Natural Assets 2024 Asset Management Plan

Hamilton

NATURAL ASSETS
2024 ASSET MANAGEMENT PLAN

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1. INTRODUCTION

At the time of writing, the City of Hamilton is early in its recognition of natural assets in asset management plans and financial reports. This Asset Management (AM) Plan is intended to document the available information for natural assets and provide a roadmap for how the City will work toward fully achieving compliance with O.Reg 588/17[1] regulatory requirements.

Listed below are related documents reviewed in preparation of this Asset Management Plan:

- Asset Management (AM) Plan Overview Document
- CSA W218:23, Specification for natural asset inventories[2]
- Natural Asset Management Guidebook for Local Governments[3]

Since Sunday, February 25, 2024, the City of Hamilton experienced a cyber incident that disabled some of the IT systems. As a result, this AM Plan was created based on the data that was accessible at the time of publication.

1.1. DEFINITIONS

The following definitions in ***Table 1*** have been used throughout this document.

Table 1: Definitions

TERM	DEFINITION
Alvars	Naturally open areas of thin or no soil over essentially flat limestone, dolostone, or marble rock, supporting a sparse vegetation cover of mostly shrubs and herbs[4].
Aquifer	Underground layer of water-bearing material, consisting of permeable or fractured rock, or of unconsolidated materials.
Areas of Natural and Scientific Interest (ANSI)	Represent lands and waters containing important natural landscapes or features that are important for natural heritage, protection, appreciation, scientific study, or education.[5]
Asset Owner	Asset Owner has direct responsibility for the operation and provision of services related to an asset and is therefore responsible for the effective management of the asset over the asset's lifecycle.
Environmentally Significant Area	Locally significant areas that meet any one of the following criteria: a) The area is a good representative of a biotic community characteristic of the natural landscapes of the City and not adequately represented in existing protected areas or the area is a good representative of pre-settlement biotic community; b) There are biotic communities that are rare in the City,

[1] (O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure, 2012-24)
[2] (CSA W218:23, 2023)
[3] (Natural Assets Initiative, 2024)
[4] (Green Belt Plan, 2017)
[5] (Ontario GeoHub, 2022)

TERM	DEFINITION
	Province, or Canada; c) The area is a large natural area (20 hectares or more in size); it may be sufficiently large to provide habitat for species requiring large habitat areas; d) There is habitat for species considered significant in the City, Province, or Canada; e) The site fulfills a significant hydrological function (groundwater recharge or discharge, ground or surface water quality, or flood attenuation), f) The site contains a significant earth science feature (distinctive and unusual landform); g) There is a high diversity of native species or biotic communities; h) The area provides essential habitat for the continuation of species; for example, significant areas of species concentrations, areas essential for certain stage of the life cycle, source areas for species; i) There are significant seasonal concentrations of wildlife; j) The area acts as a link between natural areas or functions as a corridor for wildlife; k) The area is in good natural condition, with few non-native species, particularly invasive non-natives; or l) The area contains significant fish habitat.[6]
Escarpment (i.e., Niagara Escarpment)	The Niagara Escarpment includes a variety of topographic features and land uses extending 725 kilometres from Queenston on the Niagara River to the islands off Tobermory on the Bruce Peninsula, and includes the physical and natural heritage features, cultural heritage resources, and scenic resources associated with the Escarpment landscape.[7]
Grasslands (Open Spaces)	Areas dominated by non-woody vegetation with less than 25% tree cover, including meadows, grasslands, and tallgrass prairies.
Green Infrastructure Asset	An infrastructure asset consisting of natural or human-made elements that provide ecological and hydrological functions and processes and includes natural heritage features and systems, parklands, stormwater management systems, street trees, urban forests, natural channels, permeable surfaces, and green roofs. O. Reg 588/17, s 1. (1)[8]
Green Infrastructure - Engineered Asset	Green infrastructure assets which have been designed to function like natural assets but are designs not found in nature (e.g., green roofs, permeable pavement, rain barrels etc.)[7]
Green Infrastructure - Enhanced Asset	Green infrastructure assets which have been designed to act like natural assets (e.g., street trees, urban parks, stormwater management ponds etc.)[7]
Green Infrastructure - Natural Asset	Green infrastructure assets include the stock of natural resources or ecosystems that is relied upon, managed, or could be managed by a municipality, regional district, or other forms of local government for the sustainable provision of one or more municipal services.[7]

[6] (City of Hamilton, 2022)
[7] (Niagara Escarpment Commission, 2017)
[8] (MNAI, 2019)

TERM	DEFINITION
Infrastructure Asset	An infrastructure asset, including a green infrastructure asset, directly owned by a municipality, or included on the consolidated financial statements of a municipality, but does not include an infrastructure asset that is managed by a joint municipal water board O. Reg 588/17, s 1. (1) [9]
Natural Beaches	An accumulation of unconsolidated sand or gravel along shorelines, formed by the reworking and deposition of sediments by waves, tides, and currents.
Traditional Asset	Human-made assets which are not green infrastructure assets and follow traditional lifecycle and asset management practices.
Waterbodies	Areas dominated by open water including lakes and ponds.
Watercourses	A visible channel where water flows, either seasonally or permanently and the surrounding floodplain riparian areas. Includes waterfalls.
Wetlands	Wetlands are areas that have been soaked with water long enough for the soil to become waterlogged. This allows water-loving or water-tolerant plants to grow. Wetlands are found where the water table is close to, or at the surface. They are usually in low-lying areas or along the edges of lakes and rivers. Many wetlands are permanently flooded, while others flood only periodically in the spring or fall.[10]
Woodlands	Means treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. Woodlands include treed areas, woodlots or forested areas and vary in their level of significance at the local, regional and provincial levels[9].

