Northampton County Freight-Based Land Use Management Guide

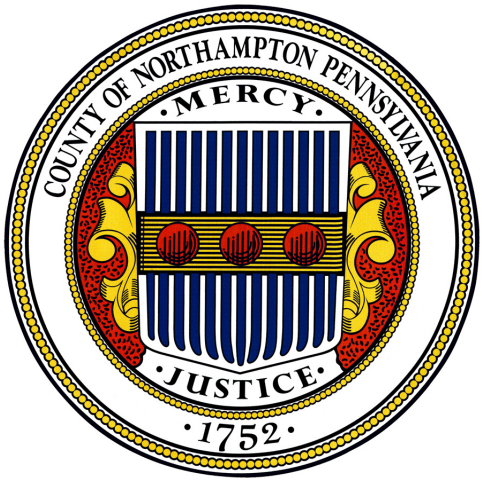
This program is being funded in part with funding from the Grow NORCO Grant Program through the County of Northampton Deaprtment of Community & Economic Development.

This document has been financed in part through funding from the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

This document serves as guidance to Lehigh and Northampton counties, the 62 municipalities of the Lehigh Valley, developers and community members, all of which have a vested interest in the impacts of freight-generating facilities on the health and well-being of the region. The LVPC is committed to supporting municipal governments and building collaboration between public and private partners to ensure the region's continued sustainability and resilience.

This document is available in other formats upon request, in accordance with applicable state and federal laws. The LVPC will provide translation or interpretation services upon request. For more information, please call the LVPC at 610-264-4544.

December 2022



Lamont G. McClure, Jr.
County Executive

Northampton County Council

Lori Vargo Heffner
President

Kerry L. Myers
Vice President

John Cusick

Thomas A. Giovanni

Ronald R. Heckman

Kevin Lott

Tara M. Zrinski

John P. Goffredo

John A. Brown

Researched, written, and designed by the LVPC Lehigh Valley Planning Commission on behalf of Northampton County.

Table of Contents

County Executive's Message 6

Introduction 8

Zoning Ordinance Review 10

Freight Land Use Analysis Tool 14

Zoning Ordinance Regulations 18

Activities and Operations Considerations 20

Setbacks, Buffer Areas and Lanscaping and Screening Requirements 24

Driver and Facility Amenities 34

Parking and Circulation 38

Height and Dimensional Requirements 42

Emergency Services 46

Extreme Weather Considerations 47



Tractor-trailers driving down Main Street, past the Amazon warehouse in Palmer Township.

Photo courtesy of LVPC staff

Subdivision and Land Development Ordinances, Official Maps and Transportation Impact Fees..... 48

Official Map 49

Traffic Impact Studies 50

Traffic Monitoring 51

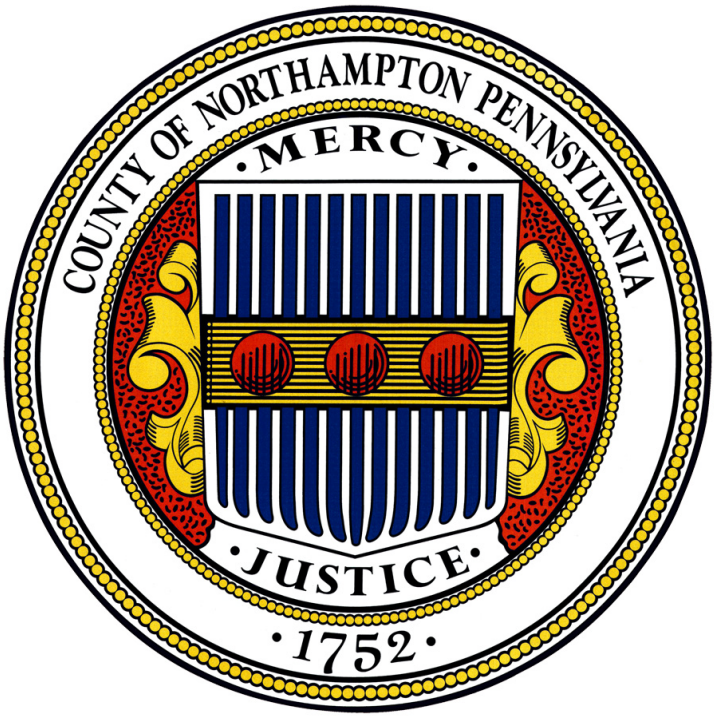
Transportation Impact Fees 52

Protecting Communities with Municipal Maps 54

Implementation Checklists 56

The Road Ahead 58




COUNTY OF NORTHAMPTON PENNSYLVANIA
·MERCY·
·JUSTICE·
·1752·

County Executive's Message



Lamont G. McClure, Jr.,
County Executive

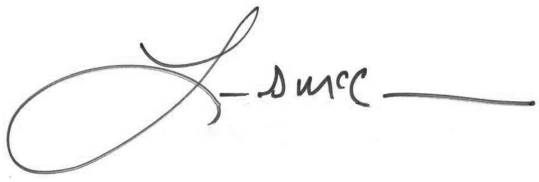
Northampton County is a great place to live, work and recreate and I am determined to ensure that legacy continues for future generations. The best way to do that is through proper planning.

For the last several years, Northampton County has experienced a building boom as a result of on-line shopping habits, the Lehigh Valley's access to interstate highways and its proximity to major metropolitan areas. While the positive economic activity and growth in jobs has been welcomed, the wear and tear on our roads and the increase in truck traffic and air pollution causes concern.

With zoning controlled at the local level, the County has limited influence over the approval or denial of building permits. One method we've used to combat warehouse proliferation is to preserve parkland, open space and environmentally sensitive land, but that doesn't address the underlying problem—making sure development is sited in appropriate areas to limit the deleterious impact on the environment and our transportation infrastructure.

Working with the Lehigh Valley Planning Commission, the Department of Environmental Protection, the trucking industry and workforce professionals, the County developed the Freight-Based Land Use Management Guide. The Guide provides drafts of model ordinances which municipalities can use to design their own regulations and prevent unsupportable freight development in their communities.

Development and progress are necessary and should not be feared, but we must strive to make sure that projects are site-appropriate and that our roads and bridges are adequate to handle the truck traffic. Proper zoning gives municipalities the tools they need to keep warehouses in appropriate areas and to protect our green spaces for future generations to enjoy.



Introduction

The e-commerce segment of the American economy has grown exponentially in recent years, most dramatically with an at-home shopping trend that was accelerated by the COVID-19 Pandemic. This economic shift has brought about tremendous changes in the built environment, most notably in the decline in brick-and-mortar stores. Concurrently, the logistical systems required to process and deliver goods has brought a proliferation of warehouses and distribution centers, greatly increasing truck traffic along the Lehigh Valley road network.

As a result, freight-based land uses have also increased dramatically in the last 10 years, both in terms of land consumption and traffic generation. Data from subdivision and land development plans reviewed by the Lehigh Valley Planning Commission (LVPC) indicates that over 35 million square feet of warehousing and distribution center development has been proposed since 2020.

In 2020, the LVPC reviewed 7.9 million square feet of warehouse space, followed by 11.7 million square feet reviewed in 2021 and 15.7 square feet of warehouse space reviewed in the first nine months of 2022. The impacts of this increase will be seen in the coming months and years, once developments are permitted, constructed and open for business.

Considering the land use impacts created by freight-based development, in 2021, Northampton County requested the LVPC create model regulatory guidance for freight-based Land Uses of Regional Significance (LURS), as outlined in FutureLV: The Regional Plan.

This guidance includes an online Geographic Information System Mapping tool intended to assess the zoning and land uses of all 38 Northampton County local governments for vulnerabilities that may lead to unsupportable freight development. It also provides sample ordinance language developed by other municipalities to control the impacts of freight-based development. Where appropriate, the ordinance text recommendations are tailored to the community type (urban, suburban, exurban, and rural) for instance, when considering the availability of sewer and water infrastructure. Other locational measures, such as distance from major highway interchanges, can cut across all municipal types from rural to urban.

Municipalities should first examine their comprehensive plan to ensure that it reflects the desired community goals for land use and development. If the municipality is part of a multi-municipal comprehensive plan, it should work with its neighboring municipalities to determine the most appropriate place for freight-centric industrial development.

This guide includes recommendations to municipalities on examining their current zoning regulations for freight-based land uses, and sample zoning ordinance language to regulate specific aspects of these uses. Additional land use regulations such as subdivision and land development regulations, official maps and transportation impact fees are provided, as well as recommendations for future actions by Lehigh Valley communities. Training and implementation programs will be available on the Northampton County website.

Finally, it is important for municipalities to continue working with their planning partners to address the significant impacts brought about by intense warehouse and industrial development.



Shipping containers along the rail line on Riverside Drive, City of Bethlehem.

Photo courtesy of LVPC staff

Zoning Ordinance Review

A municipality's comprehensive plan, either adopted singly or as part of a multi-municipal planning effort, includes guidance for the future development of that community. A Future Land Use plan map is included in the comprehensive plan which illustrates the community's vision for how it will develop in the future. This vision is captured in the zoning ordinance map which delineates and assigns specific zoning classifications to individual parcels. The regulations for each of the zoning districts is detailed in the text of the zoning ordinance.

Zoning ordinances, like comprehensive plans, must be updated on a regular basis to reflect changes that have occurred in society. For example, zoning regulations for video game arcades, important and timely in the 1980s, are no longer relevant. Similarly, new land uses such as distribution centers may not be included in ordinances that have not been updated recently. It is important for communities to take stock of how their current zoning ordinance is constructed to regulate freight-based land uses.



Zoning ordinances can include the allowance of different kinds of warehousing. This automated warehouse, located on Liberty Drive in Allen Township, would be considered a fulfillment center.

Photo courtesy of LVPC staff

Definitions

The first step in auditing the status of existing conditions is to look at the very front of the zoning ordinance and the definition section. Most commonly, the regulations include a definition of the word “warehouse”, but it may not reflect the type of development often seen today. The following are examples of warehouse and related definitions included in municipal zoning ordinances and planning guides:

- **Distribution Centers** (also known as break-bulk facilities) tend to ship from retail to business, and to fulfillment centers, and typically do not deliver to end-users (i.e., external customers). Distribution centers are typically larger than fulfillment centers, are located away from major consumer markets (population centers) and are a complex transit hub for large quantities of bulk goods that generally do not require finishing or individual packing as they are temporarily stored on pallets before being shipped. (New Jersey State Planning Commission Warehouse Siting Guidance)
  - **Distribution** is the processing of materials to sort out which finished goods are to be transported to different locations, and the loading and unloading of such goods. This use typically involves inventory control, material handling, order administration and packaging. Specifically, a use that primarily involves either loading materials from tractor-trailers onto smaller trucks or loading materials from smaller trucks onto tractor-trailers shall be considered a distribution use. This term shall not include a trucking company terminal. (North Whitehall Township Zoning Ordinance)
- **Fulfillment Centers** are a type of distribution center that pick and pack items from shelves for individual delivery to “fulfill” online orders. They are typically smaller than distribution centers and focus on quickly delivering goods to individual customers and offer an array of services to help with this goal. They typically receive, pick, pack, kit, label, and deliver products to people’s doorstep in delivery vans. They are situated closer to consumer markets so individual items can be delivered quickly to people’s doorsteps. (New Jersey State Planning Commission Warehouse Siting Guidance)
- **High-Cube Warehouse (HCW)** is a building that typically has at least 200,000 gross square feet of floor area, has a ceiling height of 24 feet or more, and is used primarily for the storage and/or consolidation of manufactured goods (and to a lesser extent, raw materials) prior to their distribution to retail locations or other warehouses. (New Jersey State Planning Commission Warehouse Siting Guidance)
  - A typical HCW has a high level of on-site automation and logistics management. The automation and logistics enable highly efficient processing of goods through the HCW. A high-cube warehouse may contain a mezzanine. In an HCW setting, a mezzanine is a freestanding, semi-permanent structure that is commonly supported by structural steel columns and that is lined with racks or shelves. (ITE Trip Generation Manual 11th Edition Definitions)
- **High-Cube Transload and Short-Term Storage Warehouse** is a transload facility that has the primary function of consolidation and distribution of pallet loads (or larger) for manufacturers, wholesalers, or retailers. A transload facility typically has little storage duration, high throughput, and its operations are high efficiency. A short-term HCW is a distribution facility often with custom features built into the structure for the movement of large volumes of freight with only short-term storage of products. Some limited assembly and repackaging may occur within the facility. (ITE Trip Generation Manual 11th Edition Definitions)

