urban Forestry Section may ask the owner to enter into a voluntary agreement to protect the tree and/or allow Urban Forestry Section to perform any branch or root pruning that may be required.

6.0 TREE PROTECTION REQUIREMENTS

The following tree protection requirements are to be considered the normal practice for protecting trees on public land. The Superintendent of Urban Forestry may consider alternatives to or relaxations of these requirements when the developer, contractor or their agents provide a written submission outlining the reasons for waiving the requirements.

6.1 Construction Near Trees on Public Land

6.1.1 Authority

Protection of trees during construction is authorized by *Forestry Bylaw #9607*.

6.1.2 Application

- The following procedures apply to both municipal construction on City property and private construction activities that may impact public trees.

- The following procedures apply to any construction occurring within five meters of a public tree.

6.1.3 Responsibilities

- The contractor or applicant is responsible for contacting The Urban Forestry Section to arrange a site inspection prior to commencing work in order to determine all protection and follow-up maintenance requirements.

- The contractor is responsible for providing the necessary tree protection based on the assessment of the Superintendent of Urban Forestry or designate.

- For approval to remove or relocate a tree refer to the Tree Removal Procedures.

- The contractor is responsible for notifying The Urban Forestry Section within 24 hours of any damage occurring to City owned trees.

- The Urban Forestry Section or The Bylaw Enforcement Division are responsible for conducting periodic inspections of all construction sites.

6.1.4 Costs Incurred

- Any costs incurred for protecting, repairing, removing or replacing public trees as a result of construction activities shall be the responsibility of the contractor or applicant.

- Any damage to public trees caused by the contractor for which the costs are not covered may be subject to prosecution under Section 3 subsection (b) of *Forestry Bylaw #9607*.

6.1.5 Requirements for Construction Near Trees on Public Land

The following requirements are to be followed during construction activities near trees on public land. The contractor will be held financially responsible for any damage that occurs to public trees as a result of not applying these guidelines.

6.1.5.1 Protective Lane

- No one shall construct a walkway, driveway or paving within a distance of 0.5 meters from the base of any tree for every 10 centimetres of diameter of the trunk at a point 100 centimetres off the ground.

6.1.5.2 Excavation and Trenching

- The cutting of roots by a trencher, root pruner or saw to a depth of 0.5 meters shall be done prior to the commencement of any excavation when the work is to occur within two meters of the trunk. (See Appendix "E" Root Pruning – Table 1: Pruning Distance From Tree Base)

- When work is to occur more than 2 meters away from the trunk, repair to any damaged roots shall occur once the excavation is complete.

- Any roots that must be exposed for a period of time shall be covered by a wet tarp to prevent drying and periodically watered to be kept moist.

- Wherever possible the contractor shall core instead of trenching when working within 2 meters of the tree trunk.

- All open holes shall be backfilled as soon as possible.

6.1.5.3 Tree Protection Zone

In order to protect the roots, trunks and branches of trees during construction activities protective barricades shall be erected according to the International Society of Arboriculture standards as follows:

Diameter of Tree Trunk	Protection Zone (minimum distance in meters from trunk)
Up to 100 mm	1.5m
100mm - 250mm	2.4m
250mm - 375mm	3.0m
375mm - 500mm	3.6m
Over - 500mm	4.5m

Within this protective zone:

i no equipment shall be operated;

ii no building material stored;

iii no temporary buildings or work trailers placed;

iv no fuels or chemicals stored or dumped;

v no soil piled; and

vi no grading or excavation shall be allowed.

6.1.5.4 Soil Compaction

Surface soils are often compacted on construction sites as a result of heavy equipment moving over the area. Compacted soils affect tree growth by restricting root activity and development. The resultant poor drainage and aeration increases the tree's susceptibility to root diseases.

If extensive soil compaction has occurred as a result of construction, as determined by the Superintendent of Forestry or designate, the contractor will be responsible for aerating the area once construction is completed and for fertilizing it the following year.

6.1.5.5 Hoarding Requirements

In those developments where trees are situated within 5 meters of the project site or where in the opinion of the Superintendent of Urban Forestry or designate the trees could be adversely affected by the development, the contractor shall erect hoardings in compliance with the following guidelines.

- When working within 1 meter of the tree trunk, protection shall be provided by pounding 4" x 4" x 4' wooden posts into the ground around the tree at one foot intervals and held together by strapping.

- When working within 1 to 3 meters of a tree trunk, protection shall be provided by six foot sheets of half inch plywood held erect by steel posts at the furthest distance away from the tree possible.

- When working within 3 to 5 meters from the trunk, snow fencing shall be erected at the farthest point away from the tree possible.

- The contractor is responsible for all costs incurred in erecting, maintaining and removing such hoardings and for the regular watering and maintenance of trees while so enclosed. All boulevard repair or reconstruction and tree repair and replacement shall be at the contractor's expense.

6.1.5.6 Grade Changes

Grade changes are frequently necessary when building sites are being prepared for construction. However, any change in grade around existing trees can have a marked effect on their survival and future growth. Unless corrective action is taken immediately, lowering the grade exposes the existing root system to the air and reduces the supply of nutrients and moisture available to the roots. Raising the grade around a tree can have an even greater adverse effect. Air circulation is cut off and moisture and nutrients cannot reach the tree roots. In some cases drainage is impaired and the tree drowns. Generally, the original grade can be increased 10 to 15 centimetres a year without damaging the tree.

When changing the grade around a tree, careful consideration shall be given to methods of preventing injury to the tree. Preventing damage is always cheaper and more effective than attempting to correct the situation after the damage has been done. Where grade changes are necessary around trees, the following measures shall be followed:

- All grade changes that will impact public trees must be approved by the Superintendent of Forestry or designate.

- Any increases or decreases in the grade shall be gradual.

- Reduction in grade levels up to, but no greater than, 75 millimeters can be tolerated without significant tree root damage. Any grade reductions greater than 75 millimeters shall be accomplished by terracing around the tree. The first terrace shall be made as far away from the tree as possible and no closer to the tree than the dripline or edge of the tree crown. The terrace should be supported by a retaining wall.

- Any grade increases of 2 - 10 centimetres must be aerified by drilling 4 centimeter holes to a depth of 10 centimetres deeper than the fill over the entire fill area. The holes are to be filled with 20 millimetres weeping tile stone and covered with soil filter fabric.

- Any grade increases greater than 10 centimetres require the installation of a retaining wall to maintain the soil level to the dripline.

- If the grade is to be increased a total of more than 45 centimetres, a tree well will be needed.

- Where extensive measures may be necessary to save a tree, the Superintendent of Forestry or his designate shall determine whether the value of the tree and its contribution to the landscape is worth the expense and effort required.

6.1.5.7 Penalty for Violations

Forestry Bylaw #9607 provides that any person who contravenes any provisions of the bylaw which includes damaging or pruning a tree, altering the grade level or drainage pattern, failing to erect a protective barrier around trees before beginning construction or removing or interfering with protective barriers is guilty of an offence punishable on summary conviction of a fine.

6.2 Requirements for Maintenance Work Around The Base of Public Trees

The following practices shall be followed to protect trees on public land during turf maintenance.

6.2.1 An orientation session is conducted before the start of each season by The Open Space Management Division, Public Works Department and Support Services Department for all maintenance staff working around the base of trees. The session shall include information on the procedures to be followed in working around trees.

6.2.2 Maintenance staff shall not strike or rub against the bark of trees with maintenance equipment such as string trimmers, mowers and rototillers.

6.2.3 Trees 15 centimetres in diameter or less that are not in prepared planting beds shall have a protective guard placed around their base. The guards shall be of the plastic variety that expand on their own as the tree grows and shall be of an adequate length to provide protection from normal maintenance activities.

6.2.4 Trees in unirrigated areas shall have mulched tree wells during their establishment period (1 - 3 years).

6.2.5 In open space areas where regular turf maintenance is required (parks, medians, etc.) consideration shall be given to using planting beds as opposed to planting individual trees for ease of maintenance and aesthetic purposes.

6.2.6 The use of protective guards on grass mowers shall be incorporated into equipment where possible to reduce the damage to trees.

6.2.7 Equipment suitable to the size of the trees, the site and the job to be done shall be utilized to minimize damage to trees.

6.2.8 Coniferous trees shall not be cultivated within their driplines in order to prevent damage to their root system.

6.2.9 Pre-emergent herbicides may be used in planting beds to control weeds. It is believed that the use of herbicides will cause less damage to trees than cultivating. Staff should be careful to read the Material Safety Sheet for the herbicide to ensure that the herbicide is not toxic to the particular species being sprayed around.

6.2.10 Trees may be wrapped in protective wire to protect them from rodent damage. The wire should not be installed too tightly around the tree and should be inspected periodically.

6.2.11 Any suckering around the base of a tree shall be removed with hand pruners and not a weed whipper or lawnmower.

6.2.12 On those existing irrigated sites where a group of trees are planted so close together mowing may cause damage, the area encompassed by the trees shall be considered either a no-mow area or for a reduced frequency of mowing.

6.3 Requirements for Transporting Trees

6.3.1 All tree material being transported to a site shall be covered with a tarpaulin to reduce desication due to wind and heat. Trees shall also be protected from leaf loss, limb breakage and trunk damage during transportation, loading and unloading procedures. Anti-desiccants may be used to reduce moisture loss when a tree is being relocated, during times of heat/drought stress or to protect evergreens during cold dry winters.

6.3.2 Ball and burlap trees are to be handled so as to ensure that the root ball is kept intact and not damaged. Trees moved by truck or trailer shall be secured to the deck by the root ball not the tree trunk.

6.3.3 Trees are to be covered with soil, mulch or a tarpaulin to prevent drying during the storage or handling period and watered regularly to prevent dessication.

6.3.4 Containerized or ball and burlap trees wintered outside shall be protected from animals by surrounding them with snow fencing.

6.3.5 Trees shall be planted immediately following removal from the nursery. They must not be stored on the landscape site for more than one working day. If trees must be stored the root balls should be watered to protect them from drying out.

6.4 Requirements For Snow Removal

It is reasonable to expect some damage to public trees as a result of City snow removal activities. While the following points will not completely eliminate the damage they should help to minimize it.

6.4.1 The Urban Forestry Section shall prune public trees to allow for the free movement of snow removal equipment.

6.4.2 Public Works shall bring to the attention of the Superintendent of Urban Forestry Section those locations where tree branches are impeding the movement of snow removal equipment.

6.4.3 The Public Works Department shall advise their operators and contractors to avoid damaging trees during snow removal.

6.4.4 Snow shall be plowed onto side or centre boulevards where applicable to provide off-road storage. Snow blowers shall not blow sand, ice or snow into coniferous trees or at the trunks of deciduous trees.

6.4.5 The snow shall be removed from the boulevard, windrowed, and loaded onto trucks for transport to a snow storage site.

6.4.6 Boulevards are not to be cleared to turf level. A cover of 10 centimetres shall be left and a 30 centimetre clearance shall be maintained from the tree trunk when removing snow.

6.4.7 To avoid damage to trees, the snow immediately next to the trees shall not be removed. Should trees be damaged The Public Works Department shall immediately notify the Superintendent of Urban Forestry Section so the necessary repairs to minimize further damage.

6.4.8 The Public Works Department shall reimburse The Urban Forestry Section for the costs related to the repair or replacement of a damaged tree.

6.4.9 Designated areas on boulevards shall be left treeless to allow for snow storage.

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APPENDIX “H”

THE HERITAGE TREES OF

REGINA PROGRAM

Trees are an important part of Regina's natural history. The City recognizes the unique and irreplaceable value of our landmark trees and proposes the establishment of a Heritage Trees of Regina Program.

