



University of Wisconsin-Stevens Point

Natural Resource Planning
Calvin Dee & Ryan Michalesko

Community Bark Park (6 Acres)



The addition of a community *off-leash dog park* fills a void in Amherst. It offers an opportunity to foster a sense of community amongst dog owners in The Village. It provides a haven for those without yards, such as renters in the adjacent apartments, or those who just need a little extra space to exercise their pets. We suggest creating a fenced-in area with a short trail system heading west toward the Tomorrow River. Mixed-height vegetation comprised of native pollinator attraction plants and grasses should be implemented to offer multiple "scenes." Further, this area serves as a buffer greenspace between the Business Park to protect the nearby Tomorrow River and residential area from potential pollution, mainly line-of-sight and noise pollution.

Mowed paths offer space for dogs to play, roam, and run, while taller vegetation provides vital pollinator habitat.

Symbiotic Developed Land Uses

As mentioned in our precedent research an aquaponics micro farm and a commercial bakery would be two land uses that would pair well with the brewery because it repurposes the waste produced by Central Waters. With integration of the solar field, businesses like this could run with very minimal costs. Aquaponics main running cost is electricity. Bakeries also use large amounts of electricity if they use electric ovens. These land uses would be located anywhere in the purple outline.



Green infrastructure, such as pervious pavements and rain gardens implemented at an aquaponics facility.

Compost (1.6 Acres)

The area outlined to the north is where the current compost site sits. Expansion to the south allows for the compost to be fenced and gated which can stop illegal dumping. The area to the south would also allow for the compost site to double in size from 0.8 acres to 1.6 acres. Maintaining space for compost and yard waste is important. Compost can help stop the production of greenhouse gasses that are created from decomposing organic matter that would normally go to landfills. Compost helps break down organic matter in a manner that produces less methane.

Green Infrastructure

The effective use of *green infrastructure* is a valuable opportunity to mitigate the impact of the Business Park on local natural resources. An impact of the Business Park is the runoff of sediment and pollutants via impervious surfaces, such as rooftops and pavement. Reducing runoff lessens the amount of water that needs to be processed through wastewater facilities, prevents erosion, and can reduce toxins entering the waterway. These practices can go a long way especially with proximity to water sources. *Rain gardens, impervious surfaces, and water catchment systems* are sustainable methods to mitigate these impacts.



Left: Rain gardens collect water runoff and provide the time necessary for it to be absorbed into the ground. Center: Permeable pavement can be used for walkways or parking lots to prevent runoff. Right: Simple water catchment system, such as this rain barrel, can provide water throughout the growing season to water gardens and plants.

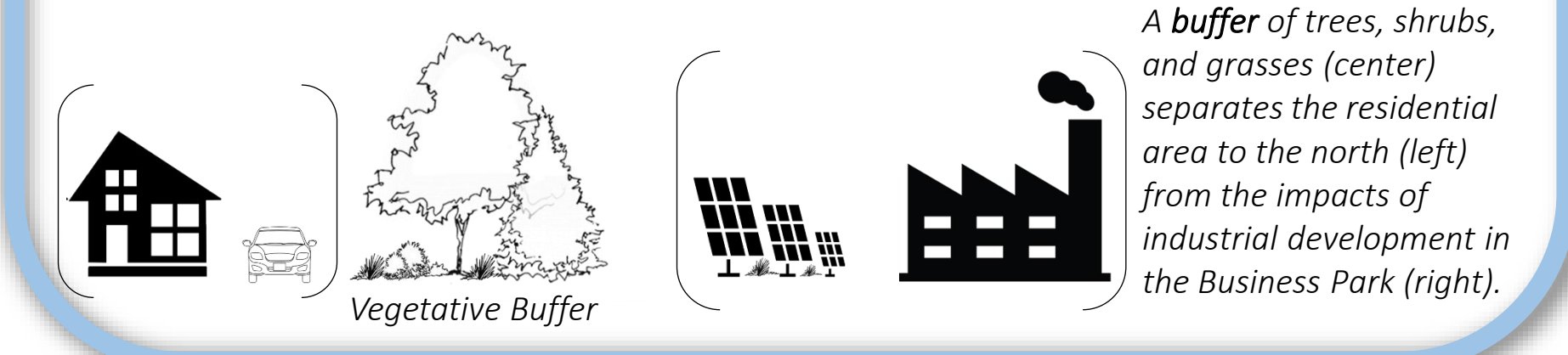
Trails

Highlighted in red is a potential trail that can be integrated into the business park. This trail would have many benefits. One would be connecting to downtown. Many bike leagues and clubs already utilize the business park as a meeting point so why not make it walking and bike friendly. Highlighted in black and white are two walking trails that would allow for access to the dog park and the buffer area. Integration of these trails would increase walkability and eliminate the need for parking and use of cars. Two small strips of private land would need to be purchased to connect the trail downtown. ■■■■ Gravel trail
- - - - Paved trail

Note! This is an active and growing residential area. The proximity of the Business Park to this area creates the potential for conflict between land uses.

