



Report to: Development Services Committee

Meeting Date: May 21, 2024

SUBJECT: Incorporating Natural Assets into Markham’s Asset Management Plan

PREPARED BY: Patrick Wong, MCIP, RPP, Senior Planner, Natural Heritage, ext. 6922

REVIEWED BY: Mark Head, MCIP, RPP, Manager, Natural Heritage, ext. 2005

RECOMMENDATION:

1. That the May 21, 2024 report entitled “Incorporating Natural Assets into Markham’s Asset Management Plan” be received;
2. That the Natural Assets Inventory and Evaluation Study attached as Appendix A be endorsed and that the study findings be used to inform updates to the City’s Asset Management Plan;
3. That Staff be authorized and directed to do all things necessary to give effect to this resolution.

PURPOSE:

The purpose of this report is to seek Council’s endorsement of the Natural Assets Inventory and Evaluation Study (the ‘Natural Assets Study’) which provides a city-wide inventory and assessment of natural assets along with recommendations on how natural assets can be more fully integrated into the City’s asset management planning framework. This information will be used to add natural assets to future Asset Management Plans and satisfy provincial regulatory requirements.

BACKGROUND:

The City of Markham has a wealth of natural assets which contribute to the quality of life of our community. Natural assets include woodlands, wetlands and meadows which provide a wide range of environmental services that complement the delivery of core municipal services such as stormwater management, carbon sequestration and recreation. One-fifth of the City, or 4,100 hectares, is covered by natural vegetation or water and is largely protected in the City’s Greenway System. Of this total, the City owns and manages 1,000 hectares of natural assets which is double the amount of parkland owned by the City.

Under O. Reg. 588/17, municipalities are required to create and maintain asset management plans and include natural assets. The City’s 2021 Asset Management Plan does not currently address natural assets such as woodlands, wetlands and meadows. The Natural Assets Study addresses this gap by providing the necessary information to include natural features into the City’s 2024 Asset Management Plan which is currently

in development. A multi-disciplinary consultant team led by Green Analytics was retained to undertake the Natural Assets Study with two primary objectives:

1. To more fully align with provincial regulatory requirements by providing information needed to incorporate natural assets within the City's asset management planning framework; and
2. To inform long range planning initiatives to enhance natural asset condition and service provision including the management of natural features to supplement core municipal services and community resilience to climate change.

The Study estimates the total value of ecosystem services provided by City-owned natural assets to be between \$60 and \$62 million per year and their total replacement cost value at \$170 million. Natural assets are not currently identified in the City's Asset Management Plan and the inclusion of these assets is expected to improve the way the City manages its natural assets to provide services and benefits to the community.

DISCUSSION:

Municipalities are required to prepare Asset Management Plans that include natural assets

Natural assets are an asset category that have only recently begun to be incorporated into municipal asset management frameworks. Under Ontario Regulation 588/17, *Asset Management Planning for Municipal Infrastructure*, municipalities are required to create and maintain asset management plans. The City developed its first Asset Management Plan in 2016 and completed a comprehensive update in 2021. A further update to the Asset Management Plan is currently underway and scheduled to be completed later this year. Additional background on the corporate asset management workplan was provided in a [report](#) to Council in December 2023.

At a high level, asset management plans are required to summarize the following:

- All city owned and managed assets
- Asset replacement cost, age and condition
- Life cycle activities including estimated capital expenditure and operating costs that are required to maintain current service levels and to keep assets in a good state of repair. This includes any expenditures necessary to accommodate increases in demand caused by growth
- Starting in 2025, consideration of proposed or appropriate service levels and associated financial strategy

O. Reg. 588/17 identifies green infrastructure including “natural features and systems” as an asset category to be included in municipal asset management plans. While the Asset Management Plan includes some green infrastructure assets such as stormwater management facilities, street trees and parkland, it does not address natural assets such as woodlands, wetlands and meadows. The Natural Assets Study addresses this gap by providing the information needed to include natural features as non-core municipal infrastructure within the City's 2024 Asset Management Plan and overall asset management framework.

Information provided through the Natural Assets Study will inform financial planning and management activities to better leverage the services and co-benefits that are, and could be, provided by natural assets

The Study followed industry best practices and standards to establish the City's first comprehensive natural assets inventory and evaluation with recommendations to formally incorporate natural assets within the City's asset management framework.