1.0 Purpose

The purpose of The Heritage Trees of Regina Program is to locate, designate, catalogue and preserve for as long as possible the heritage trees of Regina. The trees must be within the city limits and may be located on public land or private property.

2.0 Protection of Public and Private Heritage Trees

2.1 Public Land

Heritage trees located on public land where feasible will be protected under the Heritage Tree Program. Landmark trees on public land must be identified on development plans and permit applications and reviewed by the Parks and Recreation Board in cases where the tree could be impacted by construction.

2.2 Private Land

Heritage trees located on private property will be designated with the owners consent. While the City cannot enforce protection of heritage trees on private property it is believed that conferring heritage status will afford the tree some protection by making the owner aware of its value to the community. The Urban Forestry Section, if requested, may provide the owner with assistance in caring for the tree. This could be in the form of maintenance advice or actual help in caring for the tree.

3.0 Categories of Heritage Trees

There are three categories of heritage trees: record trees, historical trees and notable trees.

3.1 Record Trees

This category includes the largest and oldest tree of the various species growing in Regina.

3.2 Historical Trees

Historical trees are those associated with a notable historical event such as a royal tour, centennial and anniversary celebration. The category also includes trees planted by visiting or local dignitaries on special occasions, and trees recognized as distinctive landmarks in the history of our city.

3.3 Notable Trees

Trees in this category include those with unique characteristics such as distinctive shapes or forms. Also included are trees that are genetic mutations and hybrids or may be unique because they have adapted to adverse conditions.

4.0 Public Participation in the Program

Public participation is important in locating and preserving heritage trees. An organization or an individual may nominate a tree or a group of trees. The Forestry Technician will conduct an on-site visit to assess the heritage merits of the trees nominated for heritage status. A Heritage Tree Selection Committee comprised of the Superintendent of Urban Forestry, the Forestry Technician, the Horticultural Extension Officer and a representative of the public will review nominations and determine which trees warrant heritage status. Those trees selected as heritage trees will be catalogued in An Honour Roll of Special Trees and may be identified with a plaque or other suitable form of identification. The description in the honour roll will give credit to the person nominating the selected tree.

APPENDIX “I”

THE URBAN FOREST

STORM RESPONSE

PLAN

1.0 PURPOSE

The purpose of the Storm Response Plan is to provide a comprehensive action plan for responding to storm damage to the urban forest.

2.0 OBJECTIVES

The objectives of the plan are as follows:

2.1 To establish an early warning system for forecasting the magnitude, time and location of impact for a severe storm and determining the clean-up resources that will be required.

2.2 To establish a call-out procedure for notifying storm personnel.

2.3 To clearly identify the roles and responsibilities of the various individuals, divisions and departments involved in responding to a storm.

2.4 To establish procedures and mechanisms for coordinating the activities of the various personnel involved in the storm response effort.

2.5 To establish the criteria for prioritizing tree hazards and removing debris after a storm.

2.6 To establish a recovery plan for restoring the damaged area to its condition prior to the storm.

3.0 COMPONENTS FOR REGINA'S EMERGENCY STORM RESPONSE PLAN

There are three chronological action phases for a severe storm response plan.

3.1 Preparation - early warning and pre-planning activities.
3.2 Response - activity during and immediately after a storm.
3.3 Recovery - activities to return the damaged areas to pre-storm conditions.

3.1 Storm Preparation

3.1.1 Categories of Severe Storms

While severe storms could strike at any time during the year, the period of time when the urban forest is most vulnerable is April to October with the summer months of June, July and August being the most acute.

There are three categories of severe storms: minor storms; major storms; and disasters.

Each category has a different level of intensity and therefore requires a different response. Because of the limited historical data available to determine the indicators for the three categories of severe storms, the indicators presented are proposed as guides which should be reviewed annually and revised based upon new experience.

3.1.1.1 Minor Storms

Definition

Road blockages, fallen trees and limbs, and hazardous limbs can be properly attended to within a five day period immediately following the storm. In this level of storm the damage is restricted to a small area of the city or causes minimal damage over a broad area.

Indicators

The following indicators will serve as guides in identifying minor storms.

1) wind velocity 40 kph and 6 mm of rain during a 24 hour period;
2) wind velocity 50 kph and no moisture during a 24 hour period;
3) wind velocity 30 kph and 20 mm of rain during a 24 hour period;
4) hail 10 – 19 mm in size with no wind;
5) 10 – 19 cm of wet snow within a 24 hour period during canopy season.

Clean-up Operations

Clean-up operations may extend beyond the 5 day period but all hazardous situations should have been dealt with during this time. The Urban Forestry Section would rely upon its own resources to handle the damage and clean-up debris resulting from a minor storm.

3.1.1.2 Major Storms

Definition

In general more than 5 days will be required to clean-up the hazardous tree damage conditions resulting from a major storm.

Indicators

The following indicators will serve as guides in identifying potential major storms.

1) wind velocity 50 kph and 40 mm of rain during a 24 hour period;

2) wind velocity 75 kph with no precipitation during a 24 hour period;
3) hail 20 mm in size or larger with little or no wind;
4) 50 mm of rain in 1 hour or 100 mm in 3 hours;
5) 20 - 29 cm of wet snow within a 24 hour period during canopy season.

Clean-up Operations

Major storms are not predictable as to the extent of damage they may cause due to the nature of the weather phenomena that creates such a catastrophic condition. Escalation from minor to major storm status is dependent upon local conditions producing strong gusting winds such as a severe down draft, plow winds or tornadoes.

Major storms will require coordination of staff and equipment with other divisions, sections, or departments; (ie: Parks Maintenance, Open Space Services, Integrated Pest Management, Support Services, Public Works and the City Police). There may also be a necessity to rent equipment and utilize operators from the private sector in order to effectively and efficiently complete the damage clean-up.

Emergency Measures Bylaw # 9070 provides for special emergency powers in declared emergencies. In the event of a major storm the Superintendent of Urban Forestry Section or designate should contact the Emergency Planning Coordinator (777-7886) and advise as to the seriousness of the situation. Once an emergency has been declared, The Urban Forestry Section may request the cooperation, manpower and resources of other civic departments necessary to respond to the storm.

Clean-up efforts may range from 6 days to several weeks depending upon the severity of the storm. Funding, staffing and equipment will need to be allocated for this additional period of clean-up.

3.1.1.3 Disasters

Definition

A disaster is an emergency situation which has exceeded or has the potential to exceed the emergency response capabilities of the City of Regina. It involves multiple sites and requires the services of multiple agencies. The situation necessitates a declaration of a state of local emergency which results in activation of the City of Regina Emergency/ Disaster Plan.

Indicators

The following indicators will serve as guides in identifying a potential disaster.

1) wind velocity of 100 kph or more;
2) a tornado;
3) hail in excess of 20 mm in size with winds of 30 kph;
4) an ice storm;
5) rain in excess of 50 mm in 1 hour or 100 mm in 3 hours;
6) 30 cm or more of wet snow within a 24 hour period during canopy season.

Statutory Authority

- *Emergency Measures Bylaw #9070*
- The *Province of Saskatchewan Emergency Planning Act*

3.1.2 Early Warning Forecast

An essential element of The Urban Forest Storm Response Plan is the early warning forecast. Currently there are four weather centres on the internet that provide weather information. These centres provide long-range, 3 – 5 days forecasts as well as current weather conditions. The information is regularly updated and available on a 24 hour basis. The Urban Forestry Section currently has access to the internet in its office at the Park's Yard.

The early warning will be provided as follows:

1) The Forestry Technician monitors the weather centres on the internet every day at 8:00 a.m. and 4:00 p.m. for severe storm forecasts for Regina.

2) If a severe storm is forecasted for the Regina area, the Technician tracks the storm more closely and notifies the Superintendent of Urban Forestry of the possibility of a severe storm. In situations where the Superintendent is not available the Forestry Technician will notify the Arborist.

3) When it is clearly established that a severe storm will impact Regina, the Forestry Technician phones the Environment Canada Weather Office in Winnipeg (1-900-565-5555). The Forestry Technician can speak to a Meteorologist who will provide specific information on:

    a) the estimated time of impact of the storm;
    b) the velocity and direction of the wind;
    c) the amount of precipitation within a given period of time; and
    d) the likely duration of the storm.

The Forestry Technician should place his initial call to the Enivornment Canada Weather Office approximately two hours before the predicted impact of the storm. This should ensure that he is able to get through on the 1 – 900 number and speak to a Meteorologist. The initial call should be followed up with calls about an hour and a half hour before impact in order to track the storm and receive the most accurate and up-to-date information.

3.1.3 Spring Season Activities

1) General Tree Management Activities

A major component of any tree pruning program is the removal of deadwood from trees. Not only does this improve the overall health of the tree, it is a necessity to help reduce the amount of storm damage that could occur. Therefore the overall pruning program is geared towards improving the health and safety of all city owned trees.

2) Tree Inspection Process

This is geared towards inspecting trees for any major defects or to identify any potential problems in a tree. The Forestry Technician and Arborist throughout the year jointly inspect all trees that have not been pruned for at least three years. Any problems found will be dealt with as soon as possible to minimize the potential for further damage during storms.

3) Staff Preparation

Staff designated to assist in storm damage cleanup activities will be given an orientation prior to the storm season. At this time all aspects of the storm response process will be reviewed. Should any additional training for staff be identified it will take place prior to the storm season. All staff must be certified for the piece of equipment they are assigned to operate. The Superintendent of Urban Forestry is responsible for ensuring that the proper number of staff are trained in each area. A listing of all city staff who could potentially be involved in the storm damage clean-up effort (Forestry Division, Open Space Division, Integrated Pest Management, Public Works, Support Services and The Wascana Centre Authority) shall be developed and kept current. See Attachment “A” Staff Qualifications.

4) Resource Preparation

Any equipment or outside resources required for the storm response effort need to be ready for use when required. It is the responsibility of the Forestry Technician to maintain an up-to-date list of the equipment (ie: chainsaws, hand and polesaw pruners, wood chippers, aerial type vehicles, supervisory and field vehicles, loaders, trailers, barricade and lighting equipment, etc.) as well as a list of private rental companies and the equipment they could provide. In addition, a list of available contractors and outlets where staff are to purchase

food during the storm response should be maintained. See Attachment "B" Resource Lists.

5) Pre-Storm Season Meeting

A meeting will be convened annually in April/May to bring together all of the major participants for a review of the storm response process. Any proposed changes to the storm response plan should be discussed and agreed upon at this time so that they can be incorporated into the plan prior to the staff orientation.

3.1.4 Pre-Storm Procedures

Once a severe storm warning has been confirmed, the Superintendent of Urban Forestry or designate will determine the category of the storm based on the early warning forecast and initiate the appropriate call-out procedure. The Regina Police Service (9-1-1) and the Fire Department shall be advised of the impending storm and provided the contact phone number for the Storm Response Centre (See section 3.1.5). City Central and Public Affairs shall also be advised of the incoming storm. A preplanning meeting shall be convened.

3.1.5 The Storm Response Centre

A Storm Response Centre should be established at the Parks Yard at the earliest possible time to coordinate the overall plan to respond to the storm damage. Required to attend the meeting are the Superintendent of Urban Forestry, the Forestry Technician, the Arborist, the Supervisor of Integrated Pest Management, all Foremen (cemetery, district, and athletic field), parks yard clerical staff, the equipment co-ordinator, and a representative from City Central or Public Affairs. If a major storm is anticipated a representative from the Public Works Department will be requested to attend. A checklist has been prepared of items that need to be addressed at this meeting.

