

# SUSTAINABLE CONSTRUCTION IN INDIAN COUNTRY

INCORPORATING SUSTAINABLE LAND AND WATER  
STRATEGIES INTO A MASTER PLAN



## Pokagon Band of Potawatomi Indians

*The mission of the Pokagon Band of Potawatomi Indians is “to respectfully promote and protect the culture, dignity, education, health, welfare and self-sufficiency of our elders, our youth, our families, and our future generations while preserving Mother Earth.”*



## Problem

Developing a long-term plan that includes water management and conservation as an integral part of the overall land use and community planning strategy.

## Solution

The Pokégnek Bodéwadmik Master Plan has guided the development of sustainable water management and conservation, housing, and a LEED (Leadership in Energy and Environmental Design) Gold certified community center.

## Community Snapshot



**Location:** Communities in Dowagiac and Hartford, Michigan, and South Bend, Indiana

**Location type:** Rural

**Climate:** hot summer/cold winters with heavy snow (Köppen classification *Dfa*)

**Population:** 4,325 enrolled tribal members

**Median age:** 22

## Critical Sustainable Technologies and Strategies

- Community master plan based on tribal mission statement
- Watershed protection including
  - Bioswales
  - Cluster housing design
  - Permeable pavement
  - Replacement of invasive plant species with prairie grasses and indigenous vegetation

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## Funding

Projects	Funding Sources
<b>Master Plan</b>	U.S. Department of Housing & Urban Development (HUD) Native American Housing Assistance and Self Determination Act funds
<b>Édawát Phase I</b>	HUD Indian Housing Block Grant (IHBG), Bureau of Indian Affairs (BIA) Indian Reservation Roads (IRR)
<b>Édawát Phase II</b>	HUD IHBG, BIA IRR
<b>Édawát Phase III (community center)</b>	HUD American Recovery and Reinvestment Act, BIA IRR, HUD Indian Community Development Block Grant

## Map



## Summary

The largest community of the Pokagon Band of Potawatomi Indians is in Dowagiac, Michigan. The name “Dowagiac” comes from the Potawatomi description for a “place to hunt, fish, and forage.” Care and restoration of earth and water are at the center of the Band’s master plan.



Dowagiac, Michigan

The Pokégnek Bodéwadmik Master Plan blends deeply rooted cultural beliefs with state-of-the-art best management practices (BMPs) to achieve high-performance infrastructure. (The term “BMP” refers to environmental management strategies that prevent or reduce stormwater pollution.) The infrastructure includes stormwater management and water conservation, roadway and walking-path surfaces, and landscaping. Part of the water management includes planning the location of the housing units on the site.

Here are some of the BMPs and their effect on sustainability.

Best Management Practices	What Is It?	Effect
<b>Bioswale</b>	An alternative to storm sewers that uses natural landscaping and native plants to drain and move stormwater	Effective stormwater management, reduced landscaping maintenance, improved water quality, elimination of chemical and fertilizer use
<b>Permeable roadway and walking path</b>	Smooth surface for transportation that allows water to reach soil, not become run-off	Effective stormwater management, improved water quality, reduced pavement maintenance
<b>Planting and restoration of native trees, wildflowers, and grasses</b>	Use of plants that are native to a particular ecosystem to improve the environment	Effective stormwater management, reduced landscaping maintenance, increased plant survival, improved water quality, elimination of chemicals and fertilizer
<b>Clustered housing plan</b>	Building houses in a clustered pattern to follow the topographical contours of a building site	Minimized excavation and maximized open space

The Band is moving toward greater integration of sustainable technologies and renewable energy in future housing developments and the community as a whole.

## Visioning

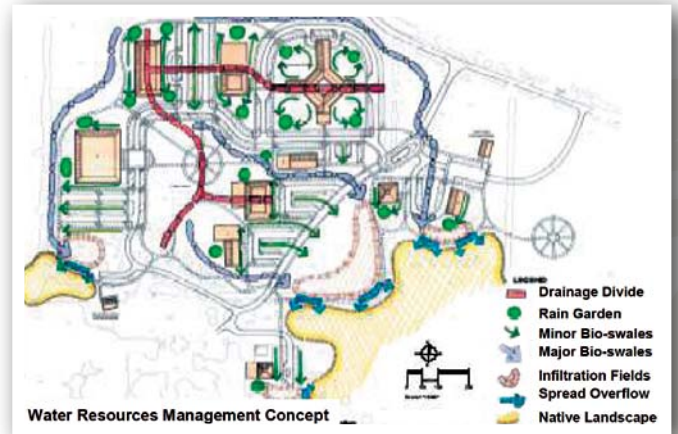
In 2002 the Pokagon Band began to develop its master plan. A question guided the visioning process: What would a plan look like if it embodied the Pokagon mission statement:

*To respectfully promote and protect the culture, dignity, education, health, welfare and self-sufficiency of our elders, our youth, our families, and our future generations while preserving Mother Earth. We will strive to give our people a better quality of life. The Band will also strive to be economically independent from federal and local government allowing the Band to fully exercise its sovereignty.*

To make sure that the plan created sustainable development, the Band allowed time to gather input and comments from community leaders and residents, conduct assessments and reviews, and make careful decisions about the selection of the development firm and contractors. Objectives in the master plan and the Band’s development strategy are:

- Protection and restoration of Mother Earth.
- Housing development as an investment.
- Quality, long-lasting housing and infrastructure.
- Deep green standards for future housing investments.
- Deference to and respect for tribal elders.
- Healthy lifestyles and outdoor recreation.

As a result, the master plan balances strong development principles with environmental sustainability. This can be seen most clearly from the plan’s water conservation and management strategies. “Édawat has been held as a national example of good resource planning. This resource planning started with a master plan that evolved from discussion of traditional tribal villages,” David Yocca, landscape architect for Conservation Design Forum, said.



**Build support for sustainable development through:**

- Ongoing education of Tribal Council members.
- Meetings and dialogue among tribal departments.
- Design charrettes to educate and hear from residents.
- Workshops and event invitations to engage Tribal Council.
- “Planning to Plan” –Former Housing Director Troy Clay.
- Keeping contractors informed.
- Training for maintenance staff on environmental systems.
- Opportunity for residents to experience first-hand how homes and community buildings save energy and use resources wisely.



**Master Plan Resources**

Every master plan will be different based on the community that creates it and will change over time. One important emphasis in this plan is the protection of water quality. Mark Parrish, Pokagon Band Director of Natural Resources, stated, “Land use has the greatest influence on water quality. There are certain ways to build while protecting our natural resources...and expanding our envelope to become more sustainable.” Planning documents used to help develop the Pokégnek Bodéwadmik Master Plan include:

- Dowagiac River Watershed Management Plan.
- Southwest Michigan Planning Commission’s Green Infrastructure Project.
- St. Joseph River Watershed Management Plan.
- Lake Michigan Lakewide Management Plan.
- Great Lakes Water Quality Agreement.

## Design Charrette

The Band engaged in various design charrettes during the design and development phases. A design charrette is a design and planning workshop (or series of workshops) where project stakeholders come together to learn, brainstorm, discuss, and develop recommendations that will lead to a feasible plan. “It is a very exciting time to be a tribal planner,” said Jason Auvil, Pokagon Band Tribal Planner. “The data gathered during the charrettes as well as from the tribal census, staff will analyze the data and take it to tribal council... By no means is this the end of this process...staff will try to get the best information that we can to make these developments reflect what tribal citizens want.”



## Watershed Goals

The Pokagon Band master plan includes goals for protecting its watershed. These goals were met by using low impact development (LID) BMPs in their infrastructure design. According to the Environmental Protection Agency, “LID is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible.” LID BMPs include cluster development, minimization of total disturbed area, protection of natural flow pathways and of sensitive areas, and reduction of impervious surfaces.

### Goal 1: Protect watershed hydrology and water quality

Protecting the watershed begins with protecting the landscape’s existing natural features. The housing development is clustered within the existing geography. This planning strategy preserved glacial depressions that formed natural drainage patterns as well as sensitive areas. Bioswales are a natural alternative to

storm sewers; they also infiltrate and filter water. Infiltration means that the water seeps into the ground.



*Bioswale*



*Rain garden*



*Restored vegetation*

Clustered housing design also reduces costs because roadways are shorter and utility infrastructure is less. In addition, fewer trees need to be removed and less land excavated. The area kept more rural, open space. Constructing homes on smaller lots, with smaller footprints, also keeps more of the land's natural features. Smaller lots reduce the distance to the roadway and the amount of lawn maintenance.

