

## CVRPC Executive Summary 2009 ARRA Grant

As part of the 2009 ARRA Grant, the Central Vermont Regional Planning Commission (CVRPC) collected and updated impervious surfaces data for each municipality within the Region. The CVRPC also held an informational design charette workshop regarding the benefits of using low impact development techniques.

### GIS Analysis and Results

From 2002-2008 CVRPC collected impervious surface data for each municipality within the Central Vermont Region. CVRPC updated this data with ARRA grant funding and performed a series of analyses to quantify the benefits of incorporating LID strategies. The impervious surface update included gathering information on new roads, driveways, residential/commercial/municipal developments, sidewalks, gravel/sand pits, rail lines and parking lots. CVRPC developed a model which utilized impervious surface data, GIS build-out analysis data and average rainfall amounts to demonstrate the increases in stormwater run-off if development continued to occur without LID strategies in place. An alternate model was created to illustrate the reduction of stormwater runoff if development incorporated LID techniques.

In the analysis, impervious surface, soil values, and land cover/land use data were utilized for the creation of the model. Two equations were utilized. The first was the Natural Resources Conservation Service Runoff Equation. This equation calculated the volume of water runoff from permeable and impervious surfaces. The second equation was the LID Technique Equation. This equation calculated a revised volume of water runoff from impervious surfaces when a LID technique was utilized. The result was a one data layer with all the unique combinations of soil hydrologic groups, land cover, and impervious surfaces. These unique areas were then run through the NRCS runoff equation, which calculated the volume of stormwater runoff for all permeable and impervious areas.

The amount of runoff from all impervious surfaces in the study area during a 2.2” rainfall event was calculated. Currently, 5% of the study area is impervious surfaces. Future development (to 2060) would increase the area of impervious surfaces to 7.5%. Currently, during a 2.2” rainfall event, 16% of the run-off is generated by the 5% of impervious surfaces (table 1.) In the future, 24% of the run-off will be generated by the 7.5% of the impervious surfaces (table 2.) In Montpelier, the model reported 9% of the area to be impervious. That area generated 30% of the runoff. In the future, 16% of the area will be responsible for 45% of the runoff.

**Table 1: Volume of Runoff from Current Development without LID Techniques (Entire Study Area)**

Surface Type	Acres	% of Acres	Volume Runoff (Acre Feet)	% Volume Runoff
Permeable	49794	95.2%	2102	83.7%
Impervious	2494	4.8%	410	16.3%
Total Area	52288		2512	

**Table 2: Volume of Runoff from Future Development without LID Techniques (Entire Study Area)**

Surface Type	Acres	% of Acres	Volume Runoff (Acre Feet)	% Volume Runoff
Permeable	48357	92.5%	2048	76.1%
Impervious	3931	7.5%	646	23.9%
Total Area	52288		2694	

A second model was run which utilized the installation of a hypothetical LID technique. This model possessed the ability to change the size of the LID technique. The relation between the size of the technique and the amount of stormwater retained was linear. Therefore when a “larger” technique was implemented, less runoff

from the impervious surfaces was generated. Although not all LID techniques may have a linear relation, the model relayed the point that LID techniques of various sizes were effective at slowing the release of stormwater into the environment.

### **LID Workshop**

The LID workshop, held on November 4<sup>th</sup> at the Central Vermont Chamber of Commerce in Berlin was funded with the annual 604b grant. The participants learned about the benefits of LID, implementation considerations in Vermont and the impacts of impervious surfaces on our region. The workshop started with presentations by Laura Killian from UVM's Lake Champlain Sea Grant/NEMO Program, Paul Boisvert from the Burlington-based firm Engineering Ventures and Dan Currier from CVRPC. The presentations included important points about cost savings for LID projects, and helped dispel misconceptions about LID use in Vermont. After presentations, the participants broke up into smaller groups to retrofit the Vermont Granite Museum with LID techniques. Groups then presented their designs to the head of the Museum.

For the workshop several pieces of literature were developed and printed - a four page handout called "Promoting LID in your Community" by the New England Finance Center; a tri-fold pamphlet "Municipal Guide to LID" by the National Association of Homebuilders; and a 4" x 8" bookmark called "Put a LID on it" developed by the CVRPC, which contains links to local and regional resources.

### **Recommendations and Possible Future Efforts**

The GIS analysis and design charette brought to light several areas where LID information could be shared further, and where changes in regulations and communication amongst parties could be improved. The CVRPC has developed recommendations in several areas which could improve the development and implementation of LID techniques in the Central Vermont Region.

#### **GIS Modeling**

- Implementation of the GIS model in other Central Vermont core towns, especially those expected to have large population growths in the next 50 years
- Further refinement of the LID technique model to include quantifying specific LID techniques
- Continual updates of impervious surface data for the Region

#### **Community Outreach and Education**

- Survey of developers, residents, local officials etc on their ideas and opinions regarding LID
- LID activities and education to school aged children (rain barrel workshops, field trips to existing LID areas etc)
- Development of a LID course offering at area universities
- Demonstration installations of LID projects in town centers

#### **Government and Regulations**

- Incorporation of LID techniques into town stormwater plans and development codes (or development of a stormwater plan)
- Working with public safety and road officials to craft creative solutions to traditional road building and engineering to allow for incorporation of LID techniques
- Working with State level stormwater officials to review and revise the State Stormwater Manual