

Status

This first draft of the Green Buildings and Environmental Sustainability Plan element was written by a team from the Environmental Commission. The team considered the strategic goals derived by the Master Plan Committee (MPC) from input from the Citizens Advisory Committee (CAC), and relevant goals found in the Master Plans of other municipalities.

After review by the Citizens Advisory Committee, the Master Plan Committee and all members of the Environmental Commission, this first draft was approved for release to the Planning Board by the Environmental Commission on March 18, 2024.

Comments and suggestions for the element-writing team should be emailed to planning@penningtonboro.org.

2025 MASTER PLAN BOROUGH OF PENNINGTON NEW JERSEY

DRAFT

9. Green Buildings and Environmental Sustainability Element (GBESE)

Approved by the Environmental Commission on March 18, 2024

Contents

Introduction

Vision

Goals

Core Topics

- Climate Change and Greenhouse Gas Emissions
- Renewable Energy and Energy Conservation
- Green Building and Design
- Land Use and Mobility
- Water
- Waste Management

GBESE Team:

Yasmine Zein (principal author) with contributions from Jim Fuger, Amy Kassler-Taub, Kate O'Neill, Nadine Stern, Meredith Moore, and Andy Jackson.

DRAFT

Introduction

In 2008, the Municipal Land Use Law (MLUL) was amended to include the Green Building and Environmental Sustainability Plan Element as a permitted Master Plan Element. N.J.S.A. 40:55D-28(16) describes the Element as follows:

“A green buildings and environmental sustainability plan element... shall provide for, encourage, and promote the efficient use of natural resources and the installation and usage of renewable energy systems; consider, encourage and promote the development of public electric vehicle charging infrastructure... consider the impact of buildings on the local, regional and global environment; allow ecosystems to function naturally; conserve and reuse water; treat storm water on-site; and optimize climatic conditions through site orientation and design.”

Development decisions, which are guided by the Master Plan, have the potential to impact a community’s local environment, resilience to natural hazards, and contribution to climate change. Incorporating sustainability into the Master Plan is a vital step in the Borough’s efforts to preserve our natural resources and operate in a truly sustainable manner, ensuring a healthy and thriving environment for future generations.

This Green Building and Environmental Sustainability Plan Element (GBESE) is intended to ensure that future planning and development in Pennington Borough enhances the environmental sustainability and resilience of the community and minimizes negative effects resulting from its environmental footprint. Specifically, its purpose is to guide and serve as a basis for Borough land use decisions, ordinances, and policies that are related to sustainability.

Sustainability as a concept can be interpreted in different ways. The United Nations Commission on Environment and Development defines sustainable development as development that “meets the needs of the present without compromising the ability of future generations to meet their own needs.” Following green building practices, reducing carbon emissions, and otherwise pursuing sustainability as addressed in this Element will benefit current and future generations of Borough residents, and will contribute to regional, national, and global reductions in greenhouse gas emissions (GHG).

Vision

The GBESE envisions a sustainable, healthy, and resilient Pennington Borough where the quality of life of both current and future residents is preserved and enhanced through:

- The protection of our natural resources,
- Dedication to sustainable development practices, and
- Reduction or elimination of our impact on the local and global environments.

The GBESE team has developed this document with an overarching aspiration to be a community that thrives socially and economically, while minimizing any detrimental impact on the environment.

Goals

This plan identifies goals related to each of the Borough's priority sustainability issues, which are listed below.

Climate Change and Greenhouse Gas Emissions

1. Achieve zero CO₂e emissions in municipal operations by 2035.
2. Stimulate a reduction in CO₂e emissions by borough residences and businesses.
3. Improve resilience to the impacts of climate change.

Renewable Energy and Energy Conservation

1. Improve the Borough's energy efficiency.
2. Electrify buildings and the transportation sector.
3. Encourage the use of renewable energy sources.

Green Building and Design

1. Implement and incentivize green building and sustainable site design practices.

Land Use and Mobility

1. Ensure that land use and development address sustainability.
2. Reduce car and truck miles traveled by Borough residents.
3. Promote the use of electric vehicles (EVs).
4. Enhance public transportation and other alternative transportation options.

Water

1. Encourage the conservation of water by Borough residents and businesses.
2. Protect wastewater systems and reduce stormwater pollution throughout the Borough.
3. Reduce flooding and pollution through improved stormwater management practices.

Waste Management

1. Establish new recycling programs to take materials not accepted by the County program.
2. Increase the use of composting throughout the Borough.
3. Ensure the Borough's municipal operations utilize optimal waste management practices.

