



**GARDINER CITY COUNCIL
AGENDA ITEM INFORMATION SHEET**



Meeting Date	10/06/2021	Department	Planning/Economic Dev
Agenda Item	5.d) Presentation from Kennebec Valley Chamber of Government (KVCOG)		
Est. Cost			

Background Information	<p>Because of the City of Gardiner's location on the Kennebec River and its designation as a coastal community, the City has recently received a Stormwater Management Assessment from Hoyle Tanner Associates that examined the physical stormwater infrastructure in and around the downtown area.</p>
	<p>A representative from KVCOG will be attending this meeting to give City Council an update on that report.</p>

Requested Action	"I move to accept the report from the Kennebec Valley Chamber of Government that discusses some low impact development recommendations."
City Manager and/or Finance Review	Acting City Manager approves the above action and thanks KVCOG for the presentation.
Council Vote/ Action Taken	
Departmental Follow-Up	

City Clerk Use Only	1 st Reading _____	Advertised _____	EFFECTIVE DATE _____
	2 nd Reading _____	Advertised _____ w/in 15 Days	
	Final to Dept _____	Updated Book _____	Online _____



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City of Gardiner

Low Impact Development Recommendations

Background

The City of Gardiner has previously received a Stormwater Management Assessment from Hoyle Tanner Associates which examined the physical stormwater infrastructure in and around the downtown area. Identifying issues and deficiencies in the City's infrastructure to deal with stormwater is a necessity but to look at other ways of mitigating the more frequent and intense rainfall events that are being experienced is also a valuable use of resources.

Whilst ensuring that existing infrastructure can handle the water during storm events in existing neighborhoods, the way that future development is designed and regulated can provide a huge benefit to not only preventing flooding but also improving water quality within a municipality and watershed as a whole.

The DACF Municipal Planning Assistance Program and KVCOG identified this as a good time to compliment the stormwater infrastructure work with a review of the City's current land use regulations. This project was part of a work plan funded through the DACF and the Maine Coastal Program that funds projects in the coastal zone related to community resiliency and in this case specifically flood prevention. The review of Gardiner's regulations will look for ways to improve the way any future development will deal with stormwater, either in new undeveloped areas or redevelopment. This will not only put less strain on the existing stormwater infrastructure but also mitigate future infrastructure costs and improve water quality.

Sensible land use strategies in general can do a large amount to mitigate potential flooding and water quality issues. Basic principles such as maintaining natural resource areas, preserving critical ecological and buffer areas, minimizing land disturbance, minimizing impervious cover, and following smart growth principles all have great benefit. More specific practices known as Low Impact Development (LID) can be incorporated into performance standards required during Municipal review.

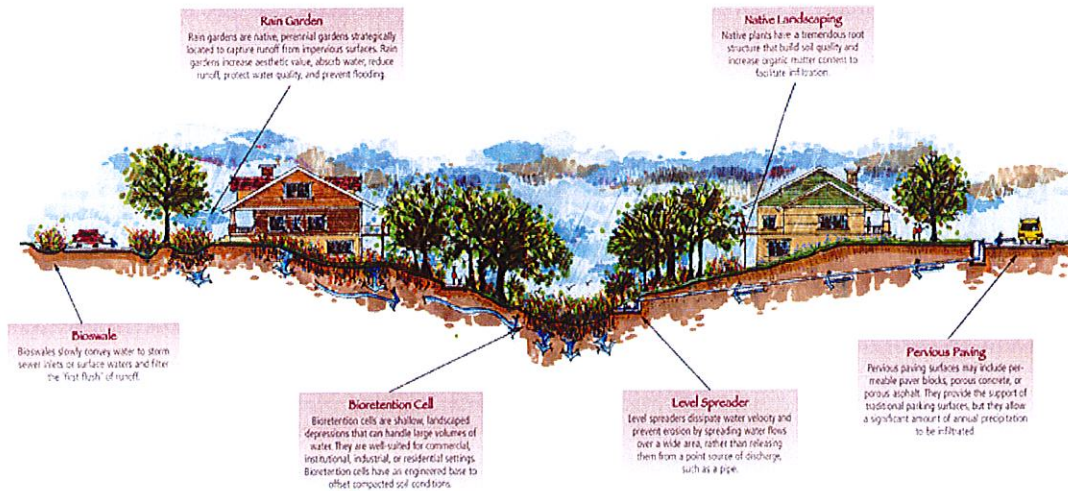
Low Impact Development essentially focuses on emulating the functions of natural systems to reintegrate rainfall into the water cycle. LID is an approach to land development (or redevelopment) that works with nature to manage stormwater as close to its source as possible. LID essentially incorporates a range of best management practices (BMPs) for planning, design and specific measures and techniques.

