

THE URBAN FOREST-MANAGING PART OF THE LANDSCAPE AROUND US

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INTRODUCTION

Urban forest is a term seen with increasing frequency to describe a portion of our North American landscape. At face value it appears to be a useful and descriptive term, yet it has stirred some controversy and remains without unanimous meaning. It is a term that embodies a number of concepts that heretofore have remained unfocused since man began to establish permanent dwellings in a planned fashion in the wooded lands of the continent.

A transition in values has occurred since the early days when the tree resource was seen only to be exploited. Today, encroachment into existing woodland is coupled with outspoken public demands for preservation of forest character and with new residential areas yielding greater returns to the developer if tree retention on public or private land has been pre-planned and accomplished successfully. Often this is not the case and the unsuspecting home buyer or understaffed and underbudgeted municipal park department inherits a costly, dangerous incubus. Many professionals who, at first thought, should be able to provide either informed assistance once the problem is recognized or a holistic management approach during the early planning process, are ill prepared both by formal education or by experience for the complex problems that characterize the interface between wooded lands and urban development.

Land that has been set aside through the early foresight of urban planners or through the dictates of certain greenspace guidelines per unit of population have often fared somewhat better than treed lands subject to very recent disturbance for residential or commercial development. Nature has great capacity to heal the scars of man's past intrusions. Yet these areas too, are not without increasing need for careful planning and expert care. While, on the one hand, mature trees suffer from severe environmental stress in newly developed areas, on the other hand, the quiescent atmosphere of established park land belies the dynamic nature of the forest as it evolves from seedling through maturity to death and decay. How we manage the treed element of our urban communities will perhaps reflect our broader resolve to provide stewardship for our global environment. If we are successful then there is hope that we will not irrevocably spoil our limited world.

We can already articulate much of the pure science involved in understanding biological resources. What we have yet to accomplish is a systematic approach integrating our scientific understanding with the administrative necessities of complex society. To produce commonly accepted management strategies that adequately reflect human values, that respond to the limitations imposed by biological principles and that will accommodate the restraints inherent in the bureaucracy of formality and fairness, will take sometime yet. It will not

come to pass, however, if we fail to try and understand the processes involved or if we do not advocate change when change is needed.

It is perhaps most useful to actually describe the management of some specific types of area that might form part of the overall treescape within or surrounding a community. Some basic ideas are presented in a later section on how the management of individual parts may be woven into an overall framework. No one profession can claim to have the expertise necessary to prepare the working documents or information implicit in such a framework. Moreover, a considerable amount of synthesis is required to integrate administrative and "political" requirements with biophysical data. This writer feels strongly that it is only in a team setting that this is possible. It is here that the landscape architect can contribute his or her talents to the development of an overall treescape plan for a community. It is also here that the landscape architect can provide the advocacy so necessary to catalize the thoughtful planning of this element of our urban environment.

A variety of definitions have appeared for urban forestry. It must be recognized that considerable confusion and perhaps even less agreement exists over what the total involvement with this special form of forestry should be called. The terms "urban forestry, municipal forestry, city forestry and community forestry" are often used. Some people believe, also, that involvement with trees in urban areas should not be called forestry at all but more properly arboriculture. It can be said, however, that "urban forestry" is an appropriate umbrella under which all matters concerning the urban treed environment should fall. It is a term with which many people are now familiar and has wide application. Perhaps the most obvious problem is where the term is applied to small towns in rural areas. Other terms, however, also present problems. "Municipal Forestry" implies a forest program directed only to City owned or City controlled trees. "Community Forestry" seems to restrictive because it seems to refer to either a small town or a particular part of a larger City or urban area. "City Forestry" has the same shortcomings as "Municipal Forestry" and lacks the wide applicability of the more popular term, "Urban Forestry".

