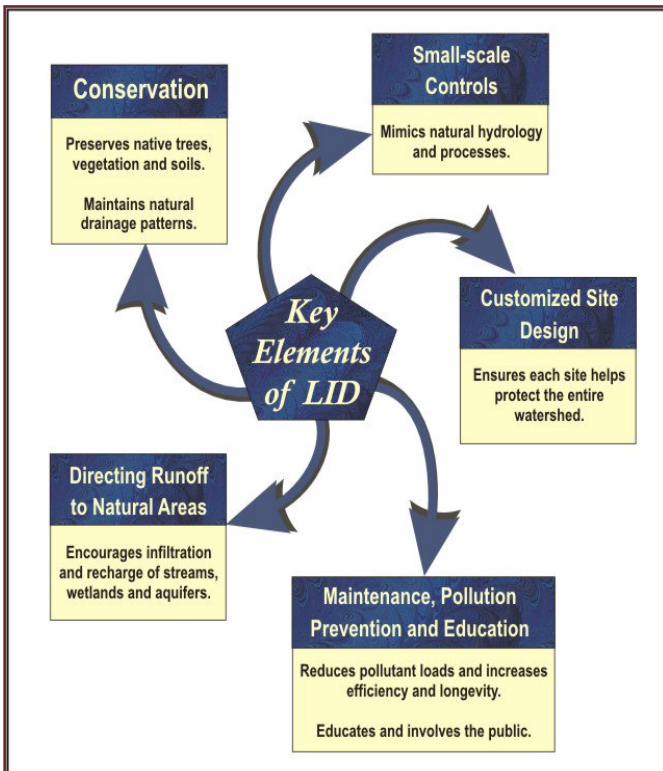


# L I D N E W S

## Low Impact Development *Balancing Development with Water Quality Protection*

LID NEWS is a newsletter designed to inform elected and appointed officials in southwest Michigan about LOW IMPACT DEVELOPMENT (LID). The LID approach to land development utilizes various land use planning and design practices and technologies to simultaneously protect water quality and reduce infrastructure costs.



This diagram shows the 5 key elements of Low Impact Development (LID). LID is an ecologically friendly, cost effective approach to site development and stormwater management that aims to mitigate impacts to land, water and air. The approach emphasizes the integration of site design and planning techniques that conserve natural systems and hydrologic functions on a site. The seven examples highlighted in this newsletter incorporate these 5 key elements into their design.

See more on LID and LID News editions 1-5 at [www.swmpc.org/lid.asp](http://www.swmpc.org/lid.asp)

This final installment of the LID News will highlight local examples of Low Impact Developments that showcase residential, urban/downtown infill, municipal parks and industrial examples in Southwest Michigan. Hopefully these examples will inspire you to encourage LID in your community. To find out what you can do visit [www.swmpc.org/lid.asp](http://www.swmpc.org/lid.asp).

### Residential

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The photograph above highlights narrowed road widths, permeable roadways, vegetated storm swales and preserved open space.

# Pokagon Band Elder Housing Cass County

The Pokagon Band has built a well rounded development that highlights examples of low impact development techniques everywhere you look. They have established walking paths throughout the development to increase foot traffic. They have narrowed road widths and utilized grassed swales to capture stormwater runoff. Rain gardens are incorporated into each home's landscaping to utilize nature's beauty with native plants. Large open spaces perform two important functions of cleaning stormwater along with providing communal spaces for the neighborhood to gather.

- Best Management Practices**
- Protect sensitive/special features
  - Rain gardens/Bioretention
  - Vegetated swales/Vegetated filter strips
  - Reduce street and/or parking imperviousness
  - Cluster uses at each site; Build on the smallest area possible
  - Protect/utilize natural flow pathways in overall stormwater planning and design
  - Minimize total disturbed area-grading
  - Re-vegetate and re-forest disturbed area, using native species
  - Porous pavement with infiltration beds



An important design element to this development was maintaining and restoring native vegetation.



One feature within the development is large lowland areas that naturally fill with stormwater. These pools allow natural groundwater recharge to occur.

- 43.2 acres of land
    - 17 homes
  - 35.8 acres of open space
- Goals of the project were to:**
- Minimize impervious surfaces and  
Maximize infiltration and groundwater recharge

*Photographs courtesy of the  
Pokagon Band*



## Longmeadow Development Niles Township, Berrien County

Longmeadow is 400 acres of rolling land divided by ponds, meadows, clusters of trees, wetlands, and horse paddocks. The design was dictated by the land, resulting in separate areas for a variety of housing types and lot sizes. It also resulted in the preservation of 50 acres of open space, providing opportunities for fishing, community gardens, walking trails, private roads for biking and more. The design has taken into account the need to preserve habitat for wildlife. This includes eliminating street lighting and maintaining animal corridors.