1.2. SCOPE

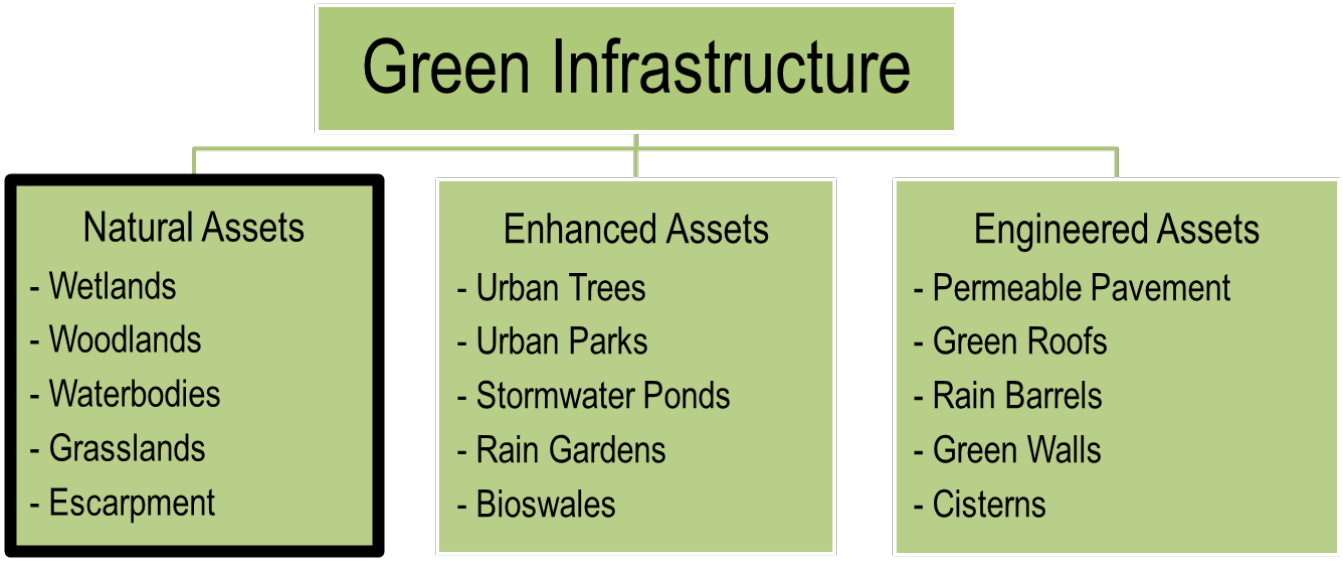
Per O. Reg 588/17, green infrastructure assets must be incorporated into a municipality's asset management planning. ***Figure 1*** below includes examples of green infrastructure assets and categorizes them into natural, enhanced, and engineered assets.

The focus of this AM Plan will be on natural assets since enhanced and engineered assets are already incorporated into the City's existing asset management program categorized by the key

[9] (O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure, 2012-24)
[10] (Green Belt Plan, 2017)

service they provide where inventories exist (e.g. street trees are included in the Forestry & Horticulture AM Plan, stormwater ponds are included in the Water Works AM Plan, etc).

Figure 1: Green Infrastructure Divisions



For Ontario municipalities to meet O. Reg 588/17 for natural assets, the scope must cover municipally owned natural assets. However, there are benefits to also quantifying all natural assets that the City depends on for services. The City of Hamilton will initially prioritize city-managed assets that are actively managed and provide key services. However, as part of the development of the Natural Asset Management Roadmap explained in ***Section 3.2***, the City will also consider broadening the scope of the inventory to all-natural assets that the City of Hamilton relies on for services.

1.3. REPORT LIMITATIONS

Since natural assets are naturally occurring, they do not always follow traditional asset or financial management practices. As a result, the process for natural asset management is not as well-defined as it is for traditional assets. This has affected the amount of information that was able to be included within this first iteration of the AM Plan. Some key differences between traditional and natural assets are shown in ***Table 2.***

Table 2: Differences between Traditional and Natural Assets

TRADITIONAL (GREY) ASSETS	NATURAL ASSETS
Typically designed to have a specified estimated service life to plan replacement.	Do not have an end-of-life or replacement schedule and are typically maintained in perpetuity unless the asset dies or is irreparably damaged.
Service capacity is immediately available upon construction and	Desired service capacity can take decades to achieve, and many natural assets increase in value over time. Therefore, replacement costs

TRADITIONAL (GREY) ASSETS	NATURAL ASSETS
replacement costs can be gathered from market data.	cannot always be calculated based on simply acquiring a new asset.
Typically, only provides the service it is intended to perform and can be quantified.	May also provide additional ecosystem services that benefit the City but may not be able to be quantified at this time (e.g. carbon sequestration benefits, wildlife habitat etc.).
Are typically included in Generally Accepted Accounting Principles (GAAP) or Tangible Capital Assets (TCA) reports.	Are typically not included in Generally Accepted Accounting Principles (GAAP) or the Tangible Capital Assets (TCA) reports which means they are not directly included in the City's financial reporting.
Exist within the municipal boundary with clear municipal asset ownership.	This may result from a larger system of interconnected features which may span multiple jurisdictions and have multiple stewards (e.g., watershed catchment which may provide stormwater management for many municipalities).
Many available best practices and guides.	Few available best practices for natural asset management which could be used to develop this plan.