- determine how the storm damage is to be assessed.
- identify available staff and equipment.
- determine additional staff and equipment needed to respond to the storm.
- review responsibilities of all staff.
- review communication processes.
- review the message staff should relay to the public.
- determine work teams, areas to work in, reporting sequence.
- outline work shifts, break times.
- determine the financial process
- outline rules for private trees.
- identify who can make the decisions in the field.

- outline expectations of field staff.
- determine drop off sites.
- set the time for the next meeting.

3.2 Storm Response

3.2.1 Roles and Responsibilities

The Superintendent of UrbanForestry

1) Provides early warning of an impending storm.
2) Monitors the storm intensity and provides an assessment of its potential impact.
3) Initiates the call-out procedure.
4) Coordinates the overall storm response.
5) Coordinates the pre-storm season activities.
6) Convenes the initial storm response meeting.
7) Reports to the Manager of Open Space Management the extent to which resources from other sections, divisions, departments or contractors may be required.
8) Requests assistance from other Departments when required through Emergency Planning Coordinator.
9) Determines which contractors to use.
10) Coordinates the movement of crews from one sector to another with the Arborist when the damage is unevenly distributed.
11) Serves as the immediate contact for alerting the news media regarding the impact of the storm and progress being made in the clean-up effort.
12) Reports the daily storm damage assessment and clean-up progress to the Manager of Open Space Management Division.
13) Monitors expenditures and requests over expenditure from the Manger of Open Space Management Division if it is required.
14) Responsible for making any after hours work decisions.
15) Determines when to reduce the level of the cleanup effort.

Based upon the information received from Environment Canada Weather Office, the Superintendent of Urban Forestry or designate will:

1) Determine if the storm is a minor storm, a major storm, or a disaster.
2) Identify the manpower and equipment required to respond to the storm.
3) Initiate the appropriate call-out procedure.
4) Alert City Central of the impending storm.

5) Alert Public Affairs
6) Notify the Public Works Dispatch.
7) Co-ordinate the pre-planning effort.
8) Continue to monitor changes in the forecast.

In the absence of the Forestry Technician, this position assumes all duties.

Forestry Technician

1) Monitors the internet daily during the storm season for potential storms.
2) Advises the Superintendent of Urban Forestry of impending storms.
3) Replaces the Superintendent of Urban Forestry in his absence.
4) Assists the Superintendent of Forestry and Arborist as required.
5) Prioritizes storm damage calls received from City Central or Public Works dispatch or calls placed directly to The Urban Forestry Section before forwarding them to the Arborist.
6) Ensures that all required purchase orders have been raised.
7) Coordinates the storm damage assessment process.
8) Co-ordinates damage assessment crews.
9) Works with the Arborist to prioritize storm damage calls.
10) May be assigned responsibility for assisting field staff in identifying priority situations in the aftermath of the storm.
11) Ensures that work crews have the equipment required for the clean-up operation, and arranges meals for staff engaged in after hour's work.
12) Handles any follow-up calls to residents who have experienced tree damage.
13) Contacts the utility companies should their services be required
14) Maintains a list of all city staff who could potentially be involved in the storm damage clean-up effort as well as related equipment including private rental companies.
15) Co-ordinates the work of clerical staff during the storm response
16) Contacts contractors when they are required
17) Provides storm damage assessment and clean-up progress reports to the Superintendent of Forestry.
18) Develops follow-up work lists for post-storm response

The Arborist

1) Supervises all field activities in response to the storm damage.
2) Acts as the liaison between Urban Forestry and other departmental staff assisting in the clean-up effort.
3) Prioritizes and assigns specific duties to Urban Forestry and other departmental staff

assisting in the clean-up.

4) Makes recommendations regarding shift staffing, hours of work and temporary cessation of clean-up activities.
5) Identifies the need for additional personnel and equipment.
6) Reports to the Superintendent of Urban Forestry concerning storm damage and progress being made in the clean-up.
7) Reviews the list of storm damage calls compiled by office staff and updates the list according to the work completed.
8) Ensures that all staff have received the required training before operating equipment assigned to them.
9) Authorizes any tree removals resulting from storm damage.
10) Determines repair process for any severely damaged tree not considered a removal.
11) Provides necessary training to all staff involved in storm damage activities.
12) Attends all operational storm damage meetings.

District Foremen

1) Supervise their staff working on storm damage activities.
2) Co-ordinate field activities with the Arborist.
1) Attend all meetings pertaining to the storm response process.
2) Make recommendations on work shifts and cleanup activities.
3) Supervise contractors working in their district.
4) Provide daily reports to the arborist on cleanup activities.
7) Determine additional resources required to complete the storm cleanup.

Forester II

1) Performs work assigned by the Arborist
2) Performs follow-up tree repair and removal.
3) May be required to direct a small crew of two to four persons.
4) Completes the appropriate forms for work completed.

Forester I

1) Performs work assigned by the Arborist.
2) May act as the technical lead person on work crews involving the use of other departmental staff in the clean-up effort.
3) Completes the appropriate reporting forms for work completed and follow-up work required when not assigned to work with the Forester II.

Assessment/Cleanup Crews

1) Conduct the initial assessment of tree damage. Specifically "Priority 1" situations.
2) Perform cleanup activities once the assessment of all "Priority 1"situations have been completed.

The Public Affairs Department

1) Coordinates any public communication required including information on how the public can assist the storm response effort.

City Central

1) Receives public requests for service as a result of storm damage and separates the calls into the three storm damage clean-up priorities outlined in Section 2.2.5 before passing them along to The Urban Forestry Section.

2) In the event of a major storm that occurs on the week-end or after hours, City Central staff should be called in to handle the requests for service.

Open Space Management Office Staff

1) Assist the Forestry Technician in coordinating the response to the storm damage calls received from the public.

3.2.2. General Meetings

Update meetings will occur at 8:00 am and 4:00 p.m. daily in the parks yard boardroom unless otherwise determined by the Superintendent of Urban Forestry.

3.2.3 Field Meetings

All work groups will hold meetings at the beginning of each work shift to review the progress of the storm cleanup along with each individuals work assignment.

3.2.4 Damage Assessment

In the event of a major storm, staff will be used to identify the "Priority 1" situations that are to be addressed first. The number of staff used for this process will depend on the severity of the storm and the extent of the damage. The staff to be used are normally assigned to the cleanup crews. Cleanup will not begin until this assessment process has been completed under the supervision of the Arborist. Staff will go street by street in their assigned areas

looking for “Priority 1” situations. The Arborist will determine if the location of these sites should be relayed to him first or directly to an aerial lift or ground crew. Once all of the “Priority 1”situations have been addressed staff will be assigned to a cleanup crew. In the event of a minor storm, crews will be responding to calls as they are received by City Central, Public Works Dispatch or the Parks Yard front office**.**

3.2.5 Tree Damage Clean-Up Priorities

The following criteria shall be used to prioritize work assignments and respond to public requests for service as a result of storm damage.

Priority I - Life Threatening Situations

1) Trees down and injured people caught in a car or home following a 9-1-1 emergency call for assistance.
2) Trees down and people caught in a life-threatening situation.
3) Trees damaged and could fall on a home threatening the inhabitants.
4) Trees on public property that are split or rocking and pose an immediate risk to public safety (ie: walkway).

In cases where people are injured or caught in a life-threatening situation, the Storm Response Centre should ensure that the Regina Police Service (9-1-1) and the Fire Department have been notified.

The Arborist makes an on-site visit to assess the situation. Crews should remove the immediate threat to life or injury before proceeding to the next location. This includes any life threatening situations on either public or private property the crews encounter. Final clean-up waits until the general clean-up phase.

Priority II - Trees Blocking Arterial Streets

Trees down and blocking streets are piled between the sidewalk and curb in the following order which is colour coded on the attached map (Attachment “C" 1999 - 2000 Priority Streets").

Red 1) Major Arterials - freeways, expressways and arterials
Blue 2) Major collectors - 3,000 - 7,500 vehicles per day
Green 3) Minor collectors - 1,000 - 3,000 vehicles per day and bus routes
White 4) Local streets - all remaining streets

Priority III - General Clean-up

1) Trees cleared from the streets in Priority II and piled on the street between the sidewalk and the curb are hauled away.
2) All uprooted and damaged trees on public property are cleared away.
3) If possible all tree material is mulched by a chipper and the wood chips taken to the designated dump sites or Landfill depending on the situation.
4) All large logs and stumps are loaded by a frontend loader or bobcat and taken to the designated dump sites or Landfill depending on the situation. See Attachment "D" Dumpsites.
5) Any material picked up that cannot be immediately mulched is taken to the closest dump and mulched at a later date.
6) If required the Public Works Department is contacted to assist in the clean-up operation.
7) A press release is issued advising homeowners of their responsibility for removing all debris resulting from private trees on their own property and for repairs to their trees.

Stumps resulting from tree removals are identified and removed.
Sites requiring tree replacement are identified to the Forestry Technician.

3.2.6 Receiving and Dispatching Calls

All calls regarding storm damaged trees are directed to the City Central Office. City Central staff separate the calls into the three storm damage clean-up priorities described described in section 2.2.5.

Routine information is taken to identify the location and the storm damage situation.

1) The name and phone number of the person reporting the damage.
2) The exact location (address) of the damage.
3) Is there a threat to life or public safety? If so, identify the severity of the threat:
    a) people caught in life-threatening situation;
    b) tree damaged and could result in life-threatening situation if not corrected; and
    c) tree poses immediate risk to public safety.

4) The ownership of the tree (city or private)
    a) Tree on side-boulevard between the sidewalk and curb.
    b) Back of the walk on the boulevard (City's easement area).
    c) On private property, (back of the City's easement area, generally ranges from 4 - 8 feet back of the sidewalk to an area around the depth of the water shut-off valve).

5) The tree status. Is the entire tree broken? Is the tree uprooted? Are there broken

but attached limbs hanging from the tree? Is the trunk split vertically?

6) The status of the broken part of the tree? Are there broken branches hanging in the tree? Is the branch hanging from the tree but resting on the ground?
7) The diameter and height of the damaged tree or limb. This will help to identify the kind of crew required to attend to the damage.
8) Any relevant road status. Is the tree completely or partially blocking passage of vehicles on the road?
9) The status of the relevant property. Has the tree fallen on the house or an automobile? If so, is it blocking access or exit from the house or car?
10) Assessment as to whether further damage is likely to result if the situation is not attended to immediately.
11) Are there any utilities in close proximity to the tree? Are electrical lines or telephone lines down? In these situations Sask Power should be called in for an assessment of the situation.
12) There is a need to screen repeat calls from the same address to avoid duplication of services. Repeat requests for services should not be forwarded for action unless there has been a significant change with the problem or a new hazard has been identified.

The Urban Forestry Section will colour-code the request for services they receive on a city map according to their level of priority. This will allow them to coordinate their response and make the most efficient use of their manpower and resources.

3.2.7 Trees on Private Property

During a storm The Urban Forestry Section will only intervene on private property to:

1) Remediate life-threatening situations or those that have the potential to cause injury; and
2) Clear private trees that have fallen on city streets.

Homeowners are responsible for removing all debris from their own property and for repairs to their trees.

3.2.8 Maintaining a Log of Services Provided

Crews performing tree work in the aftermath of a storm shall complete a log of the work completed and file it with the Urban Forestry Section.

The log includes the following information:

1) The location and address serviced.

2) The size and species of the tree serviced.
3) The time and date of the clean-up activity.
4) The nature or description of the corrective action taken at the site.
5) The extent of property damage, if any.
6) Detailed instructions as to what follow-up work is required by the Urban Forestry Section. (re: removal, replacement, stumping, botting, cabling, etc.)
7) Whether the site should be included in the Urban Forestry Section planting list.