The term "Urban Forestry" was first coined by Jorgensen in 1967 but a definition of what was meant by the term was omitted. This defect was not overcome until a paper published by the same author in 1970 wherein urban forestry was defined as:

"Urban forestry is a specialized branch of forestry that has as its objective the cultivation and management of trees and forests for their present and potential contributions to the physiological, sociological and economic well-being of urban society. These contributions include the overall ameliorating affect of trees on their environment, as well as their recreational and general amenity value"

This term has now been accepted by the Canadian Forestry Service as the approved version for implimenting environmental and amenity forestry research. It is clear this definition does not deal entirely with City trees or with single tree management, but rather with tree management in an entire area influenced by, and utilized by, the urban population. This area would normally include the watershed and recreational areas serving an urban community as well as those areas lying between the established boundaries of nearly contiguous municipalities.

A number of other definitions are worthy of brief examination. An example is the urban forestry definition prepared by the Society of American Foresters Urban Forestry Working Group. This definition, is similar in many respects to that given by Jorgensen.

"Urban forestry is a specialized branch of forestry which has as its objective the cultivation and management of trees for their present and potential contribution to the physiological, sociological and economic well-being of urban society. Inherent in this function is a comprehensive program designed to educate the urban population on the role of trees and related plants in the urban environment"

In discussing the definition the work group has noted that two key words are "cultivation" and "management". This follows the approach adopted by Jorgensen. In order, however, to encourage the public participation which should be essential to urban forestry programs, the Society of American Foresters definition include education as an integral part of the definition and thus provide a specific thrust toward a broader understanding of urban forestry by the general public.

Rather than trying to provide a single definition that is all-encompassing, Shafer and Moeller have provided two definitions in their 1979 article Urban Forestry: Its Scope and Complexity. They note that as "urban forestry" has evolved, its underlying premises are seen as "delivering benefits to people through management of forest resources in and near the City". They define the urban forest as "that portion of the urban ecosystem that consists of forest vegetation, water, soil and wildlife in densely populated areas and adjacent lands." A definition is also provided for urban forest management. This is given as "the process through which urban forests are manipulated to provide multiple, long-term benefits to urban society". These latter definitions would appear to exclude some areas that this author would certainly include in the umbrella concept of the urban forest.

Certainly it can be said that urban forestry is the management of vegetation in urban and urbanizing areas if we assume that urban area is taken to mean that man has significantly affected the "natural" ecosystem by creating areas for residence and commerce, and we also include relatively undisturbed natural forest areas around the periphery towns and cities. It becomes clear that all components of the urbanizing treescape

should be included in any appropriate definition. Perhaps a simple way of clarifying the situation without being either inclusive or exclusive is to view the urban forest as comprising all the trees and associated vegetation within and adjacent to urban areas and viewing the urban forest as being made up of several sub-systems. The street tree sub-system probably has received the most intensive management. On the other hand, the park sub-system probably has the longest history of management, going back to the managed "commons" and community woodlots or forests of Europe. Only recently have trees and vegetation on urban private lands, both residential and institutional been actively considered part of the urban forest. It depends, then, on the training, purpose, and flexibility of the individual wishing to define the urban forest as to the type of definition which is useful.

The balance of this paper examines four of the possible sub-sets of urban forest. The four which have been chosen are all components which occur within the urban community. By the same token, it would be possible to extend the management concepts developed here to embrace the urban forest and the various sub-sets as they occur on the periphery of urban communities. In that case, the urban forest would include such discrete components as regional parks, watershed, community forests, wildlife and ecological lands and multiple use forests.

GENERAL MANAGEMENT-MUNCIPAL COMPONENT OF THE URBAN FOREST

Before dealing explicitly with the specific recommendations for tree management, in typical municipal locations it is worthwhile to stress some general principles that should underlie any approach to trees in urban areas.

The first, and obvious point, is that "trees" cannot be divorced from the "land" on which they grow. This is often lost sight of when proposals for management are made. Moreover, in any municipality the overall character of the city as a result of impressions created by "vegetation", rests not only in the resource base created by the municipality on public land, but also in the retention, planting and maintenance of trees and other landscaping on private land. As the bulk of such areas are around private homes, some concern should be centered on residential land. Since such land is "private" and we have a long tradition in Canada of recognizing the individual freedoms that accompany land ownership, the emphasis in the context of tree management on such land must be on public education that encourages citizens to maintain their trees as a vital contribution to the overall treescape of each community.