LID begins at the design phase of a new development, incorporating planning techniques that minimize site clearing and impervious surfaces to reduce impact and stormwater runoff generated from the site. By reducing the volume of water leaving a site, any pollutant loading is also reduced. Other techniques that will reduce the volume and peak flow rates of runoff from the development are then incorporated throughout the site.

LID offers a number of advantages over traditional, engineered stormwater drainage approaches, including

- Addresses stormwater at its source: LID practices seek to manage rainfall where it falls, reducing or eliminating the need for detention ponds and flood controls.
- Preserves streams and watersheds: Because LID practices infiltrate rainfall and prevent runoff, they reduce both pollutant loads and streambank erosion associated with peak flows.
- Promotes ground water recharge: Many LID techniques allow stormwater to infiltrate the earth, recharging ground water aquifers and providing baseflow to streams during dry weather. The stormwater, cooled as it flows underground, helps keep stream temperatures low.
- Allows for more flexible site layouts: Whereas traditional stormwater management required large ponds and wetlands that consume valuable real estate, the small-scale, dispersed nature of LID practices means that designers can include stormwater management in a variety of open spaces and smaller landscaped areas.
- Enhances aesthetics and public access/use: Well- designed vegetated practices, such as rain gardens, can provide a visual amenity, particularly when compared to hardened drainage infrastructure such as pipes, curbs, gutters, and concrete-lined channels. Some practices can double as park space, offering recreational amenities.
- Reduces costs: A common myth is that LID costs more than traditional stormwater management, but case studies have shown the opposite to be true. Savings can arise from the reduced amount of pipes, asphalt, detention basins or other infrastructure needed to handle runoff, reduced energy costs, and increases in developable land area due to the availability of land that would not have been available had traditional stormwater management approaches been employed. A recent EPA report titled *Reducing Stormwater Costs through LID Strategies and Practices* finds that total LID capital costs are lower than conventional methods, with savings ranging from 15 to 80 percent.

The LID approach to storm water management



Gardiner Regulatory System

Gardiner currently uses an all-inclusive Land Use Ordinance for the purpose of development location and review. The land use ordinance will be the primary document in need of revision or additions.

Different sections of the ordinance will be referenced based on how they apply to different possible LID practices.

General Performance Standards (Section 8)

There are some places in this section of the Ordinance that could incorporate some aspect of LID, specifically for general single family housing development.

Some suggested standards can be as follows:

- Disturbance on an individual lot must be less than 15,000 square feet (including building, driveway, walkways, lawn area, construction access, grading).
- A minimum natural vegetated buffer must be maintained downgradient of all developed area on the lot. This buffer shall be 35 feet wide if naturally forested or 50 feet wide if maintained as a natural meadow. (Buffers may be enlarged in areas adjacent to protected waterbodies)
- No more than 7,500 square feet of impervious cover is located on the property.

- A minimum of 20 percent of the lot area must be maintained as undisturbed natural area.

Where the above standards could not be reasonably met then using a combination of other LID practices could be met in order to show that it can treat 0.5 inches of runoff from all impervious surfaces on the site, and 0.2 inches of runoff from all disturbed pervious areas of the site (lawn).

- Buffers/filter strips
- Underdrain soil filters (rain gardens and swales)
- Dry wells
- Permeable pavers
- Rain Barrels / Cisterns

Street Design Specifications (Section 11)

Practices in this area of the ordinance are essentially tied to the concept of reducing impervious surface. By looking at policies such as road widths or type of curbing, erosion and sediment control and basic landscaping requirements.

A starting point would be to try and limit any new roads to be open section that are served by roadside swales rather than hard gutters and curbs and to try to let the pavement width be no more than 22 feet or less with a pervious base for the shoulders.

Other considerations:

- Alternative road layouts can be used to reduce total pavement, while allowing for the same amount of development. Clustering will decrease imperviousness.
- Reduction to one side or elimination of on-street parking can potentially reduce overall site imperviousness by 25 to 30 percent.
- Minimizing paved driveway area can be accomplished through narrower driveways or length reduction. Shared driveways will also reduce imperviousness. In addition, pervious materials would minimize runoff.
- Parking lots should be broken up with vegetated areas specifically that water is drained to and increase the current 5% requirement and require more areas specifically designed to be better at dealing with stormwater.
- Give incentives (possible reductions in other standards or waivers (see below)) for the use of impervious pavement in low traffic or pedestrian areas.

Often this could be incompatible with site conditions so it is important to address the other departments' concerns about safety, cost and such to ensure their support.