Home sites range from 1/2 acre to over 2 acres and the commercial village currently has medical facilities. The intention was to create a community village where you can live and walk to work. The resulting senior Villas, family homes, horse farms and commercial village create an intergenerational community. Future additions to the village include doctor offices, assisted living facilities, places to eat and other businesses that will add value to the residential development. From virtually any window you'll find nature -just beyond the backyard deck or right outside the office window!



### **Corporate Village at Longmeadow**

The Corporate Village at Longmeadow incorporates housing and the business world within walking distance of one another.



*Information and photographs courtesy of Jane Tenney, owner, developer and broker of Longmeadow.*

### **Best Management Practices**

- Cluster uses at each site; Build on the smallest area possible
- Reduce street and/or parking imperviousness
- Vegetated filter strips/Vegetated swales
- Native vegetation plantings used for stormwater treatment and filtration.
- Minimize total disturbed area-grading
- Re-vegetate and re-forest disturbed areas, using native species
- Vegetated filter strips/Vegetated swales (bio-infiltration, dry, wet)
- Protect sensitive/special features
- Protect/enhance riparian areas
- Protect/utilize natural flow pathways in overall stormwater planning and design

For more information about Longmeadow please visit:

**[www.longmeadow.info](http://www.longmeadow.info)**

# River Oaks Development City of Watervliet, Berrien County



## Certified Green Built Homes

River Oaks is located along the Paw Paw River in Watervliet City. The developer maintained the forested buffer along the river and did not build any houses near the river bank.

### What are the benefits of a Green Built home?

Did you know that a typical home can have more of a negative impact on the environment than your automobile? By building a Green Built home not only do you save money, breath cleaner air, live in a more durable structure, but you also can sleep better at night knowing you did your part to keep our environment clean.

Not only are the homes green, but the lawns are as well. Each lawn has a rain garden and a no mow lawn.

For more information about Green Built Homes please visit:

[www.GreenBuiltMichigan.org](http://www.GreenBuiltMichigan.org)  
[www.powell-construction.com](http://www.powell-construction.com)

### Best Management Practices

- Protect sensitive/special features
- Protect/enhance riparian areas
- Protect/utilize natural flow pathways in overall stormwater planning and design
- Cluster uses at each site; Build on the smallest area possible
- Minimize total disturbed area-grading
- Reduce street and/or parking imperviousness
- Rain gardens/Bioretention
- Vegetated swales

### How do Green Built Homes Differ from Traditional Built Homes?

- Improved indoor air quality
- Recycled materials & on-site recycling programs
- Low water use appliances
- Tankless water heaters
- Dual flush toilets
- Drought resistant landscapes
- Effective land management, good site layout, tree preservation & minimized site disturbance.



*Photographs courtesy of Powell Construction*

# Lion's Park

## City of Bangor, Van Buren County

The South Branch of the Black River winds through the City of Bangor. The city owns significant frontage on the river, and undertook a restoration project to capitalize on this natural amenity. The project was funded through a MDEQ 319 Nonpoint Source Management Grant, a Michigan Natural Resources Trust Fund Grant and the City of Bangor.

Restoration activities focused on remediating streambank erosion and reducing stormwater runoff. Erosion and sedimentation of the river was reduced through regrading the river banks and stabilizing the bank with native plantings. The city's stormwater, which previously flowed directly into the Black River, is now filtered through a raingarden in Lion's Park.

Walking trails have been enhanced and expanded, fishing/viewing platforms were installed and a canoe/kayak launch was added. This project will not only improve water quality conditions directly, but will also provide opportunities for public education due to its location in a city park.

For more information about the Black River please visit [www.vbco.org/blackriver\\_2.asp](http://www.vbco.org/blackriver_2.asp)



Native plants helped reduce erosion and sediment flowing directly into the Black River and provided for a more scenic view.

### A Rain Garden Will:

- Filter runoff pollution
- Recharge local groundwater
- Create habitat for birds & butterflies
- Enhance sidewalk appeal
- Reduce mosquito breeding by removing standing water
- Increase beneficial insects that eliminate pest insects
- Improve water quality
- Reduce garden maintenance
- Increase garden enjoyment
- Conserve water

For more information about raingardens please visit:

[www.raingardens.org](http://www.raingardens.org)

### Best Management Practices

- Protect sensitive/special value features
- Protect/enhance riparian areas
- Re-vegetate and re-forest disturbed areas, using native species
- Rain gardens/Bioretenion
- Vegetated filter strips
- Porous pavement