- **High-Cube Fulfillment Center Warehouse, Sort & Non-Sort:** Each fulfillment center in the ITE database has been categorized as either a sort or non-sort facility. A sort facility is a fulfillment center that ships out smaller items, requiring extensive sorting, typically by manual means. A non-sort facility is a fulfillment center that ships large box items that are processed primarily with automation rather than through manual means. Separate sets of data plots are presented for the sort and non-sort fulfillment centers. Some limited assembly and repackaging may occur within the facility. (ITE Trip Generation Manual 11th Edition Definitions)
- **High-Cube Parcel Hub Warehouses** typically serve as a regional and local freight-forwarder facility for time sensitive shipments via airfreight and ground carriers. A site can also include truck maintenance, wash, or fueling facilities. Some limited assembly and repackaging may occur within the facility. (Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition Definitions)
- **High-Cube Cold Storage Warehouse** is a cold store warehouse with substantial temperature-controlled environments for frozen food and other perishable products. (ITE Trip Generation Manual 11th Edition Definitions)
- **Last-Mile Fulfillment Facilities (or Stations)** are smaller fulfillment facilities serving the final leg of delivery rather than a literal measurement of distance. They serve consumers, either individual households for online shopping or the retail stores they shop at for traditional retail. (New Jersey State Planning Commission Warehouse Siting Guidance)
- **Trucking Company Terminal or "Truck Terminal"** is a use involving a large variety of materials, including materials owned by numerous corporations, being transported to a site to be unloaded primarily from and reloaded onto tractor-trailer trucks. A use that primarily involves loading materials from tractor-trailers onto smaller trucks or smaller trucks onto tractor-trailers shall be considered a "distribution" use. A truck terminal may also include the following as clearly accessory uses if they are closely related to the principal use: repair, washing, refueling and maintenance facilities for trucks using the terminal, administrative uses for the terminal and rest facilities for drivers of trucks using the terminal. (Bushkill Township)
    - Trucking Company Terminal is a use involving a large variety of materials, including materials owned by numerous entities, being transported to a site to be unloaded primarily from tractor-trailer trucks and reloaded onto tractor-trailer trucks, but not stored at the facility. A use that primarily involves either loading materials from tractor-trailers onto smaller trucks or loading materials from smaller trucks onto tractor-trailers shall be considered a distribution use. See **§ 440-41**. Any use that serves as the base of operations for or provides maintenance for a trucking company fleet shall be considered as a trucking company terminal. (North Whitehall Township)
- **Truck Stop** is a facility located adjacent to an interstate highway interchange that provides commercial vehicle fueling, space and supplies for self-service vehicle maintenance, and other services specific to the needs of truckers (e.g., showers, on-site truck parking area). The facility typically contains a convenience store, restroom facilities, and one or more restaurants catering to fast-food or high-turnover sit-down. (ITE Trip Generation Manual 11th Edition Definitions)
- **Intermodal Truck Terminal** is a facility where goods are transferred between trucks, between trucks and railroads, or between trucks and ports. (ITE Trip Generation Manual 11th Edition Definitions)

- **Traditional Warehouse** is used for storing products or goods for longer periods, while distribution and fulfillment centers store products for relatively lesser periods. The latter see much greater product loading and unloading flow velocity, especially at fulfillment centers, which deliver goods direct to customers. (New Jersey State Planning Commission Warehouse Siting Guidance)
- **Warehouse** is a building or group of buildings primarily used for the indoor storage, transfer and distribution of products and materials that have been manufactured, assembled, or harvested, or are being stored for manufacture, assembly, or processing, by the owners of the warehouse. Office space associated with each warehouse building may be included. Warehouses are categorized into the following subcategories:
  - **A. SMALL WAREHOUSE:** Any warehouse, as defined, with a gross floor area of less than 25,000 square feet.
  - **B. LARGE WAREHOUSE:** Any warehouse, as defined, with a gross floor area of 25,000 square feet (North Whitehall Township)
- **Warehouse/Trucking Company Terminal** is a building or group of buildings primarily used for the indoor storage of a large variety of materials, including materials owned by numerous entities, being transported to a site to be unloaded primarily from tractor trailer trucks and reloaded onto tractor trailer trucks and may or may not include storage of these materials at the facility. Office space associated with each warehouse building may be included. (North Whitehall Township)

Review of Zoning Districts

The second step in evaluating your zoning ordinance is to review each of your base zoning districts and overlay zoning districts to determine where these freight-based uses are currently allowed, as well as how they are permitted – by right, by special exception use, or by conditional use.

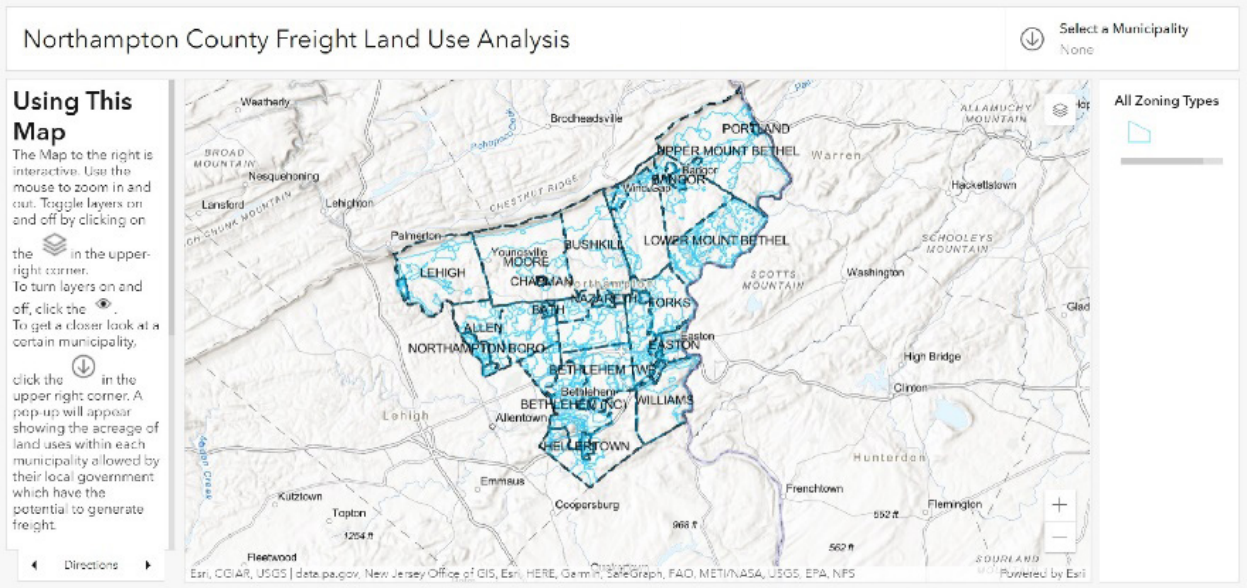
The LVPC has created an online tool to assist municipalities in determining which zoning districts permit freight-based uses, as well as other industrial uses which may also generate significant truck traffic and impact the road network. Included are land uses such as quarrying and other extractive uses, landfills, and manufacturing. The tool also identifies how specific uses are permitted, and how many acres are zoned, in total, in Northampton County for each of these uses.

To create the freight-based mapping tool, the LVPC read through all of the zoning codes in each of the 38 municipalities and identified which freight-based generating uses were allowed in each district. The process involved verification by three staff members. The LVPC then created a database and delineated those uses into seven categories.

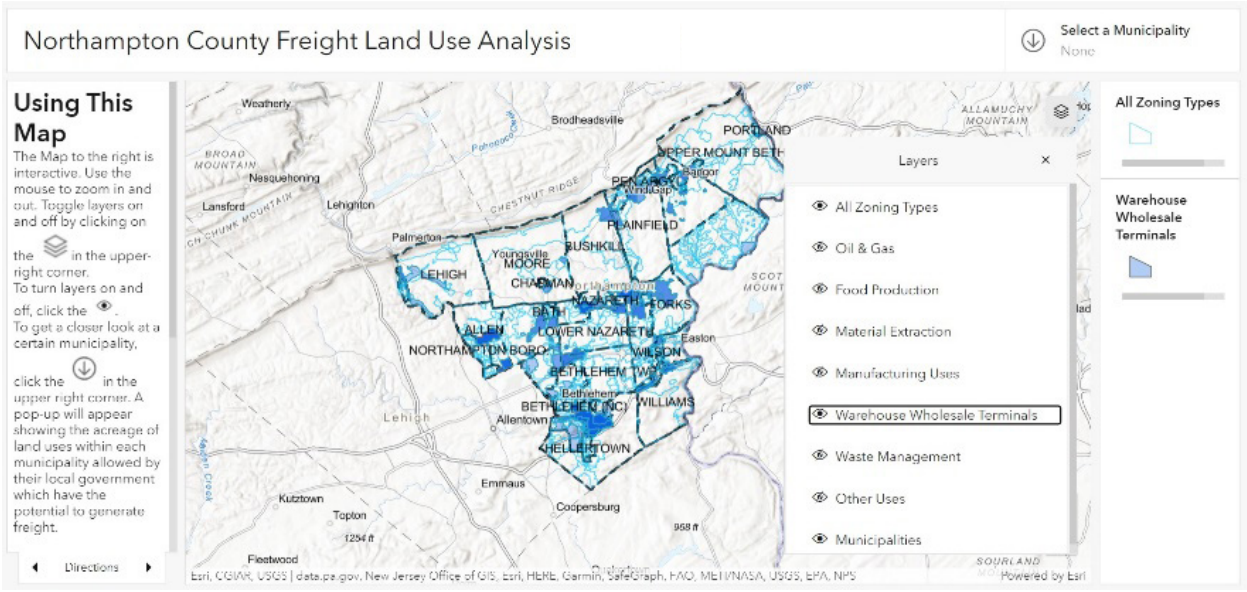
- Oil and Gas
- Food Production
- Material Extraction
- Manufacturing Uses
- Warehouse, Wholesale and Terminals
- Waste Management
- Other Industrial Uses

Freight Land Use Analysis Tool

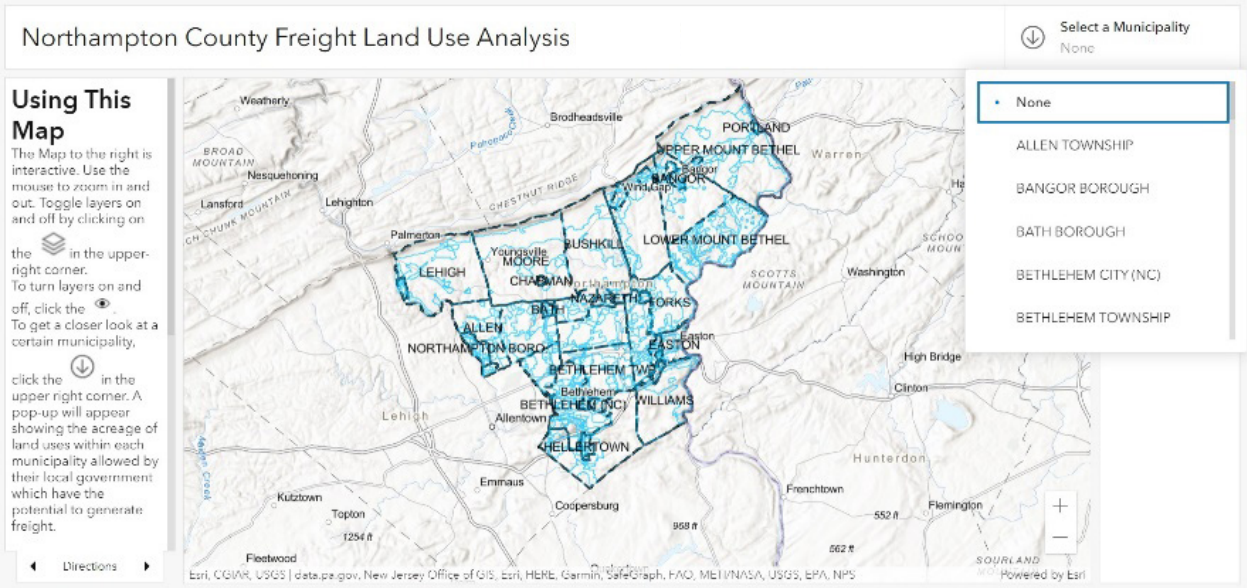
The LVPC created new layers that separated the districts based on freight-generating categories and developed the online mapping tool that you see below. Visual techniques were identified that would be most appropriate for a land use assessment in which one district may allow multiple freight-generating uses. Next, acres of uses were calculated, manually verifying that each district was not counted twice.