## Goal 2: Reduce sediment, chemicals, and thermal inputs to surface water



*Streets narrowed to 18 feet wide*



*Interlocking permeable pavers*

To protect the quality of the surface water, the Pokagon Band used infiltration techniques to ensure that this new development would not increase the amount of run-off. One technique is to limit impervious surfaces. Concrete driveways, walkways, and roads, and most asphalt cannot absorb water. Rainwater entering the soil directly is less likely to gather with it harmful chemicals, extra nutrients, or heat that may change the quality of surface water.

Streets were designed slightly narrower using interlocking permeable pavers. David Yocca said, "Permeable pavers are not only a great way to provide roadway and parking, but to allow rainwater infiltration." In addition to their environmental benefits, the street width and layout were designed to naturally slow traffic, which is important in a residential community. "The permeable pavers were more expensive up front... but require no maintenance and, therefore, save on long-term costs," said Troy Clay. Many of the walking paths in the community are also permeable, using aggregate and mulch.

## Goal 3: Protect the public water supplies by reducing nutrients and chemicals

Public water quality is directly linked to ground water quality. Restoring the vegetation native to the area is one way to protect the water supply. The Pokagon Band restored portions of their wooded areas by removing invasive species and opening up the tree canopy. They enhanced the bioswales with prairie grasses and native plants. Wildflower and rain gardens limit the amount of turf. The native vegetation develops deep root structures and generates soil's organic carbon. The ground can better filter the water, which protects water quality. These plants do not require irrigation systems, fertilizers, or lawn chemicals—making them less expensive to maintain and better for the environment.



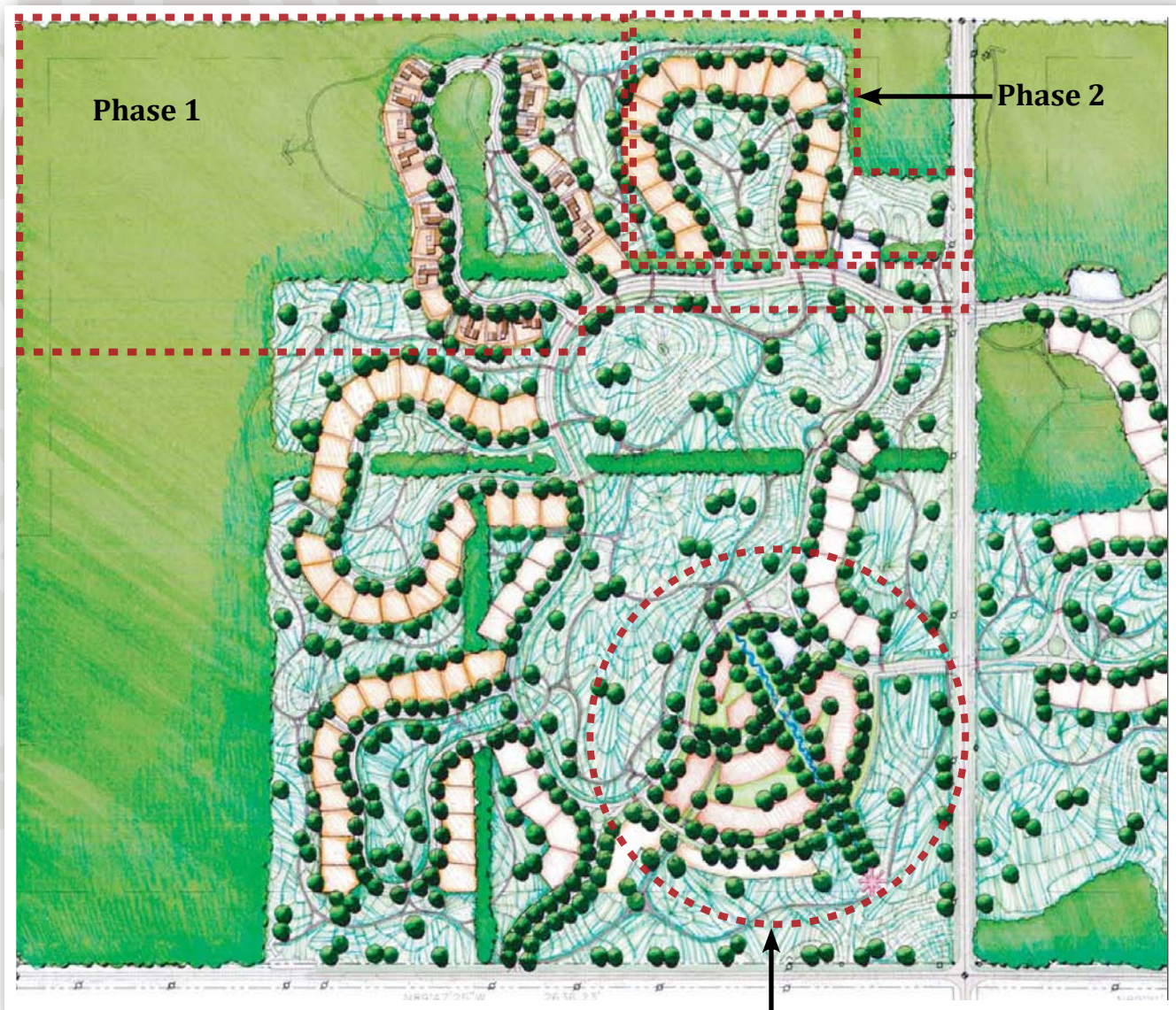
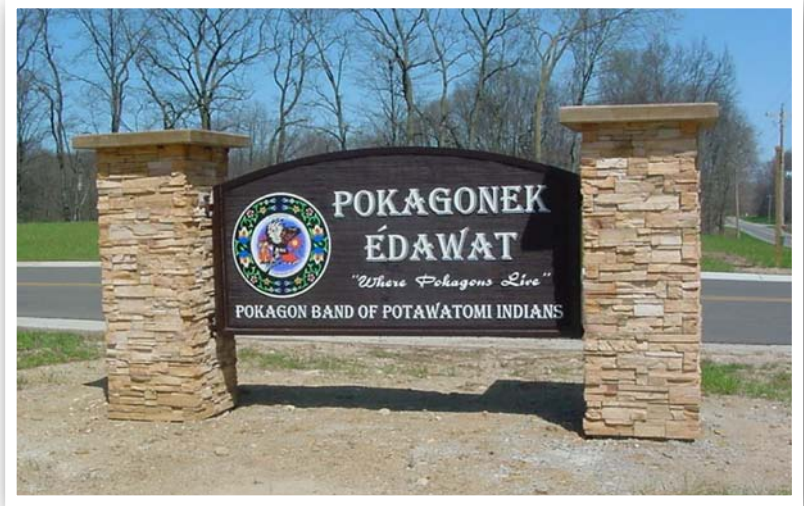
*Native plants*