Vegetative Buffers (2.5 Acres)

With the development of manufacturing and industrial land uses, there is potential for significant impacts to neighboring properties in the form of pollution (noise, sound, waste). We suggest the addition of a vegetative buffer with a mixed composition of trees, shrubs, and grasses to limit these impacts via natural means. A 100-foot wide buffer can filter air particulate by 40-75%, reduce noise by 5-8 dBA, and screen unsightly views (USDA). Further, buffers aid in the filtration of water runoff.



A buffer of trees, shrubs, and grasses (center) separates the residential area to the north (left) from the impacts of industrial development in the Business Park (right).

Solar Farm (15-21 Acres)

A one-megawatt (MW) solar farm produces enough electricity annually to offset the needs of about 190 average Wisconsin homes. There are just under 500 households in Amherst (2020, U.S. Census) and roughly 5-7 acres of land are required per 1-MW of solar capacity. Therefore, a 3-MW community-scale solar farm on 15 to 21 acres could offset the annual consumption of Amherst's residential sector. Given the flat terrain of the currently undeveloped land, the Business Park could be a prime site for a solar site. A smaller solar system could offset the energy consumption of the businesses in the Business Park. One policy option would be to incentivize incoming businesses to contribute to a green energy purchase as part of their agreement.



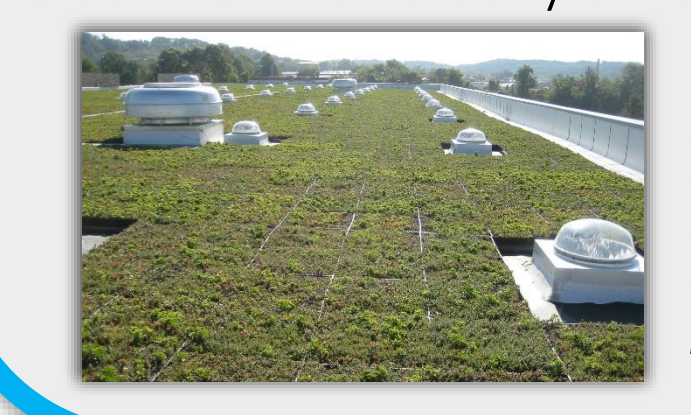
The River Falls (WI) 254-Kilowatt Community Solar Garden provides electricity to the community's renewable energy credit subscription program. A similarly sized solar project, or smaller, could offset the consumption of the Village government's energy use.

Industrial District (150 Acres)

As there is already industrial and manufacturing land uses to the south-southeast of the Business Park, we suggest consolidating further industrial development in that same area. This is useful in protecting the residential area to the north from unnecessary impacts of these types of land use. There is a roughly 90-acre (privately held) parcel of land to the east that would be a prime location for large-scale manufacturing with easy access to County Road B, as well as the railway. We suggest using zoning to steer appropriate types of development in the Business Park and surrounding areas. The Village should review permitted uses and minimum and maximum lot sizes in related districts.

Alternative Rooftop Uses

The rooftops of large buildings and warehouses are mostly unused space. Currently, bare impervious rooftops in the Business Park total approximately 2 acres. We suggest implementing a maximum impervious surface to lot size ratio for future development. To offset this ratio, developers could be incentivized to implement rooftop gardens or solar panels. Rooftop vegetation is a useful tool to control the velocity of runoff.



Green roofs provide shade in the summer and insulation in the winter, remove heat from the air, and help slow the runoff of rainwater.

Village of Amherst Eco Business Park Conceptual Master Plan

Each of the following goals seek to address both the needs of Amherst residents, heard through the charrette process, as well as our perceived opportunities for community improvement. Through these goals we hope to protect the small, local businesses of downtown; maintain the Village's "small-town charm;" and foster the valuable natural resources that provide for the community.

Goals

1. Protect small, local business and downtown character
2. Buffer residential areas from impacts by creating green space
3. Maintain the village's water-centered image through sustainable design
4. Reduce strain on the wastewater facility through sustainable design
5. Provide opportunities for solar development



Precedent Research & Development Goals

Goal 1: Protect small, local business and downtown character

In many communities, current growth patterns have disrupted, and in some cases destroyed, the strength of central downtown areas in favor of cheaper development on the outskirts of urban areas. Amherst currently has a thriving downtown, with a healthy mix of local shops and eateries. Its proximity to much of the village's residential area cements its importance to community sustainability. Further, its setting along the Tomorrow River serves as a favorable attraction for tourism revenue. Downtown Amherst and its proprietors should be protected as an asset.