Key deliverables of the Natural Assets Study include:

1. Asset registry: A GIS-linked database that can provide information on the type, size and location of each natural asset.
2. Condition assessment: A framework that assigned a 'condition rating' to each natural asset based on their physical and ecological attributes. Assets are rated on a five-point scale from Very Poor to Very Good, with the condition rating reflecting the level of ecological services being provided by the asset.
3. Risk Assessment: A risk assessment of how likely and to what extent potential hazards may affect natural assets and their service levels
4. Levels of Service: A description of the services expected to be delivered to the community from the assets and the expected performance of the assets in relation to the service being provided. Levels of Service also describe lifecycle management activities undertaken by staff to acquire, maintain, renew and restore the City's natural assets.
5. Management scenarios and modelling: The study describes three management scenarios to assess how differing levels of investment can impact the quantity and quality of natural assets, and the services and benefits that are provided.
6. Additional Analysis: to support decision making including:
 - A valuation of the ecosystem services provided by the City's natural assets; and
 - A climate change assessment (see Appendix B) which looks more specifically about how natural assets contribute to climate change resiliency as well as how they may be impacted by climate change.

The Natural Assets Study provides a comprehensive inventory and condition assessment for 1,000 hectares of city owned natural assets

Data from the City's previous natural heritage studies are used to describe the state of the City's natural assets. It is recognized that all natural assets – both publicly and privately owned – contribute environmental-related services to the community. As such, the Study identifies all natural assets in the asset registry, but focuses attention to the assessment of natural assets owned by the City of Markham. Approximately 1,000 hectares of city-owned natural assets were assessed with an estimated replacement value of \$170 million. The value of the ecosystem services provided to humans by city-owned natural assets is \$60 to \$62 million. The condition assessment found that 77% of city-owned natural assets are in good or very good condition. A summary of the state and condition of natural assets is provided below in Table 1 and more detailed information on the methodology and results are provided in Appendix A.

Table 1: Summary of the State of Natural Assets

Category	Amount of Natural Assets <i>Publicly and privately owned</i>	Amount of Natural Assets <i>City of Markham owned</i>
Area of Natural Assets	4,108 hectares	986 hectares
Area of Natural Assets a. Woodlands b. Meadows c. Wetlands d. Open Water e. Other	a. 1,707 hectares (42%) b. 1,499 hectares (36%) c. 633 hectares (15%) d. 196 hectares (5%) e. 2 hectares (0%)	a. 552 hectares (56%) b. 226 hectares (23%) c. 114 hectares (12%) d. 93 hectares (10%) e. 1 hectare (0%)
Asset Condition (1) a. Very Good b. Good c. Fair d. Poor e. Very Poor	a. 1,656 hectares (40%) b. 1,721 hectares (42%) c. 578 hectares (14%) d. 147 hectares (4%) e. 6 hectares (0%)	a. 196 hectares (20%) b. 561 hectares (57%) c. 190 hectares (19%) d. 39 hectares (4%) e. 0
Replacement Value of Natural Assets (2)	n/a	\$169.5 million
Estimated Ecosystem Services Valuation (3)	\$114 to \$121 million per year	\$60 to \$62 million per year
<p>Note: Percentages may not add up to 100% due to rounding.</p> <p>(1) Asset condition ratings are identified relative to other natural assets.</p> <p>(2) Replacement values are based on industry estimates of the cost to re-create a natural asset if it were destroyed or removed</p> <p>(3) This provides an estimate of the annual benefit to humans based on the following services provided by natural assets: recreational value, carbon sequestration, air quality regulation, air temperature cooling, biodiversity preservation, pollination for crops, aesthetic value and stormwater regulation services.</p>		

Levels of Service are established to describe service delivery objectives and to identify management activities for natural assets

The City strives to provide high quality municipal services at a sustainable cost to taxpayers. Natural assets provide services to our customers including the protection of biodiversity, ecosystem services such as carbon sequestration and air/water quality improvement, and passive recreational opportunities. For each of its asset types, the City establishes levels of service which describe the service delivery objectives and the management activities to be undertaken to maintain an asset's performance.

The service delivery objectives ('corporate level of service') for natural assets take into consideration the City's strategic plan, business drivers and legislative requirements.

Three corporate levels of service are identified for natural assets:

1. Natural assets support a diversity of natural habitats and ecosystems that are critical to maintaining biodiversity and a healthy environment for the benefit of all living things;

2. Natural assets help mitigate climate change and build resilience to climate change impacts including extreme weather events;
3. Natural assets provide access to nature for passive recreation and cultural activities.