The second general point concerns the approach taken to the general appearance of the municipality by those responsible for "public" lands. "Approach" is the sum of two separate areas of human perception and is critical and fundamental to the final results that will be achieved in making any municipality a desirable place to live.

The first segment of perception is derived from the residents of a community and is reflected in their choice of elected officials. Such officials bring with them to their respective official duties certain attitudes which, in a democratic society, are assumed to be congruent with the will of majority. These attitudes in turn effect how municipal trees are managed in two ways. Appointed staff of the municipality will take their lead from the attitudes adopted by their elected officials while the tree programs instituted will be a direct result of the priorities set by political direction (policies) and by fiscal limitations.

The second segment of "approach" is that of strategies and style. If it is deemed that the treescape of the city is important to the quality of life in a municipality and that certain tree management policies should be followed, then there are many ways of carrying out both the broad intent of such policies and the specific tasks that flow from them. Four components embody the important pre-requisites that will ensure the appropriate atmosphere for orderly implimentation of an urban forestry program:

- (i) elected officials must have attitudes that support a healthy, expanding, vibrant community treescape and thus a willingness to support specific tree oriented programs at budget time,
- (ii) there must be clear, explicit policies that provide appointed officials with the mandate to carry out such programs,

- (iii) programs must be set in a cohesive management framework that amalgamates, co-ordinates and integrates conflicting needs and differing responsibilities toward an overall goal of a desirable community treescape, and
- (iv) a municipality must have clear standards and methods, adequately supervised, in order to carry out the individual jobs that comprise the projects embodied in its urban forest program.

"Approach" then might be suggested as the sum of two separate areas of human perception and is critical and fundamental to the final results that will be achieved in making a town a desirable place to live. If any one of the components discussed above are not the case, then the municipality cannot hope to have a viable urban forest resource that engenders civic pride and sets an example for private, commercial and industrial development. This point also embodies with how we all think about trees. In this case, it is possible to apply a simple test: are trees in the community to be considered an asset or a liability? If the answer is an asset, then the community can readily justify:

- (a) some investment in the resource, and;
- (b) comprehensive management of the resource.

This section now outlines a suggested overall management format in which an urban forest program could be prepared for any municipality. The format has four basic parts:

- (i) an inventory
- (ii) a statement of objectives
- (iii) a plan and;
- (iv) a timetable

(i) Inventory

In order to manage any resource adequately, it is essential to have an accurate picture of the tree resource by location, description and condition. Since trees and land go together as an integral unit, it is necessary to also identify and provide a legal description of the land resource associated with each component of the tree resource. For example; park boundaries provide a specific identifiable location commonly understood by all municipal managers.

(ii) Statement of Objectives

The Statement of Objectives should probably have two tiers. The first should be a broad statement of expectations and intent prepared and endorsed by those responsible for a municipal urban forest area. An example would be:

"The Council of this City recognizes the substantial contribution that trees make to the landscape of the municipality. Council wishes to ensure that the treescape of the City is properly managed and maintained.

Be it, therefore, resolved that City Council endorses a City Tree (or Urban Forest) Program and that this program has the goal of providing, in perpetuity, appropriate, healthy, safe and beautiful trees and treed areas throughout the City. This Program is established in order to create and maintain an attractive central business district, peaceful residential streets, improved commercial or industrial landscape, safe, pleasing parks as well as other production and useful treed lands."

This simple statement of a goal and objectives would then provide the essential underpinning for an Urban Forest (or City Tree) Program and the appropriate mandate to appointed officials for the development of more detailed objectives and implementation of individual projects.