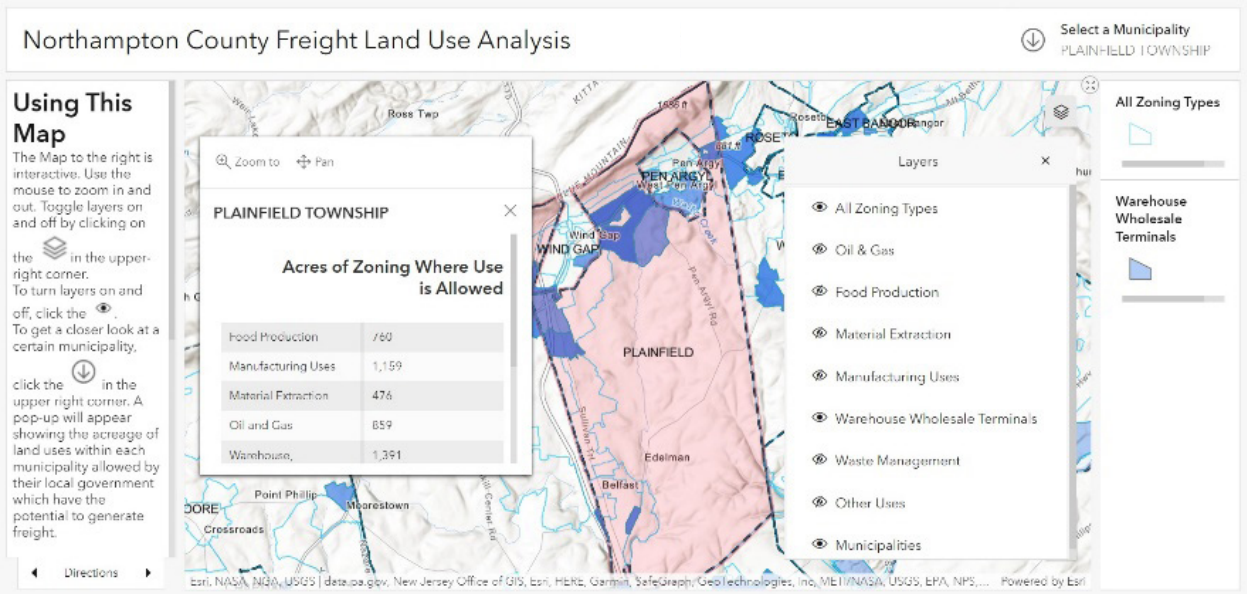
The freight-based mapping tool is available at northamptoncounty.org/CMTYECDV.



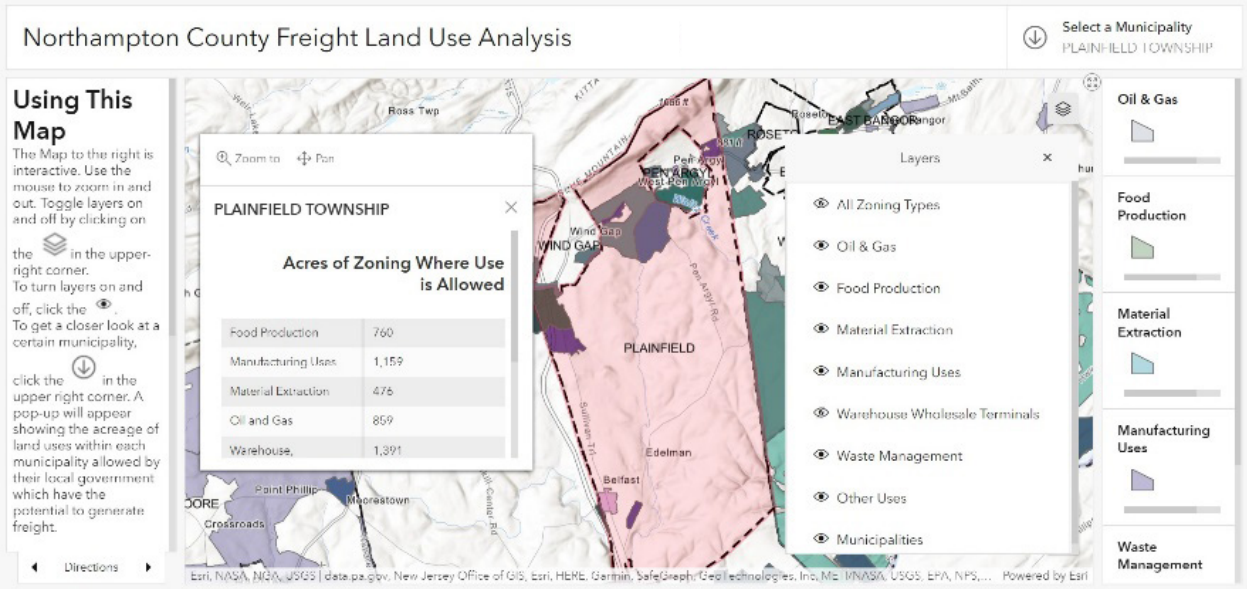
Click on the to open the list of freight-generating use layers. Click on the to toggle on and off the uses to view the zoning districts where that use is permitted.



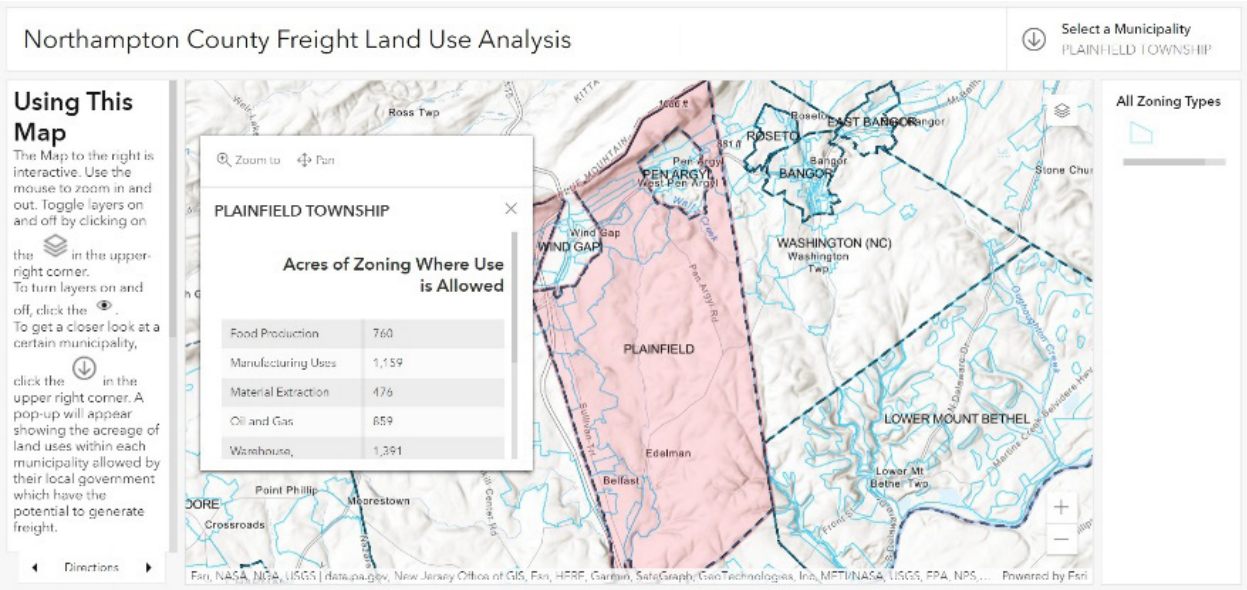
To get a closer look at your community, click on the ⓘ and scroll down to your municipality. The map will automatically zoom in.



A pop up window will open. It will present the number of acres within each freight-based use category.



Clicking on the will drop down the menu of potential uses and clicking on the show the areas that allow that use within your municipality.



You can click multiple use categories at one time, to see all of the districts that allow those uses.

Once a municipality has determined which zoning districts permit specific industrial use and how they are permitted, it should compare this information with the adopted Future Land Use map, as well as an updated existing land use map. If the zoning map hasn't been updated since the adoption of the most recent Future Land Use map, the zoning map should be brought into compliance to match the municipality's vision for future growth. Similarly, if the pattern of existing land uses has significantly changed since the adoption of the zoning map, these changes should be evaluated when determining if impactful industrial uses are compatible.

Municipalities should also review the zoning map in tandem with existing and planned public sewer and water service areas. Although warehousing and distribution centers typically require less sewer service capacity than traditional manufacturing uses, public sewer often is needed for the number of employees typically employed.

Municipalities should also examine the availability of public water service, primarily for fire suppression, for both internal controls and water hydrants for fire fighters. The assessment should include the proximity of fire companies when determining the most appropriate locations for these uses.

Municipalities that have adopted a multi-municipal comprehensive plan should be discussing shared land uses with the other municipalities participating the plan. The Pennsylvania Municipalities Planning Code (MPC) permits municipalities to designate the proper location of specific land uses. For instance, rural townships that are not served by public sewage disposal or public water service generally can't provide for higher density residential development that is more appropriately directed to suburban townships or boroughs. Similarly, industrial uses such as distribution centers that are reliant on proximity to interchanges to major transportation corridors can be restricted or excluded in municipalities that don't have this access and directed to those municipalities that do.

Zoning Ordinance Regulations

Once a municipality has determined the most appropriate location(s) for freight-based development, the next step is using the zoning and subdivision and land development (SALDO) ordinances to regulate and mitigate the potential impacts of freight-based development. Municipalities should consult with their land use solicitor, zoning officers and other staff, the municipal planning commission and others in determining the most appropriate ordinance to place these regulations. Some municipalities may use the zoning ordinance to determine how many parking and loading spaces are required and the SALDO to establish the design of the parking areas. Similarly, some municipalities require driver amenities in their zoning ordinance, others place these regulations in the SALDO.

The following recommendations deal exclusively with land use and design regulations found in the zoning and SALDO ordinances. Guidance for building construction and materials is generally outside the scope of this guide. However, municipalities are urged to review innovations in warehouse construction with their municipal engineer, solicitor and code enforcement officials.



In September 2022, Green Building United and the LVPC co-hosted a forum on sustainable warehouse design and construction. Green Building United is a group that “promotes the development of buildings that are sustainable, healthy for inhabitants, resilient, and cost-effective.”

A major theme of the forum was determining what municipal officials can do, particularly in regard to their zoning ordinance, to promote or require green building standards for warehouse development. Municipal officials and developers agree that Pennsylvania building codes support many green building standards, especially in the energy code, and it is possible to provide incentives or bonuses for green building features. For instance, additional height or impervious surface could be permitted if innovative approaches to stormwater management are used. Municipalities that wish to require green building features, such as green roofs or solar panels on roofs, should consult with their solicitor to determine the appropriate language as well as the location of the regulation in the zoning ordinance, building code, or other ordinance.

Municipal officials also expressed concern about the eventual reuse of these buildings as well as off-site road improvements required because of the development. Examples of green industrial buildings exist around the region, the United States, and the world, and should influence how structures are conceived. More information on green buildings and Green Building United can be found here: greenbuildingunited.org.

Before a municipality considers for adoption any of the following regulations, it is important to first examine the type of municipality it is, the proximity to infrastructure such as highway interchanges, public sewer and water availability, and accessibility of emergency service providers, as well as the existence of any agreements to share uses in a multi-municipal comprehensive plan.

Some rural municipalities that lack public infrastructure may still have a major transportation corridor traversing them. If freight-based industrial development is planned for, it should be permitted only in close proximity (such as one-half mile) of the highway interchange. Secondary roadways which lead to the interchange should be examined for capacity and safety limitations as well as incompatible land uses. On-site or nearby water storage capacity should be closely planned with local fire service providers.

Exurban communities are those areas that have few or none of the factors necessary for development and should remain in rural uses, including agriculture and related businesses, parks and open spaces. Special attention should be paid to potential freight-based development that would be located close to historical villages or scattered pockets of residential development that exist in exurban areas. High-intensity industrial uses may negatively impact the regional character of an area expressed by its environmental, historic, cultural, scenic or agricultural assets. Generally, these areas also lack public infrastructure and are characterized by lower classification roadways that may be utilized for access to highway interchange areas.

