CASE STUDY:

Integrating Green Infrastructure into South Bruce Peninsula Asset Management

PROJECT DURATION: 2025–2026

TYPE OF PROJECT: green infrastructure, natural asset management, climate resilience, municipal, training

CONTEXT

The Town of South Bruce Peninsula is responsible for a diverse portfolio of municipal infrastructure that supports service delivery across a geographically large and environmentally significant region. In addition to traditional built infrastructure, the Town owns and manages many green infrastructure assets, including forests, beaches, and trees located in parks and along roads.

Recognizing that green infrastructure assets provide important ecological and community services, including recreation opportunities, stormwater management, and attracting tourism. Town staff identified an opportunity to strengthen how these assets were incorporated into corporate asset management processes. While some green infrastructure assets were actively managed through operational practices, they were not yet integrated into asset hierarchy structures, levels of service, risk assessments, or lifecycle management and financial modelling.

To support this effort, the Town partnered with Asset Management Ontario (AMONTario), through funding from the Municipal Finance Officers Association (MFOA), to receive technical guidance, practical recommendations, and structured support for incorporating green infrastructure into the Town's asset management planning. The project focused on aligning green infrastructure asset management with existing municipal asset management systems and strengthening internal understanding and application of asset management principles.

This project was made possible by funding from the Municipal Finance Officers Association (MFOA)

MFOA | MUNICIPAL FINANCE OFFICERS' ASSOCIATION OF ONTARIO

AMONTario ASSET MANAGEMENT ONTARIO

CHALLENGE

Effective asset management requires alignment across departments, a shared understanding of roles and responsibilities, and the consistent application of asset management processes. For the Town of South Bruce Peninsula, integrating green infrastructure into its asset management plan presented several foundational challenges at the outset of the project.

As a small municipality, it operates with a limited staff team responsible for a wide range of services, leaving little time or resources to dedicate to specialized projects. In addition, the Town currently lacks in-house expertise in green infrastructure planning, design, and implementation. This combination of constrained staffing and limited technical knowledge makes it difficult to identify opportunities, develop effective strategies, and move projects forward without external support.

While the Town owns a wide range of green infrastructure assets, no information had been collected about these assets. Where management activities did occur, they were typically carried out through operational practice that were not utilizing asset management structures in budget decision making. The municipality is small and does not have environmental or forestry specialists on staff, therefore there was limited familiarity with the forests and wetlands located on municipality owned lands.

Built infrastructure assets were already defined within established asset hierarchies, risk models, and lifecycle management processes aligned with provincial financial reporting requirements. Green infrastructure assets did not fit easily within these existing systems, creating challenges in integrating them into established asset management processes.

Finally, there was also uneven familiarity with asset management principles across municipal staff. Some staff were well-versed in asset management planning requirements under provincial regulation, while others brought significant operational expertise but had limited exposure to formal asset management. Establishing a shared understanding of how green infrastructure management activities relate to the broader corporate asset management process was therefore an important early step in the project.

APPROACH

The project focused on all green infrastructure assets, rather than solely on natural assets, to align with Ontario Regulation 588/17. The regulation broadly defines green infrastructure to include both natural and human made elements that support ecological and hydrological processes. Using this language ensures the Town's asset management includes natural assets as well as any future hybrid assets such as bioswales or green roofs.

The project followed a phased structure, aligned with provincial asset management requirements and municipal priorities. Each phase included internal working meetings, an inter-departmental workshop, and a summary report to support green infrastructure incorporation into future asset management plan updates.

FOUR PHASES OF THE PROJECT:

Phase 1: Asset Hierarchy and Data Review	The Town reviewed its existing data, sought data from external sources, collected new data, and organized assets into a hierarchy.
Phase 2: Levels of Service Development	The Town identified both community and technical levels of service for select green infrastructure asset types, including defining expected service outcomes.
Phase 3: Enterprise Risk Management	The Town opted to undertake an enterprise risk management approach to assessing risk for green infrastructure assets. Although this process was not used for their built assets it is a consistent risk assessment process that will benefit all assets in the future.
Phase 4: Lifecycle Management	Lifecycle management activities were mapped across five lifecycle stages for green infrastructure assets. Unlike built assets, many natural assets require ongoing monitoring and adaptive management rather than predictable replacement cycles. Guidance was provided on how to incorporate costs and integrate the results into financial modeling.