(iii) Plan

In order to carry out the overall Program, it is envisaged that an organized Plan would be the most effective management tool. A "MUNICIPAL TREESCAPE MASTER PLAN" would draw together each aspect of the tree resources of the City and unite these under one simple cohesive framework. The extent of detail contained in such a Plan would depend on the priorities placed by Council in its Statement of Objectives. In general, however, the Plan might contain:

Part I

- (a) An Introduction. This would contain a discussion of the use and benefits of trees in the City, an outline of the purpose of the Treescape Master Plan, a discussion of the Plan in relationship to other planning processes in the City, and a discussion of the Plan in relation to the broader objectives of all greenspace management in the Municipality.

- (b) A description of the Municipality. This would examine location, climate, original natural vegetation and history of preservation or removal, topography as well as layout of the city, and location of special areas of historic, geographic, natural or cultural interest. This section would also document briefly the physical makeup of the City in the context of existing land use and zoning.
- (c) A description of the Municipal Tree Resources. This section would combine the information gathered from existing sources, a tree and land inventory of public lands and any important sectors of private lands, along with those areas of open space that had potential for supporting trees. Also included would be those lands where trees were an important adjunct to an existing land use such as watersheds or those areas of dereliction that might be developed to include existing trees. Wherever appropriate this description should address the complete forest ecosystem including soils, drainage, all vegetation and layers forest stand dynamics.
- (d) A description of Program Management. This section would examine and describe the Tree Program in the context of administrative policies, procedures, practices and responsibilities. Also described here would be any subordinate plans that were developed for specific

units of the urban treescape. An example would be brief Park Management Plans. (These are described in greater detail under management of specific areas)

Part II

- (a) A discussion of the Tree Resource. This section would review the history of the municipal treescape to date and appraise its present condition, age, composition and suitability at particular locations. In addition, this section would identify trees or areas of trees for preservation and areas needing improvement or renewal of the resource. Since part of the forest resource will include areas of a complete eco-system, appropriate management of these areas would also be discussed.

- (b) A discussion section on Design. This part of the Plan would review the basic design principles and consideration that would relate to tree planting in the urban context, both on individual private properties and on public property. This would include a short discussion on the various design purposes that trees can fulfill, establish design criteria and objectives, and outline how to assess tree species and their suitability for particular locations.

In the core of the city this section would also outline general design guidelines for civic projects and enumerate specific projects that do or would demonstrate good design.

In the more heavily wooded areas where more extensive tree removal or replacement is anticipated then specific guidance should be provided on techniques that minimize visual impact. Particular examples might be limitations on clearing methods with those utilizing selective thinning being favoured over clear-cutting or specific criteria being set regarding specific composition in replanting areas to ensure that visual monotony does not occur as a result of single species establishment.

(c) A discussion section on Program Opportunities. This section would review and discuss those constraints and opportunities that restricted or governed the program. Included here would be an analysis of the areas that could be planted or thinned. An example would be those areas that should receive some type of silvicultural treatment and those areas or locations that should not. These areas would also have to be split into two categories; those under direct control of the municipality where criteria that would govern the decisions associated with silvicultural or arboricultural treatment would be established, and those areas in private ownership where incentives might be instituted or examples encouraged through assistance from City staff or other appropriate government departments.

In the case of land under municipal control, specific projects would be developed in this section and their relative merits reviewed. In the case of private lands, opportunities for public education, public participation or recreation and possible joint projects with other jurisdictions would be outlined. This section would also contain an outline of the specific standards and regulations that might govern trees in the public domain and the recommendations for guidance to citizens and business in managing private areas.

Part III

The final part of the Treescape Master Plan should embody the dynamic element of this approach. It would provide short and long-term implementation horizons for each project or set of projects in each segment of the overall Program. This can perhaps be best accomplished as a timetable of targets set for each fiscal year, established by priority within the scope of the budget with each accomplishment forming part of the overall program, analogous to taking individual pieces of a jigsaw puzzle to build a picture that is the desired City treescape.

Not only must the Master Plan have a timetable but the actual steps which should be taken prior to this final document must also be scheduled with clear initiation and completion dates set out to ensure that the whole process moves at a deliberate pace and is not overshadowed by other municipal priorities.