Storm Water Management Design Standards (Section 9.10)

As this section identified developments over a certain size threshold that therefore requires the following of State standards, there could still be some requirements for development that falls below the threshold for state stormwater review under Chapter 500.

There is a Basic LID Standard that can presume that a minimal hydrologic alteration will result from the project and consequently the objectives of LID are met at the site. If an applicant meets this standard, they are not required to do any further stormwater management on the site. If an applicant cannot or elects not to meet the Basic LID Standard, then a set of Alternative LID Standards could apply.

Possible basic standards (mainly meant for any non-residential development) could be as follows:

- Disturbance on an individual lot must be less than 1 acre (43,560 square feet, including building, driveway, walkways, lawn area, construction access, grading).
- A minimum 60-foot natural vegetated buffer must be maintained along downgradient property boundaries except where access to the property is provided. If the runoff flow path between developed areas and the buffer exceeds 60 feet for impervious surfaces or 100 feet for pervious surfaces, then a level spreader must be installed. (Could be increased in lots that are closer to protected water bodies as needed).
- No more than 15,000 square feet of impervious cover is located on the property.
- A minimum of 15 percent of the lot area must be maintained as undisturbed natural area.

Where the above standards could not be reasonably met then using a combination of other LID practices could be met in order to show that it can treat 0.5 inches of runoff from all impervious surfaces on the site, and 0.2 inches of runoff from all disturbed pervious areas of the site (lawn).

- Buffers/filter strips
- Underdrain soil filters (bioretention system, swales)
- Dry well/infiltration trenches
- Stormwater Planters
- Permeable pavers
- Cisterns
- Green roofs

Other consideration for Stormwater standards

Incentives

In order to encourage the use of LID techniques in new development in Gardiner, incentives can be in the form of density bonuses, reduced size of required drainage infrastructure, discounted utility fees, and tax credits. Gardiner could also offer incentives to developers to preserve open space, protect or plant trees, and implement LID site design techniques by offering stormwater credits.

The city could offer credits to those using BMPs in their residences or commercial buildings. The goal of the credits is to reduce the required capacity (and therefore the cost) of stormwater treatment practices by using nonstructural site design and conservation measures. These credits can also decrease a utility fee, if applicable.

General Guidance

Providing guidance for implementing the new standards can help with the adoption of these desirable LID practices in Gardiner. It might be an idea to develop a standards manual. In Maine there are already lots of existing resources that can be adapted to the city's situations.

Another idea might be to implement demonstration projects and monitor them for effectiveness and suitability of design on Municipal projects and property. Gardiner could take the initiative to experiment with BMP designs and identify those that work well in local conditions. Demonstration projects show developers and citizens the effectiveness of stormwater BMPs and LID practices and instill confidence in their performance.

Gardiner itself could set a good example, show confidence in the use of new technology, and demonstrate success with pilot projects in the public right-of-way. Municipalities have jurisdiction over development activities in the right-of-way and on public lands, which allows greater design flexibility and more reliable maintenance using municipal crews. LID projects adapt well to linear applications (e.g., streetscapes, courtyards, medians) and small-scale open spaces. Work with Public Works and landscaping crews because maintenance of vegetated LID practices sometimes requires special handling, such as hand-weeding and prohibiting heavy equipment and pesticide use. Also, consider adopting Leadership in Energy and Environmental Design (LEED) Green Building Rating System standards for all municipal building and development projects which incorporates many LID principle already.

Understanding Limitations

Evaluating the constraints within Gardiner (areas of high ground water, poorly drained soils, etc.) can help to inform the development community about where the new requirements might best apply and where site constraints prohibit LID implementation. However, many site constraints can be overcome.

Educate designers and developers

Allow time and dedicate resources for bringing design engineers and landscape architects up to speed on new requirements. At initial preliminary application meetings the desire for utilizing LID as a stormwater management tool should be mentioned. Provide checklists to help ensure compliance with new procedures. As previously stated, you will always need to consider unique local conditions, to ensure accurate sizing calculations and include example calculations to ensure consistency and transparency in project submittals. Hold periodic training sessions on LID applications, and request that plan reviewers provide specific comments when submitted designs do not meet standards.

Establish a maintenance tracking system

A lot of LID practices require maintenance in order to remain effective over time. Determining whether property owners or the municipality will be responsible for maintenance can be a crucial element. If property owners will be responsible, there are a number of ways in which the municipality can assure look to assure maintenance:

- Require maintenance agreements, recorded with the property deed, for new and existing BMPs
- Require a performance bond for new BMPs
- Perform spot inspections to identify problems and check maintenance records
- Require that property owners submit records or other evidence that maintenance was performed as prescribed

Municipalities should consider a balance between compliance assistance and enforcement mechanisms to ensure that property owners uphold their maintenance responsibilities.