*Prairie grasses*

## Phases of Development

Energy efficiency, sustainable water use, landscape-sensitive planning, and the selection of appropriate material and methods of construction are current practices of the Pokagon Band of the Potawatomi Indians. The addition of new key and sustainable features in the projects demonstrates the Band's growing vision of sustainable development.



Phase 3

## Phase 1: Project Summary

**LOCATION:** Pokagonek Édawat Housing Development (Dowagiac, Michigan)

**DESIGN/PLAN TEAM:** Conservation Design Forum (Master Plan/neighborhood design), Wightman & Associates, Inc. (home design)

**TIMELINE:** Visioning began in 2004. Units were occupied in late 2005.

**PROJECT TYPE:** High performance infrastructure with 20 single-family elder units

### PHASE 1

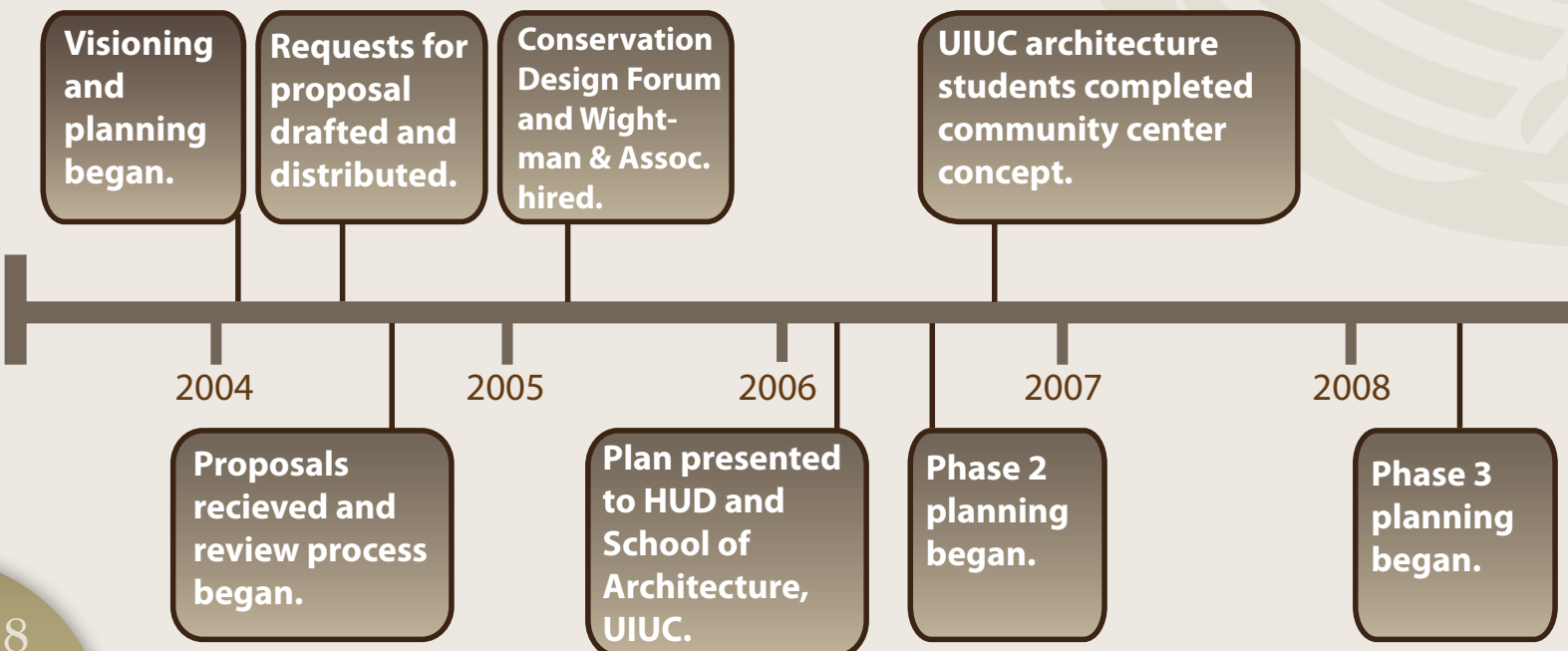


### Project Key Features

- Culture-based development.
- Integrated design--streets, sidewalks, stormwater management and landscaping.
- Financial benefits.
  - Decreased operation and maintenance costs.
  - Decreased energy costs.
  - Increased real estate values.

### Key Sustainable Elements

- Dense deep-rooted vegetation—aids in pollutant removal and infiltration.
- Permeable pavement.
- Clustering and placement of houses in development preserves topography and existing vegetation.
- Rain gardens and bioswales.
- ENERGY STAR appliances.