Most plans created by the City of Hamilton's Corporate Asset Management division contain a minimum number of sections to ensure compliance with O. Reg 588/17. However, due to the City's early stage in natural asset management, the following sections have not been included in this plan:

- Municipally Defined Levels of Service
- Demand Management
- Risk Management
- Lifecycle Management Plan
- Financial Management

As the City makes progress on the Natural Asset Management Roadmap described in ***Section 3.2,*** these sections will be incorporated into future iterations of the AM Plan.

In addition, it is important to note that a ***Natural Asset Management Guidebook for Local Governments*** was published by the Natural Assets Initiative in April 2024. This guidebook provides guidance on how to approach natural asset management. However, due to the date of publication and the City's lack of maturity in natural asset management, the document was not able to be fully incorporated in this AM Plan in time for the O. Reg 588/17, July 2024 deadline and will be used to develop future iterations of this report.

2. ASSET REGISTRY

A natural asset registry refers to the database that houses the natural asset inventory which contains important attribute information required to properly manage assets. To comply with O. Reg 588/17, typically a summary of assets would include number of assets, replacement value, average age, and average condition which would typically be contained within the asset registry information for traditional assets.

2.1. SUMMARY OF ASSETS

For Ontario municipalities to meet O. Reg 588/17 for natural assets, the scope of this AM Plan must cover municipally owned natural assets. The inventory in **Table 3** below includes all known natural assets that exist within the municipal boundary as of April 2024 and are broken into city-managed and total assets within the Municipal Boundary where possible. Currently, the data confidence is Medium for both the total asset quantities as well as the portion of natural assets that the City is responsible for managing. Data confidence descriptions are outlined on ***Page 31*** of the AM Plan Overview. It is important to note that the identification of City-managed natural assets is an ongoing process which will be addressed as part of the Natural Asset Management Roadmap explained in ***Section 3.2***.

Currently, the known asset registry information the City can report with respect to natural assets is the estimated quantity which is not always delineated by asset category (e.g. Environmentally Significant Areas contain many different natural assets) which makes it difficult to fully quantity the individual natural assets. Replacement value and condition are not yet able to be quantified, and the average age would not be applicable for natural assets. Collecting this attribute information will be addressed as part of the Natural Asset Management Roadmap explained in ***Section 3.2***.

In addition, it is likely that additional natural asset data exists in conservation authority, community, or other institutional databases, but due to time constraints, significant coordination with these groups to request or review their natural asset inventory data has not yet occurred. Collecting additional inventory data is a continuous improvement item which will be addressed as part of the Natural Asset Management Roadmap explained in ***Section 3.2***.

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Table 3 : Quantity of Natural Assets

NATURAL ASSETS		
ASSET CATEGORY	**QUANTITY (CITY-MANAGED)**	**QUANTITY (TOTAL WITHIN MUNICIPAL BOUNDARY)**
Alvars	Undetermined	1,968 ha
Aquifers	114,882 ha[11]	114,882 ha
Area of Natural and Scientific Interest (ANSI)[12]	292 ha[13]	5,566 ha
Environmentally Significant Areas (ESA)[12]	1,282 ha[13]	21,294 ha
Escarpment Face	93 linear km	93 linear km
Hamilton Harbour	0 ha	2,230 ha
Lake Ontario	1770 ha[11]	Undetermined
Natural Beaches	8 total	12 total
Niagara Escarpment (Total Natural & Protected Areas)[12]	830 ha[13]	7,643 ha
Parks (including Grasslands)[14]	1,869 ha[13]	2,795 ha
Waterbodies	Included within Watercourses[15]	3,792 ha
Watercourses	149 km[16]	2,325 km
Wetland	166 ha[13]	9,615 ha
Woodland	1,000 ha[13]	21,385 ha
DATA CONFIDENCE	**MEDIUM**	**MEDIUM**

[11] Quantity based on Source Water Protection Plans and Polices
[12] Contains multiple different natural assets which may overlap other asset categories already included in Table 3.
[13] Quantity based on Year Ending 2023 MPAC and City Real Estate data
[14] Currently includes duplication of data with urban parks already included in the Parks AM Plan. Natural assets embedded in these parks such as grasslands were not able to be delineated at the time of writing.
[15] Discussions are currently taking place to separate waterbodies from watercourses in spatial database.
[16] Waterbodies included in this quantity are currently recorded as a "creek reach" in kilometers. However, waterbodies have a larger surface area which will be recorded as an area measurement when these assets are delineated.

2.2. DATA COLLECTION FRAMEWORK

As previously stated, the City of Hamilton is early in its recognition of natural assets in asset management plans and reports. This section documents the progress to date following the guidelines outlined in both the CSA W218:23 as well as the ***Natural Asset Management Guidebook for Local Governments***.

2.2.1. INVENTORY FRAMEWORK

Establishing an inventory of natural assets is an important step when completing an asset management plan. The ability to visualize data is an important consideration when completing a natural asset inventory as it will allow the assessment of infrastructure relationships, conditions, and risks. Therefore, the established inventory will include both spatial and attribute data and will follow existing City data standards and best practices.

The five key steps to establishing an inventory of natural assets per the ***Natural Asset Management Guidebook for Local Governments*** are included in ***Table 4*** below with the City progress made to date.