Suburban and urban municipalities are comprised of a series of existing and emerging centers served by transportation corridors of varying capacities, as identified in *Future LV: The Regional Plan*. Centers for freight-dependent industrial land uses have developed organically in the Lehigh Valley, locating close to interchanges of major corridors such as Route 33 or Route 22. Highway-oriented commercial uses such as fast-food restaurants and convenience stores have also located in these areas. Municipalities should be diligent in examining both existing neighboring land uses and those planned and zoned for the future, to avoid creating land use conflicts. The highest-intensity freight land uses, both in terms of trip generation numbers and square footage, could be appropriate in these areas if they are planned for thoroughly. Freight movement and access must be carefully coordinated to avoid truck traffic spilling over into adjoining neighborhoods or trucks parking along the roadways. Public sewer and water service must be carefully coordinated with utility providers to ensure adequate capacity. Employee access, including transit, should be incorporated into the overall site design. Finally, setbacks, buffering and landscaping must be coordinated to minimize the visual impact of the facility.

The LVPC has examined a number of zoning, subdivision and land development ordinances, and land use guides, both locally and nationally, and offers the following examples of zoning regulations to address these specific impacts.

Activities and Operations Considerations

Proposals for new warehouse or distribution centers should include an overall description of the proposed operation. Included would be hours of operation including peak hours, a summary of the traffic impacts detailed in the traffic impact study, methods of sewer and water supply and anticipated volumes, and identification of surrounding land uses. Specific examples of narrative and description requirements from Moore Township and Lehigh Township follow.

Moore Township Example

When submitting a conditional use application, the applicant shall provide a written narrative, and additional supporting information, documentation, studies, and reports as necessary or required below, containing detailed descriptions of the proposed use and substantive evidence demonstrating consistency of the proposed use relative to each of the following topics:

i. The nature of all activities and operations to be conducted on the site, the types of materials to be stored, the duration of storage of materials, and the methods for disposal of any surplus or damaged materials. In addition, the applicant shall furnish evidence that the disposal of materials will be accomplished in a manner that complies with applicable state and federal regulations.

ii. Hours of operation and the times and frequency of deliveries, distributions and/or restocking.

iii. The general scale of the operation in terms of its market area, specific floor space requirements for each activity, and the total number of employees on each shift.

iv. Consistency of the proposed use with each of the general standards for a Conditional Use as set forth in Section 200-24.C(1) of the Moore Township Ordinance.

v. Consistency of the proposed use with the General Performance Standards set forth in Sections 200-30 relative to any environmental or other impacts (e.g. odor, noise, smoke, dust, litter, glare, vibration, electrical disturbance, wastewater, stormwater, solid waste, etc.) that are likely to result from the use and any specific measures to be employed to mitigate or eliminate any such negative impacts.

vi. The applicant shall submit a current Pennsylvania Department of Conservation and Natural Resources Pennsylvania Natural Diversity Inventory (PNDI) environmental review receipt for the project and additional evidence as necessary to demonstrate that no endangered species will be negatively impacted by the proposed development.

vii. The applicant shall submit a traffic study as required elsewhere herein.

viii. Adequacy of the number, size, and location of loading and staging spaces provided for trucks to accommodate the expected demand generated by the use, including both pre-loading and post-loading activities.

ix. Adequacy of off-street staging spaces available for tractor-trailers arriving during non-business hours to prevent vehicles from parking on public streets while waiting to access the facility

Moore Township Example

x. Adequacy of off-street staging spaces available at facility entrances to prevent vehicles from queueing on public streets while waiting to access the facility.

xi. The applicant shall submit a truck routing map identifying anticipated routes to and from the proposed facility to the Township boundary, consistent with truck routing signage and trip distribution data presented in the traffic study as required elsewhere herein. (Moore Twp. Section 200-22 Subsection G-14, (4) m.)

Lehigh Township Example

The applicant shall provide a detailed description of the proposed use which addresses each of the following topics:

1. The nature of the on-site activities and operations, the types of materials stored, the frequency of distribution and restocking, the duration period of storage of materials, and the methods for disposal of any surplus or damaged materials. In addition, the applicant shall furnish evidence that the disposal of materials will be accomplished in a manner that complies with commonwealth and federal regulations; and

2. The general scale of the operation, in terms of its market area, specific floor space requirements for each activity, the total number of employees on each shift, and an overall needed site size; and

3. Any environmental impacts that are likely to be generated (e.g., odor, noise, smoke, dust, litter, glare, vibration, electric disturbances, wastewater, stormwater, solid waste, etc.) and specific measures employed to mitigate or eliminate any negative impacts. The applicant shall further furnish evidence that the impacts generated by the proposed use fall within acceptable levels, as regulated by applicable laws and ordinances. (Lehigh Township, Sect. 180-105 A.)

The complete Lehigh Township ordinance can be found at https://ecode360.com/13035404.



Municipalities should plan for multimodal elements of the freight distribution system, including rail where available, such as this site in South Bethlehem on Route 412.

Photos courtesy of LVPC staff



Setbacks, Buffer Areas, and Landscaping and Screening Requirements

Freight-based land uses generate impacts that may make them incompatible when located adjacent to other land uses, including residences, health care facilities, senior care facilities and educational institutions. While it is better to prohibit freight-based land uses adjacent to incompatible uses to avoid adverse impacts to the community, in some instances this may be unavoidable or acceptable based on the scale of the proposal. In these instances, setbacks and separation areas in the form of buffers can help negate visual impacts of large-scale buildings and viewsheds, light pollution and noise. Separation areas also play an important role where freight-based land uses are permitted along municipal boundary lines, to protect adjacent communities from impacts. Municipalities enacting buffer requirements should ensure that meeting these requirements are achievable, based on the sizes of lots within the specified zoning districts.

The bulk, height, and footprint of freight-based industrial developments can create substantial visual impacts to neighboring uses, especially if those uses are non-industrial. High-cube warehouses can be more than 100 feet in height, and some warehouses and distribution centers buildings can cover more than 20 acres. The most important tool in minimizing the visual impact of these structures is to ensure they are located in industrial areas with similar structures and located away from incompatible uses. Beyond locational requirements, the visual impact can be lessened by a variety of tools including setbacks and separation areas (discussed above), grading, and landscaping and screening.

Examples of buffer requirements:

- 100-foot buffer yard (Moore Township- Section200-22Subsection G-14, Warehouse, (2) Buffer Yards)
- 50-foot buffer between the industrial use and all other uses, 30-foot buffer along all front frontages (North Whitehall Township, Section 803.D.)
- In Industrial Districts, for Yard Adjacent to Residence District or Municipal Boundary Line: Along any boundary line of a residence or Residential District or any similar District in an adjoining municipality, a buffer yard shall be provided which shall be not less than 150 feet wide, measured from the boundary line. Where a street constitutes the boundary line, the yard shall be measured from the street line. The 50 feet of such yard space nearest the district boundary line shall be used only as a planting strip on which trees or suitable shrubbery shall be placed. The remaining one 100 feet of space may be used for off-street parking or for any purpose other than a building or permanent structure, or any manufacturing, commercial, or processing activity. (American Planning Association Guidelines)

    a. Where the footprint of the proposed principal warehouse structure is 100,000 square feet to 250,000 square feet:

        i. A minimum 150-foot buffer yard shall be provided along the entire length of the street frontage of any property upon which a warehouse is located.

        ii. A minimum 150-foot buffer yard shall be provided along any property line which abuts or is within 500 feet of an existing residential property line or zone, school, daycare center,

hospital, place of worship, overburdened community, designated park, or other public open space.

iii. In all other cases, a minimum 150-foot buffer yard shall be provided along any property line adjacent to a non-residential use or zone

b. Where the footprint of the proposed principal warehouse structure is 250,000 square feet to 350,000 square feet:

i. A minimum 250-foot buffer yard shall be provided along the entire length of the street frontage of any property upon which a warehouse is located.

ii. A minimum 250-foot buffer yard shall be provided along any property line which abuts or is within 500 feet of an existing residential property line or zone, school, daycare, hospital, place of worship, overburdened community, designated park, or other public open space.

iii. In all other cases, a minimum 150-foot buffer yard shall be provided along any property line adjacent to a non-residential use or zone.

c. When other warehouses or industrial uses are located on the same property or any adjacent property line within the Industrial Zone, a minimum 75-foot buffer shall be provided between the two uses.

d. When other warehouses or industrial uses are located along the adjacent street frontage within the Industrial Zone, a buffer yard of equal width, but no less than 100 feet shall be provided along the street frontage between the two like uses.

e. When commercial or retail uses are located on the same property as a warehouse, a buffer of 100 feet shall be provided between the two uses.

f. Buffer yards shall exclude environmental encumbrances such as, but not limited to, wetlands, wetland transition areas, riparian buffers, and flood hazard areas as may be imposed by outside agencies such as the New Jersey Department of Environmental Protection.

g. The buffer yard shall be measured from the property line or street right-of-way line.

h. Where a lot line drainage or utility easement is required, the buffer yard shall be measured from the inside edge of the easement.

Landscaping and Screening Regulations

New Jersey State Planning Commission Example

A. The buffer yard shall be a landscaped area free of roads, driveways, parking lots, storage, buildings, structures, and stormwater facilities of any kind, except for emergency access roads or recreational pathways and/or sidewalks as may be required by Township ordinances, circulation plans, or fire or safety regulations and/or as may be required and/or approved by the Planning Board.

B. Unless otherwise naturally vegetated in a predominantly forested condition of a density reasonably adequate for effective screening acceptable to the Planning Board, the buffer yard shall be landscaped with native plant materials comprising evergreen trees, deciduous trees, flowering trees, and shrubs of types resistant to draught and disease.

C. Landscaped buffer areas shall utilize underground irrigation systems that shall be maintained in working order for at least five years from issuance of a certificate of occupancy. Water-efficient irrigation systems are encouraged, including systems that minimize the use of potable water and systems that recycle rooftop runoff.

D. All areas of the buffer yard not covered with plantings shall be covered by a well-maintained, all-season vegetative ground cover such as grass.

E. Earthen berms shall be constructed within buffer yards in accordance with Section (5), Berm Requirements, herein.

F. Minimum planting requirements in Buffer Yards:

i. Trees and shrubs shall be planted in the following minimum quantities per 100 lineal feet of buffer yard, as measured parallel to the buffer yard.

1. Five evergreen trees.
2. Five deciduous trees.
3. Five flowering trees.
4. Five evergreen shrubs.
5. Five deciduous shrubs.

ii. This landscaping shall be provided in addition to any landscaping required by other [municipal] regulations.

iii. Plantings shall be arranged to provide a complete visual screen of the warehouse of at least 12 feet in height (measured in addition to the height of the berm) within three years.

iv. The plantings shall be arranged on the outside (non-warehouse side) and top of the berm.

New Jersey State Planning Commission Example

v. Evergreen trees shall have a minimum height of eight feet. Deciduous trees shall have a minimum trunk caliper of two inches measured three feet above the top of the root ball and a minimum height of twelve feet. Flowering trees shall have a minimum height of seven feet. Shrubs shall have a minimum height of 30 inches. Minimum heights shall be as measured from finished grade at the time of planting.

G. Those portions of the entire site that are not used for buffer yards, roads, lanes, off-street parking, loading, storage or buildings, shall follow the standards prescribed in the (specificed zoning district). (New Jersey State Planning Commission Warehouse Siting Guidance)



An example of a berm on Willowbrook Road, Allen Township.

Photos courtesy of LVPC staff

Lower Macungie Township Examples

- All tractor-trailer truck parking, outdoor storage and/or loading/unloading areas that are visible from beyond the exterior lot lines of the use shall be screened by a 50-foot buffer yard meeting the following requirements:

  A. Include a dense evergreen screen which will provide, within three years, a complete visual screen of at least 10 feet in height.

  B. Include deciduous shade trees meeting the following requirements:

     1. Shall meet provisions of the subdivision and land development Ordinance [Chapter 22A] concerning type and initial size of shade trees.
     2. Shall be placed abutting streets as required by the subdivision and land development Ordinance [Chapter 22A] and along every 50 feet of lot perimeter that does not abut a public street (such trees are not required to be planted at regular intervals but may be clustered).
     3. Shall be of types selected to be resistant to diesel exhaust.
     4. Shall be planted on the exterior side of any required berm (or any wall that might be permitted in place of such berm), any wall used for screening, any fence and any evergreen screening.
     5. Shall not be planted on the top of any berm, in order to provide effective screening. (Lower Macungie Township. Sect. 27-2406 MM (8))

- Any tractor-trailer truck parking, outdoor storage and/or loading/unloading areas that are visible from and are within 250 feet of the exterior lot lines of the use shall be separated from such lot lines by an earthen berm. Such berm shall meet the following conditions:

  A. Average a minimum of 10 feet in height above the adjacent average ground level (disregarding any drainage channel) on the outside of the berm.