3.2.9 Severe Storm Response Flow Charts

3.2.9.1 Minor Storms

Figure I: Flow Chart for Responding to a Minor Storm

The Atmospheric Environment Program

Public Works Dispatch

Superintendent of Urban Forestry

Forestry Technician

Arborist

Ground Crews (Casual)

Chipper Trucks (2)

Aerial Trucks (4)

1) Based on the early warning information provided by The Atmospheric Environment Program the Superintendent of Urban Forestry determines that a minor storm will

impact the city. He then initiates the minor storm call-out procedure and convenes a pre-planning meeting.

2) The Forestry Technician and the Arborist work together to prioritize the storm damage calls received from City Central or Public Works Dispatch based on the criteria outlined in section 2.2.5 Tree Damage Clean-up Priorities.

3) Calls regarding life threatening situations are dispatched directly to the crews out in the field for immediate response.

4) A site inspection of the storm damage calls is conducted by the Arborist. The initial prioritization of calls may be revised based upon the site inspections.

5) All storm damage requests are colour coded on a city map based on their level of priority in order to better coordinate the storm response.
priority in order to better coordinate the storm response.

6) The Arborist coordinates all tree work on site. He communicates instructions to the aerial life crews, ground crews and the chipper truck crews under his direction.

3.2.9.2 Major Storms

Figure II: Flow Chart for Responding to a Major Storm

Enivronment Canada
Weather Service

Public Works Dispatch

Superintendent of Urban Forestry

Forestry Technician

		Arborist		
Foreman District 1	**Foreman District 2**	**Ground Crews**	**Aerial Trucks**	**Foreman District 3**
		Half-ton	**Chipper Truck**	
Clean-up Crews	**Clean-up Crews**			**Clean-up Crews**
		Chipper Truck		

1) Based on the early warning information provided by The Atmospheric Environment Program the Superintendent of Urban Forestry determines that a major storm will impact the city. Once an emergency has been declared he contacts the Emergency Planning Coordinator to have him declare a local emergency under The Emergency Measures Bylaw No. 9070. He then initiates the major storm call-out procedure and establishes a Storm Response Centre to coordinate the response to the storm.

2) Staff in other divisions (Parks Maintenance, Pest Management and Support Services) who are certified to operate a chain saw may be utilized as additional staff for pruning and tree removals. Staff not certified to operate a chain saw will be restricted to those clean-up activities that do not involve the use of a chain saw.

3) The Forestry Technician prioritizes the storm damage calls received from City Central or

   Public Works Dispatch based on the criteria outlined in Section 2.2.5 Tree Damage Clean-up Priorities.

4) Calls regarding life threatening situations are dispatched directly to the Arborist out in the field for immediate response.

5) The area of tree damage is divided into sections with a staff member assigned responsibility for a section.

6) The Arborist coordinates all tree work. He communicates instructions to the aerial lift crews, ground crews and the chipper truck crews under his direction.

7) The Parks Maintenance Foreman report directly to the Arborist assigned to the area and coordinate their staff based on instructions from him.

8) Clean-up crews survey all damaged areas for priority situations before commencing clean-

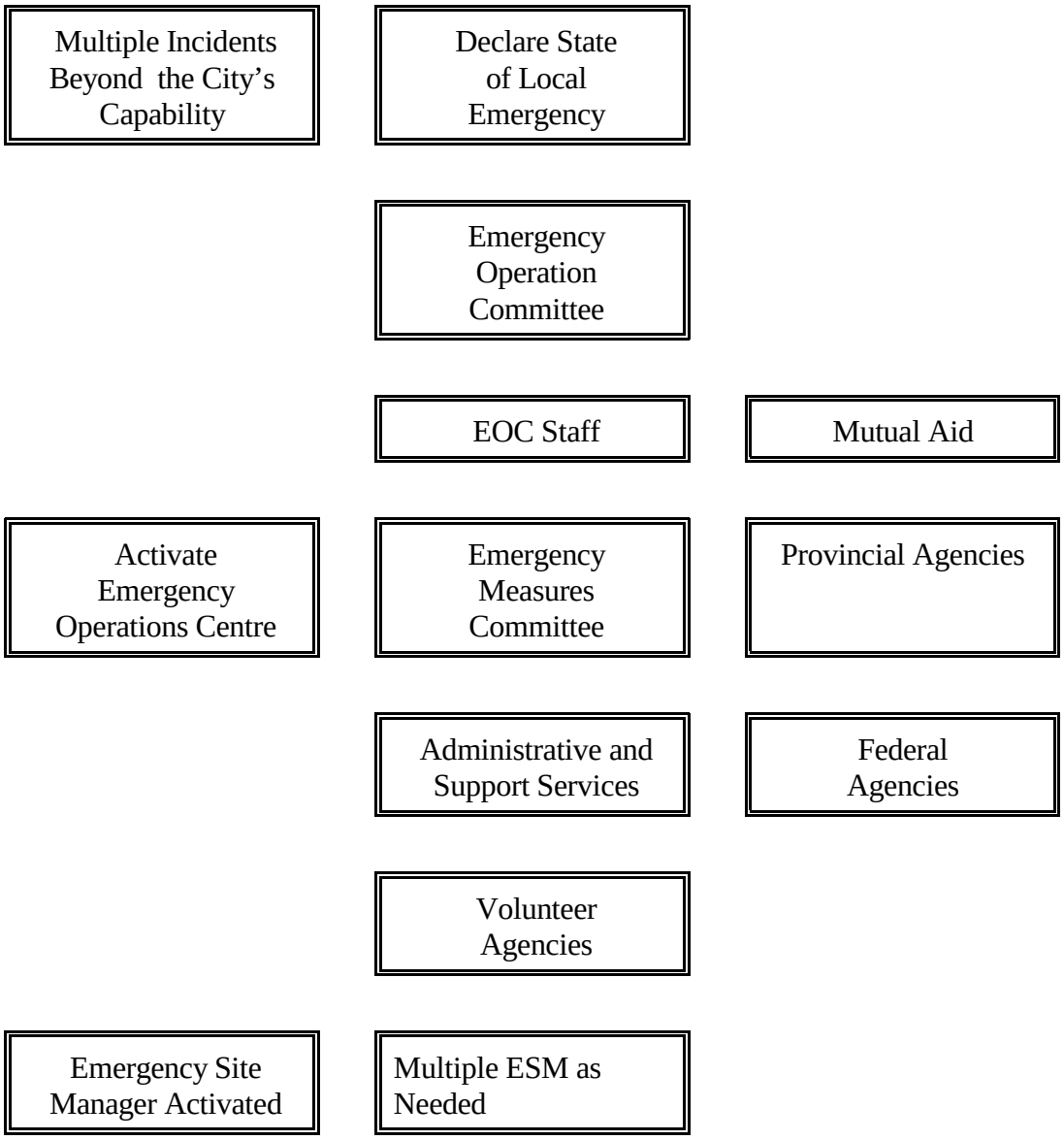
up. Life threatening situations are referred to the Arborist for immediate action.

3.2.9.3 Disasters

Figure III: The Disaster Activation Plan

Figure III illustrates the flow chart for activating the response procedures in the event of a disaster.

Figure III The Disaster Activation Plan



1) A state of local emergency is declared by the Emergency Measures Committee (the Mayor or Deputy Mayor - see Emergency Planning Bylaw).

or

A state of emergency is declared by the Lieutenant Governor in Council (see Section 15 of *The Saskatchewan Emergency Planning Act*).

2) Command and control is centralized in the Emergency Operations Centre.

3) The emergency response is coordinated by the Emergency Operations Committee.

The Emergency Operations Committee coordinates and directs the emergency response operations of the City of Regina to save lives, reduce suffering, prevent property damage, maintain and restore facilities, sustain health and morale, and generally neutralize the effects caused by any major emergency or disaster.

The members of the Emergency Operations Committee include:

- City Manager
- Police Chief
- Fire Chief
- Director of Emergency Medical Services
- Director of Public Affairs
- Director of Public Works
- Director of Transit
- Manager of Purchasing
- Medical Health Officer
- Director of Emergency Social Services
- Other department/agency representatives

The Community Services Department is represented on the committee by the Director of Public Works. The department's role in a disaster is described in the Public Works Emergency/Disaster Manual (Appendix 7).

- Provide staff and/or equipment to support the Public Works Department.
- Maintain contact with the Public Works Department’s dispatch office when in the field.
- Provide assistance upon request to the Emergency Operations Committee.

4) The Emergency Operations Committee can, as required, call on the emergency

resources of the City and surrounding municipalities (through Mutual Aid agreements), and through Saskatchewan Emergency Planning, the resources of the provincial and federal governments and support agencies.

3.3 Storm Recovery

3.3.1 Damage Assessment

When the urban forestry inventory is fully operationalized in the next few years, it will provide an individualized inventory of all trees on public land in Regina's urban forest. This will enable The Urban Forestry Section to accurately assess the damage to the urban forest as a result of a storm. An accurate assessment of the damage will be required to settle insurance claims, reimbursements and federal and/or provincial funding for relief efforts. The Tree Assessment Evaluation Formula can be used to determine the specific costs associated with replacing the trees.

3.3.2 Storm Damage Clean-up

If the storm damage is so severe The Urban Forestry Section cannot accommodate the clean-up within its existing operating funds, a request will be made for an over expenditure.

3.3.3 Replacement

If the replacement of the damaged trees after a storm cannot be accommodated within the existing Urban Forestry Section operating budget, a request may be made for one time funding to return the area to pre-storm condition.

3.3.4 Communication

3.3.4.1 Public Affairs

Public Affairs will play the lead role in communicating with the public or media. They will confer with the Superintendent of Urban Forestry prior to issuing of news release to ensure the material is accurate.

3.3.4.2 Media

Public Affairs is responsible for any Public Service Announcements that are released to the media. Unless otherwise directed, the Superintendent of Urban Forestry will be responsible for any television, newspaper or radio interviews.

3.3.4.3 City Central

City Central, Parks Yard administration staff and Public Works (on weekends) will be responsible for passing on any pertinent information to the public when they call in. The Superintendent of Urban Forestry will provide storm damage update information to City Central on an ongoing basis.

ATTACHMENT “A”

Staff Qualifications

ATTACHMENT "B"

RESOURCE LISTS

Hours of Work – subject to union agreement. Any hours outside normal shift will be paid as over time (superintendent approval required). Any shift starting before 7:00 am will be paid a minimum of 1.5 hours shift differential.

Work Order Numbers
North West Area – Sectors 1 – 29 WO# 35501
North East Area – Sectors 30 - 49 WO#35502
South East Area – Sectors 50 – 79 WO#35503
South West Area – Sectors 80 – 99 WO#35504

Supplied Meals

KFC – Kentucky Fried Chicken
565 Albert Street PO # 29266
820 McCarthy Boulevard PO# 29269
1631 Victoria Avenue PO# 29270
3501 Dewdney Avenue PO# 29268
3998 Albert Street PO# 29265
621 Victoria Avenue East PO# 29267

Meals purchased from any other source will required a CPO cheque.

Contractors

These purchase orders will be raised at the beginning of storm damage cleanup should additional assistance is needed. The forestry technician will contact the purchasing with the requirements. The Purchasing Department will issue an immediate tender any inform the technician of quoted received within a reasonable time frame depending on the urgency of the request.