Core Topics

This GBESE addresses sustainability in six main areas, which are the plan's core topics. The areas are Climate Change and Greenhouse Gas Emissions, Renewable Energy and Energy Conservation, Green Building and Design, Land Use and Mobility, Water, and Waste Management.

The goals listed in the previous section are used to structure the core topic sections. Each section expands on the goals by identifying specific objectives and recommending strategies that can be implemented in support of the goals and objectives. Sustainability considerations should be incorporated into the Borough's planning and zoning decision-making as well as into the rest of the Master Plan.

Climate Change and Greenhouse Gas Emissions

According to NJ DEP's 2020 Scientific Report on Climate Change, New Jersey will experience significant direct and indirect changes in its environment due to climate change, which is caused largely by human activities in the form of greenhouse gas emissions. The impacts that New Jersey has experienced and will continue to experience include more severe storm events, higher temperatures and heatwaves, more frequent precipitation and flooding, and others. To minimize the effects of climate change on our ecological systems, natural resources, human health, and economy, we must pursue strategies that will improve our resilience, and reduce our contribution to climate change.

In 2021, the Borough resolved that municipal operations would become carbon neutral by 2035 (Resolution 2021-3.4). This resolution also states that the Environmental Commission will report to the Council on an annual basis the amount of CO₂e released and offset by the Borough and assist the Borough in developing strategies to migrate away from carbon energy sources. Finally, the resolution asks that the Environmental Commission educate and encourage residents to become carbon neutral.

The strategies listed in this, and other sections of this document have the potential to reduce the Borough's greenhouse gas emissions and improve resilience to the impacts of climate change.

Goals

1. Achieve zero CO₂e emissions in municipal operations by 2035.
2. Stimulate a reduction in CO₂e emissions by borough residences and businesses.
3. Improve resilience to the impacts of climate change.
 - a. Adapt the Borough's infrastructure and natural resources to better withstand the impacts of climate change using building practices, infrastructure upgrades, and other measures.
 - b. Prepare for natural hazard events, including adapting public infrastructure and preparing to assist residents displaced by natural hazard events.

Climate Change and Greenhouse Gas Emissions Strategies

Goal 1: Achieve zero CO₂e emissions in municipal operations by 2035.

- Conduct an annual analysis of municipal CO₂e emissions.
- Develop a plan to reduce CO₂e emissions in municipal operations, which may include strategies related to buildings, vehicle fleets, lighting, and water use. The strategy to increase electrification is sound, but CO₂e emissions from electricity generation are beyond the Borough's control. CO₂e offset opportunities should be explored.

Goal 2: Stimulate a reduction in CO₂e emissions by borough residences and businesses.

- Encourage Borough residents and businesses to reduce their emissions through energy conservation measures and green design practices.
- Support the purchase and production of renewable energy.
- Adopt ordinances that facilitate the production of renewable energy within the municipality.
- Modify existing ordinances that prevent or hinder the use of renewable energy by borough residents and businesses.
- Support the use of electric vehicles and residential battery energy storage.
- Continue to coordinate sustainability efforts with neighboring municipalities.

Goal 3: Improve resilience to the impacts of climate change.

- Ensure that critical facilities are equipped with backup power.
- Upgrade the electric grid to be more resilient to severe weather.
 - Bury power lines when the opportunity arises.
 - Strengthen key energy infrastructure.
- Improve stormwater management to reduce flooding related to extreme storm events.
 - Map stormwater and hydrological systems to identify areas of flood risk.
 - Increase the drainage capacity of the current stormwater system.
 - Manage stormwater using green infrastructure best management practices and by educating residents about their role in stormwater management.
 - Reduce the amount of impervious surface area in the Borough.
 - Update building and infrastructure design standards to account for projected increase in flooding due to climate change.
- Prepare for heatwaves and the urban heat island effect by preserving open spaces and growing the Borough's tree canopy.

Renewable Energy and Energy Conservation

Transitioning to renewable energy sources and conserving energy are some of the most powerful ways that the Borough can reduce carbon emissions and become more sustainable. In addition, pursuing renewable energy and energy conservation has the potential to improve resilience compared to the traditional energy system, which uses centralized generation and can be inefficient.

The Borough can support the sustainability of the energy system by promoting strategies such as the use of renewable energy sources with domestic battery energy storage, local energy production, energy conservation practices, and electric vehicles. This core topic is closely linked to the Climate Change and Greenhouse Gas Emissions, Green Building and Design, and Land Use and Mobility core topics. Strategies listed in other sections may help to improve the sustainability of our energy usage, and the strategies in this section may contribute to the goals associated with other core topics.