  B. Not have one completely continuous height, but instead shall vary in height by one foot or two feet in places.

  C. Have a maximum side slope of three horizontal to one vertical.

  D. Be covered by a well-maintained, all-season, natural ground cover, such as grass. (Lower Macungie Township. Sect 27-2406 MM (9))



Landscaping could be enhanced with a mixture of ground cover, shrubs, and deciduous and evergreeen trees of varying sizes. Northampton Business Center, Seemsville Road, Allen Township.

Photos courtesy of LVPC staff

Forks Township Example

All tractor-trailer truck parking, outdoor storage and/or loading/unloading areas that are visible from beyond the exterior lot lines of the use shall be screened by a fifty-foot buffer yard meeting the following requirements:

1. Include a dense landscape buffer consisting of the following:
    a. One large evergreen tree per 25 linear feet of buffer.
        i. Size of large evergreen trees shall be a minimum of eight feet in height at the time of planting.
        ii. Narrow/upright evergreen species may also be used within buffers at a ratio of 3:1 (narrow species: large evergreen). No more than 25% of total required large evergreen species can be substituted with narrow/upright species.
    b. One canopy (shade) tree per 75 linear feet of buffer. Size of canopy (shade) trees shall be a minimum of 2.5 inch caliper at the time of planting.
        i. Size of ornamental/flowering trees shall be a minimum of eight feet in height for multi-stemmed varieties, or 2.5 inch caliper at the time of planting for single-stemmed varieties.
    c. One ornamental/flowering tree per 50 linear feet of buffer.
    d. Five shrubs per 25 linear feet of buffer.
        i. Size of shrubs shall be fully branched and minimum of three feet in height at the time of planting.
        ii. Shrubs shall be a combination of evergreen and deciduous species, with a minimum of 50% being evergreen.
2. Plant material shall meet the following requirements:
    a. Plant species within buffer plantings shall:
        i. Be resistant to diesel exhaust; and
        ii. Not be identified on the most current Pennsylvania Department of Conservation and Natural Resources invasive species or watch lists; and
        iii. Be hardy within United States Department of Agriculture hardiness Zone 6b.

Forks Township Example

b. Shall be planted on the exterior of any required berm (or exterior side of a wall or fence if permitted in lieu of a berm).

c. Shall be planted on the top and the exterior of any berm, in order to provide effective screening.

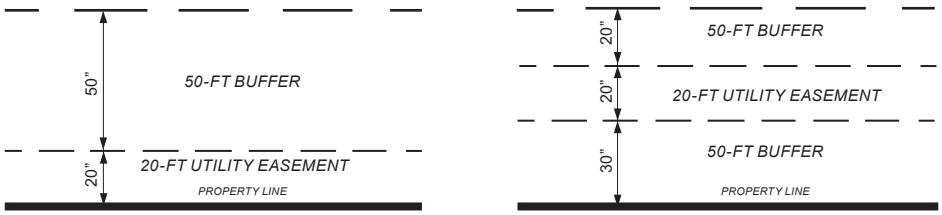
d. Shall be arranged in groupings to allow for ease of maintenance and to provide a naturalized appearance.

e. Shall provide a diversity in plant species, such that no one species accounts for more than 25% of each plant type.

f. Proposed plantings shall be reviewed and approved by the [Municipal] Engineer.

3. Where buffer yards are contained within, or contain within themselves, utility easements, such buffer yards shall be taken in addition to the utility easements.

4. Where buffer yards are contained within, or contain within themselves, utility easements, such buffer yards shall be taken in addition to the utility easements.



EXAMPLE NO. 1 EXAMPLE NO. 2

- Landscape material that is required for buffers shall be in addition to any other ordinance requirements such as street trees and parking area buffers.

(Forks Township. Sect 200.28 G.(17)(i) (j))

Buffer Yards

Moore Township Example

A. A 100-foot buffer yard shall be provided along the entire length of the street frontage of any property upon which a warehouse is located. Further, a 100-foot buffer yard shall be provided along any property line which abuts a residential or agricultural zoning district or an existing residential use.

B. The buffer yard shall be measured from the property line or street right-of-way line. Where a lot line drainage or utility easement is required, the buffer yard shall be measured from the inside edge of the easement.

C. The buffer yard shall be a landscaped area free of roads, sidewalks, driveways, parking lots, storage, buildings, and structures of any kind, except for emergency access roads or pathways and/or sidewalks as may be required by [municipal] ordinances or fire or safety regulations and/or as may be required and/or approved by the Board of Supervisors.

D. The buffer yard shall be landscaped with evergreen trees, deciduous trees, flowering trees, and shrubs of types resistant to diesel exhaust.

E. All areas of the buffer yard not covered with plantings shall be covered by a well maintained, all-season vegetative ground cover such as grass.

F. Earthen berms shall be constructed within buffer yards in accordance with Section (3), Berm Requirements, herein.

G. Minimum planting requirements in Buffer Yards:

   i. Trees and shrubs shall be planted in the following minimum quantities per 100 lineal feet of buffer yard, as measured parallel to the buffer yard.

      1. Ten evergreen trees.
      2. Five deciduous trees.
      3. Three flowering trees.
      4. Ten shrubs.

   ii. This Landscaping shall be provided in addition to any landscaping required by other [municipal] regulations.

   iii. Plantings shall be arranged to provide a complete visual screen of the warehouse of at least 14 feet in height (measured in addition to the height of the berm) within three years.

   iv. The plantings shall be arranged on the outside (non-warehouse side) and top of the berm.

   v. Evergreen trees shall have a minimum height of eight feet. Deciduous trees shall have a minimum trunk caliper of two inches measured three feet above the top of the root ball and a minimum height of 12 feet. Flowering trees shall have a minimum height of seven feet. Shrubs shall have a minimum height of 30 inches. Minimum heights shall be as measured from finished grade at the time of planting.

Section (3) Berm Requirements

a. A raised earthen berm shall be constructed along the entire length of the street frontage of any property upon which a warehouse is located. Further, a berm shall be constructed along any property line which abuts a residential or agricultural zoning district or an existing residential use.

b. The berm shall have a minimum average height of 14 feet measured above existing grade on the outside (non-warehouse side) of the berm. The berm shall not have a completely continuous height but shall vary in height by one or two feet along the length of the berm.

c. The berm shall have a maximum side slope of three feet horizontal to one foot vertical.

d. The berm shall have a minimum top width of 10 feet.

(Moore Twp. -Section 200-22 Subsection G-14, (2), (3))

Lehigh Township Example

All tractor-trailer truck parking, outdoor storage and/or loading/unloading areas that are visible from beyond the exterior lot lines of the use shall be screened by a 50-foot buffer yard. This buffer yard shall meet the following conditions:

1. Include evergreen screening meeting the provisions of § 440-79.
2. Include the planting of deciduous shade trees, which shall meet the following requirements:
    a. The species and size shall meet § 440-61, unless alternative species are approved by the Board of Supervisors;
    b. Shall be placed at an average of one tree for every 60 feet of lot perimeter, including abutting a public street (such trees are not required to planted at regular intervals, but may be clustered);
    c. Shall be of types selected to be resistant to diesel exhaust;
    d. Be planted on the exterior side of any required berm (or any wall that might be permitted in place of such berm), any wall used for screening, any fence and any evergreen screening.
    e. Shall not be planted on the top of any berm, to provide effective screening; and
    f. May be planted within the future street right-of-way.

(Lehigh Township - Sect 440-41 (74)(b))

Driver and Facility Amenities

Land Development plans for freight centric or freight movement dependent operations need to provide accommodations at their facilities to enable the truck drivers essential to their operations to comply with federal laws regulating the hours a driver may operate a commercial vehicle. Freight land uses and facilities should incorporate onsite parking for the commercial vehicles that are essential to the operations of the owner or lessee of the building or use.

It should be noted that Drivers of a Commercial Motor Vehicle (CMV) or Commercial Trucks that fall under the Hours of Service (HOS) regulations are defined as being used as part of a business, is involved in interstate commerce, and fits any of these descriptions:

- Weighs 10,001 pounds or more
- Has a gross vehicle weight rating or gross combination weight rating of 10,001 pounds or more
- Is designed or used to transport 16 or more passengers (including the driver) not for compensation
- Is designed or used to transport nine or more passengers (including the driver) for compensation
- Is transporting hazardous materials in a quantity requiring placards

There are special exemptions from these HOS requirements such as:

Short-Haul: Driving within 150 miles of the origin and destination and must start and end within 14 hours at the same starting location.

Adverse Driving Conditions: Drivers can extend their duty day and driving time by up to two hours when adverse driving conditions are encountered. Adverse driving conditions include snow, ice, sleet, fog, or other weather conditions or unusual road or traffic conditions that were not known, or could not reasonably be known, to:

- A driver immediately beginning the duty day or immediately before driving after a qualifying rest break or sleeper berth period, or:
- A motor carrier immediately before dispatching a driver

Long-term or overnight truck parking amenities should provide or enable trucks to:

- Have easy access to trash receptacles
- Adequate lighting to provide security for drivers while sleeping or resting
- Directional signage to major interstates or common freight destinations

Additionally, it is important that the freight-based land use also provide amenities for the driver to utilize while restricted from driving. These amenities may include:

- Driver Lounges with vending machines
- Rest Rooms
- Showers
- Wi-Fi Internet access
- Dog walking
- Multimodal trails

Multimodal Access

Municipalities should plan for the availability of trails, sidewalks and access to mass transit facilities when planning for the location of freight-based operations. This infrastructure serves both drivers coming to the site as well as providing employees options for work trips. The subdivision and land development approval process should require consultation with transit providers on the optimal location for stops. Sidewalks and trails should also be required to connect with existing and proposed trail and sidewalk systems.

Forks Township Example

Every building containing this use shall have amenities for the truck drivers/operators of the vehicles using the facility in addition to any similar amenities provided to on-site warehouse/ distribution employees.

i. The amenities shall include, at a minimum, a suitable lounge for drivers/operators, with restroom facilities, including at least three sinks, stalls, etc., per restroom, and dispensing machines or other facilities to provide food and beverages.

ii. At least one amenity shall be provided for every 30-truck loading/unloading docks/ doorways of the use.

iii. The size of each such amenity shall be proportionate to the number of loading/unloading docks/doorways of the use. Each amenity shall contain not less than one seat per 10 docks/ doorways, with a minimum area to accommodate six seats and one four- person table.

iv. Parking for the amenity shall be provided in close proximity to the amenity and in a suitable, safe, and separately defined location. There shall be provided at least one 12-foot-by-8-foot truck parking space per each required lounge seat of the amenity.

v. Trucks parked in amenity parking spaces shall not leave engines idling unless required for safety or weather-related reasons. Electrical outlets shall be included in parking areas for trucks to utilize.

vi. All trucks awaiting access to a loading/unloading dock/doorway shall park in the designated amenity parking spaces unless all such spaces are already occupied.

(Forks Township Sect. 200-28 G. (a) (17))

Moore Township Example

Every building containing this use shall provide amenities for the truck rivers/operators of the vehicles using the facility in addition to any similar amenities provided to on-site employees. The following provisions shall apply:

i. The amenities shall include, at a minimum, a suitable lounge for drivers/operators sized to accommodate six lounge seats and one four-person table, with restroom facilities, and dispensing machines or other facilities to provide food and beverages.

ii. At least one additional amenity (i.e. showers, sleeping areas, entertainment area, etc.) shall be provided for every 30-truck loading/unloading docks/doorways of the use. The size/quantity of each such amenity shall be appropriate and proportionate to the number of loading/unloading docks/doorways of the use.

iii. At least one 12-foot-by-75-foot truck parking space shall be provided per each required lounge seat of the amenity. Such parking spaces shall be provided in close proximity to the amenity and in a suitable, safe, and separately defined location.

iv. Electrical outlets shall be provided for use by drivers/operators at each amenity parking space.

v. Appropriate signage shall be provided directing trucks to park in the designated amenity parking spaces while awaiting access to a loading/unloading dock/doorway, unless all such spaces are already occupied.

vi. Appropriate signage shall be provided prohibiting idling of trucks parked in amenity parking spaces unless required for safety or weather-related reasons.

vii. Mechanical scraper systems shall be installed at each truck exit drive for the purpose of removing snow, slush and ice from trailer and truck rooftops. During winter months, all trucks must pass under these mechanical scrapers prior to exiting the warehouse facility.