ATTACHMENT "C"

1996-97 PRIORITY STREETS

ATTACHMENT "D"

DUMPSITES

Distrtict 1

- A.E. Wilson Park- just behind Jack Hamilton Arena.
- Dales House – utility parcel south of building
- Mt. Pleasant parking lot at Kaplan Field.
- North West Arena – rough grass area east of arena

District 2

- Dominion Park
- Dover Park parking lot
- Holland Park
- Maple Leaf Park
- Milford Park
- Reibling Park
- Stuart Russell Park
- Westminster Park

District 3

- Grant Road School
- Kinsmen North parking lot
- Kinsmen South parking lot
- Kiwanis Park parking lot
- Optomist Arena

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APPENDIX “J”

SAFETY REQUIREMENTS

1.0 PURPOSE

The purpose of this policy is to provide safety requirements for civic employees, contractors and sub-contractors involved in tree care activities for the City.

2.0 OBJECTIVES

The objectives of the policy are as follows:

2.1 To provide employees with the necessary safety training.

2.2 To prevent accidents on the job.

2.3 To protect the public from possible injury around construction sites.

2.4 To ensure that employees follow the requirements specified in the Occupational Health and Safety Manual.

3.0 DEFINITIONS

Tree - A woody plant with one or more stems and a minimum calliper width of 2.5 centimetres and a minimum height of 1.5 meters.

Public Land - Any real property owned or controlled by the City of Regina including but without limiting the generality of the foregoing, any real property the City of Regina is granted acces to under a tree planting easement.

Public Tree - Any tree located on public land including parks, boulevards, medians, bufferstrips and naturalized areas.

Contractor - Includes any private company contracted to work on public land.

4.0 RESPONSIBILITY

4.1 The Superintendent of Urban Forestry is responsible for ensuring employees are aware of their responsibilities under the Occupational Health and Safety Regulations Manual and for seeing that employees attend relevant Occupational Health and Safety courses.

4.2 The Arborist is responsible for ensuring the safety of forestry employees on site.

4.3 The Superintendent of Urban Forestry and the Arborist should be familiar with the relevant sections of T*he Occupational Health and Safety Act and Regulations* that pertain to forestry operations.

4.4 It is the responsibility of all employees to familiarize themselves and adhere to all safety regulations pertaining to their duties.

4.5 It is the responsibility of employees to know the procedures they should follow when they are involved in or witness to an accident on the work site.

4.6 It is the responsibility of the Sask Power Corporation for either pruning trees or hiring a certified contractor to prune trees that are within three meters of an overhead line.

4.7 The Administration is responsible for ensuring that employees receive the training required to perform their duties.

4.8 The Arborist and the Community Services Training Officer are responsible for ensuring that employees are adequately trained to operate the equipment they use on the job.

4.9 Employees are responsible for checking their equipment on a daily basis and reporting any problems to the Arborist.

4.10 The Municipal Engineering Department is responsible for inspecting and approving temporary street closures or restrictions on arterial routes, collector streets or downtown streets.

5.0 PROCESS

5.1 The Superintendent of Urban Forestry and the Arborist shall determine the training required for each employee.

5.2 The Arborist and the Community Services Training Officer shall ensure that all employees are adequately trained and certified to operate the equipment they use.

5.3 The Arborist shall ensure employees have the necessary safety equipment to wear and the safety materials they require for various work sites.

5.4 Employees shall set up the perimeter of the work site under the supervision of the Arborist or set up the work site and then obtain the approval of the Arborist before proceeding to perform the required work.

6.0 SAFETY REQUIREMENTS

The following safety requirements apply to City employees and private construction companies engaged in planting, maintaining, repairing and removing trees and cutting brush on public land.

6.1 Employees Training

6.1.1 Employees shall be trained in the proper use of the equipment they use.

6.1.2 Employees shall be certified by the Community Services Training Officer before operating equipment.

6.2 Personal Protective Equipment

6.2.1 Employees shall wear Canadian Standards Association (CSA) steel toed safety boots, work gloves or mitts, safety glasses or goggles, job specific hearing equipment, safety vest/shirt or safety coveralls and a CSA approved hard hat on site.

6.2.2 Employees shall wear respiratory, eye and skin protection when spraying.

6.2.3 Employees without the required safety gear shall not be allowed on the job site.

6.2.4 Employees shall wear chainsaw chaps and chainsaw gloves when using a chain saw.

6.3 First Aid

6.3.1 A first-aid kit shall always be available on the job site.

6.3.2 At least one member of a work crew shall have first-aid and CPR training.

6.3.3 Employees shall adhere to the Occupational Health and Safety Guidelines and any applicable City guidelines.

6.4 Traffic Control

6.4.1 Effective means of control of pedestrian and vehicular traffic shall be instituted on every job site where necessary according to the Municipal Engineering Department Manual for temporary traffic control.

6.4.2 The public shall be informed of any traffic disruption prior to major work commencing.

6.5 Fire Protection

6.5.1 Flammable liquids shall be stored, handled and dispensed only from metal containers or approved safety cans.

6.5.2 Smoking is prohibited when handling or working around flammable liquids.

6.5.3 Gasoline-powered equipment shall be refuelled only after it has stopped and should not be operated within ten feet of a refuelling area.

6.6 Equipment Maintenance

6.6.1 Routine equipment maintenance shall be conducted as scheduled.

6.6.2 Employees shall perform circle checks each day before operating equipment.

6.6.3 Any repair work required to equipment shall be reported to the Arborist or repair garage immediately.

6.7 Pruning

6.7.1 Employees shall receive training in basic pruning skills before they are allowed to prune.

6.7.2 A hard hat, safety glasses or goggles, work gloves/mitts and steel toed safety boots shall be worn at all times when pruning.

6.7.3 Employees shall not work overhead with pruning equipment for more than five minutes at a time.

6.7.4 Employees shall never cut a branch which is directly overhead.

6.8 Tree Planting

6.8.1 No holes shall be dug until all underground utilities have been located.

6.8.2 Hard hats shall be worn when working near overhead cranes, tree spades, front-end loaders, or bobcats.

6.8.3 When a construction site is located adjacent to a major arterial roadway a flashing sign board shall be used to notify traffic of potential hazards.

6.8.4 All trees shall be securely fastened to the truck during transportation.

6.9 Removing Trees

6.9.1 Employees shall check the tree and surrounding area for potential problems before removing a tree.

6.9.2 Employees shall rope off limbs before removing them from the upper portion of a tree where safety or property damage may be a concern.

6.9.3 Employees shall cordon off the entire site with cones and barricades before removing a tree.

6.9.4 Saws used for tree removal shall be sharp and operational.

6.9.5 The Arborist shall be present for the removal of trees higher than ten meters unless a major storm makes this impossible.

6.9.6 An aerial lift shall be used to remove trees over ten meters in height. The tree shall be de-limbed first.

6.10 Storm Damage

6.10.1 All aerial lifts shall be equipped with a high beam light to assist in night work.

6.10.2 All non-emergency work shall cease when winds exceed 60 kilometres per hour or when lightning is present.

6.10.3 Employees shall not work alone during a storm damage response effort.

6.10.4 Crews shall assess trees for any potential hazards before commencing work.

6.10.5 Crews working at night shall take a two-way radio with a phone capacity.

6.10.6 Crews shall not work on an unsafe tree until the potential hazard is secured.

6.10.7 Any hazardous tree that cannot be repaired immediately shall be adequately secured until the necessary work can be done.

6.10.8 Safety beacons shall be used during all work.

6.11 Electrical Hazards

6.11.1 Employees shall assume that all electrical wires and cables are energized and dangerous wires and must not be touched directly or indirectly.

6.11.2 The Occupational Health and Safety Regulations require forestry personnel to maintain a minimum of three metres from energized conductors.

6.11.3 If a branch is hanging on a power line, Sask Power shall be called. Insulated equipment must be used to remove it.

6.11.4 When ladders, platforms and aerial devices contact a live wire, they shall be considered energized and dangerous.

6.11.5 Emergency rescue shall only be attempted by properly trained persons familiar with electrical hazards.

6.12 Aerial Lifts

6.12.1 A safety harness shall be worn when operating an aerial lift bucket.

6.12.2 The combined load, including employees, material and tools shall not exceed the rated lift capacity as stated by the manufacturer.

6.12.3 Wheel chocks shall be installed before using an aerial lift.

6.12.4 A one-person bucket shall not have more than one person riding in it during operations.

6.12.5 Booms or buckets shall not be run into conductors, cables, poles, trees or other similar objects.

6.12.6 An aerial lift truck shall not be moved when the boom is elevated in a working position with someone in the bucket, except for equipment that is specifically designed for this type of operation.

6.12.7 Employees shall be instructed that even fully insulated buckets do not protect them from other electrical paths to the ground such as those through trees, guy wires, or from one phase wire to a second phase wire, any one of which can be fatal.

6.13 Brush Chippers

6.13.1 Employees shall be trained and certified before they operate a wood chipper.

6.13.2 Approved ear and eye protectors shall be worn when operating a chipper.

6.13.3 Loose fitting clothing, rings and watches shall not be worn by employees feeding the chipper.

6.13.4 The operator shall check to ensure that the safety shut-off bar is working before commencing work.

6.13.5 Operators shall check for pedestrian and vehicle traffic before commencing work.

6.13.6 Foreign material such as stones, nails and sweepings shall not be shovelled through the chipper.

6.13.7 The chipper shall not be left unattended while running.

6.13.8 The key shall not be left in the chipper when it is unattended.

6.13.9 The operator shall not stand directly behind the chute when feeding material through.

6.13.10 Branch material shall be pushed through the chipper with another branch and not with a shovel or a rake. Hands shall be kept well away from the chute.

6.14 Root Pruners and Stump Cutters

6.14.1 Operators shall wear approved eye, ear, head and safety foot wear when working with either a root pruner or a stumper.

6.14.2 Underground utilities shall be located on the work site before commencing work.

6.14.3 Employees not directly operating the equipment are responsible for ensuring that the operator and passing pedestrians are kept safe.

6.14.4 Holes resulting from a root pruner or stumper shall be immediately filled in with dirt or wood chips or safely cordoned off with cone barricades and plywood.

6.14.5 The immediate area shall be checked for obstacles before proceeding with work.

6.15 Hydraulic and Gasoline-Powered Chain Saws

6.15.1 Chainsaw operators must be trained and certified in the use of hydraulic and gasoline-powered saws before using them.

6.15.2 Hard hats, safety chaps, chain saw gloves/mitts as well as eye and ear protection shall be worn when operating any gasoline-powered saw.

6.15.3 The job site shall be secured before operating a saw.

6.15.4 Employees shall not carry a chainsaw by hand while climbing, but instead should have it lifted up by a rope or handed up by someone on the ground.

6.15.5 The overhead operation of a chainsaw is prohibited.

6.15.6 Gasoline-powered saws shall not be refuelled while running. Hot saws must be permitted to cool for three minutes before refuelling.

6.15.7 Smoking around gasoline-powered saws is prohibited.

6.15.8 Cut with the middle of the blade, not the tip, which will kickback.

6.16 Power Hand Tools

6.16.1 All portable electric hand tools shall be equipped with a grounded three-prong cord, be double insulated, or connected to the power source through an isolated transformer.

6.17 Vehicle Safety

6.17.1 When a truck with obscured rear vision must back up, the driver shall obtain outside guidance.

6.17.2 Employees shall store all materials carried on vehicles so that they do not fall off the truck during transit.

6.17.3 Employees shall not ride outside or on top of a truck unless this is required for the job, such as in spraying.

6.17.4 Employees shall not leave vehicles unattended while the motor is running.

6.17.5 Wood chips shall not be left in truck beds for extended periods of time due to spontaneous combustion.

6.18 Lifting

6.18.1 Employees shall crouch as close to the load as possible keeping their legs bent at an angle of about 90 degrees. Then keeping their back as straight as possible, lift with their legs, not their back.