Goals

1. Improve the overall energy efficiency of the Borough.
 - a. Continuously improve the energy efficiency of Borough operations.
 - b. Encourage and support private energy conservation practices.
 - c. Employ building and site design practices that reduce total energy usage.
2. Electrify buildings and the transportation sector.
3. Encourage the use of renewable energy sources.

Renewable Energy and Energy Conservation Strategies

Goal 1: Improve the overall energy efficiency of the Borough.

- Develop and maintain a Community Energy Plan.
- Improve the efficiency of municipal buildings through green building practices and energy conservation measures.
- Encourage the use of efficient and green building practices in private development.
- Support the efforts of residents to conserve energy by being a resource for information on new technology and products and for government and private financial incentives.
- Support the use of smart grid technologies such as smart meters with the opportunity for interactive supply and pricing decisions.

Goal 2: Electrify buildings and the transportation sector.

- Support the electrification of homes (e.g., installation of electric appliances and heat pumps)
- Install Level 2 (220V) or Level 3 (440V) electric vehicle charging stations at central locations for those without a suitable private location, such as a garage, for charging.
- Encourage all new development to install Level 2 (220V) electric vehicle charging.
- Support the installation of Level 2 (220V) electric vehicle charging in existing homes.
- Replace the Borough operational vehicle fleet with electric or hydrogen-powered vehicles when practical.

Goal 3: Encourage the use of renewable energy sources.

- Install solar photovoltaic panels on as many municipal buildings as possible.
- Support the use of solar on private structures and land through solar friendly zoning and permitting.
- Explore the potential to generate geothermal power within the Borough.

- Encourage residents to enroll in community solar programs.
- Apply for incentives through New Jersey's Clean Energy Program.
- The Borough should act as an information resource for other grants and incentives that can accelerate the transition to renewable energy sources in the public and private sector.

Green Building and Design

Improving the sustainability of our buildings will be essential to achieving overall sustainability. In the US, buildings account for 41% of total energy consumption, 72% of electricity consumption, 39% of carbon dioxide emissions, and 14% of potable water usage (US Green Building Council, Benefits of Green Building). In terms of total energy consumption, buildings out-consume the industrial and transportation sectors. Green building not only makes buildings more efficient, but also reduces the impact of buildings on the surrounding environment.

Requiring the use of green building practices for the construction and renovation of municipal buildings would improve the Borough's sustainability across all the core topics. Green building and design should also be encouraged for private development.

The US Green Building Council's Leadership in Energy and Environmental Design (LEED) certification program is the industry standard for green buildings. Building to meet LEED certification standards is an effective way to ensure that buildings are green and sustainable and should be strongly encouraged in the Borough. Other green building certifications and frameworks should also be considered and encouraged.

Organizations such as the US Green Building Council provide extensive libraries of green building strategies. For example, to make its buildings sustainable, the Borough and its residents can: design building envelopes to reduce heating, cooling, lighting, and ventilation loads; set performance targets for energy, water, and waste; use passive and active renewable energy to meet energy loads; select water-efficient plumbing fixtures and appliances; design infrastructure to support non-fossil fuel transportation; eliminate the use of potable water for irrigation; reduce and recycle demolition and construction waste, and other strategies.

Goals

1. Implement and incentivize green building and sustainable site design practices.
 - a. Assess the efficiency and environmental impact of existing buildings.
 - b. Use green building practices in the building and renovation of municipal facilities.
 - c. Strongly encourage the use of green design practices in private development and redevelopment.
 - d. Prioritize adaptive reuse, historic preservation, energy retrofits, and upgrades to existing buildings instead of demolition and replacement.
 - e. Improve code standards and update building permit processes to reflect sustainable building practices and energy choice and efficiency standards.

Green Building and Design Strategies

Goal 1: Implement and incentivize green building practices.