(Moore Township - Section 200-22 Subsection G-14 (5))

Lower Macungie Township Ordinance

Each and every building containing this use shall have amenities for the truck drivers/ operators of the vehicles using the facility in addition to any similar amenities provided to on-site warehouse/distribution employees. The following provisions shall apply:

i. The amenities shall include, at a minimum, a suitable lounge for drivers/operators, with restroom facilities, including at least three sinks, stalls, etc., per restroom, and dispensing machines or other facilities to provide food and beverages.

ii. At least one amenity shall be provided for every 30 truck loading/unloading docks/ doorways of the use.

iii. The size of each such amenity shall be proportionate to the number of loading/unloading docks/doorways of the use. Each amenity shall contain not less than one seat per 10 docks/doorways, with a minimum area to accommodate six seats and one four-person table.

iv. Parking for the amenity shall be provided in close proximity to the amenity and in a suitable, safe, and separately defined location. There shall be provided at least one twelve-foot-by- eighty-foot truck parking space per each required lounge seat of the amenity.

v. Trucks parked in amenity parking spaces shall not leave engines idling unless required for safety or weather-related reasons. Electrical outlets shall be included in parking areas for trucks to utilize.

vi. All trucks awaiting access to a loading/unloading dock/doorway shall park in the designated amenity parking spaces unless all such spaces are already occupied.

(Lower Macungie Township. Sect 27-2406 MM (1))

Parking and Circulation

Almost all municipalities that regulate land use include parking and circulation requirements in their zoning ordinance, subdivision and land development ordinance, or both. These requirements dictate the number and dimensions of parking spaces for all vehicles and ensure that traffic flows efficiently throughout the site as well as entering and exiting the site. Loading and unloading areas must be designed so that traffic flow is uninterrupted and doesn't cause traffic to back up to the roadway.

However, many parking and circulation regulations were adopted before the advent of the current generation of warehouses and distribution centers, as well as larger trucks and double trucks. Specifications and design of truck parking for long duration or overnight parking, trailer storage, as well as dock spaces in length and width, should accommodate the largest Commercial Motor Vehicle.

Standard Trailer Sizes are:

Length: 48 - 53 feet

Width: 8.5 feet

Height: 13.5 feet



Dock spaces, such as the ones seen at Silgan Containers Manufacturing, Upper Macungie Township, must adhere to the parking and circulation requirements in the municipality's zoning ordinance, land and subdivision ordinance, or both.

Photos courtesy of LVPC staff

Tractors attached to a trailer can add an additional 17 feet to the trailer length for a size of 65 feet to 70 feet in length. The size of required trailer spaces and tractor-trailer spaces should be specified accordingly in ordinances regulating the size of parking spaces for commercial motor vehicles

Some operations rely on “doubles” which are two smaller trailers connected and pulled by one tractor. These smaller trailers are often utilized by parcel delivery trucks between distribution centers by carriers such as UPS and FedEx. The trailers are often 28 feet in length and connected with a tractor can reach lengths of 80 feet.

It is recommended that spaces for overnight or long duration parking, as well as spaces at dock doors, be 12 feet wide by 70 feet in length. Trucks loading or unloading at dock doors will at some point be connected to a tractor and as such need to be provided a safe space that fits their dimensions.



Forks Township Example

- Where guard shacks or checkpoints are proposed at the entrance(s) to such facilities, adequate queuing space shall be provided within the property boundaries to prevent stacking of tractor-trailers on or along public streets.
- This use shall reserve a minimum of 5% of the proposed total tractor-trailer parking spaces for trucks which are required to arrive early or required to layover or rest due to hours-of-service regulations. Such spaces must be made available to tractor-trailers 24 hours a day/seven days a week.

(Forks Twp. Sect. 200-28 G. (b), (c))

Moore Township Example

Off-street parking, loading, and staging spaces and loading docks are required as follows:

i. **Off-street parking spaces:** 1.5 parking spaces for every one employee at peak periods of operation, including any potential overlap between shifts.
   - In the event that a particular tenant has not been identified for the facility, the applicant shall demonstrate adequacy of proposed parking to meet requirements of Sections 200-57.G14, Warehousing.

ii. **Staging spaces:** Two 12-foot-by-75-foot truck staging spaces for each loading dock.
   - A minimum of five percent of required truck staging spaces shall be reserved for outbound trucks which are required to layover or rest due to hours-of-service regulations. Such spaces must be accessible during and after the facility's operating hours as necessary.

iii. **Loading spaces:** One 12-foot-by-75-foot truck loading space for each loading dock.

iv. **Loading docks:** The minimum number of loading docks shall be determined using the following calculation: Number of trucks per hour (at the peak hour of the use) x Turnaround time per truck (in hours) = Number of required docks. The number of docks determined by the above formula shall be rounded up to the next whole number. By way of example: 17 trucks are required to be serviced during the peak hour of the use, each requiring 45 minutes (0.75 hours) to service. This equates to 17 trucks per hour x 0.75 hours per truck = 12.75 docks required, rounded up to 13 docks.
   - In the event that a particular tenant has not been identified for the facility, a minimum of one loading dock shall be provided per 5,000 square feet of building gross floor area.

(Moore Township - Section 200-22 Subsection G-14, (4), g.)

Lower Macungie Example

- One parking space per 5,000 square feet gross floor area, plus one space per 10,000 square feet of gross floor area over 100,000 square feet. At least 10% of parking spaces must be designated as truck staging spaces (North Whitehall T.)
- This use shall reserve a minimum of 5% of the proposed total tractor-trailer parking spaces for outbound trucks which are required to layover or rest due to hours-of-service regulations. Such spaces must be made available to tractor-trailers during and/or after the facility's operating hours as necessary.

(Lower Macungie Township Sect 27-2406 MM (3))

Height and Dimensional Requirements

Freight-based land uses like warehouses are often characterized by their substantial size relative to other buildings in a community. For example, the average size of a typical grocery store is between 20,000 and 40,000 square feet, whereas a 50,000-square-foot warehouse is considered small. As e-commerce and the demand for fast direct-to-consumer shipping has increased rapidly, it is not uncommon for freight facilities to be between 400,000 and 1 million square feet. Additionally, the height of these facilities are often greater than four stories, as the more space inside generally corresponds with the amount of goods that can be moved and stored. The combination of square footage and building height can have a tremendous impact on community character. It is important for communities to regulate the scale and height of buildings, as well as the locations where larger-scale buildings are permitted in order to minimize impacts. It is also critical that communities ensure that local fire departments and emergency management departments have the equipment necessary to serve larger-scale facilities in case of emergency.

Moore Township Example

Within the Industrial (I) Zone, Warehouses shall be permitted as a Conditional Use, subject to the following criteria:

1. Special Dimensional Requirements for Warehouses
    a. The maximum building height shall be 44 feet.
    b. The total maximum building coverage shall be 44%.
    c. The total maximum impervious coverage shall be 55%.
    d. Where the footprint of the proposed principal warehouse structure is greater than 100,000 square feet:
        i. The minimum lot area shall be 10 acres.
        ii. All access points shall be a minimum of 250 feet from any dwelling.
        iii. All drive aisles, loading/unloading areas, and parking areas intended for use by tractor-trailers as well as outdoor storage areas shall be a minimum of 250 feet from any dwelling.

(Moore Township, Section 200-22, Subsection G-14)

Palmer Township Examples

- Truck parking and loading docks. Any area routinely used for the parking of two or more tractor-trailer trucks and/or trucks that would have refrigerated systems operating during nighttime hours and any related loading dock(s) shall be set back a minimum of 75 feet from any residential lot line. If such parking and/or loading dock(s) are within 200 feet of any residential lot line and are not separated from such lot line by a building, then an earth berm shall be provided between such parking and such lot line(s) (Palmer Township, Section 190-116 J.)
- Height in the Heavy Industrial/Mixed Use District
    1. Three and one-half stories or 45 feet, whichever is more restrictive.
    2. Structures higher than the above height may be permitted as a conditional use, provided that fire protection measures above and beyond those normally required would be provided as the Supervisors determine are necessary, after providing the Township Fire Commissioner with an opportunity for a review. [Amended 8-21-2006 by Ord. No. 2006-365]

(Palmer Township, Section 190-116 G.)

East Allen Township Example

Maximum lot coverage in the General Industrial District

- Principal Buildings — 40%
- Total Impervious Coverage — 50% (At least 30% of the total lot area shall be lawns and/or vegetation land cover)

(East Allen Township, Section 250-23 F.)

William Township Example

- Any industrial use or area routinely used for the movement, parking or storage of tractor-trailer trucks or refrigerator trucks shall be setback a minimum of 200 feet from any residential zoning district boundary or an existing principally residential building, unless such areas are separated by an expressway.

    1. Reduction of Setback. A 200-foot minimum setback under this section may be reduced to 120 feet if the business use provides an earthen berm as a buffer that meets the following conditions:

        a. (a) Minimum height: an average of five feet above the average finished ground level on the residential side of the berm.

        b. (b) Maximum side slopes: three horizontals to one vertical.

        c. (c) The evergreen plantings required by §27-1304 shall be placed on the top or on the residential side of the berm. (Williams Township Section 27-1107 M.)

- Maximum impervious coverage: 60%, except 70% if an earthen berm around the perimeter of all paved areas (other than accessways) is provided that meets the following requirements:

    1. Minimum average height of berm: five feet above the average finished ground level (disregarding drainage channels) on the outside side of the berm. Fluctuations in height are encouraged.

    2. Maximum side slopes of berm: three horizontals to one vertical.

    3. A 50-foot yard (which may include vegetated drainage channels) and the berm (which may be within such yard) shall be maintained in an all-season natural ground cover, and with any fence on the inside of the berm or any wall

(Williams Township Section 27-1107 G.)2



Communities need to be able to regulate the height and dimensions of all warehouse buildings, including buildings like Bimbo Bakeries and their silos, on Nestle Way, Upper Macungie Township.

Photos courtesy of LVPC staff

Emergency Services

Freight-based industrial land uses can pose special challenges for emergency service providers. Manufacturing facilities may utilize or generate hazardous materials that are stored at the facility. High-cube warehouses or other tall structures may be difficult to access with fire suppression equipment. Specific areas of the site may be secured during off-peak times and inaccessible to emergency service providers. The following examples address access concerns, availability of water supply, and the need to coordinate development proposals with service providers. Other aspects of emergency service provision will be regulated through the building codes.

- An exterior access stair tower shall be provided to allow public safety personnel direct emergency access to the roof of the building from the ground level. Steps, guiderails, handrails, brackets, gates, and other components shall meet or exceed applicable Uniform Construction Code and Occupational Safety and Health Administration (OSHA) standards. The final location and specifications for the exterior access stair tower shall be subject to review and approval by the Emergency Services Coordinator and/or Fire Marshall (Moore Twp. - Section 200-22 Subsection G-14 (4) (k))

- Commercial Knox Boxes are required to provide public safety personnel access to any secured areas of the site, the principal building structure, and any accessory structures. The final location(s) and specifications for Knox Boxes shall be subject to review and approval by the Emergency services Coordinator and or/Fire Marshall (Moore Twp. - Section 200-22 Subsection G-14 (4) (l))

- Plans that accompany special exception or conditional use applications, or subdivision or land development applications, should clearly identify the location, design, and capacity of water storage facilities intended for fire suppression.

- Municipalities should require requests for special exceptions and conditional uses, as well as all subdivision and land development applications for freight-based development, be submitted to emergency service providers for their comment and review. Thresholds for review, such as a minimum square footage of principal building and trip generation rate, can be used to determine which applications should be reviewed.

Karst Geology

Most of the municipalities in Northampton County are underlain entirely or in part by carbonate geology. These limestone and dolomite formations underlie the heart of the Lehigh Valley's urban core. In addition to providing the area's most fertile farmland, raw material for the cement industry, and providing a generally favorable foundation for the region's cities, the carbonate geology's characteristics include the potential for sinkhole formation. When these sinkholes occur in developed areas they can cause property damage, injury and the loss of life, and the disruption to utility and public services.

