

VERMONT  
GREEN INFRASTRUCTURE  
STRATEGIC PLAN  
2014 – 2019

Developed by the Green Infrastructure Roundtable in collaboration with the  
Vermont Department of Environmental Conservation

JULY, 2014



# ONE PLAN

In 2010, the Vermont Agency of Natural Resources (VTANR) convened a small group of public and private sector entities to discuss an emerging set of stormwater management techniques commonly referred to as low impact development (LID) and green stormwater infrastructure (GSI). Both techniques were gaining popularity as an alternative to the traditional approach of managing stormwater runoff using gray infrastructure (networks of catch basins, pipes, ponds). Recognizing the applicability and benefits of LID and GSI in Vermont, the group decided to meet on a regular basis to discuss various strategies for promoting and overcoming barriers to LID and GSI. The group is now referred to as the Green Infrastructure Roundtable (Roundtable).

In a four-year span, the Roundtable was able to accomplish a great deal, most notably by developing the *Vermont Green Infrastructure Strategic Plan 2011-2013*. The plan laid the groundwork for the creation of Vermont's Green Infrastructure Initiative within the Vermont Department of Environmental Conservation's Ecosystem Restoration Program, employing a dedicated Green Infrastructure Coordinator, and the signing of Executive Order 06-12 which asks State Agencies to act as role models for LID and GSI adoption. Additional outcomes included:

- Increased training and networking opportunities for design professionals
- Focused and targeted efforts to raise municipal awareness of LID principles
- Action by non-profit groups to educate the public about stormwater issues
- Inclusion of additional LID principles and GSI practices as part of the Vermont Stormwater Manual revision process

Recognizing that there is still much to do, the Roundtable developed a new five-year strategy: *The Vermont Green Infrastructure Strategic Plan 2014 – 2019 (VGISP 2014-2019)*.

As with the 2011-2013 plan, *VGISP 2014-2019* places a heavy focus on actions targeted at specific audiences. *VGISP 2014-2019* draws attention to five audiences: citizens, municipalities, organizations, professionals, and state agencies. While almost all of the actions identified in the plan span multiple audiences, it is important to recognize that each audience has a unique relationship with the topic of green infrastructure. By identifying differences in target audiences and adapting our efforts appropriately, we will be better able to achieve our goals.

*VGISP 2014-2019* identifies seven strategic objectives and outlines key actions to meet them. In this way, *VGISP 2014-2019* and the previous plan are very similar. However, whereas the previous plan centered on the development of a programmatic structure for the Green Infrastructure Initiative, *VGISP 2014-2019* centers on the Roundtable itself and the specific actions it will take as a collaborative body over the next five years.

*Note: By definition, green infrastructure (GI) is "a wide range of multi-functional, natural and semi-natural landscape elements located within, around, and between developed areas at all spatial scales." Broadly, GI includes forests, floodplains, wetlands, riparian buffers and more. For the purposes of this plan, the Roundtable chose to focus narrowly on the elements of GI that relate principally to stormwater management, low impact development (LID) and green stormwater infrastructure (GSI).*

# FIVE TARGET AUDIENCES

## CITIZENS

We know that non-point source pollution has diffuse sources across the landscape. Because private citizens own the overwhelming majority of land in Vermont, their awareness and action is critical to increasing the widespread use of LID and GSI. This group can be most effectively influenced by regulation, public service announcements, demonstration on public lands, and incentive programs.

## MUNICIPALITIES

Due to their direct role in regulating land use, municipal governments are where the “rubber meets the road” in terms of whether or not LID and GSI are encouraged and facilitated (even mandated) in both new developments and infill/redevelopment projects. Through their zoning bylaws, subdivision regulations, ordinances and other regulations, municipalities directly affect key factors in stormwater management including broad measures such as setbacks, lot clearing and coverage, vegetation retention, parking requirements, and specific stormwater engineering standards such as curbing, swales, ponds, pipes and rainfall retention requirements. Unless LID and GSI are directly encouraged, facilitated, incentivized and in some cases mandated in municipal land use regulations, application of these strategies will be limited to projects using public dollars and the occasional private landowner with a unique interest.