Another idea may be to maintain a database or geographic information system (GIS) of locations of all LID BMPs. This database is needed for maintenance assurance and can also be used for other efforts, such as watershed modeling, stormwater master planning, and inspection programs that are currently performed on existing infrastructures already.

Quantifying the benefits of LID

Eventually presenting case studies showing the water quality and community benefits of LID, whether modeled or measured, would be a great way to spur adoption of BMP's in the development of the future. Good examples and reliable data will help to make a case for changes in development standards by describing potential cost savings and other amenities offered by LID. This information can be part of a larger effort to educate municipal decision-makers, such as the city councils, about the benefits of LID, and to dispel any myths and misconceptions surrounding green infrastructure. These studies can also be used to gain buy-in from state permitting authorities and to quantify stormwater management benefits in terms of volume reductions and pollutant removal. One tool that can be used to estimate the benefits of LID and conservation practices is the Center for Neighborhood Technology's Green Values Stormwater Calculator <http://greenvalues.cnt.org/calculator> . Users input site development characteristics and green practices, and the calculator returns the financial and hydrologic outcomes for different scenarios.

Consider drinking water sources

If the development is near a public drinking water source, consider the development's cumulative effect on drinking water sources, especially if the project includes any infiltration BMPs. BMPs should provide pollutant removal before discharge and be sited a sufficient distance away from ground water or surface water sources. For examples of bio-retention areas, rain gardens, gravel wetlands, and pervious pavement throughout New England, see the UNH Stormwater Center at <http://www.unh.edu/erg/cstev> .

Consider Gardiner's current and future drinking water supplies and the need to protect them from contaminants that might threaten the drinking water source.

Practices such as rain gardens, bio-retention areas, vegetated swales, stormwater wetlands, and permeable pavement are typically not regulated in the same way as other discharges might be in and around drinking water sources.

Existing Development

A number of LID techniques can be used to effectively improve the stormwater management on an existing developed site within Gardiner also. Although not enforceable through regulation (except for large scale redevelopment of sites), encouraging the addition of LID practices at existing residential and commercial areas should be attempted, in particular by connecting to the promotional aspects described above. Retrofitting of existing site to improve stormwater management can have a significant impact both on a given site and the area downstream of that site. Some landowners may be interested in making improvements to the stormwater management on their site, but do not know exactly what stormwater practices are appropriate.

Gardiner should look to promote the use of LID practices to retrofit the drainage and stormwater treatment from existing development as a way to help remedy a water quality or flooding problem.

The use of LID techniques on existing developments can help to improve the water quality and quantity problems that may be occurring downstream or on downstream sections of a property, and can help to reduce erosion and sedimentation from large concentrated stormwater flows that may be discharging from an existing site. Anything the city can do to help to guide property owners in selecting appropriate practices to retrofit an existing development will add to the resiliency of the City. Advice based on benefits, limitations and estimated costs of the practices, as well maintenance requirements and engineering design requirements would be most helpful.

This guidance also could be used to help Gardiner itself or local watershed organizations to perform stormwater management and hydrologic improvements to restore a water body that may be at threat from stormwater runoff.

Below is a description of a number of LID practices that are suitable for retrofitting the stormwater management on existing development. These practices include:

- Buffer/filter strip
- Underdrain soil filters (rain garden, bio-retention system, swales)
- Dry well/infiltration trench
- Permeable pavers
- Rain barrel/cistern
- Stormwater Planter
- Micro-bio Inlet
- Green roof

Gardiner could consider making LID a part of the permit process for improvement or expansion projects, in addition to new development projects. These types of projects typically receive approval from the building inspector/ code enforcement officer.

Additional Resources – “Practice Profiles”

Supplementary information or what can termed a “practice profile” includes a description of the benefits and limitations of the practices that are listed in all the previous sections:

- Vegetative buffers;
- Underdrain soil filters (bio-retention, rain gardens and swales);
- Infiltration practices (dry wells and infiltration trench);
- Pervious pavements;
- Rain barrels and cisterns;
- Green roofs;
- Stormwater planters; and
- Micro-bio inlet.

For each of these practices there includes a discussion of selecting appropriate practices and appropriate locations for those practices, sizing guidelines, estimated planning level costs and maintenance requirements.

These are available from KVCOG either individually or as a whole appendix.

A suggested format of an application form that could be used in conjunction with a building permit for building improvements or building expansion projects is also available on request.

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