Minimizing Sinkhole Occurrences , *Joint Planning Commission , November 1988*

Extreme Weather Considerations

The accumulation of snow and ice on top of tractor-trailers poses a safety hazard to other vehicles on the roadway, potentially resulting in serious injury and death. The 2006 Pennsylvania Snow/Ice Removal Law requires the removal of snow and ice from all vehicles prior to leaving the site. Violators of this law are subject to state-related fines and penalties.

Subdivision and land development ordinances should require that every facility that involves commercial vehicles have devices or equipment for the removal of snow on rooftops of trucks and trailers. Proper siting of this equipment and the plan for removal of the snow once removed from the rooftop is essential to compliance with state law and for the safety of the community overall to eliminate snow and ice dislodgement from impacting roads and other motor vehicles.

Electrification

Subdivision and land development ordinances should require the installation of adequate electric infrastructure both for charging electric vehicles as well as powering refrigeration units of temperature-controlled trailers and driver amenities of the tractor cab of vehicles that allow electricity to power the devices.

Driver Information

Freight-based land uses are often used by drivers with little or no local knowledge of the local area facilities or regulations. All drivers, but especially drivers with no knowledge of the location of the freight facility, need information and guidance on state and local requirements. This can include signage or information onsite of truck routes, state laws for the operation of vehicles, the state idling law as well as the closest convenience stores, food establishments and even lodging accommodations of local hotels. Information provided can also be for local road restrictions, bridge height clearances and weight restrictions, as well as local truck service businesses for repairs to trucks and trailers as they arise.

Subdivision and Land Development Ordinances, Official Maps and Transportation Impact Fees

Zoning ordinances primarily regulate the location of specific land uses within a community. They also can include regulations for certain design standards such as building heights, setbacks, screening and landscaping requirements, and parking requirements. Subdivision and land development (SALDO) ordinances are used to regulate other design elements of a development including stormwater management, parking and traffic circulation, street, and access drive design, and locating sewer and water facilities. Some of these regulations such as design of parking and loading spaces or screening and buffering, often overlap with regulations within the zoning ordinance. Municipalities should consult with their solicitors and engineers to determine which ordinance these regulations should be placed in and ensure that cross-references are included.

Access Management Model Ordinances for Pennsylvania Municipalities Handbook (PennDOT), April 2005, Updated February 2006

This handbook categorizes three tiers of model ordinance language to manage traffic access. Tier 1 practices relate to the number and location of driveways and basic design elements that should be evaluated for every access. Additional practices such as shared driveways and internal access to outparcels attempt to consolidate access points among adjacent property owners. The practices included in this tier are generally the easiest to implement because they cost the least, take the least time to implement, and require the least amount of coordination between the property owner, municipality and PennDOT.

Tier 2 practices involve more complex design elements for individual driveways, such as left turn lanes and deceleration lanes. Other practices, such as driveway and signalized intersection spacing, involve multiple driveways or off-site intersections. Some of the practices could require implementation through multiple land development approvals or a comprehensive project involving several properties. The practices in this tier can be more costly and require a longer period to implement than the practices in Tier 1, due to the participation of multiple property owners.

Examples include:

- Auxiliary Lanes
- Left Turn Lane
- Acceleration Lane
- Driveway Spacing
- Signalized Intersection Spacing
- Driveway Clearance from Interchange Ramps

Tier 3 practices include roadway design and planning practices such as medians, two-way center left turn lanes, setbacks, frontage roads involving multiple driveways, intersections and properties. These practices cover a much larger corridor or area and typically require the highest degree of coordination among property owners, the municipality and PennDOT. In addition, this tier contains planning and regulatory tools such as the official map and zoning overlay districts to implement these types of practices. In most situations, these practices would require capital funding for implementation. These types of practices could require years to fully implement. These practices are more expensive, require much higher levels of coordination between stakeholders, and much more time to implement than Tier 1 and Tier 2 practices

Official Map

The official map is an effective planning tool to reserve right-of-way for new road alignments and interchanges. In addition, it can be used to reserve right-of-way along existing roadways for turning lanes at intersections, additional through lanes along corridors, and Tier 3 access management techniques such as two-way left turn lanes and non-traversable medians (see Handbook).

The Pennsylvania Municipalities Planning Code (MPC) provides that a municipality may adopt an official map covering the entire municipality, or a portion thereof, to show elements of the comprehensive plan pertaining to public lands and facilities. An official map identifies areas of public interest and need for the purpose of reserving lands for public use. It can be used to implement the transportation network and other community facilities.

Section 401(a) of the MPC permits the municipality to represent the following transportation facilities on the official map:

1. Existing and proposed public streets including widening, narrowing, extensions, diminutions, openings, or closings.
2. Pedestrian facilities and easements.
3. Railroad and transit rights-of-way and easements.

The adoption of any street or street lines as part of the official map does not constitute the opening or establishment of any street, the taking of any land, nor does it obligate the municipality to improve or maintain any such street. The adoption of the official map does not constitute the taking or acceptance of any land by the municipality. The construction of any building is not permitted within the lines of any street that is shown on the official map. The municipality may fix the time for which streets on the official map shall be deemed reserved for future taking or acquisition for public use. However, the reservation of public lands lapses and becomes void one year after an owner of such lands has submitted a written notice to the municipality announcing their intentions to build, subdivide, or otherwise develop the land reserved for public use, or has made a formal application for an official permit to build a structure for private use.

The municipality may use property records, aerial photography, photogrammetric mapping, geographic information systems (GIS), or other methods for the identification, description, and publication of elements of the official map. An ordinance must accompany the official map that describes the lands identified for future public use. The ordinance may be placed directly on the map. The municipality does not need to survey designated lands prior to the adoption of the official map and ordinance. At the time of land acquisition or easements, boundary descriptions by metes and bounds must be provided by a licensed surveyor. (*Access Management Model Ordinances for Pennsylvania Municipalities Handbook (PennDOT)*, April 2005, Updated February 2006)

The official map and ordinance must be reviewed, advertised and adopted in accordance with the requirements of the Pennsylvania Municipalities Planning Code.

Traffic Impact Studies

The Pennsylvania Department of Transportation (PennDOT) has established criteria requiring a development to produce a Transportation Impact Study (TIS) to help understand the impacts to the transportation network, and the improvements that are a needed to mitigate those impacts to provide a safe and efficient network for all modes of transportation.

Municipalities are encouraged to follow the guidelines provided by PennDOT for requiring a TIS. The municipalities may also provide reasonably lower or higher thresholds for requiring a TIS on local roads. Local governments should include provisions for TIS in the subdivision and land development ordinances and it is recommended that standards align with those that PennDOT utilizes, making them applicable to all roads and bridges.

PennDOT guidelines call for a Transportation Impact Study when:

1. The site is expected to generate 3,000 or more average daily trips or 1,500 vehicles per day.
2. More than 100 vehicles are projected to enter or exit the site during any one-hour period of any day of the week.
3. On an existing site, more than 100 additional vehicles trips, entering or exiting, are expected to be generated during any one-hour period of any day of the week.
4. In the opinion of PennDOT the development or redevelopment is expected to have a significant impact on highway safety or traffic flow, even if Study Warrants 1, 2, or 3 above are not met.

Alternatively, if the site does not raise to the level of requiring a TIS, the PennDOT District Permits Manager or Traffic Engineer may require the preparation of a Transportation Impact Assessment (TIA). Factors in determining if a TIA is necessary include, but are not limited to, location of proposed access and site configuration, congestion and delay of surrounding roadway network and safety concerns.

The purpose of a TIA is to assess the impact of the application on specific intersections or elements of the state transportation system. As such, the scope of a TIA will be limited and targeted to the concern of the Department or the municipality; it would generally be limited to an opening year analysis.

An example of a TIA would be to determine the best access plan for a corner property that would not generate traffic sufficient to warrant a TIS but could impact queuing patterns at the intersection. A TIA should be prepared at the same point in the application process as a TIS and in the same manner as a TIS, as applicable.

The TIA must be conducted under the supervision of a person with a Professional Engineer's (PE) license issued by the Pennsylvania Department of State and preferably capable of possessing a Professional Traffic Operations Engineer (PTOE) certificate. The TIA must be signed and sealed by PE licensed in Pennsylvania.

PennDOT TIS/TIA Appendix References

https://www.penndot.pa.gov/DoingBusiness/Permits/HighwayOccupancyPermits/

Improving the Land Use Transportation Connection Through Local Implementation Tools: http://www.dot.state.pa.us/public/PubsForms/Publications/PUB%20662.pdf

Traffic Monitoring

Traffic monitoring is a critical part of site development planning, and helps committees understand current traffic and estimated increases per a TIS. The cost of traffic monitoring as part of the land development approval process maybe added to the municipal fees charged for review and the municipal engineer is recommened as the responsible party for conducting the traffic monitoring. This edited excerpt from a Hingham, Mass. traffic engineering peer review takes a complete approach:

Implement a traffic monitoring program consisting of these actions:

- Performing a 7-day, week-long automatic traffic recorder counts on the project site driveways to include vehicle classification
- Performing manual turning movement counts and vehicle classification counts at the Project site driveway intersections … peak periods
- Obtaining motor vehicle crash data for the most recent one-year period … at the following locations…

The monitoring program should commence within 90 days of the issuance of a Certificate of Occupancy for the Project and be repeated within one-year thereafter. The results of the traffic monitoring program shall be summarized in a report or technical memorandum provided to the Director of Community Planning and the Building Commissioner within one-month of the completion of the data collection effort and should include the following information and analyses:

- Comparison of the measured traffic volumes (trucks and passenger vehicles) to the traffic volume projections for the project as presented in the [Site Development Traffic Study], and as may be subsequently modified
- An evaluation of motor vehicle crash rates at the monitored intersections
- Traffic operations analysis for the monitored intersections.

To the extent that the measured traffic volumes for the project exceed the projected traffic volumes by more than 10 percent (e.g., 110 percent of the projected traffic volumes) and/or the calculated motor vehicle crash rates exceed the MassDOT average crash rates for similar intersections, corrective actions to reduce the unmitigated impact of the project should be proposed and implemented. The corrective actions should be documented in the traffic monitoring report and undertaken by the applicant subject to receipt of all necessary rights permits and approvals. Examples of traffic monitoring can be found at https://www.hingham-ma.gov/481/Traffic-Committee.



A refrigerator truck driving Northbound on Route 33, going towards Route 22, Bethlehem Township.

Photo courtesy of LVPC staff

Transportation Impact Fees

Pennsylvania has enabled municipalities to utilize transportation impact fees tied to a Capital Improvement Plan (CIP). These fees are assessed to private developers proposing a project on a road included within the study area of the CIP. The intent of the impact fee tool is to require developers to pay for some of the impacts they create from their proposed development. Municipalities considering the use of impact fees should consider the following:

a. Impact fees in Pennsylvania can only be used for transportation improvements.

b. Municipalities can't require developers to fix existing deficiencies in the road network, they are only responsible for mitigating the impacts caused by their development.

The Pennsylvania Department of Transportation has created guidance for municipalities in analyzing, creating, and implementing a transportation impact fee.

Transportation impact fees are a funding mechanism permitted by the Pennsylvania Municipalities Planning Code (MPC). Fees can be assessed to new development in proportion to its impact on transportation — the traffic the development is expected to generate during peak commuter periods. Funds collected are used to improve roadways used by development-related traffic, enabling Pennsylvania municipalities to provide adequate infrastructure to support economic growth and development. The MPC authorizes municipalities within the Commonwealth to enact, amend and repeal impact fee ordinances, and to charge impact fees to cover the cost of off-site road improvements necessitated by new land development as defined in sections 501-A through 506-A of the MPC.

In summary, impact fees can be used for capacity improvements to accommodate traffic generated by new development, but not to address existing or anticipated deficiencies unrelated to the development. Eligible improvements include adjustments to existing traffic signals, new traffic signals, auxiliary turn lanes, additional through-travel lanes, new roads, and any other items associated with those types of improvements. Improvements can also include the correction of any existing design deficiencies within the limits of work for the capacity improvements. Since ost warehouse-related traffic is channeled onto State highways, the role of municipal traffic planning for this use is limited to supporting roads owned by municipalities Nevertheless, traffic impact fees and trffic management planning by municipalities, along with traffic issues associated with traffic impact requirements from PennDOT should help mitigate congestion and other traffic issues associated with new warehouse development or for any other significant traffic gererator.