Project Example: Village of Bartlett

- Priority to maintain the historic downtown
- Modernized downtown zoning to be more streamlined and less restrictive
- Allows for mixed-use development, such as residential or office space on the second floor above a storefront or restaurant
- Utilized blighted lot for development of new mixed-use condos and storefronts with historic architectural themes
- Improved pedestrian access and walkability
- Provide grants to support local small business development in the downtown area

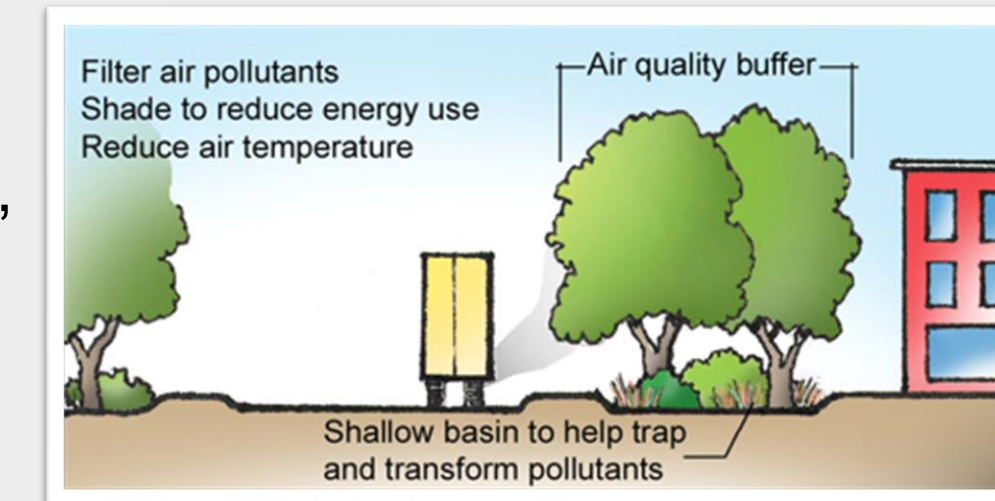


Goal 2: Create green space via buffer zone

Given the potential impacts of development, there is a keen opportunity to both create new multi-use community green space and buffer the adjacent residential area. Potential outcomes not only benefit residential life, but also serve as a mitigating factor for the possible environmental effects of development. We propose the creation of a dog park as part of the buffer space. This creates a haven for dog-owners to exercise their pets and connect with other community members. Further, a dog park has potential to serve as a valuable resource for renters who may not have access to a yard. Zoning and restrictive covenants could be refined to guide heavy industrial use away from residential areas. For example, a new industrial development could be guided to the southeast of the Business Park and County Rd B, where there is already established industrial and manufacturing use.

Project Example: Ledgeview Business Park

- Buffers serve as barrier between land uses to prevent conflict, improve visual aesthetics, and filter air and noise pollution
- The Ledgeview Business Park Master Plan calls for several different types of buffers to mitigate impacts of development
- Filter air particulate (a 65-600ft buffer can reduce particulate by 40-75%, USDA)
- Moderate noise pollution (a 100ft wide buffer can reduce noise by 5-8 dBA, USDA)
- Mitigating visual degradation may also prevent loss in neighboring property value

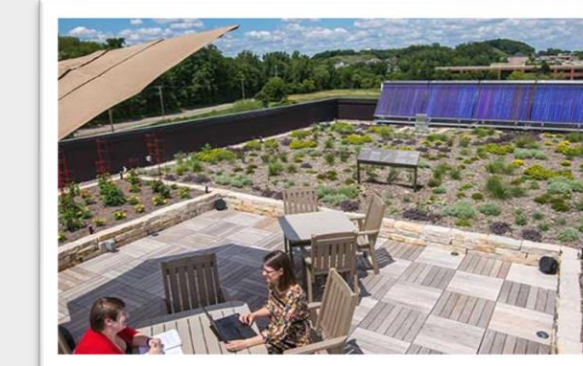


Goal 3: Maintain community's water-centered image through sustainable design

Development in the Business Park should aim to be water-friendly, when possible. This can be done by minimizing the total area of impervious surfaces, preventing site pollution, and implementing sustainability features on buildings such as water catchment systems. Other sustainable design methods, such as rain gardens, use of solar and other renewable energy sources, and construction using durable and recycled materials promote a greener tomorrow for the "Tomorrow River Community." By promoting the sustainability-minded image embraced by Northwind Solar and Central Waters, further green development may be attracted to the Business Park.