- Conduct sustainability audits of existing municipal buildings for sustainable improvements.
- Assess existing residential properties and suggest strategies for resiliency in climate change, e.g. rainwater management, heat island reduction.
- Encourage a reduction in light pollution.
- Create construction site management policies to encourage low noise and low emission equipment, manage stormwater and reduce water use.
- Ensure municipal building renovations, and new municipal buildings, meet LEED certification standards.
- Strongly encourage LEED certification for private development, redevelopment, additions and upgrades.
- Strongly encourage building to meet other sustainability-related standards and certifications, such as Net Zero and Net Zero Ready.
- Encourage the use of LEED for Neighborhood Development, LEED for Cities and Communities, Living Community Challenge, and Sustainable Sites Initiative (SITES) as they apply for new construction and development projects and for landscaping.
- Reduce dependency on fossil-fuels during construction and building operation.
- Encourage all new construction, renovations, and equipment replacements to meet Energy Star (EPA) energy standards.
- Develop a construction waste management plan that incentivizes recycling and reduction of construction waste.
- Identify and abate lead hazards and risks in buildings and infrastructure built before 1978.
- Encourage collaboration between new-construction and renovation design teams and the Environmental Commission early in the design process.
- Incentivize green building practices in the permitting process by expediting permits and green-relevant variances, and other strategies.
- Create policies and standards for local building codes that meet certifiable energy standards and sustainable building practices.
- Encourage sustainable innovation in new construction and in existing buildings.

Land Use and Mobility

Vehicles powered by gasoline, diesel and natural gas are major emitters of greenhouse gases. Reductions in emissions can be achieved by encouraging alternative modes of transportation, such as shared or public transportation, walking, and biking, with the goal of reducing the total vehicles miles traveled (VMT) by Borough residents.

Electric vehicles are a promising alternative to fossil fuel-powered cars. Rather than filling up on fuel at a gas station, electric vehicles need to be plugged into a power source to charge.

Therefore, building electric vehicle charging stations at central locations and supporting the installation of charging stations in homes can help encourage electric vehicle uptake by making charging more convenient.

Land use is often a key determinant of whether alternative transportation options and electric vehicles are feasible for residents. Increasing town density, mixing land uses, offering a variety of transportation choices, providing the appropriate infrastructure for walking, biking, and electric vehicle charging, and other strategies consistent with “smart growth” can all help encourage more sustainable travel within and through the Borough. The conflict between the need for residential and commercial parking and the desire for dedicated bike and micro-mobility lanes will have to be resolved equitably.

Goals

1. Ensure that land use and development address sustainability.
 - a. Follow “smart growth” principles that aim to improve community resilience, health, diversity, and sustainability.
2. Reduce car and truck miles traveled by Borough residents.
 - a. Improve the walkability and bike- and micromobility-friendliness of the Borough.
 - b. Encourage the establishment and promote the viability of locally owned and operated businesses.
3. Promote the use of electric vehicles (EVs) from micromobility to mini-EVs and to EV cars and trucks.
4. Enhance public transportation and other alternative transportation options.

Land Use and Mobility Strategies

Goal 1: Ensure that land use and development address sustainability.

- Consider “smart growth” strategies to guide land use and development decisions; update zoning regulations to be consistent with ‘smart growth’ (the points below come from the Environmental Protection Agency’s (EPA) list of Smart Growth Strategies):
 - Mix land uses such that residential, commercial, and recreational uses occur in close proximity to each other.
 - Take advantage of compact building design.
 - Create a range of housing opportunities and choices.
 - Create walkable neighborhoods.
 - Foster distinctive, attractive communities with a distinct sense of place.
 - Preserve open space, farmland, natural beauty, and critical environmental areas.
 - Strengthen and direct development to existing communities.
 - Support the provision of a variety of public transportation choices.
 - Make development decisions predictable, fair, and cost-effective.
 - Encourage community and stakeholder collaboration in development decisions.

Goal 2: Reduce car and truck miles traveled in the Borough.

- Increase density of housing and support the establishment and viability of businesses in the downtown area to reduce the need for vehicle travel.
- Use a Complete Streets approach when designing and updating roads to prioritize personal transportation over cars and truck traffic.
- Improve and add more sidewalks and pedestrian infrastructure.
- Create infrastructure for bicycles and personal micromobility vehicles, including electric.

Goal 3: Promote the use of electric vehicles (EVs)

- Encourage the installation of electric vehicle charging stations as outlined in the Renewable Energy and Energy Conservation section goal 2 above.
- Replace the Borough operational vehicle fleet with electric or hydrogen-powered vehicles when practical.

Goal 4: Enhance public transportation and other alternative transportation options.

- The Borough should conduct frequent surveys to determine where people travel and under what circumstances they would choose public transport and what type of services they would use.
- Collaborate on regional transportation initiatives with the County and the State, including services for persons with disabilities.

Water

Sustainability measures that protect the Borough's water quality and quantity can help ensure that residents have access to reliably clean water. The Borough should actively work to protect its bodies of water and related infrastructure, including the four active wells that supply all of the Borough's water.