Before incurring the upfront costs of implementing a transportation impact fee ordinance, municipalities should consider several issues related to existing traffic conditions and projected land development activity to help determine whether the investment would indeed be worthwhile. A municipality should conduct a feasibility or cost-benefit analysis of these issues before proceeding with the implementation of an impact fee ordinance. The analysis should focus on:

- Future Land Use projections
- Review of proposed road improvements
- Traffic volumes and roadway capacity
- Potential revenue generation from Impact Fees

Checklist for Establishing Transportation Impact Fees

- **Establish Traffic Impact Fee Advisory Committee (TIFAC)**
- **Complete Land Use Assumptions Report**
  - Describe the existing land uses within the designated area or areas and the highways, roads, or streets incorporated therein.
  - To the extent possible, reflect projected changes in land uses, densities of residential development, intensities of nonresidential development, and population growth rates which may affect the level of traffic within the designated area or areas over a period of at least the next five years.
- **Complete Roadway Sufficiency Analysis**
  - The purpose of the Roadway Sufficiency Analysis is to determine the improvements that would be required to obtain a preferred level of service (LOS) for intersections and roadways in the transportation service area of the municipality for existing conditions, projected conditions prior to land development, and projected conditions after land development. The improvements that are identified for projected conditions are based on the traffic impact resulting from the projected land development from the approved Land Use Assumptions Report.
- **Complete Capital Improvements Plan**
  - The improvements identified in the Roadway Sufficiency Analysis report are carried forward to a Capital Improvements Plan to identify estimated project costs, schedule for completion, and potential funding sources. In addition, the Capital Improvements Plan establishes the amount of the impact fee on a per peak hour trip basis to be adopted in the impact fee ordinance.
- **Adopt Transportation Impact Fee Ordinance**
  - After the approval of the Capital Improvements Plan, the municipality can adopt the ordinance establishing the impact fee on a per peak hour trip basis.

(Transportation Impact Fees A Handbook for Pennsylvania's Municipalities, Publication 639, March 2009, Pennsylvania Department of Transportation, https://www.dot.state.pa.us/public/Bureaus/Cpdm/ImpactFees.pdf)

THE FOLLOWING MUNICIPALITIES IN THE LEHIGH VALLEY HAVE ADOPTED TRANSPORTATION IMPACT FEES:

Upper Macungie
https://www.lowermac.com/172/Traffic-Impact-Fee

Whitehall
Article X https://ecode360.com/13158320

Bethlehem Township
ch. 116 https://ecode360.com/13351511

Lower Nazareth
https://lowernazareth.com/wp-content/uploads/2020/11/Ord161-04-03-TrafficImpactFee.pdf

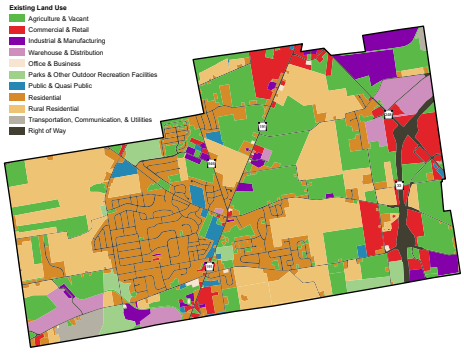
Hanover Township, Northampton County
ch. 102 https://ecode360.com/6763632

Forks Township
http://www.forkstownship.org/forms/tif-ord.pdf

Coordinate Planning for Freight-Based Development

It is important that municipalities review and coordinate where freight-based development currently exists in their community, where it is zoned to occur, and where it is planned to be located in the future. These Lower Nazareth Township maps use the policies of *FutureLV: The Regional Plan* illustrate how communities can coordinate their planning and zoning maps to direct industrial development to places where they are compatible with the surrounding community and infrastructure network. These municipal maps outline some of the key considerations when managing freight-based impacts in your community.

Existing Land Use

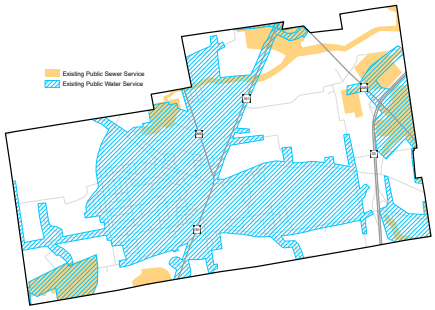


STEP 1

WHAT ARE MY EXISTING LAND USES?

This Existing Land Use map shows that industrial and manufacturing uses, and warehouse and distribution uses, are primarily located in the northeast, southeast and southwest corners of the Township. These areas generally coincide with major transportation corridors, including Routes 33 and 248 and Hanoverville Road. This information may be included in your comprehensive plan or the Northampton County GIS Tax Parcel Viewer.

Existing Public Utilities



STEP 2

WHERE ARE MY UTILITIES?

This map is used to identify areas that are generally served by both public sewer disposal and water supply. The existing public sewer lines and service areas are included in your Act 537 Sewage Facilities Plan. This information is also from the public utilities operating in your municipalities.

Existing Transportation System

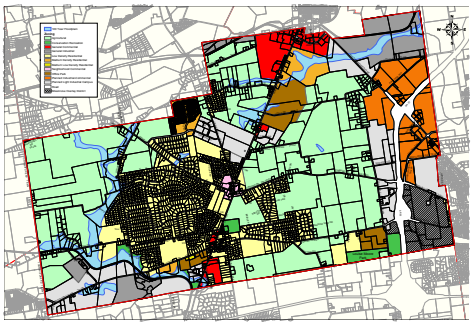


STEP 3

WHAT IS MY EXISTING TRANSPORTATION INFRASTRUCTURE?

This map shows major transportation infrastructure and opportunities for creating denser, mixed-transportation development. The best locations for industrial are at highway interchanges like I-78, Route 22 and Route 33. In general, industrial development beyond a half-mile from a highway interchange should be avoided.

Township Zoning Map



STEP 4

WHERE DO I ALLOW INDUSTRIAL USES IN MY COMMUNITY?

This Township Zoning map clearly lays out where General Industrial or Planned Light Industrial Campuses are allowed. Most municipalities have their current zoining map digitized.

Future Land Use Comprehensive Plan Map

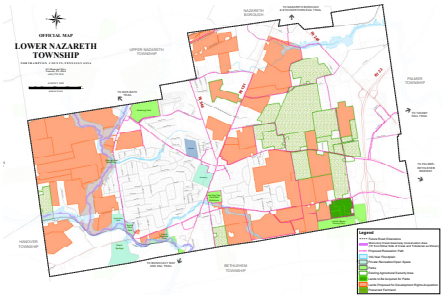


STEP 5

WHERE DO I PLAN FOR DEVELOPMENT?

This Future Land Use Plan map, included as part of the recently adopted Nazareth Area Multi-Municipal Comprehensive Plan, also clearly designates areas for Development, along with an area in the central part of the Township planned primarily for residential development. The Future Land Use Plan Map is located in your municipal or multi-municipal comprehensive plan.

Township Official Map



STEP 6

WHERE DO I PLAN FOR PUBLIC INFRASTRUCTURE EXPANSION?

Finally, the Township's Official Map serves as a powerful tool by clearly identifying areas of existing parks, floodplains and preserved farms, as well as proposed parks, farmland preservation areas and road extensions. None of the areas zoned or planned for industrial development are included in the open space/farmland areas identified on the Official Map. Some municipalities have created and adopted an official map, which would be in the comprehensive plan.

Municipalities, by overlaying their existing land uses and public utilities, along with their existing zoning map, can create Future Land Use maps and Official maps that direct where freight-based development should be located in their community. When communities overlay existing and planned development areas and supportive infrastructure, a clear picture of where you can or cannot accomodate the needs of industrial uses appears.

Implementation Checklists

Activities and Operations require a description of the proposed operation including the following:

- Hours of operation
- Traffic impacts
- Source and capacity of sewer and water
- Identification of surrounding land uses

Setbacks, buffer areas, landscaping and screening require a combination of the following elements:

- Include varied required setback distances depending upon size of facility and location of facility in relation to neighboring land uses. Setback may be reduced with additional landscaping and buffering.
- Include a combination of trees, shrubs, and ground cover. Require a mixture of evergreen, deciduous and flowering species to create a dense cover.
- Require berms in addition to landscaping materials.
- Provide incentives for decorative walls and other features.

Driver and Facility Amenities:

- Driver lounges with vending machines, rest rooms, internet access, showers, and others.
- Electrical outlets at each amenity parking space. Electric connections also required for refrigerated trucks to maintain temperature.
- Multi-modal access, including trails, to provide options for employees to get to work as well as recreational health benefits for drivers.

Parking and Circulation:

- Require parking spaces that can accommodate all tractor-trailer combinations, including doubles, 70 to 80 feet in length.
- Reserve a percentage of spaces for outbound trucks which are required to layover or rest due to hours-of-service regulations.

Height and Dimensional Requirements:

- Permit differing building heights depending upon the zoning district.
- Require setbacks from the street, neighboring property lines, and neighboring dwellings.
- Consider permitting additional height or impervious coverage in return for additional landscaping or other design features.
- Require and/or incentivize green and high performing buildings to support healthier communities, workplaces and climate action. Also, to ensure compliance with the adopted Pennsylvania Building Codes, particularly for energy efficiency.

Emergency Services

- Require exterior access stair towers.
- Require commercial Knox Boxes to provide public safety personnel access to any secured area of the site.
- Identify on all plans the location of water storage facilities intended for fire suppression.
- Require applications for freight-based development be submitted to emergency service providers for their comment and review.

Extreme Weather Considerations:

- Require every facility that involves commercial vehicles have devices or equipment, such as scrapers, for the removal of snow on rooftops of trucks and trailers.
- Require information be provided to drivers identifying local road restrictions, bridge height clearances and weight restrictions, and local truck service businesses for emergency repairs to trucks and trailers.

Official Map:

- Can be used to reserve right-of-way for new road alignments and interchanges as well as right-of-way along existing roadways for turning lanes, additional through lanes and access management techniques.
- Can be used to identify pedestrian facilities and easements.

Traffic Impact Studies:

- PennDOT has established criteria requiring a development to produce a TIS based on average daily trips, vehicle trips entering a facility, or if the development or redevelopment is expected to have a significant impact on highway safety or traffic flow.

Traffic Monitoring:

- Perform manual turning movement counts and vehicle classification counts at the driveway intersection(s) during peak periods.
- Compare actual performance measures to TIS projected performance measures.
- Traffic Impact Fees:
- Must be tied to a Capital Improvement Plan (CIP).
- Must prepare a Complete Land Use Assumptions Report and Complete Roadway Sufficiency Analysis.
- Fees collected can only be used for transportation improvements.
- Municipalities can't require developers to fix existing deficiencies in the road network, only impacts caused by their development.

The Road Ahead

This new form of warehouse development has quickly changed the development landscape of the Lehigh Valley. Proactive measures are needed to keep up with the ever-evolving nature of the warehouse and logistics sector of the economy. Municipalities are urged to continuously monitor development trends and ensure that their planning and regulatory efforts reflect current trends and are consistent with their long-term land use goals. The recommendations included in this guide will help communities balance their economic vitality with their vision for enhancing community character and identity.



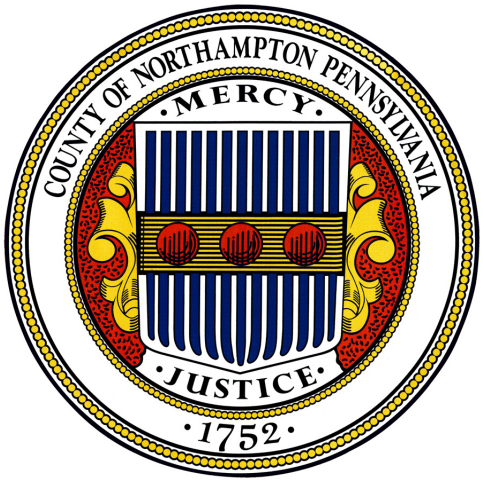
Parking facility for tractor trailers at Wakefern, Industrial Drive, Upper Macungie Township.

Photos courtesy of LVPC staff

For more information visit northamptoncounty.org/CMTYECDV

For technical assistance, contact the LVPC at 610-264-4544 or planning@lvpc.org.




COUNTY OF NORTHAMPTON PENNSYLVANIA
·MERCY·
·JUSTICE·
·1752·