7.0 COMMUNICATION

7.1 The Urban Forestry Superintendent shall notify the appropriate employees of safety seminars related to forestry equipment.

7.2 The Safety Officer shall notify The Urban Forestry Section of upcoming safety courses.

7.3 The Community Services Training Officer shall notify the Arborist when he is conducting safety courses and/or certification.

PEST MANAGEMENT

THRESHOLD INDICATORS

CITY OF REGINA
Pest Management Threshold Indicators

The following table shows the threshold indicators for insect pests and tree diseases. When these threshold indicators are exceeded corrective action is required. The action may involve 1) pruning; 2) tree removal; 3) non-chemical control measures; or 4) chemical spraying. The determination as to which corrective action is appropriate depends upon the following factors: 1) the type of disease or insect involved; 2) the number of trees affected; 3) the species of the trees affected; 4) the age of the trees affected and their general health; and 5) the specific location and area of the city involved. It is important to recognize that the threshold indicators described in Table 1 are based on Integrated Pest Management's experience with insect pests and tree diseases to date. The threshold indicators, however, are not static and should be reviewed regularly and revised as additional information becomes available.

The following table shows the threshold indicators for insect pests and tree diseases.

Table 1: Pest Management Threshold Indicators

INSECTS

Pest(s) to be Monitored	Species for Monitoring	Monitoring Method	Time of Year	Counting Method	Threshold Indicators
Elm Bark Beetle	Ulmus	Pheromone Traps	S/Sm/F	#/trap/sector	DED Presence
Cankerworms	Acer, Betula, Cotoneaster, Fraxinus, Malus, Populus, Prunus, Tilia Ulmus	Visual	S/F	#Adult Moths/Band #/Leaf	Avg. 250 Adults - per band - per sector - 5 per leaf
Aphids	Various Deciduous	Visual	S/Sm/F	#/Leaf	> 25/Leaf on 10 Leaf Avg. (include 1 clutch)
Borer	Various	Visual & Pheromone Traps	S/Sm	Dead/Branch Exit/Holes	5/25 sq. cm./wound Avg. of 5/trap/sector
Western Ash Bark Beetle	Fraxinus -Green -Black -Patmore	Visual	S/Sm/F	# Basal Exit Holes/Dead Branch	>25% of tree affected or 5/7 sq.cm.
Plant Bugs	Acer Fraxinus	Visual	Sm/F	#/Leaf % of tree affected	>20% of tree affected
Pear Slugs	Cotoneaster	Visual	Sm/F	# of slugs	>25% of tree

				/leaf Visual	affected
Leaf Rollers	All	Visual & Pheromone	S/Sm	#/Pheromone trap Visual	# of adults per trap # of rolled leaves >25%
Tent Caterpillar	Deciduous	Tree Banding Visual	S/Sm	Tent egg mass or #/Tree	Feeding Damage to 25% of leaves
Sawfly	Spruce, Pine	Visual	Sm	#/Branch	10/Branch on 5 Branches
Spruce Budworm	Picea	Visual	S/Sm	# larvae per branch % damage per branch	>5 branch >10%
Spider Mite	Spruce, Pine	Visual	S/Sm/F	#/Area	10/13 sq. cm. or 10% of tree
Hard Body Scales	Var. Species	Visual	Sm/F	#/sq.cm.	5/7 sq.cm. 10 branch avg.
Soft Body Scales	Var. Species	Visual	Sm/F	#/sq. cm.	5/7 sq.cm. 10 branch avg.
Leafminers	Var. Species	Visual	Sm	% of tree affected	10% leaves affected
Bronze Birch Borer	Betual	Visual	Sm/F	# exit holes/tree larvae gallaries % dieback in tree	>5/tree >5/tree >10%
Flower Gall Mite	Poplar, Ash	Visual	Sm/F	Presence	10 Branches affected
Leaf Beetles	Var. Species	Pheromone Paper Traps	S/Sm/F	#/sq. cm.	5/7 sq.cm. (10 count avg.)
Web Worm	Various	Visual	Sm	#/tree	>25% of tree affected

Disease

Pest(s) to be Monitored	Species for Monitoring	Monitoring Method	Time of Year	Counting Method	Threshold Indicators
D.E.D.	Ulmus	Visual & Lab Analysis	S/Sm/F	Flagging/Wilting	Presence of D.E.D. Fungus
Dothiorella	Ulmus	Visual & Lab Analysis	S/Sm/F	Flagging/Wilting	20 % die back & positive lab result
Verticillium	Ulmus	Visual & Lab Lab Analysis	S/Sm/F	Flagging/Wilting	20 % die back & positive lab result
Fireblight	Cotoneaster	Visual & Lab	S/Sm/F	Presence	Any infection

Pest(s) to be Monitored	Species for Monitoring	Monitoring Method	Time of Year	Counting Method	Threshold Indicators
	Malus Prunus Sorbus	Analysis			
Environmental	All	Visual & Lab Analysis	W/S/Sm/ F	% of Tree Affected	>25%
Blackknot	All Prunus	Visual	S/Sm/F/ W	# of knots on Tree	1 or more per tree once in main trunk cannot be managed
Bacterial Wetwood	Ulmus	Visual	S/Sm/F	Presence	Area affected > 26 sq. cm.
Anthracnose	Fraxinus, Platanus, Cornus/ Quercus/ Acer	Visual	S/Sm	Lesions/Leaf	5 per leaf
Chlorosis	All	Visual	Sm/F	% Tree Affected	> 20%
Leaf Spots	All	Visual & Microscopic	S/Sm	% coverage # spots/5 leaves	50% of tree 5 per leaf
Phytophtohora (cinnamoni)	Var. Species	Visual	S/Sm	% of leaf loss	1 canker on main stem
Scab	Crabapples, Pears, and Cherry	Visual	S/Sm	Lesions/Leaf	5/Leaf or On Petiole

APPENDIX “L”

THE TREE DONATION PROGRAM

1.0 BACKGROUND

The City of Regina recognizes the important contribution the citizens of Regina can make to the protection, enhancement and maintenance of the City's urban forest. Since 1998 the City has made excess trees at the City nursery available to community organizations for planting in public open space. A number of community organizations (primarily Home and School Associations) have taken advantage of this opportunity. In recognition of the community's interest in enhancing the urban forest, the City of Regina proposes to establish a formal, on-going tree donation program. To ensure that appropriate trees are available, 100 trees will be identified annually for this purpose.

2.0 PURPOSE

The purpose of the Tree Donation Program is to encourage public involvement in enhancing the urban forest by making trees from the City nursery available to community organizations for planting on public land. It is the intent of the program to enhance open space opportunities on public lands that are accessible to the general public.

3.0 TREES DONATED TO COMMUNITY ORGANIZATIONS

3.1 Eligibility

Registered non-profit organizations, Student Representative Councils and Parent Teacher Associations with an interest in the urban forest would be eligible to request donations. Community associations with high tree vacancy percentages as per the City's tree inventory may submit requests for tree donations.

3.2 Public Land

Donated trees may be planted on public land with the consent of the property owner where tree plantings would be of benefit to the community. Public land includes land owned or under control of the City of Regina, the provincial or federal governments and the Wascana Centre Authority.

3.3 The Criteria for Assessing Projects

The following criteria shall be applied in assessing projects. Each criteria should be weighed and projects prioritized based upon the sum total of all criteria.

3.3.1 The project should be of benefit to the community and accessible to the general public.

3.3.2 The project should create a desirable landscape or enhance the existing landscape

design.

3.3.3 The functional purpose of the landscaping is an important consideration. Landscaping can provide: shade protection; wind protection; define an area; screen an unsightly view; or provide a wildlife habitat etc.

3.3.4 The context in which the landscaping is to occur is also a consideration. The applicant should explain any unique features of the site. For example, if the site has a lot of pedestrian or bicycle traffic, this should be explained in the application.

3.3.5 The trees should be planted with the safety and security of the users of the open space a prime consideration.

3.3.6 The availability of the appropriate species and size of trees at the City nursery for a particular site should be taken into account.

3.3.7 Maintaining the continuity of the existing landscape should be a consideration.

3.3.8 Those sites with a greater public visibility should be assigned a higher priority.

3.3.9 Potential conflict with existing infrastructure or other projects planned for the site must be considered.

3.3.10 Sites that are easy to maintain should be given a higher priority.

3.3.11 The likelihood of the trees surviving on the site should be considered.

3.4 Application Preparation

Each application must include the following information.

3.4.1 A description of the project including:

i) the project location;

ii) the anticipated benefits the project will provide to users/the community;

iii) who will benefit from the project; iv) a Tree Planting Plan showing

a) the proposed planting locations in relation to the existing elements (play apparatus, amenities, furniture);
b) the existing plant material, their sizes, species and quantities, and
c) identify any underground utilities and irrigation systems.

3.4.2 Applicants must include a letter of approval from the property owner of the land if the trees are not to be planted on City property.

3.4.3 Applicants must provide evidence they have sufficient funds to cover the costs of the project.

3.4.4 Applicants must provide a letter indicating which organization is assuming responsibility for the ongoing maintenance of the trees and for their removal in the event they become diseased or die.

3.5 Responsibilities of the Organization

- The organization is responsible for arranging delivery and paying a private contractor to move the trees.
- The organization shall plant the trees according to the Tree Planting Plan approved by Planning and Design Division.
- The organization shall prepare the site and plant and stake the trees according to the City of Regina specifications.
- The organization shall water the trees twice a month for a period of three years.
- The organization shall not remove or relocate the trees without the prior approval of the City of Regina.

3.6 Timelines

Applications for trees must be received before March 1. The Review Committee will advise the applicants if their application is approved prior to April 1. The trees may be planted between May 15 and June 30 or between September 15 and October 31 depending on weather conditions.

3.7 Approval

A Review Committee will review the requests for trees. Organizations will be notified by letter whether their request was approved. Successful applicants will be sent a letter outlining the organization's responsibilities for their signature. Once the signed document has been returned, the organization can contact Urban Forestry Section to arrange delivery of the trees. The organization is required to arrange the time of delivery with the tree spade company.

3.8 Financial Requirements

There will be no cost for the trees but the organization will be responsible for all labour and equipment charges associated with moving the trees from the City nursery to the approved site.

3.9 Implementation and Inspection

Successful applicants will be provided with a brochure describing the proper procedure for planting trees. The Urban Forestry Section will inspect the newly planted trees to ensure compliance with the approved Tree Planting Plan. Any deficiencies will be reported to the Grants and Services Coordinator who will discuss the matter with the organization. Organizations who fail to meet their obligations may not be given additional trees.

APPENDIX “M”

THE MASTER TREE PLANTING

AND

CITY NURSERY PRODUCTION PLAN

1.0 THE MASTER TREE PLANTING AND CITY NURSERY PRODUCTION PLAN

The following tables prioritize the tree planting sites for both new tree plantings and replacements for the City of Regina. Based upon an estimated planting rate of 2000 trees per year (1150 new developments and 850 replacements) it would take 15 years to complete the new tree plantings and 11 years to complete the replacement plantings. Of the total 2,000 trees to be planted each year it is anticipated that approximately 1500 trees will be provided by the City nursery and 500 purchased from private nurseries.

2.0 THE MASTER TREE PLANTING PLAN

2.1 New Tree Plantings

New planting locations were identified based on a conceptual Master Tree Planting Plan developed by the Landscape Design Section. The plan is consistent with the recommendations of the Development Plan for the City of Regina and describes where new plantings would most enhance the over-all appearance of Regina's streetscape. The specific number of trees or cultivars identified in the conceptual master plan may change when a detailed design plan is developed for each site. Map 3 on the following page illustrates new tree planting sites.