*Photographs courtesy of Erin Fuller*

# Veterans Park

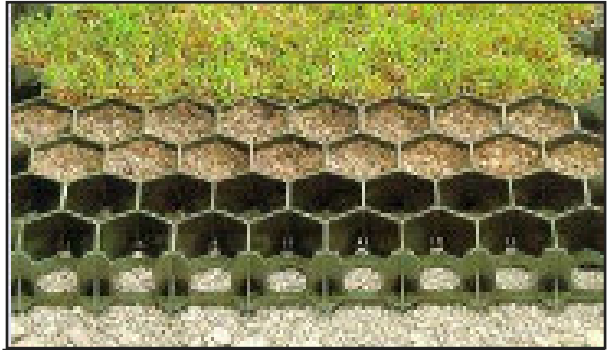
## City of Watervliet, Berrien County

The City of Watervliet partnered with the Great Lakes Basin and Southwest Michigan Planning Commission to construct an Urban Sediment Management Demonstration Center. This project, which is located along the banks of the Paw Paw River, incorporates porous pavement, a rain garden, a riparian native grass buffer, and interpretive signs to increase awareness of “LID” development techniques within the southwest Michigan community. The project incorporated one of the community’s greatest natural resources, the Paw Paw River, to attract users to the site.

For more information about the Paw Paw River please visit:  
[www.swmpc.org/pprw.asp](http://www.swmpc.org/pprw.asp)

### Best Management Practices

- Protect/enhance riparian areas
- Porous pavement with infiltration beds
- Rain gardens/Bioretention
- Vegetated filter strips



### Porous pavement parking lot

The porous pavement photograph above shows how stormwater will be recharged before entering the Paw Paw River. The water will soak through the parking lot being filtered as it recharges the groundwater, the water will then enter the river without carrying toxins picked up from the parking lot.



### Rain garden with river buffer in background

The rain garden and river buffer act as a natural filtering agent for particulates. The vegetation captures and cleanses the water prior to it entering the river. Cleaner water ensures that the river stays healthy and keeps those that are dependent upon it healthy too.



### Educational signs

Signs placed near the demonstration site explain the low impact development techniques being used to protect the Paw Paw River and discuss the importance of maintaining the Paw Paw River Watershed.

# Saugatuck Center for the Arts City of Saugatuck, Allegan County

The Saugatuck Center for the Arts (SCA), in conjunction with the City of Saugatuck, Michigan Department of Environmental Quality (non-point source grant program), and private donors, constructed a public garden that treats rain water that falls on the SCA roof. The original design was modified to accommodate rain water that would otherwise have entered the Kalamazoo Lake untreated. The resulting design for the garden absorbs and infiltrates 50% of the rain water from the SCA roof, the remaining 50% is treated before entering the nearby lake.

For more information about the Saugatuck Center for the Arts please visit:  
[www.sc4a.org](http://www.sc4a.org)



## **The SCA project achieves the following goals and objectives:**

1. Serves as a model for effectively handling stormwater in an urban watershed by implementing an innovative, on-site stormwater management system.
2. Reduces impervious surfaces by incorporating porous paving technologies.
3. Reduces phosphorus loads and contaminants through the use of native plants .
4. Provides detention, reduces stormwater velocity and quantity and improves water quality by implementing innovative storm water management techniques.
5. Improves plant diversity and increases habitat by planting bioswales and rain gardens with native plants.

### **Best Management Practices**

- Protect/enhance riparian areas
- Protect/utilize natural flow pathways in overall stormwater planning and design
- Rain gardens/Bioretention
- Porous pavement
- Subsurface infiltration beds
- Water quality inserts
- Detention/extended detention
- Special storage: Parking lot, rooftop, etc
- Amended soils

This Nonpoint Source Pollution Control project has been funded in part through the Michigan Nonpoint Source Program by the United States Environmental Protection Agency under assistance agreement C9975464-05 to the Southwest Michigan Planning Commission for the Paw Paw River Watershed Planning project. The contents of the document do not necessarily reflect the views and policies of the EPA, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.



## Dowagiac Industrial Park City of Dowagiac, Cass County

The Dowagiac Industrial park borders the Peavine Creek/Drain, which is a coldwater tributary connected to the Dowagiac River. With industrial development comes impervious surfaces and additional runoff (potentially polluted) running directly into the Creek. However, in this case, the City designed an innovative stormwater system that preserved the existing wetlands on site and utilized an infiltration basin leading to a created wetland to retain and treat polluted stormwater runoff.

Only during extremely large storm events will there be a surface discharge into the Creek. Otherwise, the stormwater will be cleansed and allowed to recharge the groundwater supplies. Once the water infiltrates into the groundwater it will recharge the creek as it did before the development took place. In effect, the stormwater system will help to maintain the high quality coldwater status of the creek.



### Best Management Practices

- Protect sensitive/special features
- Protect/enhance riparian areas
- Protect/utilize natural flow pathways in overall stormwater planning and design
- Constructed wetlands