MANAGEMENT OF SPECIFIC AREAS

The headings here are not given in any order of priority since each general area is unique in its contribution to the City treescape and all are important. Only four examples are given here since this brief paper is not intended as an exhaustive compilation of management requirements for every component of the urban forest. The following sections do, however, provide an indication of format that might apply in approaching the management of other areas. These areas might include foreshore lands, riverbanks, buffer strips, greenbelt and watershed lands with tree cover, institutional lands, various types of right-of-way corridors and, of course, actual forest land on the periphery of urban communities that has been designated for multiple use.

Designated parklands provide the municipality with an ideal opportunity to maintain the treescape character of the municipality since it has full control of these areas. Such

parkland can be broken into two categories for the purpose of urban forest management; those areas with complete tree cover over much of the area and secondly, those high-use parks, or portions of parks, which are largely grass interspersed with small clumps of trees or single trees.

1. Parkland with closed canopy. Areas of contiguous tree cover provide two types of impression, the distant view and the immediate, which are crucial in providing a basic impression of the natural qualities of the municipality and its desirability as a place to live. Trees are, however, a dynamic resource - they evolve from young seedlings, through mature tree, to death and eventual decay. Although this takes time, certain species of tree, particularly pioneer hardwood may do this in only fifty years. Since most of the treed land in many municipalities has experienced substantial disturbance in the past and, perhaps with the exception of some few conifers and very old hardwoods, has only grown trees from that particular time, the tree resource will largely be of one age class. This means trees can be expected to all become decadent and die within a fairly short span of time. Although this may not occur for some years, in order to ensure a continued, successive

growth and replacement of the tree resource, the first concern is that of ensuring uneven ages within the tree stands of each park. This will ensure that, as trees become overmature and die or are removed, new, younger, vigorous trees will take their place without there being a period between youth and maturity when there are almost no trees in some particular areas. The key, obviously, is in selective thinning, removal and selective replacement on a continuous basis.

In order to ensure orderly, sound, manipulation of the tree resource and to impliment desired silvicultural objectives, it is necessary to develop a detailed inventory of the trees in each park. This inventory should identify species diversity and composition, ages, condition, location, size and numbers. From this information it is possible to identify life expectancy, desirability and opportunities for the resource. From this information, in turn, it is possible to predict needs for repair, removal or replacement. It is then possible to plan actual field practice, and to identify staff, financial and plant material resource needs over time. Important too are the public/political information processes that will be required to explain the reasoning, standards of work and anticipated results that, in turn, will provide continued can public support for such a program.

The objectives of management in each park should be summarized in a brief Park Management Plan. Included in this plan should be a section devoted to the park resources stating the general goal or goals for tree management in all community parks and supported by specific objectives applicable to each specific location. For example, a simple goal would be to:

Maintain in perpetuity appropriate healthy, safe, attractive trees in park woodlands for the enjoyment of all citizens of the municipality.

At first appearance this appears a fairly simple goal. However, to develop a plan, work methods, timetable and staff able to accomplish this, and a tree resource in each park that reflects the full silvicultural implications, takes a determined effort even for large communities with relatively few parks.

Possible management objectives might include, but by no means be limited to:

- (i) ensure there is sufficient age class diversity amongst the tree resource in each park so there is no overall attrition from the resource, with immature additions at least equalling overmature tree and thinning removals.
- (ii) ensure that the character or design of each park, as influenced by the existing tree resource, is not changed by manipulation of the tree canopy, by pressure of usage effecting the health of trees, by new tree establishment or by any unnecessary tree removals. The exception will be when explicit intent to alter the park is contained in the Park Plan and approved by Council.
- (iii) ensure that mature trees predominate in the tree cover of each park and that there is an ecologically appropriate balance of species, tree numbers and conifer to deciduous ratios.

In parkland with only individual trees scattered throughout the area. Open grown trees are, in general, subjected to considerably greater stress than would be the case in a closed canopy situation where the first layer protects the trees from ground compaction and surrounding trees protect individuals from other environmental stress. Single parkland trees must often face stress from root damage caused by constant human or equipment traffic, from watertable fluctuations, from vandalism, from unintentional damage such as mower wounding and from exposure.