Technical levels of service describe the day-to-day management activities undertaken by the City to maintain its assets. These levels of service function as performance indicators to measure success and serve as a target for continuous improvement. The Study organizes technical levels of service for natural assets by the primary lifecycle categories of acquisition, maintenance and rehabilitation. A summary of the lifecycle categories and the associated management activities are provided below in Table 2.

Table 2: Summary of Lifecycle Management Categories for Natural Assets

Lifecycle Management Category	Description	Examples of Management Activities for Natural Assets
Acquisition & Expansion	Activities to provide a new asset that did not exist previously or an expansion to an existing asset	Securing new natural assets through development applications; Purchase of natural heritage/restoration lands.
Maintain	Activities to retain asset condition to enable it to provide service for its planned life	Monitoring asset condition; Hazard tree removal; Invasive species management; Tree pruning; Watering and mulching trees.
Rehabilitate	Activities that return the original service capability of an asset	Major reforestation or wetland creation projects.

The City currently invests staff time and capital dollars into managing natural assets which represent the City’s *existing* levels of service for natural assets

Staff from the Operations and Planning & Urban Design Departments are primarily responsible for the management of natural assets. Both staff time and capital dollars are invested to manage and maintain natural assets which have been documented through the Study as the City’s *existing* or baseline level of service performance for natural assets.

It is estimated that approximately \$0.9 million worth of staff time and capital dollars annually are currently invested in natural asset management activities across the corporation. The major lifecycle activities undertaken by the City and the current service levels are summarized below in Table 3 and will be documented in the City’s 2024 Asset Management Plan & Financial Summary.

Table 3: Summary of Lifecycle Activities completed for Natural Assets

Type of Lifecycle Activity	Current Level of Service Performance
Acquisition of new natural assets	Average of 17.8 hectares of new natural assets secured by the City per year; Allocation of money towards the Environmental Land Acquisition Fund per year.
Monitor asset condition and update natural heritage inventories	Completed every 5 years.
Facilitate community volunteer and stewardship programs	Trees for Tomorrow program: Average of 7,000 trees and shrubs planted per year by partners and volunteers; Facilitate volunteer stewardship of new reforestation sites
Maintenance of natural areas	Mulching on all reforestation projects; Seasonal watering of new trees and litter removal based on staff availability.
Management of invasive species	Giant Hogweed control program; Response to invasive pests, e.g., spongy moth and emerald ash borer; Manual removal of certain noxious weeds; Manage two meadow habitats.
Hazard tree management (in natural areas)	Respond to resident requests and prioritize those that affect public safety.
Reforestation and wetland creation by contractors	Average of 8,000 trees and shrubs planted, 4 ha of woodland and 0.2 ha of wetlands per year

Proposed or Appropriate Levels of Service will be reviewed comprehensively through the 2025 Asset Management Plan & Financial Strategy

As described in the Natural Heritage Management Study, the City's current approach to natural asset management provides a basic level of asset management. Natural assets face challenges associated with urbanization, climate change, unauthorized removals and pollution and there are risks to the City that the services provided by natural assets will diminish over time without long-range management plans. In accordance with the York Region Official Plan, 2022, 1,140 hectares have been added to the City's Urban Area and the City is forecasted to grow to a minimum of 618,000 people by 2051 which will place further strain on natural assets.

The Study identifies opportunities to consider a more integrated, proactive and systematic approach to natural asset management. Two management scenarios are identified in the Study beyond the current baseline existing Levels of Service to consider how increased investment into natural assets can help the City better address climate change resiliency, corporate objectives and planned population growth. The Study identifies that the current business-as-usual scenario will result in a gap in relation to the target level of service over the long term. Increased investment into volunteer stewardship and ecosystem restoration would be required to accelerate the maintenance and rehabilitation of natural assets.

Potential enhancements to levels of service will be refined and reviewed in the future as part of the City's 2025 Asset Management Plan & Financial Strategy. The 2025 Asset Management Plan will be reviewing appropriate service levels and associated financial implications across all asset types owned by the City in an integrated and comprehensive manner.