## ORGANIZATIONS

Organizations are strategic partners in promoting LID and GSI at the local level. They serve a variety of functions including education and outreach, technical assistance, and project implementation and oversight. They are often at the forefront of innovation and have a strong capacity for moving initiatives forward when other groups cannot. The LID and GSI movement cannot move forward without the support and work of organizations throughout Vermont.

## PROFESSIONALS

*(ARCHITECTS, CONSULTANTS, CONTRACTORS, DESIGNERS, ENGINEERS, LANDSCAPE ARCHITECTS, LANDSCAPERS, PLANNERS)*

The professional community is an important link between LID and GSI planning and implementation. It is vital for professional groups to be engaged early on in the LID and GSI planning process so that the on-the-ground perspective of the professional can be integrated into design/regulatory changes, and also so that professionals can better communicate these programmatic LID and GSI changes to their clients, who will mostly be responsible for operating and maintaining systems over time. Engaging these groups in focused training or network settings will also help the advancement and effectiveness of LID and GSI by promoting communication and collaboration within the group (between planner and builder, for example).

## STATE AGENCIES

State agencies play an important role in the management of stormwater runoff throughout Vermont. State agencies develop broad-reaching policies and regulations, offer funding and technical resources, assist in the coordination of efforts, and have the ability to show strong leadership on critical issues. They are an essential partner in promoting LID and GSI implementation.

# SEVEN STRATEGIC OBJECTIVES

## 1. SPREAD THE WORD

**OBJECTIVE: RAISE AWARENESS OF THE ISSUES ASSOCIATED WITH STORMWATER RUNOFF AND THE ROLE THAT WIDESPREAD USE OF LID AND GSI PLAYS IN MANAGING STORMWATER SUSTAINABLY.**



A Tour of the Bioretention Laboratory at UVM.

The issues associated with stormwater runoff are not new to Vermont. In fact, Vermonters have been dealing with them for many years. However, the vast majority of Vermonters are still woefully unaware of how much of an impact unmanaged stormwater can have on the environment, despite a number of well-intentioned outreach and education efforts. It is likely that even fewer people are aware of the wide range of LID and GSI techniques and practices being implemented in Vermont and throughout the country.

Given this, it is important that a good deal of energy and effort be put into raising the general level of awareness about stormwater, LID, and GSI across all sectors. Developing a baseline level of knowledge is key to the continual improvement of our stormwater infrastructure. Improved understanding enhances people's connection with the subject matter, increases the level of public engagement, enriches the decision-making process through informed and thoughtful discussion, and eases the work of coordination and implementation.

### KEY ACTIONS

- A. Identify educational needs/gaps and develop strategies to address them.
- B. Create a statewide marketing strategy to address the lack of understanding surrounding the impacts of stormwater and the benefits of LID and GSI.
- C. Seek opportunities to leverage other relevant outreach efforts, e.g., flood resiliency, Lake Champlain Total Maximum Daily Load, shoreland protection.
- D. Identify and seek strategic partnerships to enhance educational outreach efforts.
- E. Support the development of, and help to sustain, an online information hub.

## 2. COORDINATE EFFORTS

**OBJECTIVE: SUPPORT AND COORDINATE STATEWIDE EFFORTS TO PROMOTE AND UTILIZE LID AND GSI**

Strong and continued coordination is a critical element of any endeavor, particularly one that has a statewide focus. At its core, coordination allows disparate entities to work together to achieve common goals and objectives in a timely manner. Coordination helps to minimize conflicts, ensures a smooth working environment, and leads to higher levels of efficiency through the sharing and effective use of

resources. The strength of the GI Roundtable is in its ability to bring together a diverse array of stakeholders around a common interest. This strength should be leveraged and enhanced where possible.

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#### KEY ACTIONS

- A. Identify statewide needs and actions and develop a 5-year action plan.
- B. Seek funding to support statewide LID/GSI initiatives.
- C. Invite additional entities and partners to participate in the GI Roundtable.
- D. Monitor progress towards strategic plan goals.