Again, it is recommended that a Park Plan containing tree management goals and objectives should be prepared for these types of park. In addition, specific standards for:

- (i) acceptable minimum tree condition for retention in parks,
- (ii) acceptable tree surgery, repair and maintenance,
- (iii) acceptable minimum tree size (height and caliper e.g. 7 meters & 9 centimeters) for establishment
- (iv) acceptable tree species (not too great an emphasis on exotics) and;
- (v) acceptable tree establishment methods (e.g. tree space planting, fertilizing, guying and watering).

In order to provide a framework for the Park Management Plans suggested here, a Park Master Plan can be prepared and adopted which integrates the individual Park Plans and amplifies the recommendations concerning parks made in any Treescape Master Plan or in a Community Plan if one has been developed.

In addition, a Park By-law with specific provision for controlling or prohibiting activities which damage or destroy park trees can be introduced and adopted.

2. Derelict or "Undeveloped" Lands form an important component of a municipal urban forest resource and can often be unknowingly at risk. This is occasioned by two factors. The first concerns the number of mature trees that may contribute substantial benefits to the community but are on older tracts of privately owned land, for example old estate lands. These lands are often broken up for new housing and the tree resource removed.

The second factor relates to holding potential development land for investment but allowing a tree "resource", even though it is only alder, to grow and produce a "woodland" or scrub appearance. In addition, existing large trees often give the impression of a park area. It is not until a development permit application or the start of actual construction that local residents become aware of the potential loss of amenity and any attempt at preservation appears. This is usually too late to effect any major change or regulation of a developer's intentions. These areas can make a major contribution to the appearance of the community but there is no guarantee they will be retained unless specific action is taken long before major development plans are prepared.

Areas of this type should be identified and an organized inventory detailing:

- (i) Legal Description
- (ii) Ownership
- (iii) Area, general location, access, zoning and intended use, value and importance to the community
- (iv) Opportunities and costs

developed in order to establish priorities for possible preservation action. Such action might take the form of an offer to purchase, zoning limitations, negotiations for restricted covenant, education and tax or other incentives for owners to retain the urban forest character of particular areas.

There are often small areas of publically owned "derelict" lands that have not been managed in any intensive manner. The appropriate City Department should maintain an inventory of these areas. It should not be construed that intensive management means negating the natural appearance and condition of an area. Rather, it means that these locations are properly identified and are managed so they do not detract from the overall community. Restoration, clean up, noxious weed control, arboricultural safety, tree planting or removal, control of encroachment and prevention of dumping should all be concerns that are adequately dealt with in the management process.

3. Ravine areas are often of unique natural landscape character but rarely reach their full potential. This can be ascribed to the fact they are "left over" land and fall somewhere on the scale between parkland and derelict land. Ravine land is often vulnerable to encroachment, tree removal, windblow, eroion and fire risk. Unauthorized dumping, water pollution, noxious weed growth and rampant brush growth are also common.

As with parkland, a detailed inventory of large and small ravine land should be conducted and the tree resource assessed. Plans should be made for immediate and future management. Ravine land should be specifically mentioned in any Park By-law and specific provisions included to control dumping.

Potential for recreational useage such as interpretative walks should be explored since ravines offer natural features and plant diversity often unique to an area, particularly when the surrounding land is built-up. Objectives of management should support and exploit the natural characteristics of each valley and water body.

Management of ravine land must, in addition to the normal requirements for tree management discussed for parkland, include an explicit component for priority inspection and regulation. Although a major natural asset to a community, public perception of such areas is often of a natural refuse disposal and firewood supply point. Such activities must be controlled and an aggressive program of public education developed to ensure this component of the urban forest is protected from the ravages of urban man.