Natural assets build community resilience to climate change but natural assets are also vulnerable to the impacts of climate change

The Natural Asset Study completed a climate change assessment which is attached to this report as Appendix B. Natural assets provide opportunities to capture greenhouse gases and to build community resilience against climate change effects such as extreme weather and the reduction of air temperatures in urban settings. The effects of climate change are expected to result in a range of changes to natural assets. While there are some potential positive impacts associated with longer growing seasons, it is anticipated that climate change will have an overall negative impact to natural assets. This will reduce the ability of natural assets to support indigenous plants and wildlife as well as the services and benefits they provide to our community. The City can increase the resiliency of its natural assets through enhanced management activities as summarized below in Table 4.

Table 4: Opportunities to Increase Climate Change Resiliency of Natural Assets

Type of Activity	Examples
Improving plant species diversity and soil health	<ul style="list-style-type: none"> • Expanding naturalized planting areas and establishing mini-forests • Using locally sourced plants and seeds • Remediating disturbed and compacted soils
Invasive species management and habitat management	<ul style="list-style-type: none"> • Developing an invasive species management plan • Undertaking targeted management in sensitive ecosystems • Forest management and maintenance of grasslands
Creation of new natural features and areas	<ul style="list-style-type: none"> • Reforestation • Wetland creation • Acquisition of new restoration lands
Protection of surface and ground water quality	<ul style="list-style-type: none"> • Protection of headwater areas and highly vulnerable aquifers • Planting vegetated buffer strips along waterbodies
Enhancing the urban forest	<ul style="list-style-type: none"> • Developing an Urban Forest Management Plan • Increasing canopy cover
Increasing community awareness, engagement and stewardship	<ul style="list-style-type: none"> • Expanding the Trees for Tomorrow program

Conclusion and Next Steps

- The City owns approximately 1,000 hectares of natural areas which have been inventoried and assessed as part of the Natural Assets Study. These assets are not currently identified in the 2021 Asset Management Plan.
- The findings of the Natural Assets Study (i.e., the existing condition assessment, replacement values and levels of service) will be incorporated into future updates of the Asset Management Plan including the current ongoing update to the 2024 Asset Management Plan.
- City-owned natural assets provide services to residents which are valued at \$60 to 62 million per year and have a replacement value of \$170 million.
- Proposed or appropriate levels of service for natural asset management will be reviewed as part of the future 2025 Asset Management Plan and Financial Strategy.
- Continuous updates will be required to incorporate newly acquired natural assets into the City's asset inventory and to reflect changes to asset condition and performance.

FINANCIAL CONSIDERATIONS

The information noted in this report will inform the update to the Asset Management Plan anticipated in October 2024 and maintaining current service levels will have no impact to the Operating Budget or Life Cycle Reserve.

Funding to support current City programs and services noted in this report for protecting and preserving natural assets are incorporated into approved operating and capital budgets.

The existing funding includes \$0.3M in operating and \$0.6M in capital projects. Capital projects are primarily funded from the Landscape Recovery (\$0.12M) and the Woodlot/Wetland Reforestation Fund (\$0.40M) of which 84% are offset by money collected from permits issued for the removal of trees and natural features. The Capital Budget request would depend on funding availability in the Landscape Recovery and Woodlot/Wetland Restoration Fund.

From a financial reporting perspective, the value of natural assets are not required under the Public Sector Accounting Board (PSAB) and are not included in the City's financial statements.

Future enhancements to current levels of service, including recommendations that have any financial implications will be brought forward for future consideration as part of future budget processes. Potential enhancements to levels of service are proposed to be reviewed and refined in the future as part of the City's 2025 Asset Management Plan & Financial Strategy.

HUMAN RESOURCES CONSIDERATIONS

Not applicable.

ALIGNMENT WITH STRATEGIC PRIORITIES:

Natural asset management supports the efficient use of City resources to maintain natural assets and the services they provide to residents. It is aligned with the four strategic priorities of the Building Markham's Future Together, 2020 - 2026 Strategic Plan.

BUSINESS UNITS CONSULTED AND AFFECTED:

Staff from the Planning & Urban Design, Sustainability & Asset Management, Operations – Parks, Engineering and Environmental Services Departments were involved in the preparation of this Study.

RECOMMENDED BY:

Darryl Lyons, MCIP, RPP
Deputy Director, Planning & Urban Design

Giulio Cescato, MCIP, RPP
Director, Planning & Urban Design

Arvin Prasad, MCIP, RPP
Commissioner, Development Services

ATTACHMENTS:

Appendix A: Natural Assets Inventory and Evaluation Study
Appendix B: Climate Change Assessment