Table 4: Steps to Establish a Natural Asset Inventory

STEP	TASK	PROGRESS TO DATE
1	Obtain and review data	The information included in ***Table 3*** was extracted from various sources outlined in ***Section 3.3***. Currently, this data is not always delineated by asset category. A more fulsome analysis of available data will be completed following this plan and consultation with conservation authorities, community and/or other institutional organizations will occur. This is a continuous improvement item which will be addressed as part of the Natural Asset Management Roadmap explained in ***Section 3.2***.
2	Categorize assets and establish an asset hierarchy	An asset hierarchy does not currently exist for natural assets. The natural assets reported in ***Table 3*** are reported at the highest level which represents the data currently available. This is a continuous improvement item which will be addressed as part of the Natural Asset Management Roadmap explained in ***Section 3.2***.
3	Construct a natural asset registry	Currently, attribute information is largely unknown for the assets included in this AM Plan. A formal registry template has not yet been completed. These are continuous improvement items which will be addressed as part of the Natural Asset Management Roadmap explained in ***Section 3.2***.

4	Identify other key attributes to incorporate into the inventory	These tasks are dependent on the completion of the above items and have not yet been initiated. These are continuous improvement items which will be addressed as part of the Natural Asset Management Roadmap explained in ***Section 3.2***.
5	Develop inventory metadata	

2.2.2. CONDITION METHODOLOGY

When developing a condition methodology for each natural asset, the City will follow the guidelines outlined in both the CSA W218:23 as well as *the* ***Natural Asset Management Guidebook for Local Governments***. The condition methodology is broken into three steps:

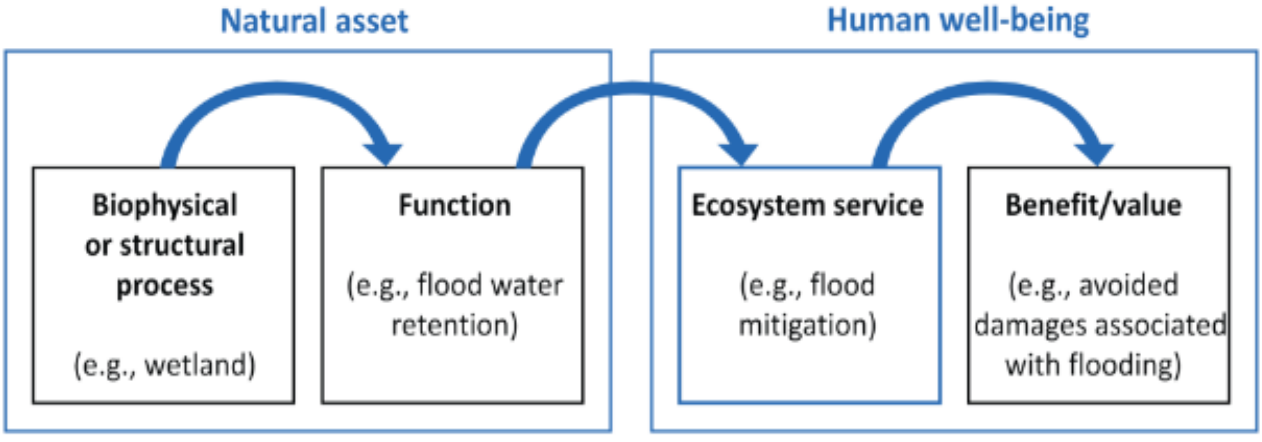
1. Service Identification
2. Desktop Condition Assessment & Scoring
3. Field Verification

2.2.2.1. SERVICE IDENTIFICATION

Natural assets often deliver core services to the public. When assessing the condition of natural assets, it is important for municipalities to identify the services these natural assets are providing in order to assess the capacity for these assets to continue to deliver these services.

The CSA W218:23 approach to linking natural assets to ecosystem services and human benefits is shown below in ***Figure 2.***

Figure 2: Linkage between natural assets, ecosystem services, and human benefits[17]



[17] (CSA W218:23, 2023)

As part of this initial AM Plan development, the City explored the key natural assets that exist within the City and connected these assets to the ecosystem service that was being provided to the City which is shown in ***Table 5.*** This information will be used as the starting point for developing a more robust condition methodology as well as for outlining initial asset owner responsibility.

Table 5: Natural Asset Service Identification

NATURAL ASSET	ECOSYSTEM SERVICE	POTENTIAL BENEFIT
Alvars	Wildlife habitat	Increased biodiversity, improved crop and forage production through pollination, natural seed source, biochemical resources, medicinal goods and services for improved human health
	Soil stabilization and erosion control	Soil health and improved water quality
	Stormwater management	Reduction of flood impacts from storms, reduces pollutant load in receiving waterbody, water available for multiple uses in the watershed
	Carbon sequestration	Mitigate climate change impacts
Aquifers	Water Storage	Drinking water source
	Water Filtration	Improves drinking water quality
Escarpment	Soil quality	Ideal growing conditions for fruit and grapes
	Tree canopy	Local temperature heat mitigation, noise reduction, wind breaks.
	Carbon sequestration	Mitigate climate change impacts
	Wildlife habitat	Increased biodiversity, improved crop and forage production through pollination, natural seed source, biochemical resources, medicinal goods and services for improved human health
	Recreational	Improved human health and well-being by recreating in natural areas. Tourism for the City.
	Corridor	Transportation and wildlife migration corridor