Table 1: New Tree Plantings

1) **Ceremonial Routes**

Sector	Street	Location	Estimated Number of Trees	Species/Cultivars
80	Elphinstone	Sask. Drive → Exhibition Park Entry • Both sides	40	Rosybloom Crab 10 Kelsey 10 Red splendor 10 Selkirk 10 Thunderchild
Total			**40**	

2) **Gateways**

Sector	Location	Estimated Number of Trees	Species/Cultivars
93	Lewvan & Hwy #1 Intersection	330	110 cottonwood "Manitou" 55 Tower poplar 55 Laurel-leaf willow 55 Siberian larch 55 Scots pine

Sector	Location	Estimated Number of Trees	Species/Cultivars
87	Lewvan & Regina Ave. Intersection	390	130 cottonwood "Manitou" 65 Tower poplar 65 Laurel-leaf willow 65 Siberian larch 65 Scots pine
85	Lewvan & Regina Ave. Intersection	6	2 cottonwood "Manitou" 1 Tower poplar 1 Laurel-leaf willow 1 Siberian larch 1 Scots pine
6	Pasqua St. & 9th Ave. N. Intersection	270	90 cottonwood "Manitou" 45 Tower poplar 45 Laurel-leaf willow 45 Siberian larch 45 Scots Pine 40 Assiniboine poplar
7	Albert St. & RingRd. Intersection * Planting inside the cloverleafs	480	120 cottonwood "Manitou" 80 Tower poplar 80 Laurel-leaf willow 80 Siberian larch 80 Scots pine 40 Assiniboine poplar
60	Albert St. & Hwy #1 Intersection	540	180 cottonwood "Manitou" 90 Tower poplar 90 Laurel-leaf willow 90 Siberian larch 90 Scots pine
64	Ring Road & Victoria Ave. E. Intersection	30	10 cottonwood "Manitou" 5 Tower poplar 5 Laurel-leaf willow 5 Siberian larch 5 Scots pine
69	Ring Road & Victoria Ave. E. Intersection	450	150 cottonwood "Manitou" 75 Tower poplar 75 Laurel-leaf willow 75 Siberian larch 75 Scots pine
69	Prince of Wales Ave. & Victoria Ave. E. Intersection	85	45 cottonwood "Manitou" 10 Tower poplar 10 Laurel-leaf willow 10 Siberian larch 10 Scots pine
TOTAL		**2,581**	

3) **Major Arterial Intersections**

Sector	Location	Estimated Number of Trees	Species/Cultivars
17	McCarthy Blvd. & 9th Ave. N. Intersection	153	77 Shubert chokecherry 38 American mountain ash 38 Dropmore linden "Wascana"
17	McCarthy Blvd. & 9th Ave. N. Intersection	12	6 Schubert chokecherry 3 American mountain ash 3 Dropmore "linden" "Wascana"
6	Argyle St. N. & 9th Ave. N. Intersection	21	11 Schubert chokecherry 5 American mountain ash 5 Dropmore lindenWascana
6	Argyle St. N. & 9th Ave. N. Intersection	32	16 Schubert chokecherry 8 American mountain ash 8 Dropmore linden "Wascana"
66	Arcola Ave. & Ring Road Intersection	32	16 Schubert chokecherry 8 American mountain ash 8 Dropmore linden "Wascana"
66	Arcola Ave. & Ring Road Intersection	273	137 Schubert chokecherry 68 American mountain ash 68 Dropmore linden "Wascana"
Total		**523**	

4) **Major Arterials**

Sector	Street	Location	Estimated Number Of Trees	Species/Cultivars
6	Pasqua	Stapleford → N.Sector L. • Both sides	60	35 White spruce 25 Black ash "Fallgold"
9	Pasqua	S.Sector L. → N. Sector L.	510	298 White spruce 212 Black ash "Fallgold"
16	9th Ave. N.	McIntosh → Pasqua • Both sides	338	158 Silver maple 180 Black ash "Fallgold"
9	Pasqua	S.Sector L. → N. Sector L. • Both sides	450	250 Scots pine 200 cottonwood "Manitou"
18	Rochdale	Pasqua → McIntosh • Both sides	502	293 White spruce 209 Black ash "Fallgold"
9	Pasqua	S.Sector L. → N. Sector L. • Both sides	450	250 Scots pine 200 cottonwood "Manitou"

Sector	Street	Location	Estimated Number Of Trees	Species/Cultivars
93	Hwy #1	W. Sector L. → Albert	423	235 Scots pine 188 cottonwood "Manitou"
59	Hwy #1	Albert → E. Sector L. • South Side	150	62White willow "Golden" 88 Green ash "Patmore"
59	Albert	Hwy #1 → N. Sector L. • West side	57	33 White spruce 24 Black ash "Fallgold"
59	Albert	S.Sector L. → Gordon Rd. • West side	153	89 White spruce 64 Black ash "Fallgold"
30	Dewdney	Train Tracks → Broad St. • South side	73	73 Green ash "Patmore"
60	Ring Road	W.Sector L. → N. Sector L. • South side	219	90 White willow "Golden" 129 Green ash "Patmore"
11	McCarthy	Dewdney → 8th Ave. • West side	62	38 Colorado spruce (mix blue & green) 24 Green ash "Patmore"
12	McCarthy	Mikkelson → 1st Ave. No. • Both sides	200	120 Colorado spruce (mix blue & green) 80 Green ash "Patmore"
15	McCarthy	Eden Ave. → Storm Channel • Both sides	34	34 White willow "Golden"
19	McCarthy	9th Ave. N. → Rink Ave. • East side	104	64 Colorado spruce (mix blue & green) 40 Green ash "Patmore"
20 & 21	9th Ave. N.	McCarthy → Courtney • Both sides	706	392 Scots pine 314 cottonwood "Manitou"
93	Lewvan	Hwy #1 → N. Sector Line • Both sides	130	72 Scots pine 58 cottonwood "Manitou"
93	Hwy.#1	Lewvan → E. Sector L. • Both sides	178	89 White willow "Golden" 89 cottonwood "Manitou"
93	Lewvan	S.Sector L. → N. Sector L. • Both sides	450	250 Scots pine 200 cottonwood "Manitou"
91	Lewvan	S.Sector L. → N. Sector L. • Both sides	450	250 Scots pine 200 cottonwood

Sector	Street	Location	Estimated Number Of Trees	Species/Cultivars
				"Manitou"
89	Lewvan	S.Sector L. → N. Sector L. • Both sides	454	252 Scots pine 202 cottonwood "Manitou"
87	Lewvan	S.Sector L. → Regina Ave.	292	162 Scots pine 130 cottonwood "Manitou"
80	Lewvan	11th Ave. → Dewdney Ave. • Both sides	307	179 White spruce 128 Black ash "Fallgold"
60	Ring Rd.	S.Sector L. → Wascana Parkway • South side	140	58 White willow "Golden" 82 Green ash "Patmore"
51	Saskatchewan Dr.	St. John St. → Winnipeg St. N. • North side	72	36 Green ash "Patmore" 36 Black ash "Fallgold"
61	Arcola Ave.	Atkinson → Reynolds • North side	40	20 Green ash "Patmore" 20 Black ash "Fallgold"
39	Ring Road	CNR Tracks → Access Ramps	210	140 Colorado spruce (mix blue & green) 70 cottonwood "Manitou"
67	Ring Road	Assiniboine → N.Sector L. • Both sides	60	25 White willow Golden" 35 Green ash "Patmore"
67	Ring Road	S.Sector L. → Arcola	541	223 White willow "Golden" 318 Green ash "Patmore"
67	Arcola	Ring Road → E. Sector L.	632	384 Colorado spruce (mix blue & green) 248 Green ash "Patmore"
66	Arcola	Ring Road → S.Sector L. • North side	28	17 Colorado spruce (mix blue & green) 11 Green ash "Patmore"
66	Arcola	Ring Road → Park • North side	115	115 Colorado spruce (mix blue & green)
66	Ring Road	Arcola → Victoria Ave. E.	250	103 White willow "Golden" 147 Green ash "Patmore"
61	Victoria Ave. E.	Park → Abbott • North side	24	24 Silver maple
65	Victoria Ave. E.	Ring Road → Fleet	162	76 Silver maple

Sector	Street	Location	Estimated Number Of Trees	Species/Cultivars
		• Both sides		43 Green ash "Patmore" 43 Black ash "Fallgold"
39	Ring Road	Ross → N. Sector L. • Both sides	530	106 White willow "Golden' 85cottonwood "Manitou" 339 Colorado spruce (mix blue & green)
39	Ring Road	S. Sector L. → McDonald • Both sides	114	23 White willow "Golden" 18 cottonwood "Manitou" 73 Colorado spruce (mix blue & green)
72	Arcola	City Limit → N. Sector L. • Both sides	918	565 Colorado spruce (mix blue & green) 353 Green ash "Patmore"
69	Arcola	S.Sector L. →W. Sector L. • Both sides	442	272 Colorado spruce (mix blue & green) 170 Green ash "Patmore"
73	Victoria Ave. E.	Fleet → City Limit • Both sides	608	284 Silver maple 162 Green ash "Patmore" 162 Black ash "Fallgold"
38 & 40	Dewdney	Fleet → P.O.W. • North side	447	275 White spruce 172 Silver maple
9	Pasqua	From 249M N.Sector L. → Hwy. #11	88	49 Scots pine 39 cottonwood "Manitou"
Total			**12,166**	

2.2 The Tree Donation Program

The purpose of The Tree Donation Program is to encourage public involvement in enhancing the urban forest by making trees from the City nursery available to community organizations for planting. The following table shows the species and quantities that will be required for the program based on an annual allotment of 100 trees.

Table 2: The Tree Donation Program

Number Of Trees	Species/Cultivars
100 per year x 15 years =	20% Ash – 150 Manchurian, 75 Patmore, 75 Fallgold 20% Linden – 150 American, 75 Little leaf, 75 Dropmore

1500 trees	20% Coniferous – 150 Colorado spruce, 75 Scots pine, 75 Siberian larch 20% Ornamentals – 75 Thunderbird crab, 75 Radiant crab, 150 Schubert chokecherry 20% Shade Trees – Poplar (75 Assiniboine, 75 Northwest) Willow (45Laurel-leaf, 30 Prairie cascade), 30 Paper birch, 30 Burr oak, 15 Manitoba maple

2.3 Total New Tree Plantings

A preliminary review of potential tree planting locations indicates the following numbers for new plant location opportunities. Further site specific exploration is required to verify plant counts and locations. The following numbers are not intended to imply a conclusive and exhaustive study. Rather they are intended to reflect an obvious visual deficiency in existing plantings. Further investigation may reveal that some of the existing plantings may not be sufficient or appropriate in their specific locations and additional plantings, plant removal or relocation may be suitable in certain circumstances.

1)	Ceremonial Routes:	Ornamental Flowering Design: 40
2)	Gateways:	Coniferous: 850 Deciduous Canopy: 1700
3)	Priority One Intersections:	Ornamental Deciduous: 390 Deciduous Canopy: 130
4)	Priority One Streets:	Coniferous: 5500 Deciduous: 7000

Species exchange for replacements should only occur when there is a compelling reason to do so, with the intent of guarding the integrity of the original planting scheme. If appropriate, an alternate species or cultivar can be selected for replacement in consultation with the Design Section.

The following table shows the estimated total new tree plantings for all sites.