## Phase 2: Project Summary

**LOCATION:** Pokagonek Édawat Housing Development  
(Dowagiac, Michigan)

**DESIGN/PLAN TEAM:** Wightman & Associates, Inc.

**TIMELINE:** Visioning began in January 2006. Units were occupied in 2006.

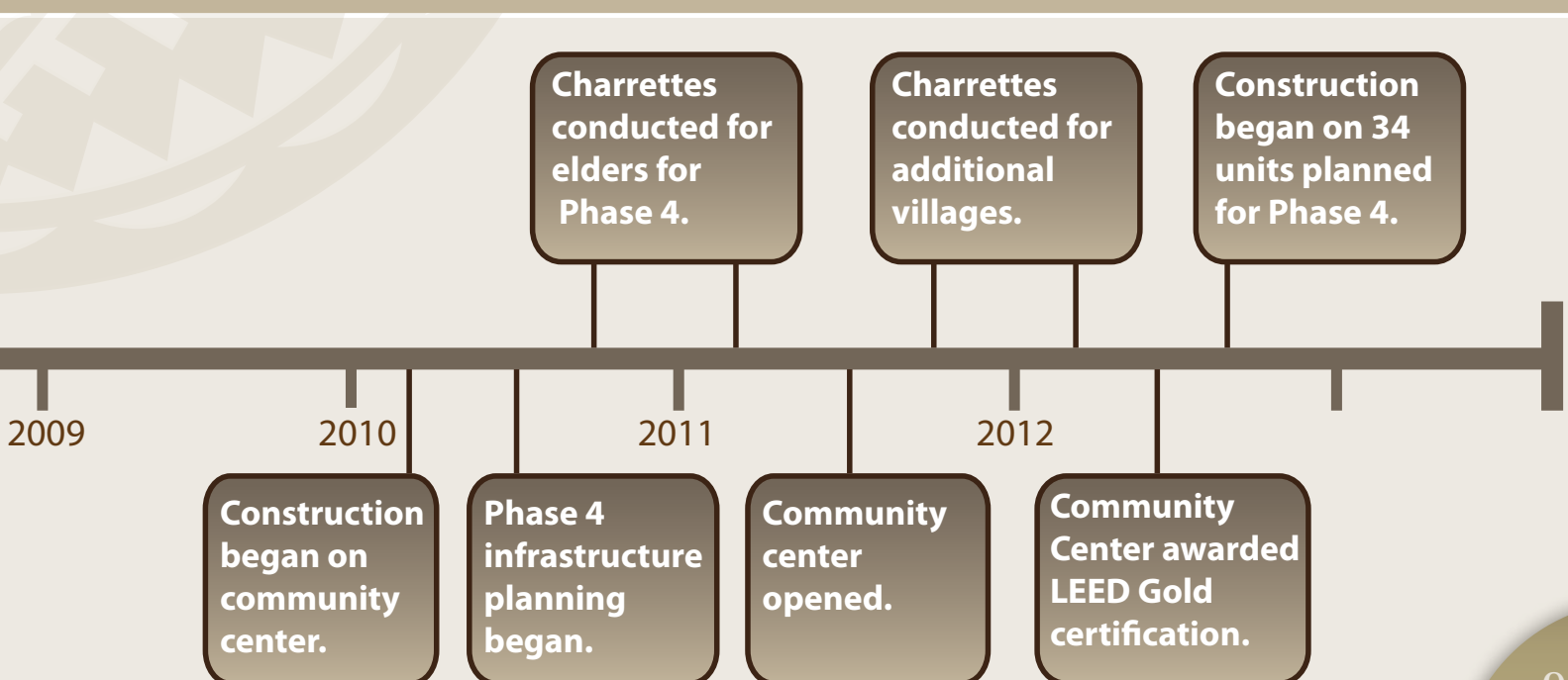
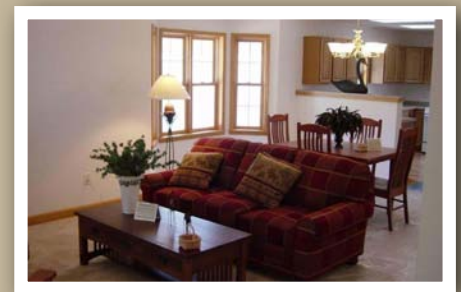
**PROJECT TYPE:** Fourteen single-family units. (High-performance infrastructure was already in place.)

### PHASE 2



### Additional Key Sustainable Elements

- ENERGY-STAR Certified houses



## Phase 3: Project Summary

**LOCATION:** Pokagonek Édawat Housing Development  
(Dowagiac, Michigan)

**DESIGN/PLAN TEAM:** University of Illinois at Urbana Champaign  
School of Architecture, Wightman &  
Associates, Inc.

**TIMELINE:** Visioning began in 2006. Construction began in 2010.  
Building opened in 2011.

**PROJECT TYPE:** Community Center

### PHASE 3



### *Additional Project Key Features*

- Built to LEED Gold standards.
- Decreased dependence on fossil fuels.

### *Additional Key Sustainable Elements*

- Dedicated open space, native vegetation and landscaping, preserved tree line.
- Vegetated roof and LED site lighting.
- Photovoltaic system and geothermal heat.
- Bike rack and minimized parking.
- Earth berm.
- Local, natural, and durable building materials.
- Passive solar heat sink with roof overhang and tinted insulated glazing.



## Best Practices

The Band is planning a phase IV in its housing development. This will include 20 additional housing units at the Édawat development (half elder and half single-family units) and also housing with high performance infrastructure in its Hartford, Michigan, and South Bend, Indiana, locations. Planning for these new houses begins with best practices taken from the earlier phases of development. Troy Clay, who took part in the planning process from the start, says, "The community is just now realizing the community center as a resource and wanting more amenities." The best practices include:

- Culture of the Pokagon people embedded in each housing development.
- Sensitivity to the landscape in the development of the built environment.
- Successful performance of the high-performance infrastructure.
- Community center's sustainable features, such as passive solar heat sink, insulated glazing, vegetated roof, minimized parking, and earth berm.
- Walkability features within the Édawat Development.
- Good stormwater management and water quality through infiltration and filtration strategies.
- Limited housing footprint and lot size to maximize existing rural landscape.