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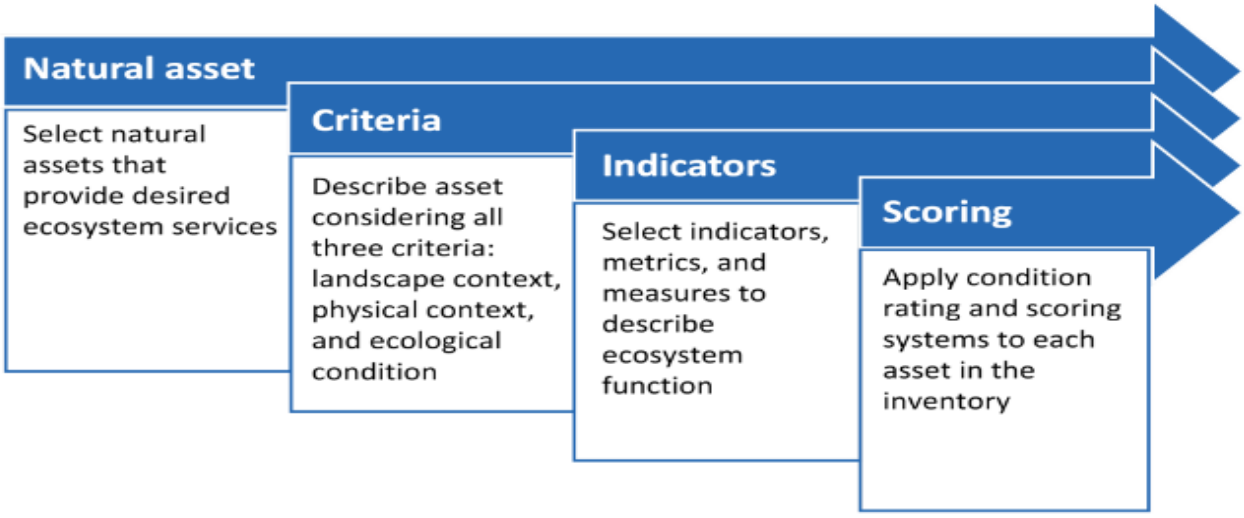
NATURAL ASSET	ECOSYSTEM SERVICE	POTENTIAL BENEFIT
Grasslands	Wildlife habitat	Increased biodiversity, improved crop and forage production through pollination, natural seed source, biochemical resources, medicinal goods and services for improved human health
	Stormwater management	Reduction of flood impacts from storms, reduces pollutant load in receiving waterbody, water available for multiple uses in the watershed
	Carbon sequestration	Mitigate climate change impacts
	Recreational	Improved human health and well-being by recreating in natural areas
	Soil stabilization and erosion control	Soil health and improved water quality
Natural Beaches	Recreational	Improved human health and well-being by recreating in natural areas. Tourism for the City.
	Wildlife habitat	Increased biodiversity
	Stormwater management	Reduces pollutant load in receiving waterbody through infiltration
Waterbodies	Stormwater management	Reduction of flood impacts from storms, water available for multiple uses in the watershed
	Water Storage	Drinking water source
	Recreational	Improved human health and well-being by recreating in natural areas. Tourism for the City.
	Wildlife habitat	Increased biodiversity, improved water quality
	Carbon sequestration	Mitigate climate change impacts
Watercourses	Stormwater management	Reduction of flood impacts from storms, reduces pollutant load in receiving waterbody through infiltration, water available for multiple uses in the watershed
	Recreational	Improved human health and well-being by recreating in natural areas
	Wildlife habitat	Increased biodiversity, improved crop and forage production through pollination
Wetlands	Stormwater management	Reduction of flood impacts from storms, reduces pollutant load in receiving waterbody, water available for multiple uses in the watershed
	Recreational	Improved human health and well-being by recreating in natural areas

NATURAL ASSET	ECOSYSTEM SERVICE	POTENTIAL BENEFIT
	Wildlife habitat	Increased biodiversity, improved crop and forage production through pollination
	Temperature regulation	Local temperature reduction in urban settings
	Carbon sequestration	Mitigate climate change impacts
Woodlands	Tree canopy	Local temperature heat mitigation, noise reduction, wind break.
	Carbon sequestration	Mitigate climate change impacts
	Stormwater management	Reduction of flood impacts from storms, reduces pollutant load in receiving waterbody, water available for multiple uses in the watershed
	Wildlife habitat	Increased biodiversity, improved crop and forage production through pollination, natural seed source, biochemical resources, medicinal goods and services for improved human health
	Recreational	Improved human health and well-being by recreating in natural areas
	Soil stabilization and erosion control	Soil health and improved water quality

2.2.2.2. DESKTOP CONDITION ASSESSMENT & SCORING

Initially, the City is proposing to first complete a desktop condition assessment for all natural assets using condition indicators for ecosystem functioning per CSA W218:23. The CSA W218:23 process is summarized in ***Figure 3.*** This process will occur as part of the Natural Asset Management Roadmap explained in ***Section 3.2***.

Figure 3: Natural Asset Condition Assessment Process



For consistency across the organization, the natural assets condition scoring will follow a 5-point scale ranging from Very Good to Very Poor, however, due to natural assets not having an end-of-life, the descriptions will differ from traditional assets. The CSA W218:23 has a sample condition scale shown below, in **Table 6** which will be used as a starting point, but may continue to evolve.