The water supply can be stressed during droughts, which are predicted to occur more frequently due to climate change. In addition, intense rainfall and storm events, which will also increase in frequency due to climate change, can cause flooding that may negatively impact water quality. Water quality is a known issue in New Jersey, where most streams, lakes, and rivers are classified as impaired (NJ DEP, 2022 Integrated Water Quality Assessment Report). Total Maximum Daily Load (TMDL) studies have also been published to set goals for pollutant load reductions for Pennington Borough's watersheds, including for phosphorus and sediment in the Stony Brook Watershed and for fecal coliform in the Jacobs Creek Watershed.

To protect our water resources, the Borough should pursue strategies that reduce water usage, protect water quality and quantity, and reduce flooding.

Goals

1. Encourage the conservation of water by Borough residents and businesses.

2. Protect wastewater systems and reduce stormwater pollution throughout the Borough.
3. Reduce flooding and pollution through improved stormwater management practices.

Water Management Strategies

Goal 1: Encourage the conservation of water by Borough residents and businesses.

- Conserve water in municipal buildings and encourage water conservation practices among residents and businesses.
 - Install water-efficient appliances and fixtures.
 - Harvest rainwater and reuse graywater for landscape watering and irrigation.
 - Use of landscaping plants that require little to no irrigation, such as native plants.

Goal 2: Minimize storm water pollution throughout the Borough.

- Determine if there are inflow and infiltration issues associated with the wastewater system and ensure there is sufficient capacity to convey wastewater flows to the receiving treatment plant.
- Create or enhance vegetated riparian buffers to reduce nonpoint source pollution.
- Direct development away from riparian areas, wetlands, wetland buffers, and flood hazard areas.
- Conduct education and outreach programs to encourage behavior that reduces nonpoint source pollution.

Goal 3: Reduce flooding and pollution through improved stormwater management practices.

- Map stormwater and hydrological systems to identify areas of flood risk.
- Reduce or eliminate disturbance to natural stormwater systems and use green infrastructure.
- Develop a maintenance plan to ensure that stormwater pipes and catch basins remain free of debris and that stormwater facilities are operating as designed.
- Require site designs to limit impervious surfaces and set infiltration rates.
- Retrofit municipal facilities with green infrastructure to retain stormwater on site and encourage the same for private development; potential green infrastructure tools include rain gardens, bioswales, green streets, green and blue roofs, and vegetated islands.
- Update design standards to account for a projected increase in flooding and precipitation. Consider enhancing stormwater management ordinance with standards stronger than the statewide minimum requirements. Enhanced stormwater management model ordinances have been published by The Watershed Institute and New Jersey Future.
- Explore other potential stormwater management strategies based on analysis of the Borough's high flood risk areas.
- Support the full or partial replacement of lawns with meadows to support biodiversity, absorb stormwater and reduce emissions and noise from lawn mowing and leaf blowing.

Waste Management

Reducing waste and increasing recycling are key components of environmental sustainability. This reduces consumption of new raw materials, energy use (from production of new materials), air pollution (from solid waste incineration) and water pollution (from landfills).

Goals

1. Encourage Mercer County to expand the range of materials accepted for recycling and explore other recycling programs that take materials not accepted by the County.
2. Increase the use of composting throughout the Borough.
3. Ensure the Borough's municipal operations utilize optimal waste management practices.

Waste Management Strategies

Goal 1: Encourage Mercer County to expand the range of materials accepted for recycling and explore other recycling programs that take materials not accepted.

- Continue to promote the County's current recycling program through residential education of what can/cannot be recycled and publicizing the recycling schedule.
- Encourage Mercer County to expand the range of materials accepted for recycling.
- Explore alliances with other local/regional organizations to establish new or expanded programs to address materials not currently included in existing programs (e.g. metals, plastics other than 1 or 2, Styrofoam, construction/demolition debris, window glass, etc.).

Goal 2: Increase the use of composting throughout the Borough.

- Encourage participation by residents, businesses, and institutions through the education of the benefits of composting and how it can be done successfully.
- Facilitate participation by establishing compost bins at municipal facilities and schools which would also be made available to residents.

Goal 3: Ensure the Borough's municipal operations utilize optimal waste management practices.

- Continue the drive towards conducting Borough business as 100% paperless, while recognizing that some residents are not comfortable with computers, or don't have access, and will require paper options.
- Provide recycling facilities at all municipal locations including playing fields and parks and wherever trash receptacles are located.