### 3. SHARE RESOURCES

**OBJECTIVE: COLLECT AND DISSEMINATE INFORMATION REGARDING THE USE, PERFORMANCE, BENEFITS, MAINTENANCE, AND FINANCING OF LID AND GSI.**

In many aspects, Vermont is a leader in environmentalism. However, in regards to LID and GSI, Vermont has some catching up to do. The Pacific Northwest region of the United States, particularly Seattle and Portland, has been using LID and GSI on a relatively large-scale for a number of years. Minnesota, Pennsylvania, New York, Maryland, and many other states are following suit. In addition, on a federal level, the EPA has institutionalized LID and GSI within many of their programs.



Raising the Bar Workshop in South Burlington.

Luckily, Vermont is not totally behind the curve. A number of organizations were quick to catch on to the shifting paradigm and have already accomplished some amazing work. This work could be bolstered by the wealth of resources and information available from other states including technical guidance, BMP specifications, cost-benefit analyses, financing studies, and maintenance procedures. Unfortunately, not all the information is relevant to Vermont due to our specific climatic and physiographic conditions. A major challenge, and role for the GI Roundtable, is sorting through that information to determine what is relevant and what needs still exist.

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#### KEY ACTIONS

- A. Research and document guidance available nationally and internationally.
- B. Compile and disseminate a list of available resources specific to Vermont.
- C. Identify and work to address needs/gaps in technical guidance.
- D. Identify and work to address needs/gaps in scientific knowledge.

## 4. GROW TECHNICAL CAPACITY

**OBJECTIVE: PROMOTE AND SUPPORT TECHNICAL TRAINING AND LEARNING OPPORTUNITIES.**

Raising awareness of stormwater, LID, and GSI is an important endeavor but is only one piece of the puzzle. To facilitate change in Vermont we also need to develop the technical capacity of target audiences to plan, design, and implement practices. Vermonters should understand the problem, be motivated to fix it, and have the tools, skills, and resources to do so. This should be the case regardless of whether it is a citizen installing a rain barrel on a residential property or an engineer designing a constructed gravel wetland in an industrial park.

Building technical capacity can happen in a number of different ways including workshops, conferences, on-site demonstrations, and webinars. Regardless of the media used, the trainings must be effective, relevant, and specifically targeted to the needs of participants. To ensure that this is the case, the GI Roundtable should learn from and take advantage of previously successful efforts and long-standing training partnerships.

### KEY ACTIONS

- A. Identify and support training needs.
- B. Develop partnerships with training networks/organizations and institutions of higher education.
- C. Research and evaluate training efforts undertaken nationally and internationally.

## 5. CELEBRATE SUCCESSES

**OBJECTIVE: IDENTIFY AND RECOGNIZE INDIVIDUALS AND ENTITIES THAT DEMONSTRATE THE EFFECTIVE USE OF LID AND GSI.**



Bioretention at Village Square in Waitsfield.

As can be the case with some small-scale environmentally beneficial practices, the adoption of LID and GSI can be encouraged through interactions between neighbors, co-workers, and friends. The combination of civic pride and peer pressure can serve as an excellent motivator, especially for the early and late majority adopters. The recognition of individuals and organizations that effectively use LID and GSI can serve to raise their profile and motivate others to learn and ideally adopt such practices.

Vermont's small size in terms of both population and geography make it relatively easy to identify and recognize such persons and organizations. Vermont would benefit from website and media outreach efforts that highlight these individuals and entities. A formal award or contest could also be considered.

Given the limited financial resources of both the state and municipalities to implement LID and GSI on their own, it is crucial that the energy and interest of organizations and individuals is sustained. A

database of such contacts could be used to keep people abreast of local efforts as well as what is going on at both the national and international level. Such information sharing can assure collaboration and serve to inspire local initiatives.

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#### KEY ACTIONS

- A. Capture and share success stories and lessons learned.
- B. Seek out and attempt to leverage existing recognition efforts/opportunities.
- C. Compile a directory of individuals who support the planning, implementation, and maintenance of LID/GSI.