Table 6: Sample Natural Asset Condition Description[18]

RATING	DESCRIPTION
1-Very Good	Well-maintained, good condition, no signs of deterioration in ecological conditions. Natural asset service provision is high.
2-Good	Ecological conditions appear to be sufficient; some minor localized (or isolated) impacts noticeable, which might be a warning sign of possible decline. Natural asset service provision is acceptable.
3-Fair	Clear signs of deterioration in ecological function and service-influencing factors. Natural asset service provision, while still functional, is at risk of failing.
4-Poor	Condition is below standard with large portion(s) of the system exhibiting significant deterioration in ecological function. Natural asset service provision is impacted, and some services might be non-functioning.
5-Very Poor	Widespread signs of advanced deterioration; unlikely that the natural asset is providing any functional service.

[18] (CSA W218:23, 2023)

2.2.2.3. FIELD VERIFICATION

When assessing the condition of natural assets, field verifications of ecosystem components and their functions should also occur.

Following the desktop condition exercise, the City will create a field condition assessment protocol to verify the condition of the natural asset in the field using the ecosystem function indicators established during the desktop exercise. The timing of these assessments will be prioritized based on the identified risk profile of the asset while also considering the budget and resources available. The estimated timing and required resources for these assessments have been included in the Natural Asset Management Roadmap in ***Section 3.2***.

During these assessments, field staff will also collect additional inventory information for those natural assets. If possible, condition assessments will occur over a five-year cycle to align with O. Reg 588/17 reporting timelines.

2.3. REPLACEMENT COST VALUATION

In order to meet the requirements for O. Reg 588/17, a replacement cost must be developed for natural assets within the asset management plan.

Since natural assets are naturally occurring and not purchased or constructed, the recommendation within the ***Natural Asset Management Guidebook for Local Governments*** is to develop a replacement cost to restore the natural asset if it is in a degraded state or recreate the natural asset if it was lost. However, there are limitations to this methodology with respect to irreplaceable natural features, desired service capacity potentially taking decades to achieve, cultural significance to Indigenous peoples, and low data confidence.

It can also be beneficial to quantify the cost of replacing the services the natural asset is providing to illustrate the importance of monitoring, protecting and managing these assets. To quantify the cost of natural asset services, typically the replacement cost for engineering a similar solution would be established. For example, the Grindstone Creek Watershed which is a shared City of Hamilton asset is estimated to provide over $2 billion in stormwater services. This was calculated by evaluating the value of engineered infrastructure with an equivalent stormwater management capacity. However, this watershed also provides additional services which were evaluated to have an annual service value of approximately $34 million in co-benefits which include recreation, erosion control, habitat biodiversity, atmospheric regulation, and climate mitigation.[19]

A lifecycle cost analysis could also be conducted for traditional versus natural assets. This is different from a replacement cost valuation and would allow the City to directly compare the performance of natural assets to the performance of traditional assets and provide justification from a monetary perspective for preserving the condition of these assets. Creating an investment

[19] (Municipal Natural Assets Initiative (MNAI), 2022)

plan for natural assets will also be completed as part of the Natural Asset Management Roadmap explained in ***Section 3.2***.

3. PLAN IMPROVEMENT AND MONITORING

It is important that the City recognizes areas of the AM Plan and planning processes that require future improvements to ensure both effective asset management and informed decision-making. These improvements typically span from improved lifecycle activities, improved financial planning, and plans to physically improve the assets.

As previously stated, the City of Hamilton is early in its recognition of natural assets in asset management plans and reports and therefore a Natural Asset Management Roadmap has been created to develop the City's asset maturity.

3.1. ASSET MANAGEMENT DATA SOURCES

This AM Plan contains natural asset quantity data. The sources of the data are:

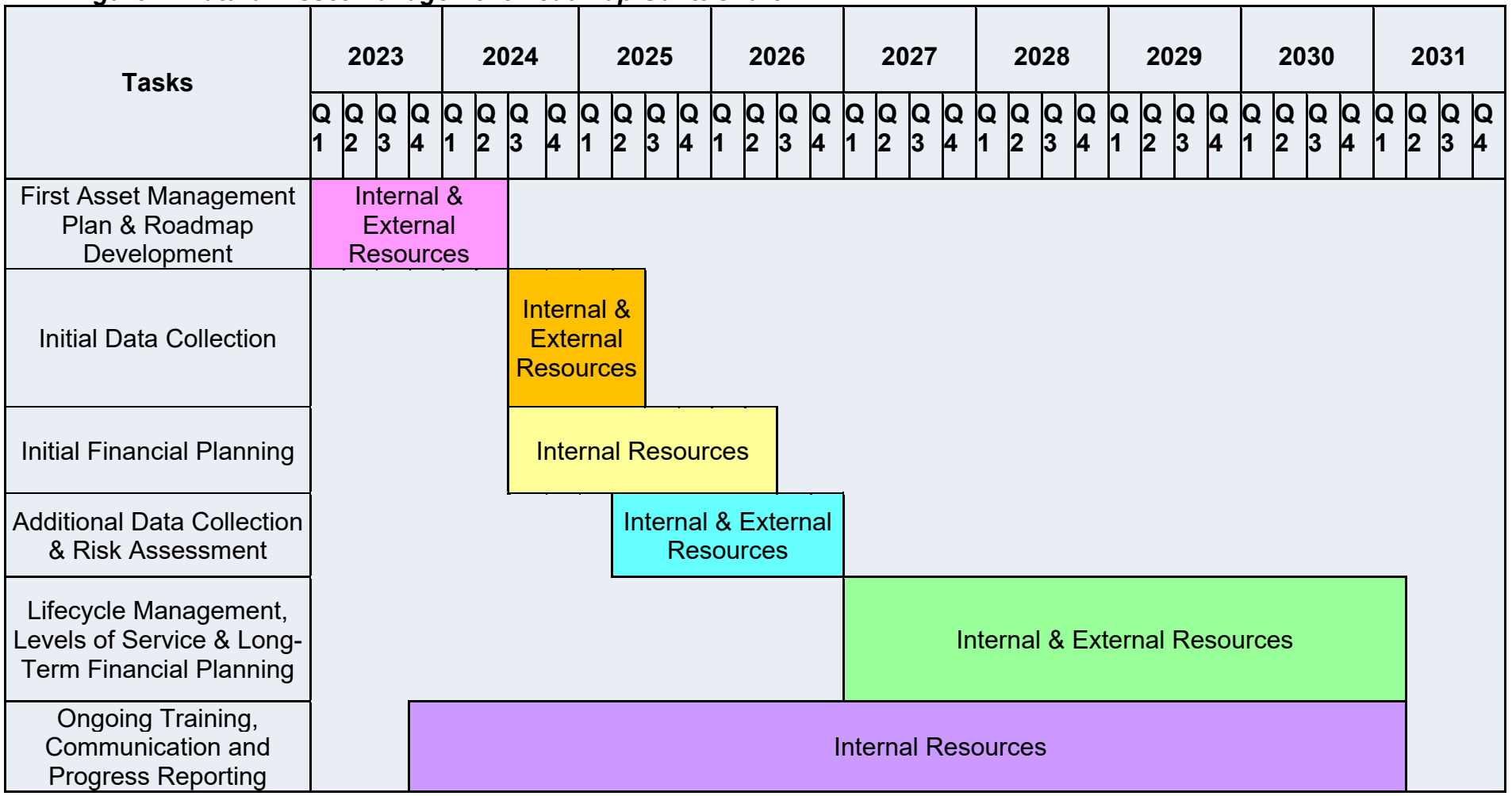
- City of Hamilton Open GIS Data;
- Niagara Escarpment Commission;
- Province of Ontario GeoHub;
- Year Ending 2023 MPAC and City Real Estate data;
- 2014 Hamilton Natural Areas Inventory Project 3rd Edition;
- Asset Management Data Collection Templates; and,
- Subject Matter Expert Opinion and Anecdotal Information.

3.2. NATURAL ASSET MANAGEMENT ROADMAP

In November 2023, the City of Hamilton completed a Natural Asset Management (NAM) Roadmap with the Natural Asset Initiative (NAI), formerly known as the Municipal Natural Assets Initiative (MNAI), which resulted in over 30 items which outline the tasks required to reach the goal of integrating natural assets into the City's asset management program. A summary of these items is included in ***Figure 4***, on the following page, and a detailed table is included in ***Table 7*** in ***Appendix "A"***.

The implementation of the NAM Roadmap has already begun with the development of this initial asset management plan, and at the time of writing all roadmap items are expected to be completed by early 2031. It is important to note that due to the large amount of unknown information, the earlier tasks in the timeline have higher confidence than the tasks later in the timeline. As more data is collected and more information is known, the estimated timelines, scope, and required resources will likely be adjusted.

Figure 4: Natural Asset Management Roadmap Gantt Chart



3.3. MONITORING AND REVIEW PROCEDURES

As part of the Natural Asset Management Roadmap completion, when financial information is available for natural assets, this AM Plan will be reviewed during the annual budget planning process and revised to show any material changes in service levels, risks, forecast costs and proposed budgets as a result of additional data collection or budget decisions.

The AM Plan will also be reviewed and updated when more data is available through the Natural Asset Management Roadmap to ensure it represents the current service level, asset values, forecast operations, maintenance, renewals, acquisition and asset disposal costs and planned budgets. When established, these forecast costs and proposed budget will be incorporated into the Long-Term Financial Plan once completed.

3.4. PERFORMANCE MEASURES

The effectiveness of this AM Plan can be measured in the following ways:

- The degree to which the Natural Asset Management Roadmap items have been completed on time.

4. REFERENCES

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5. APPENDIX A – NATURAL ASSET MANAGEMENT ROADMAP

Table 7: Natural Asset Management Roadmap

#	TASK	RESPONSIBILITY	RESOURCES REQUIRED	COMPLETION DATE
FIRST ASSET MANAGEMENT PLAN & ROADMAP DEVELOPMENT				
1.	Present revised Strategic Asset Management Policy to Council in June 2023, which incorporates all assets including natural assets	Corporate Asset Management	Internal Resources	Complete
2.	Develop a draft natural asset management roadmap with the Natural Assets Initiative.	Corporate Asset Management	Internal Resources & $600 External	Complete
3.	Identify natural asset classes to be included in AM Plans, potentially starting with 2 or 3 asset classes.	Corporate Asset Management	Internal Resources	Complete
4.	Include someone who is responsible for incorporating natural asset management considerations in our Corporate Asset Management Steering Committee and add natural asset management considerations as a regular agenda item.	Corporate Asset Management	Internal Resources	Complete
5.	Define initial asset owner responsibility for natural assets inventory creation.	Corporate Asset Management	Internal Resources	Complete
6.	Ensure that staff responsible for managing natural assets are connected formally to the asset management planning process.	Corporate Asset Management	Internal Resources	Ongoing

