URBAN FORESTS & ASSET MANAGEMENT PLANNING - A PRIMER

TOOLKIT PART 2

Green Infrastructure
ONTARIO COALITION

Asset Management Planning

Asset management planning is the process of making the best possible decisions regarding the building, operating, maintaining, renewing, replacing and disposing of infrastructure assets. It does this by assessing and comparing the value and lifecycle costs of different assets. Recently there has been a push to recognize the value of urban forest assets in asset management planning initiatives. The hope is that this will help municipalities justify urban forest budgets and create a framework to ensure urban forest assets are valued and managed for the services they provide to communities, akin to their grey infrastructure counterparts.

This primer provides a high level introduction to asset management planning. It presents a set of green infrastructure asset categories that include urban forest assets, and provides an assessment of the key opportunities and existing challenges the public sector faces when integrating urban forest assets into asset management planning.

ASSET MANAGEMENT PLANNING

The objective of an Asset Management Plan (AMP) is to maximize benefits, manage risk, and provide satisfactory levels of service to the public in a sustainable manner.[1] An AMP includes:

- An inventory of the current condition of infrastructure assets, and an articulation of the desired levels of service expected from these assets;
- The actions needed to achieve the desired levels of service given the full life-cycle costs and risks associated with an asset; and
- A financial plan.

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[1] https://www.ontario.ca/page/building-together-guide-municipal-asset-management-plans

Municipal Decision Making Frameworks

Asset management planning applies a long-term perspective to infrastructure decisions. This allows municipalities to achieve lower total costs by making small but timely renewal investments throughout an asset's life-cycle. Such an approach aims to avoid premature deterioration of the asset, and to manage the trade-off between reinvestment in renewal vs. full replacement. Asset management aims to meet the expected level of service at the lowest possible cost.

Asset management is an important piece of a municipal decision making framework. It is however, just one piece that supports other municipal planning and financial activities. This means the integration of urban forest assets into AMPs will not eliminate the need for integration of urban forest considerations at all levels of municipal decision making.

The guidance offered by the Municipal Finance Officers' Association of Ontario, recommends that municipalities strive to extend the use of their AMP beyond infrastructure decisions to inform municipal financial, strategic, and land use plans. Hence, it is crucial that urban forest assets are included in AMPs in order to ensure that they are managed in a manner that better reflects the value provided to a municipality and its citizens.

Green Infrastructure Assets

Part of the AMP process is defining what assets will be included, so it is important to demonstrate how urban forests are assets for the purposes of an AMP.

Green infrastructure is defined as natural vegetation and green technologies designed to support natural processes. Green infrastructure takes many forms including but not limited to the following: urban forests, natural areas, greenways, streams and riparian zones, meadows and agricultural lands; green roofs and green walls; parks, gardens and landscaped areas, community gardens, and other green open spaces; rain gardens, bioswales, and engineered wetlands. Green infrastructure also includes soil as well as technologies like permeable paving, rain barrels, cisterns and structural soils.

Table 1 proposes that green infrastructure assets can be grouped into three asset categories that range from living to engineered. The table also illustrates how different green infrastructure focus areas have assets that span the three categories. Generally, engineered assets will be the easiest to integrate into asset management planning (some may already be included), but for urban forest assets it is important that mixed and living assets be integrated into AMP frameworks as well.

Table 1: Green Infrastructure Asset Categories

ASSET CATEGORY	GREEN INFRASTRUCTURE FOCUS AREAS			
	Urban Forest	**Stormwater**	**Parks & open space**	**Agriculture & urban agriculture**
Living	• Forest/woodlot • Park tree • Street tree • Soil	• Wetland • Stream • Pond	• Meadow • Soil	• Agricultural land • Community garden • Soil
Mixed living & engineered	• Soil cell • Engineered soil	• Green roof • Bioswale • Rain garden	• Park	• Green roof garden
Engineered	n/a	• Permeable paving • Rain barrel	• Sports field • Playground	n/a

Urban forest assets are highlighted in yellow in the first column. They include both living assets and mixed living and engineered assets. For a single forest/woodlot, the asset is generally measured in hectares of forest area because natural regeneration and mortality make it unrealistic to measure each tree. Street and park trees, however, can be measured individually and require maintenance and management at the level of a single tree, so each individual tree is considered an asset.

Basic Components of Asset Management Planning

The Ontario provincial government published "Building together – Guide for municipal asset management plans" to provide municipal officials with guidance on the main elements of an AMP. Below lists these elements along with discussion of the opportunities, challenges or gaps related to integrating urban forest assets into each one on the following pages.