### 6. EXPLORE FUNDING OPPORTUNITIES

**OBJECTIVE: EXPLORE AND ADVOCATE FOR THE DEVELOPMENT OF DEDICATED FUNDING MECHANISMS FOR LID AND GSI PLANNING, DESIGN, IMPLEMENTATION, AND MAINTENANCE.**

LID and GSI are fairly new concepts in Vermont and thus face a number of hurdles to broad-scale implementation. Funding of these new and innovative principles and practices can go a long way towards overcoming some of these barriers. For many, LID and GSI is a drastic change from what they have traditionally done and with that comes a certain amount of hesitation and uncertainty. Targeted funding incentives and financing programs often provide the extra boost people need to try out a new technology or idea. The GI Roundtable can play a large role in identifying and developing those incentives and programs for a variety of audiences.

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#### KEY ACTIONS

- A. Explore various private funding opportunities.
- B. Identify opportunities to prioritize work in current grant sources, e.g., Ecosystem Restoration Program, Watershed Grants, State Revolving Fund, Lake Champlain Basin Program, Department of Housing and Community Development.
- C. Investigate the development of a statewide/regional financial incentive program.

### 7. INFORM POLICY

**OBJECTIVE: ADVOCATE FOR POLICY AND REGULATORY CHANGES THAT IMPROVE THE UTILIZATION OF LID AND GSI STATEWIDE.**

Most discussion of LID and GSI in Vermont centers on the dense urban landscape where more traditional GSI practices such as porous pavement or curb bump outs could be utilized effectively. However, very little useful technical information exists for LID and GSI in village and the rural landscape where there are specific challenges to LID and GSI that do not exist in the urban centers.

In order for LID and GSI to be broadly accepted and effective in Vermont there will need to be development of a framework that can be applied to smaller municipalities. This framework should include standards that are targeted for the specific water quality challenges in the rural areas, an approach for town boards to review and approve LID/GSI designs, and a process for tracking ongoing operation and maintenance of the practices.

In order for this to happen there will first need to be a fundamental shift in how development is permitted at the local level. Design standards that impede LID and GSI will need to be re-assessed. This could be a challenging and tedious process but if local codes and standards do not match well with LID/GSI principals then broad implementation of LID/GSI will not be feasible.

LID/GSI standards developed at the local level will need to mesh well with the larger state effort to develop new LID/GSI standards for state jurisdictional projects. Compatibility between the state and local standards will promote compliance and provide assurance to the professional community, municipal managers, as well as the regulated community, that the standards can be fairly applied and interpreted.

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#### KEY ACTIONS

- A. Identify and disseminate model ordinances/laws/policies to strengthen local and state utilization of LID and GSI.
- B. Identify barriers to LID and GSI and develop action-oriented solutions.
- C. Seek opportunities to engage policy makers at the local, state, and federal level.