NATURAL ASSETS
2024 ASSET MANAGEMENT PLAN

#	TASK	RESPONSIBILITY	RESOURCES REQUIRED	COMPLETION DATE
7.	Present the natural asset roadmap to senior management and council to build awareness of the steps that need to be taken and estimated resources required to make progress.	Corporate Asset Management	Internal Resources	Complete
8.	Apply current AM Planning methodology to natural assets and adapt as necessary.	Corporate Asset Management	Internal Resources	Complete
9.	Complete Asset Management Plan for natural assets, which includes the final NAM Roadmap.	Corporate Asset Management	Internal Resources	Complete
INITIAL DATA COLLECTION				
10.	Include Key Performance Indicators to measure progress on the implementation of the natural asset management roadmap.	Corporate Asset Management	Internal Resources	Q4 2026
11.	Include Key Performance Indicators to measure progress on natural asset management roadmap in new or updated asset management plans.	Corporate Asset Management	Internal Resources	Q4 2024
12.	Develop or strengthen natural asset data by incorporating fields into an asset register/inventory template.	Asset Owner	Internal Resources	Q1-Q2 2025

NATURAL ASSETS
2024 ASSET MANAGEMENT PLAN

#	TASK	RESPONSIBILITY	RESOURCES REQUIRED	COMPLETION DATE
13.	Incorporate most complete natural asset datasets into Enterprise Asset Management System for Public Works owned assets.	Asset Owner	Internal Resources	Q4 2024
14.	Conduct a high-level desktop inventory & condition assessment (if possible) of natural assets to determine where additional field verification of natural assets inventory and condition may be beneficial.	Asset Owner	Internal Resources, possible request for FTE in future, $150K Roster Assignment	Q3-Q4 2025
15.	Connect with conservation authorities and other organizations when completing natural asset inventory.	Asset Owner/ Corporate Asset Management	Internal Resources	Ongoing
INITIAL FINANCIAL PLANNING				
16.	Seek funding for priority improvements in natural asset management.	Finance	Internal Resources	Ongoing
17.	Review capital and operating budgets to establish if natural assets are embedded into existing costs and begin to separate.	Asset Owner / Finance	Internal Resources	Q4 2025
18.	Budget for capital and operating expenditure for future natural asset expenditures into financial planning and AM systems.	Asset Owner / Finance	Internal Resources	Q1 2025

NATURAL ASSETS
2024 ASSET MANAGEMENT PLAN

#	TASK	RESPONSIBILITY	RESOURCES REQUIRED	COMPLETION DATE
19.	Better consider and integrate natural asset management-related needs into the budgeting process.	Finance	Internal Resources	Q1 2025
20.	Ensure natural assets are specifically identified in capital and operating budgets.	Finance	Internal Resources	Q1 2025
ADDITIONAL DATA COLLECTION & RISK ASSESSMENT				
21.	Conduct a desktop risk identification exercise to estimate risks to natural assets and relevant services and develop a risk mitigation strategy after inventory is complete.	Corporate Asset Management / Asset Owner	Internal Resources	Q4 2027
22.	Create a detailed asset owner lifecycle responsibility matrix for natural assets after assets are inventoried.	Corporate Asset Management	Internal Resources	Q4 2026
23.	Prioritize strengthening the quality of asset data where risks have been identified.	Asset Owner	Internal Resources, possible request for FTE in future, $350K Roster Assignment	Q2 2025
24.	Conduct a field condition assessment for natural assets that have been identified as high-risk assets to support their protection and proactive management.	Asset Owner	Internal Resources, $80K Co-op Students, $150K Roster Assignment	Q1-2026

NATURAL ASSETS
2024 ASSET MANAGEMENT PLAN

#	TASK	RESPONSIBILITY	RESOURCES REQUIRED	COMPLETION DATE
LIFECYCLE MANAGEMENT, LEVELS OF SERVICE & LONG-TERM FINANCIAL PLANNING				
25.	Model or study the services that one or more significant natural assets or areas provide to support the development of levels of service and subsequently lifecycle management strategies for them.	Corporate Asset Management / Asset Owner	Internal Resources	Q4 2027
26.	Develop a specific natural asset investment plan that considers multiple service areas.	Finance / Corporate Asset Management	Internal Resources	Q4 2027-Q1 2031
27.	Conduct an economic valuation of the services associated with natural assets to support financial planning and budgeting.	Planning & Economic Development / Asset Owner / Corporate Asset Management	Consultant 1st Phase-$75K; 2nd Phase- $250K	Q4 2027-Q1 2031
TRAINING AND COMMUNICATION				
28.	In future, after the development of this roadmap and after receiving clarification on how our proposed methodology may differ for natural assets, we may alter our training on natural assets.	Corporate Asset Management	Internal Resources	Q4 2025
29.	Communicate the benefits and offer training for natural asset management to council.	Corporate Asset Management	Internal Resources	Q1 2025
30.	Disseminate new knowledge about natural asset management internally (e.g., The natural asset management roadmap).	Corporate Asset Management	Internal Resources	Q4 2025

NATURAL ASSETS
2024 ASSET MANAGEMENT PLAN

#	TASK	RESPONSIBILITY	RESOURCES REQUIRED	COMPLETION DATE
31.	Connect with neighbouring Indigenous nations when completing natural asset inventory.	Indigenous Relations / Asset Owner	Internal Resources	Ongoing
32.	Continue relationships with neighbouring Indigenous nations while completing natural asset management strategies and plans.	Indigenous Relations / Asset Owner	Internal Resources	Ongoing
33.	Investigate opportunities to attend natural asset management-related educational events.	Corporate Asset Management	Internal Resources	Ongoing