4. Boulevard Tree Planting. This type of planting can be one of the most important components of the municipal contribution to the treescape of a community. This type of planting may be broken down by street type and by planting location. Street types are often designated as arterial roads, feeder roads and residential streets. Street tree planting areas include centre boulevards, street triangles, tree lawns, sidewalk cut outs and large container planting. Substantial street tree planting has not been undertaken in many cities despite strong recommendations supporting this activity. This

is unfortunate, particularly in central business districts where tree planting can substantially improve the attractiveness of many commercial areas. Where provision has been made on residential streets for a tree lawn or planting strip, it is vital that tree choice fit the constraints of street clearance, height and width limitations, spacing and distance from street lights, signs and furniture, in order to minimize future maintenance.

Engineering limitations and design criteria should be established as written guidelines for tree planting. Whenever possible, adequate space to ensure a tree growth should be incorporated to overcome the problem of narrow tree planting and landscape islands which are too limited for all but the smallest of tree species.

As with parkland, a Boulevard Tree Master Plan should be prepared. This plan should identify a goal for this component of the communities' treescape program and set clear objectives, for example:

1. The City Boulevard Tree Program should enhance the central business district, residential and public areas of the City to a standard that will ensure that the municipality is an attractive place to live, work or visit.
2. The Boulevard Tree Program should ensure that suitable tree species are chosen for use on appropriate city streets and maintained to a standard that encourages business and private tree planting.

3. The Boulevard Tree Program should be comprehensive, technically competent and fiscally sound.

A simple Boulevard Tree Master Plan might contain:

- (i) A brief introduction containing a discussion of the use and benefits of trees in the streetscape and the purpose of the Master Plan.
- (ii) A description of the City climatically, graphically and topographically.
- (iii) A description of the existing street tree resource.
- (iv) A description of the present street tree management responsibilities, goals, objectives, policies, funding and legislation (if any).
- (v) A discussion section outlining a brief history of the area and its natural tree cover, a history of the present tree resource and an appraisal of the condition, age and suitability of existing street trees.
- (vi) A discussion section examining the constraints that limit tree planting in various parts of the city, such as road improvement, development plans or view restriction. This section of the Master Plan would also discuss public participation and general funding of the Program.
- (vii) A discussion and design section would examine the design opportunities for individual locations and streets; outline possible design objectives and develop actual design plans for priority locations.
- (viii) The actual implementation timetable for individual projects within the overall program would be given for each year of the program for a first five year segment.
- (ix) Plans for a second five year segment would complete the Master Plan which should thereafter be prepared and adopted for a ten year period. Further planning would then be incorporated in a new Street Tree Master Plan at the end of the first ten year program.

- (x) Included in the Master Plan should be provision for updating specific plans as a result of changing conditions in the city or experience of tree management success or difficulty. In this regard, specific projects should be monitored for unanticipated problems and findings feedback into the design process.

A number of operational practices should be adopted to ensure that the Boulevard Tree Program is efficient and fiscally sound. These include:

- (i) A Street Tree By-law.
- (ii) Appointment of a City Arborist or Foreman specifically responsible for all aspects of trees on Municipal property.
- (iii) A properly trained crew with appropriate tools, equipment and knowledge for tree establishment, tree care or tree removal and replacement.
- (iv) A tree inventory of those trees under city management giving location, species and condition in turn, this should be translated into a simple workload analysis that relates work requirements to staff availability.
- (v) A record system that tracks unit costs and tree needs.
- (vi) A community relations program that informs citizens about the program, city policy toward trees, the location of aid and upcoming projects.
- (vii) An information program for developers that outlines tree protection measures, responsibilities and procedures for sidewalk crossings, encroachments, etc.
- (viii) Detailed procedures and practices for tree planting, care and replacement, including specifications, approved methods and equipment, supervision, safety and tree choice.
- (ix) A budget system that is equally keyed to the implementation and maintenance segments of the Street Tree Master Plan.

CONCLUSION

It is possible, with some forethought, to develop a simple framework in which to organize and plan the management of treescape information. Each component of the urban forest can be individually identified and a mini-plan developed to meet specific needs. In turn, these plans can be amalgamated into an overall Master Plan that will provide a community with a detailed document on its urban forest resources. The landscape architect has the skills and opportunity to participate as a resource manager. It remains for him or her to seek out those communities who are keen to retain or enhance their natural forest heritage.

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