1 State of Infrastructure

2 Levels of service

3 Asset management strategy

4 Financial strategy

I STATE OF INFRASTRUCTURE

	OPPORTUNITY TO INTEGRATE URBAN FOREST ASSETS	CHALLENGES OR GAPS
Inventory		
What do you own?	Many municipalities own a variety of the urban forest assets outlined in table 1.	The AMP will clearly define municipal responsibilities for maintenance of public assets (e.g. trees on public land) and provide policy for non-municipal assets (e.g. trees on private property). An AMP is therefore only one piece of the municipal decision making process; it does not replace private-land stewardship programs, and protective regulations.
Where is it located?	The state of inventory for urban forest assets varies by municipality, but many now have location data for their urban forest assets, which can be integrated into an AMP.	Canopy cover assessments that rely on remote sensing are less useful for this level of inventory information because they include both public and private trees and do not report on individual street and park tree assets. In general, data for streets trees (and associated soil cells and engineered soils) as well as municipally owned forest/woodlot areas are more readily available and suitable for integration in AMPs. Park tree data and native soil information tend to be less available to date.
What is it worth?	There have been significant advancements in the valuation of urban forest assets in recent years. Furthermore, streets trees, soil cells, and engineered soils have clear costs associated with them, which makes them easier to integrate into AMP frameworks than natural assets such as forested areas.	There is no standard evaluation approach and there have been a variety of approaches taken by different municipalities to date (see examples section). It is important to use the same valuation methodology within each AMP as is used for other municipal assets, such as water treatment plants or traffic signals. This means that urban forest managers should aim to value the assets based on the construction cost and replacement cost, not the value of the services they provide (often referred to as ecosystem services). Ecosystem services valuations can, however, be useful in the level of service assessment in AMPs and for integrating urban forest assets into other municipal decision making practices.

EXAMPLES IN ONTARIO

- York Region: State of Infrastructure Report
- City of London: Corporate Asset Management Plan
- Richmond Hill: Asset Management Plan

I STATE OF INFRASTRUCTURE

	OPPORTUNITY TO INTEGRATE URBAN FOREST ASSETS	CHALLENGES OR GAPS
Condition	Whether this information is readily available will vary by municipality, but it is useful to encourage all municipalities to understand the health and condition of their urban forest assets.	Ontario's 'Building Together' guide states that "Asset condition must be assessed according to standard engineering practices." This does not transfer well to urban forestry assessments, which should be completed by qualified arborists. Canopy cover assessments are also not useful here because they do not evaluate asset condition (i.e. tree health). New advancements in remote sensing technologies might improve this limitation.
What is the remaining expected useful life?	Data for mortality rates of urban forest assets is often available for street trees, and the average life expectancy can be integrated into an AMP. Additionally, "pooled asset" accounting practices can be used for trees, whereby individual assets are not tracked, but rather a percentage per year is amortized, or aggregate replacements are recorded each year. Because forest/woodlot assets are considered by area, the mortality of individual trees is not relevant. These assets should consider the life expectancy of the forest ecosystem, which could result in an asset that has no expected replacement date. This will require AMPs to adjust some assumptions around how they integrate lifespan estimates.	The life-span for assets is typically the length of time from installation date to expected replacement date. This estimate can be more difficult with living assets because they can unexpectedly die and stop their service provision.

2   LEVELS OF SERVICE

OPPORTUNITY TO INTEGRATE URBAN FOREST ASSETS

Asset management planning aims to find alternative/less expensive ways of achieving desired levels of service. This works in favour of integrating urban forest assets into AMP, as green infrastructure solutions can often be more cost effective than a grey infrastructure approach (e.g. naturalized floodplains vs. channelized streams).

CHALLENGES OR GAPS

Urban forest assets provide important services to a community. Defining and measuring the levels of service can be tricky for all infrastructure asset classes - urban forest assets are no exception.

3   ASSET MANAGEMENT STRATEGY

This element aims to identify the action needed to provide the desired levels of service, given the costs and risks associated with an asset. Analyzing different management options is necessary to develop this section of an AMP. The options analysis compares different actions, and requires an assessment of all relevant direct and indirect costs and benefits associated with each option, which provides an opportunity to incorporate green infrastructure as a more cost-effective alternative to grey infrastructure, where appropriate. Currently Ontario's 'Building Together' guide directs municipalities to consider the following indirect costs/benefits of assets:

• municipal wellbeing and health
• amenity values
• value of culturally or historically significant sites.
• municipal image

There is a risk that AMPs will not include a full assessment of indirect benefits of assets under consideration. The current guidelines could be extended to include a wider range of indirect benefits. Otherwise the extensive co-benefits provided by urban forest assets, such as public health improvements, climate change resilience, and increased air quality, might not be reflected.

4   FINANCIAL STRATEGY

All of the asset information gathered as part of the asset management planning process will guide municipalities in determining how to allocate their resources in this element of an AMP. So the financial strategy component provides the opportunity to build defensible funding requirements for urban forestry programs.

The Ontario 'Building Together' guide directs municipalities on the level of financial analysis detail needed in an AMP. To date this section of the guide has worked against the inclusion of urban forest assets because it requires years of data collection, and urban forestry experience to make the detailed argument between traditional infrastructure and green infrastructure. This limits a municipality's ability to innovate through new approaches that include green infrastructure practices.

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