OUTCOMES

Each phase of the project resulted in 1-2 primary outcomes that are useful for other small municipalities in Ontario seeking to integrate green infrastructure into their asset management process. These outcomes are:

Baseline Inventory and Data Collection

The project began by identifying the green infrastructure asset types for which the Town is responsible, focusing on assets located on municipally owned lands. Staff reviewed available information and identified opportunities to collect new asset data. Because the Town had no existing green infrastructure data and limited internal expertise, a guidance document was developed to support basic green infrastructure data collection. The document included a basic table format for data collection, methods for measuring tree size, using a mobile app to identify tree species, and distinguishing between individual park trees, shrubs, and forest assets.

Individual park trees and manicured grass in Bluewater Park in South Bruce Peninsula. Tree numbers indicate individual tree assets.

Town staff also used datasets from Bruce County and the Province of Ontario to identify and collect information on type, size, and location of forests, wetlands, and watercourses. Overlaying the forest dataset with municipally owned properties initially identified 105 assets. However, after approximately 2-3 hours of

"As Director of Financial Services, I found working with the AMONTario team to be a highly valuable experience. Their collaborative approach effectively engaged our management team, strengthened our understanding, and equipped us with the skills needed to successfully develop a Natural Asset Management Plan."

Tracey Neifer CPA,CA | Director of Financial Services/Treasurer Town of South Bruce Peninsula

desktop verification, staff removed and consolidated areas, resulting in a final total of 37 assets. Many small forest fragments, such as those located between roads at Y-intersections, were identified in the initial analysis but were considered too small to include as assets. In other cases, forest areas on adjoining properties were initially mapped as separate assets but were found to form part of a contiguous forest ecosystem. These areas were therefore combined and recorded as a single asset in the register.

Green Infrastructure Asset Hierarchy

The project developed a structured approach for incorporating green infrastructure into the Town's existing asset hierarchy. Two potential pathways were explored.

The first option integrated green infrastructure into the Town's current hierarchy structure, allowing it to be included within the existing asset management framework with minimal disruption. This approach supports immediate integration of green infrastructure into asset registers, and lifecycle planning, while maintaining compatibility with current data systems and reporting processes.

The second option outlines a future evolution toward a service-based hierarchy. In this model, assets (including built and green infrastructure) are organized according to the services they deliver to the community, such as parks and recreation and transportation (street trees). This approach provides a more strategic perspective on infrastructure management by linking assets directly to service outcomes and community priorities.

Together, these options provide both a practical short-term solution and a long-term pathway for advancing asset management maturity in the Town.

Final Green Infrastructure Asset Hierarchy

Class	Category	Segment
Green infrastructure	Natural Areas	Forests
		Wetlands
		Watercourses
		Sand Dune
	Rail Trail	
	Shorelines	Beaches
		Bluffs
		Rocky Shorelines
	Trees	Park Trees
		Street Trees
		Boulevard Trees
		Rural ROW Trees
	Manicured Grass	

Levels of Service (LOS)

The project established Community LOS and Technical LOS for a select number of green infrastructure asset types and categories. Community LOS describe the outcomes the Town aims to provide, such as safe beaches, accessible natural spaces, and healthy tree canopy, while Technical LOS define measurable indicators used to monitor performance. Traditionally, Community LOS are developed at the category level, while Technical LOS are focused on the segment level. However, with limited available data and historically minimal management planning for green infrastructure assets, it wasn't useful to differentiate between forests, wetlands, and rivers. Therefore, Technical LOS were developed for the "Natural Areas" category at this juncture. Similarly, Community and Technical LOS were developed for the "Trees" category, instead of differentiating between park and street trees (see example below).

Example LOS for Trees (Park and Street)

Community LOS
Provide safe, well-maintained, and diverse treed spaces that enhance community and visitor experiences, support environmental sustainability, and contribute to beautiful, inviting surroundings.