## Accomplishments/Awards



- American Institute of Architects (AIA) Michigan Chapter Design Merit Award



- LEED Gold certification for community center

- Best Practices and Innovation Award, 2005 HUD National Indian Housing Summit
- 2011 HUD Greener Homes National Summit awardee
- Featured on Southwest Michigan Planning Commission Web site: [http://www.swmpc.org/pokagon\\_band.asp](http://www.swmpc.org/pokagon_band.asp)
- Featured on Southeast Michigan Council on Governments, Low Impact Development Case Studies: <http://www.semcog.org/Data/lid.report.cfm?lid=132>

## Next Steps

With the eventual goal of becoming a net-zero energy community which produces as much energy as it uses, the Band sees opportunities for continued improvement. Development of the first three projects has begun to expand the Band's idea of what sustainable housing can be. In addition to housing with a small footprint and ENERGY STAR certification, for example, the Pokagon Band wants to explore renewable energy, alternative sustainable building materials, and multifamily housing. Although already adapted to its topography, future housing can accomplish greater energy savings if it also can be oriented to benefit from passive solar heating and ventilation practices based on prevailing wind patterns.

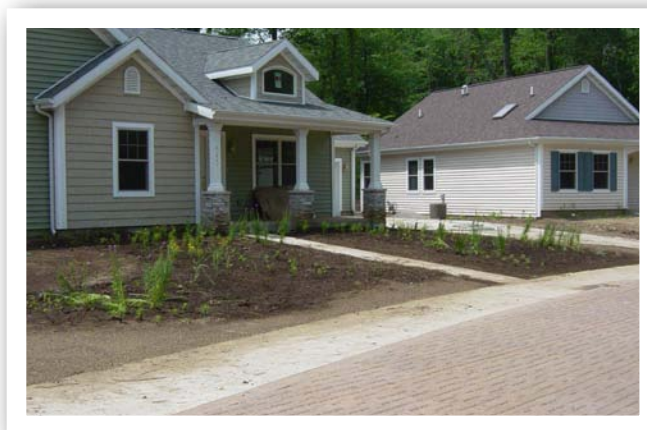
The original master plan called for on-site residential wastewater treatment. In the long term, this option may be possible if the Band takes the properties into trust. The shorter term plan, which supports Pokagon's cultural emphasis on reducing and reusing, is to explore additional water reclamation and treatment opportunities.

Increased community building is another area of interest. Clustering housing is one strategy. The Band also plans to develop additional housing types to build a supportive community in which tribal members can live, work, and play without traveling long distances.

### For more information:

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## How To Get Started

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To learn more about creating a master plan, implementing a water management and conservation strategy, or conducting a charrette, check out these resources.

Search for local State, county, or city at the Council of Governments Web site on planning organizations:

<http://narc.org/regional-councils-mpos/listing-of-cogs-and-mpos-2.html>

Intergovernmental Partnership for Sustainable Communities Web site for community planning. (Also, see sections on Energy Efficiency and Rural Communities):

<http://www.sustainablecommunities.gov/toolsKeyResources.html>

U.S. Environmental Protection Agency for LID:

<http://water.epa.gov/polwaste/green/index.cfm>

Toolbase.org low impact development BMPs:

<http://www.toolbase.org/TechInventory/TechDetails.aspx?ContentDetailID=909&BucketID=6&CategoryID=11>

Landscaping with native plants:

<http://www.epa.gov/greenacres/>

U.S. Department of Agriculture, Natural Resources Conservation Service fact sheets:

<http://www.ia.nrcs.usda.gov/news/brochures/urbanfactsheets.html>

Handbook from the National Renewable Energy Laboratory on planning and charrettes:

[http://www.nrel.gov/applying\\_technologies/pdfs/charrettes\\_handbook.pdf](http://www.nrel.gov/applying_technologies/pdfs/charrettes_handbook.pdf)

National Charrette Institute:

<http://www.charretteinstitute.org/>

*This best practice case study is one in a series that examines how Native American and Alaska Native communities have incorporated sustainable technologies and strategies into their housing development.*

*The Sustainable Construction in Indian Country initiative was created to support and increase sustainable construction practices in Native American communities. It is administered through the U.S. Department of Housing and Urban Development's Office of Policy Development and Research in partnership with the Office of Native American Programs.*