Project Example: Margaret A. Carghill Foundation Headquarters (Eden Prairie, MN)

- Rain and greywater catchment system stores 55,000 gallons of water
- Includes Minnesota's first greywater drip irrigation system for use to maintain native plantings on site
- Building constructed using 95% recycled materials
- Meets energy and conservation standards for platinum LEED certification
- Solar photovoltaic panels produce 15% of facility's electricity
- Solar thermal provides 70% of energy needed to heat facility's water



Goal 4: Reduce strain on wastewater facility though symbiotic land uses

When developing the Business Park, Amherst should evaluate the impacts of different land uses on the wastewater treatment facility and look to turn waste products into a resource. For example, the brewery uses high amounts of water and produces a yeast slurry which has high amounts of suspended solids and BODs. This yeast slurry has value as it carries many nutrients, so much so that it can be used as a fertilizer. Rather than expand the wastewater facility there is an opportunity to repurpose the waste. This can be done by creating a Mixed-Use Ecopark. MUEs complement other business in the park and create symbiotic relationships such as complex food webs.

Project examples: Rooftop Aquaponics with a Brewery and Bakery

Kalundborgs Environmental industrial park uses the concept of turning waste into other uses. Seen on figure 1, many of the industrial waste products are reused by different industries. This can be replicated on the small scale of Amherst. A business that could utilize Central Waters waste would be an aquaponics farm integrated within the brewery. Seen on figure 2, the hops and grain would feed the fish and the plants would receive nutrients supplied from the yeast slurry. Lastly, a commercial bakery would be another symbiotic business that can use waste products like yeast. An article in the Public Journal of Cereal Science shows research on how used yeasts from brewing beer can be used to make bread. Brewery yeasts can be superior to general baking yeasts for bread crust and shelf life.



Figure 1.

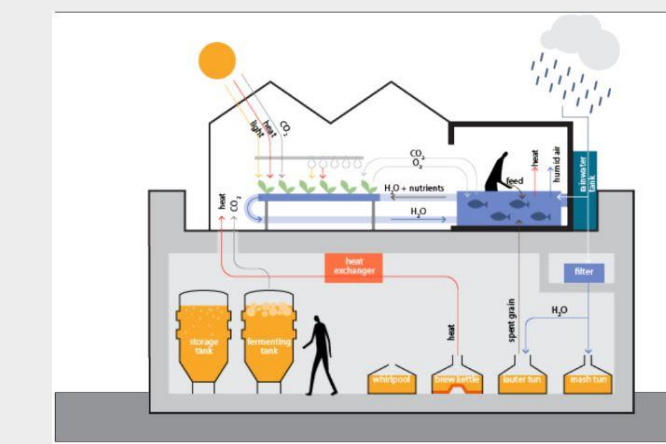


Figure 2.

Goal 5: Implement solar

The flat terrain and undeveloped parcels of the Business Park offer ideal sites for solar development. This offers a unique opportunity to offset the potential impacts of developing local industry and business by harnessing clean energy. It was found that to produce one megawatt of solar you need 5-7 acres of land. With plenty of developable land the park could produce 3 megawatts of power which would power roughly all of the Amherst residential sector or offset the Business Park's consumption.

Project Example: River Falls Community Solar Garden

- River Falls Community Solar Garden in their Business Park has 254-Kilowatt in capacity
- 100% of municipal buildings are powered by renewable energy, including from the solar garden
- A renewable energy credit program is offered, in which residents can buy from an exclusively-renewable energy portfolio
- The community has taken a pre-emptive stance to promote clean energy sources



Business Park Development



Planning Research: "Towards sustainable business parks: A literature review and systematic model"

Common issues with industrial and manufacturing parks are the waste and pollutants that they produce. One principle discussed in the literature was creating symbiotic relationships with other industries within the business park. An example provided was the Kalundborg's Environmental Industrial park (EIP) in Denmark in which waste like steam generated from a pharmaceutical company was converted into energy. Also discussed in this article is the concept of a mixed-use ecopark (MUE). "An MUE is a community of businesses located on a business park planned and built in a sustainable approach, that cooperate with each other and with the local community to efficiently share information, materials, energy or infrastructure, leading to economic gains, improvements in environmental quality and equitable enhancement of human resources for businesses and the local community." For Amherst, it's vital that the Business Park provides revenue while not detracting from the downtown and residential areas. A symbiotic relationship in some form could lead to productivity in this regard.