Technical LOS	
Percent of trees in good or better condition	Dead or diseased trees removed

Enterprise Risk Management

The project developed a structured Enterprise Risk Management approach to evaluate risks associated with green infrastructure assets and their levels of service. The framework defines risk as the likelihood of failure multiplied by the consequence of failure, aligning with standard risk management practices used in asset management.

A key feature of the approach is the direct link between Technical Levels of Service and risk. Technical Levels of Service performance ratings (e.g., very good to very poor) are translated into likelihood-of-failure ratings, allowing staff to assess how declining asset condition or performance increases risk to municipal services.

To evaluate consequences, the Town developed an enterprise consequence table that measures impacts across several categories including:

1. Health and safety
2. Community services
3. Municipal finances
4. Natural environment
5. Town's reputation

Using this framework in a facilitated workshop, staff assessed the current and target risk levels associated with each green infrastructure Technical LOS metric. The results showed that the assets and management practices currently fall within desirable low-to-medium risk ranges. The risk assessment also identified three Technical LOS priorities for continued management and resourcing going forward:

- removal of dead or diseased trees
- inspection of rocky shorelines
- monitoring beach closure days

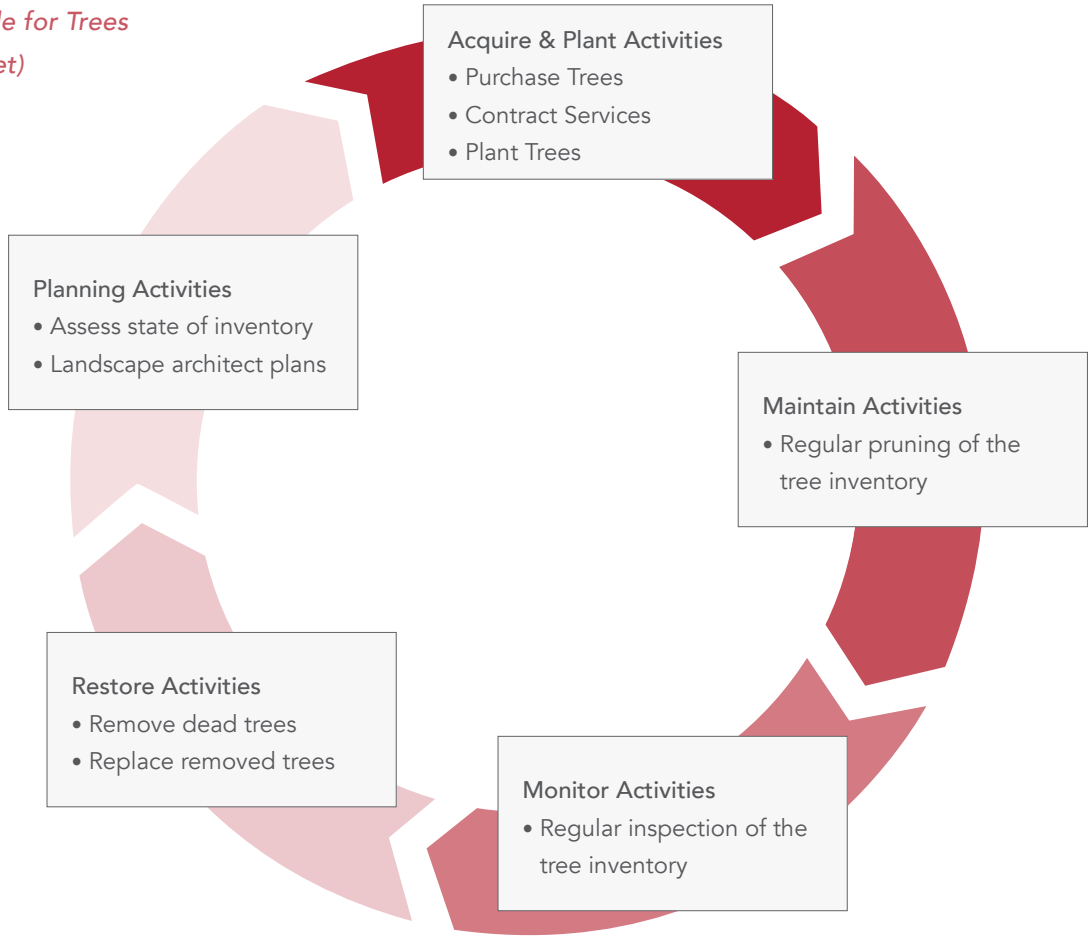
These indicators were identified as higher-priority risks because they have greater potential to affect service delivery and public safety. This enterprise-wide risk assessment approach can be applied to all assets within the municipality.