# APPENDIX A: ACTION SUMMARY

- 1A. IDENTIFY EDUCATIONAL NEEDS/GAPS AND DEVELOP STRATEGIES TO ADDRESS THEM
- 1B. CREATE A STATE MARKETING STRATEGY TO ADDRESS THE LACK OF UNDERSTANDING SURROUNDING THE IMPACTS OF STORMWATER AND THE BENEFITS OF LID AND GSI
- 1C. SEEK OPPORTUNITIES TO LEVERAGE OTHER RELEVANT OUTREACH EFFORTS
- 1D. IDENTIFY AND SEEK STRATEGIC PARTNERSHIPS TO ENHANCE EDUCATIONAL OUTREACH EFFORTS
- 1E. SUPPORT THE DEVELOPMENT OF, AND HELP TO SUSTAIN, AN ONLINE INFORMATIONAL HUB
- 2A. IDENTIFY STATEWIDE NEEDS AND ACTIONS AND DEVELOP A 5-YEAR ACTION PLAN
- 2B. SEEK FUNDING TO SUPPORT STATEWIDE LID/GSI INITIATIVES
- 2C. INVITE ADDITIONAL ENTITIES AND PARTNERS TO PARTICIPATE IN THE GI ROUNDTABLE
- 2D. MONITOR PROGRESS TOWARDS STRATEGIC PLAN GOALS
- 3A. RESEARCH AND DOCUMENT GUIDANCE AVAILABLE NATIONALLY
- 3B. COMPILE AND DISSEMINATE A LIST OF AVAILABLE RESOURCES SPECIFIC TO VERMONT
- 3C. IDENTIFY AND WORK TO ADDRESS NEEDS/GAPS IN TECHNICAL GUIDANCE
- 3D. IDENTIFY AND WORK TO ADDRESS NEEDS/GAPS IN SCIENTIFIC KNOWLEDGE
- 4A. IDENTIFY AND SUPPORT TRAINING NEEDS
- 4B. DEVELOP PARTNERSHIPS WITH TRAINING NETWORKS/ORGANIZATIONS AND INSTITUTIONS OF HIGHER EDUCATION
- 4C. RESEARCH AND EVALUATE TRAINING EFFORTS UNDERTAKEN IN OTHER PARTS OF THE UNITED STATES
- 5A. CAPTURE AND SHARE SUCCESS STORIES AND LESSONS LEARNED
- 5B. SEEK OUT AND ATTEMPT TO LEVERAGE EXISTING RECOGNITION EFFORTS/OPPORTUNITIES
- 5C. COMPILE A DIRECTORY OF INDIVIDUALS WHO SUPPORT THE PLANNING, IMPLEMENTATION, AND MAINTENANCE OF LID/GSI
- 6A. EXPLORE VARIOUS PRIVATE FUNDING OPPORTUNITIES
- 6B. IDENTIFY OPPORTUNITIES TO PRIORITIZE WORK IN CURRENT GRANT SOURCES
- 6C. INVESTIGATE THE DEVELOPMENT OF A STATEWIDE/REGIONAL FINANCIAL INCENTIVE PROGRAM
- 7A. IDENTIFY AND DISSEMINATE MODEL POLICIES/LAWS TO STRENGTHEN LOCAL AND STATE UTILIZATION OF LID AND GSI
- 7B. IDENTIFY BARRIERS TO LID AND GSI AND DEVELOP ACTION-ORIENTED SOLUTIONS
- 7C. SEEK OPPORTUNITIES TO ENGAGE POLICY MAKERS AT THE LOCAL, STATE, AND FEDERAL LEVEL

# APPENDIX B: PARTNERS IN ACTION

DAN ALBRECHT – CHITTENDEN COUNTY REGIONAL PLANNING COMMISSION

JON ARMSTRONG – VERMONT AGENCY OF TRANSPORTATION

MILLY ARCHER – VERMONT LEAGUE OF CITIES AND TOWNS

KAREN BATES, JUSTIN KENNEY AND AMY PICOTTE – VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

BRIAN COTE, JESSICA LOUISOS AND ROY SCHIFF – MILONE AND MACBROOM

TOM DIPIETRO – CITY OF SOUTH BURLINGTON STORMWATER UTILITY

LAURA DLUGOLECKI AND SOPHIE SAUVÉ – WINOOSKI NATURAL RESOURCES CONSERVATION DISTRICT

DANIELLE FITZKO AND FRANK SPAULDING – VERMONT DEPARTMENT OF FORESTS, PARKS AND RECREATION

KIM GREENWOOD – VERMONT NATURAL RESOURCES COUNCIL

AMANDA HOLLAND – NORTHWEST REGIONAL PLANNING COMMISSION

KARL HONKONEN – UNITED STATES FOREST SERVICE

AMY MACRELLIS AND JULIE MOORE – STONE ENVIRONMENTAL INC.

CORRIE MILLER – FRIENDS OF THE MAD RIVER

MEGAN MOIR - CITY OF BURLINGTON DEPARTMENT OF PUBLIC WORKS STORMWATER PROGRAM

CHRIS ROTTLER – BLUE® AT TETHYS ENVIRONMENTAL, INC.

MARY RUSS – WHITE RIVER PARTNERSHIP

PAT SAGUI – COMPOSTING ASSOCIATION OF VERMONT

ANN SMITH – FRIENDS OF THE WINOOSKI RIVER

DENISE SMITH – FRIENDS OF NORTHERN LAKE CHAMPLAIN

KELLY STETTNER – BLACK RIVER ACTION TEAM

BECKY THARP – LAKE CHAMPLAIN SEA GRANT

ANDRES TORIZZO – WATERSHED CONSULTING ASSOCIATES