Table 3: Estimated Total New Tree Plantings

Priority	**Estimated Number of Trees**
1) Ceremonial Routes	**Estimated Number of Trees**
Rosybloom crab “Kelsey”	10
Rosybloom crab “Red spendor”	10
Rosybloom crab “Selkirk”	10
Rosybloom crab “Thunderchild”	10
Total:	**40**
2) Gateways	**Estimated Number of Trees**
Scots pine	426

Priority	Estimated Number of Trees
Siberian larch	426
Laurel-leaf willow	426
cottonwood “Manitou” (males)	837
Tower poplar	426
Total:	**2,581**
3) Major Arterial Intersections	**Estimated Number of Trees**
Shubert Chokecherry	263
American mountain ash	130
Dropmore linden “Wascana”	130
Assiniboine poplar	40
Total:	**523**
4) Major Arterials	**Estimated Number of Trees**
Colorado spruce (mix blue & Green)	2,127
White spruce	1,202
Scots pine	2,162
Green ash “Patmore”	2,059
White willow “Golden”	813
cottonwood “Manitou”(males)	1,993
Black ash/ “Fallgold”	1,103
Silver maple	714
Total:	**12,166**

5) The Tree Donation Program	Estimated Number of Trees
Manchurian ash	
Patmore Ash	150
Fallgold ash	75
American linden	75
Little-leaf linden	150
Dropmore linden	75
Colorado Spruce	75
Scots pine	150
Siberian larch	75
Thunderbird crab	75
Radiant crab	75
Schubert chokecherry	75
Assiniboine poplar	150
Northwest poplar	75
Laurel-leaf willow	75
Prairie cascade willow	45
Paper birch	30
Burr oak	30
Manitoba maple	30
	15

Priority	Estimated Number of Trees
Total:	**1,500**
Grand Total:	**16,810**

3.0 TREE REPLACEMENT PRIORITIES

Replacement vacancies were identified from the tree inventory worksheets. The species/cultivars to be planted at each site were selected from the tree species list provided in Appendix "C" section 3.0 Species Selection. The need for species diversity was also considered by using the formula described in Appendix "C" Table 1: Species Diversity. Replacement trees shall be prioritized in the following order.

3.1 Streets

Table 4: Street Tree Replacement Priorities

1) Ceremonial Routes

Sector	Street	Estimated Number of Trees	Species/Cultivars
10	6000 Dewdney Ave.	4	American linden
Total		**4**	

2) Gateways

Sector	Street	Estimated Number of Trees	Species/Cultivars
6	100 – 300 Pasqua St.	15	American linden
Total		**15**	

3) Major Arterials

Sector	Street	Estimated Number of Trees	Species/Cultivars
23	6700 – 7300 Rochdale Blvd.	19	Green ash
15	100 – 400 McCarthy Blvd.	18	Green ash
17	700 – 1000 McCarthy Blvd.	19	Green ash
34	800 – 1100 Broad St.	9	American linden
Total		**65**	

4) Minor Arterials

Sector	Street	Estimated Number of Trees	Species/Cultivars
39	200 – 400 Park St.	50	American linden
39	500 – 600 Park St.	5	Green ash
39	100 – 700 McDonald St.	70	35 Green ash/35 Silver maple
38	1100 – 1300 Fleet St.	12	American linden
32	2100 – 2300 – 4th Ave.	7	Green ash
21	1011 – 1167 Dorothy St.	12	American linden
5	100 – 200 Argyle St.	10	American linden
6	100 – 400 Argyle St.	13	American linden
8	500 – 800 Argyle St.	18	Green ash
14	4200 – 4900 Sherwood Dr.	5	Silver maple
15	5000 – 5700 Sherwood Dr.	14	Silver maple
15	6100 Sherwood Dr.	5	Green ash
15	6500 Sherwood Dr.	1	Green ash
15	6700 – 7407 Sherwood Dr.	9	Green ash
11	6800 – 7300 Dewdney Ave.	24	American linden
1	1000 Elphinstone St.	8	Green ash
91	4200 – 4600 Pasqua St.	10	American linden
89	3100 – 3800 – 25th Ave.	12	Schubert chokecherry
70	2 – 155 University Park Dr.	3	Green ash
71	1900 – 2200 Assiniboine Ave.	12	American linden
71	100 – 900 College Ave.	60	30 Green ash 30 American linden
57	2100 Grant Rd.	3	Green ash
58	3364 Grant Rd.	14	Green ash
59	2408 – 3216 Grant Rd.	6	Green ash
58	1600 – 2013 Grant Dr.	7	Green ash
58	4008 – 4221 Hillsdale St.	35	American linden
55	2200 – 2500 Parliament Ave.	2	American linden
90	4200 – 4300 Rae St.	13	Green ash
90	3100 – 3300 Gordon Rd.	8	Green ash
91	3400 – 3600 Gordon Rd.	5	Green ash
57	2401 – 2504 Gordon Rd.	2	Green ash
58	3 – 199 Massey Rd.	26	American linden
34	1900 – 2200 – 12th Ave. N.	26	Green ash
35	1100 – 1415 – 12th Ave. N.	4	Green ash
35	1709 – 12th Ave. N.	2	Green ash
56	1100 – 23rd Ave.	4	Green ash
32	1900 – 2000 – 6th Ave. N.	8	Green ash
Total		**525**	

5) Boulevard Trees – Each year the City receives requests from the public to have trees planted on the boulevards adjacent to their property. An attempt is made to accommodate these requests when the City is planting in the area. Three hundred trees will be set aside annually for this purpose. Since boulevard trees fall along major arterials, minor arterials or residential streets, these numbers will be reduced by 300 each year.

6) Residential Streets I - The following are those sectors with a 10 per cent greater vacancy rate. The sectors have been prioritized in order of the greatest vacancy rate.

Sector	Percentage Vacancy	Estimated Number Of Trees	Species/Cultivars
74	56%	58	38 American linden 10 Schubert chokecherry 10 Thunderchild crab
92	40%	209	100 Colorado spruce 50 Patmore ash 30 Thunderchild crab 29 Schubert chokecherry
62	24%	231	100 American linden 50 Patmore 50 Manchurian ash 20 Thunderchild crab 11 Schubert chokecherry
39	24%	344	100 Patmore ash 100 Manchurian ash 75 American linden 50 Fallgold black 19 Schubert chokecherry
27	23%	333	50 American linden 25 Little-leaf linden 25 Norlin linden 75 Radiant crab 58 Schubert chokecherry 33 Patmore ash 33 Manchurian ash 34 Bergeson ash
73	19%	191	50 Manchurian ash 50 Schubert chokecherry 50 American linden 41 Radiant crab
40	18%	379	50 American linden 50 Dropmore linden 50 Patmore ash

Sector	Percentage Vacancy	Estimated Number Of Trees	Species/Cultivars
			50 Manchurain ash 50 Thunderchild crab 50 Strathmore crab 50 Schubert chokecherry 29 Japanese lilac
14	18%	128	75 American linden 25 Manchurian ash 28 Thunderchild crab
38	16%	203	100 American linden 50 Little leaf linden 30 Thunderchild crab 23 Schubert chokecherry
25	15%	266	50 Patmore ash 50 Manchurian ash 50 American linden 50 Norlin linden 36 Thunderchild crab 30 Schubert chokecherry
6	12%	124	50 American linden 25 Little leaf linden 25 Manchurian ash 24 Strathmore crab
64	11%	67	30 American linden 20 Manchurian ash 17 Thunderchild crab
72	11%	185	50 American linden 50 Patmore ash 50 Thunderchild crab 35 Schubert chokecheery
16	10%	103	50 American linden 30 Fallgold black 23 Thunderchild crab
Total		**2,821**	

7) Residential Streets II – After the Residential Streets I have been exhausted, vacancies in the remaining sectors (see attached list) can be planted in order of the greatest vacancy rate as identified in Appendix "B" Sector Profiles.

Number Of Trees	Species/Cultivars
3664	30% Ash – 366 Patmore, 366 Manchurian, 367 Fallgold black 30% Linden – 366 American, 366 Little leaf, 183 Dropmore, 184 Norlin 20% Crab – 183 Almey, 183 Kelsey, 183 Thunderchild, 184

	Strathmore 15% Cherry – 550 Shubert cherry 5% - Syringa - 183 Japanese lilac

3.2 Parks, Buffers and Floodplains

Replacement of trees in parks, buffers and floodplains will occur at the rate of approximately 200 trees per year.

Table 5: Parks, Buffers and Floodplains

Number Of Trees	Species/Cultivars
200 per year x 11 years = 2200 trees	20% Ash – 220 Manchurian, 110 Patmore, 110 Fallgold black 20% Linden – 220 American, 110 Little leaf, 110 Dropmore 20% Coniferious – 220 Colorado spruce, 110 Scots pine, 110 Siberian larch 20% Ornamentals – 220 Schubert chokecherry, 110 Thunderchild crab, 110 Radiant crab 20% Shade trees – poplar (110 Assiniboine, 110 Northwest), willow (55 Laurel-leaf, 55 Prairie cascade) 50 Paper birch, 30 Burr oak, 30 Manitoba maple

3.3 Golf Courses

There are four golf courses within the city limits. The City is currently in the process of developing a Golf Course Management and Financial Plan. The identification of the tree replacement and enhancement needs for the golf courses should be done within the context of this management plan and a Master Tree Plan for each golf course.

3.4 Total Replacement Plantings

The following table shows the total replacement plantings for all sites.

Table 6: Estimated Total Replacement Plantings

Priority	**Estimated Number of Trees**
A. Streets	Estimated Number of Trees
1) Ceremonial Routes	Estimated Number of Trees
American linden	4
Total:	**4**
2) Gateways	Estimated Number of Trees
American linden	15
Total	15
3) Priority I Streets (Major Arterials)	Estimated Number of Trees
Green Ash	56

Priority	Estimated Number of Trees
American linden	9
Total:	**65**
4) Priority One Streets (Minor Arterials)	Estimated Number of Trees
American Linden	236
Green Ash	223
Schubert chokecherry	12
Silver Maple	154
Total:	**525**
5) Residential I	Estimated Number of Trees
Little-leaf linden	100
American linden	718
Norlin linden	75
Schubert chokecherry	315
Patmore ash	383
Manchurian ash	403
Bergeson ash	34
Fallgold black ash	80
Thunderchild crabapple	294
Radiant crabapple	116
Strathmore crabapple	74
Colorado spruce	100
Japanese lilac	29
Total:	**2,721**
6) Residential II	Estimated Number of Trees
Patmore ash	366
Manchurian ash	366
Fallgold black ash	367
American linden	366
Little leaf linden	366
Dropmore linden	183
Norlin linden	184
Thunderchild crabapple	183
Almey crabapple	183
Kelsey crabapple	183
Strathmore crabapple	184
Schubert chokecherry	550
Japanese lilac	
Total:	**3,664**

B. Parks, Buffers and Floodplains	Estimated Number of Trees
Manchurian ash	220
Patmore ash	110
Fallgold black ash	110
American linden	220
Little leaf linden	110

Priority	Estimated Number of Trees
Dropmore linden	110
Colorado spruce	220
Scots pine	110
Siberian larch	110
Schubert chokecherry	220
Thunderchild crabapple	110
Radiant crabapple	110
Assiniboine poplar	110
Northwest poplar	110
Laurel-leaf willow	55
Prairie cascade willow	55
Paper birch	50
Burr oak	30
Manitoba maple	30
Total:	**2,200**
Grand Total:	**9,194**

4.0 ESTIMATED TOTAL TREE PLANTINGS

The following table shows the estimated total for the new tree plantings and replacements for the city.

Table 7: Total Tree Plantings

Type of Planting	Estimated Number of Trees
New tree plantings	**16,810***
Replacement plantings	**9,194****
Grand Total:	**26,004**

* New tree plantings will require 15 years to complete.
** Replacement plantings will require 11 years to complete.