Lifecycle Management

Lifecycle management activities were identified for green infrastructure assets to support long-term planning. Unlike traditional infrastructure, green infrastructure assets rely more heavily on monitoring, ecological management, and restoration rather than predictable replacement cycles. The project identified lifecycle phases and activities for the Town's green infrastructure assets (see figure below).

A continuous improvement action was identified to set clear responsibilities for green infrastructure and facilitate regular cross departmental collaboration. A related recommendation was to organize regular (e.g., biannual) internal workshops or joint planning sessions to help achieve a more shared understanding of what guides maintenance, monitoring, and/or restoration decisions for green infrastructure and to continue the project's momentum. These governance-related activities will tie in well with the Town's desire to enact a future Data Governance policy which would provide clear direction and responsibility.

Typical Lifecycle for Trees (Park and Street)



KEY LESSONS LEARNED

Throughout the project, Town and AMONTario gained several important insights for integrating green infrastructure into the asset management processes of a small municipality. The key lessons are summarized below.

1. Recognizing green infrastructure as infrastructure

A key realization for Town staff was that integrating green infrastructure requires a shift in how infrastructure is understood and managed. Green infrastructure assets are often viewed primarily as environmental features or regulatory requirements, but they also provide essential municipal services, similar to built assets such as roads, water systems, and bridges.

Recognizing green assets as "infrastructure" shifts the paradigm on how decisions are made. It brings green infrastructure assets into central asset management planning processes, where they become part of routine planning, budgeting, and risk management rather than being considered separately or addressed only reactively or in response to regulatory requirements.

2. In-house inventory setting and data collection

Developing a green infrastructure inventory is achievable even in smaller municipalities with minimal environmental expertise. This project provided the opportunity to train and guide a staff member at the Town to lead the effort to build the inventory and work collaboratively across departments and data sources. Examples include:

- **Tree Assets:** Staff visited sites and measured the required information in the field to establish baseline data.
- **Manicured Lawns:** The information was collected using the area measurement feature in Google Maps.
- **Larger Natural Assets (forests, wetlands, and watercourses):** The inventory was developed using a combination of provincial datasets (environmental data), internal municipal data (property boundary data), and support from a spatial analysis specialist. Collaboration with other Town staff also helped fill knowledge gaps and validate the information.

This experience demonstrates that building a green infrastructure asset inventory does not always require an internal team of specialists or significant consultant contracts. With staff initiative, specific knowledge of the assets, cross-department collaboration, and the strategic use of available datasets, municipalities can begin developing the foundational information needed to support green infrastructure asset management.

3. Simplicity is key

The project ultimately used asset categories (e.g., Natural Areas) to develop LOS, undertake risk ratings, and determine lifecycle management activities. Although there were initial efforts to complete this work by asset type (e.g., forests, wetlands), it proved more effective to use asset categories. This approach improved staff understanding, helped with meaningful contributions, and better aligned with current operational realities.

It was also helpful to identify low effort, high value technical levels of service early in the process to build momentum and confidence among staff. Selecting metrics that are meaningful, easy to measure, and already supported by existing data allows municipalities to demonstrate early success. For example, the metric "Number of beach closure days per year" was straightforward to track and clearly reflected a service that the community values. This indicator also showed that Town staff were

already performing well in this area, helping reinforce confidence in the process and demonstrating the practical value of linking technical levels of service to measurable community outcomes.

4. Enterprise risk management as a learning and validation tool

The risk assessment process proved valuable for testing and refining the Town's technical levels of service metrics and consequences table. Through this process, staff identified opportunities to adjust both items to better reflect operational realities. Conducting the assessment collaboratively across departments was particularly beneficial, as it created opportunities to share knowledge and consider different perspectives when evaluating risk levels. Staff found that walking through the risk assessment process together, rather than on their own, improved understanding and helped clarify how LOS metrics and consequence ratings should be applied. As a result, the Town is now well positioned to apply the enterprise risk management process to other asset classes across the portfolio.

5. Green infrastructure asset management is iterative and collaborative

Asset management is premised on continuous improvement for all assets, both built and green. Throughout this project, it was important to recognize that decisions can be revisited and refined over time. As additional information becomes available, cost data, condition information, and lifecycle management activities can be added, updated, and improved. Asset management maturity develops incrementally, and early efforts help establish a foundation that can be strengthened as knowledge, data, and organizational expertise grow.

The workshops also highlighted the importance of cross-departmental collaboration in advancing green infrastructure asset management. Bringing together staff from different departments created opportunities to share knowledge, align priorities, and build a more comprehensive understanding of each other's work. This collaborative approach strengthened internal capacity and buy-in.

NEXT STEPS

To build on the progress achieved through this work, the following next steps have been identified as priorities to advance green infrastructure integration in the Town's asset management planning:

NEXT STEP 1:
Establish a Clear Timeline Toward the Next Asset Management Plan Update

The Town should develop structured goals leading to the next Asset Management Plan (AMP) update, with defined milestones, internal timelines, and assigned responsibilities. This process can outline the specific actions required to ensure that the next version of the AMP formally incorporates green infrastructure assets based on the results of this project. Establishing clarity around timing, sequencing, and staff involvement will support coordinated implementation across departments.

As an interim approach, the Town may also consider preparing a standalone or supplementary AMP focused on green infrastructure assets to meet the requirements of Ontario Regulation 588/17. This would allow for more immediate compliance and progress, while providing an opportunity to more fully integrate green assets into the comprehensive five-year AMP update once methodologies, data, and internal capacity have further matured.

NEXT STEP 2:

Define Goals for Integrating Assets into the Asset Register

A key next step is to ensure that the green infrastructure information organized and collected through this project are integrated into the Town's asset register. The short-term hierarchy lends itself to the addition of a new "green infrastructure" asset category. Assets and the associated inventory data collected should be added to this new category in the register, with each asset being assigned a unique asset ID.

Another key component of this next step will be to convene a meeting with internal staff to present and discuss maps of Town owned forests and wetlands identified through the inventory process. Preparing the maps could involve two levels of outputs:

- High level map for council/communications
- Technical GIS layers (for internal use) based on provincial datasets

Sharing these spatial representations will provide a clear visual understanding of the extent, location, and connectivity of key natural assets, supporting collaborative discussion on priorities, risks, and potential management actions. This process will also validate the asset data in preparation for adding it to the register.

NEXT STEP 3:

Report on Progress Through Annual Updates to Council

The Town staff will support compliance with the "Annual review of asset management planning progress" requirement under O.Reg. 588/17 by preparing an annual asset management progress report for Council. This report is an opportunity to outline both completed actions and ongoing initiatives, demonstrating continuous improvement and strengthening accountability. Integrating an update on this project and its outcomes is a key opportunity to communicate to Council and reinforce the Town's commitment to integrating green infrastructure assets into asset management planning, while also highlighting the significant progress that has been achieved through this project.

NEXT STEP 4:

Align Strategic Plan and Asset Management Policy with Green Infrastructure

Green infrastructure asset management can be further embedded within the Town's corporate strategy by reviewing and strengthening alignment with the Town's Strategic Plan, Asset Management Policy, and related planning documents. Updating these guiding documents to explicitly recognize the role of green infrastructure will help reinforce the importance of these assets and their integration into asset management.

Given that the Town is located within an environmentally significant area, future updates to the Strategic Plan present an opportunity to formally recognize the natural environment as a key strategic objective. Doing so would acknowledge the ecological, social, "and economic value of natural systems and support "the Town's commitment to protecting and managing these assets in a sustainable manner.

Through these coordinated next steps, the Town will continue to advance and mature its asset management practices and solidify the integration of green infrastructure assets within corporate decision-making processes.