chapter five

Resources

Resources

Previous chapters of this handbook have specified the design aspects which should guide the construction or reconstruction of the multimodal transportation system. This chapter identifies the planning efforts which should be considered to institutionalize these principles into municipal plans and ordinances. This chapter presents the tools, such as plans, programs or ordinances, which can be used to guide the development of the transportation system in a community.

The Pennsylvania Municipalities Planning Code (Act 247, as amended) delegates most of the power to regulate land use to individual municipalities. Significant transportation issues such as access to state roads and the provision of new highway capacity are primarily the responsibility of the state. Regardless of this separation of powers, there are tools and procedures that foster the coordination of multimodal circulation and land use among all levels of government.

The following exhibit provides a conceptual framework of the many tools that can be established by a municipality and used by landowners and developers. Each tool listed in the exhibit is directly linked to the comprehensive plan, the focal point for all municipal planning. An interactive relationship exists between these various tools. For example, a comprehensive plan may identify a highway corridor which needs more detailed evaluation. Through an access management study, specific recommendations can lead to revisions in the zoning and subdivision and land development ordinances. These steps then lead to an update or amendment to the comprehensive plan.

Tools for Circulation Planning

Land Development Process

The review of any development plan focuses on the consistency of that plan with the policies and ordinances of the municipality. To some extent these are independent reviews which should carefully consider the relationship of the plan to the future vision of the municipality and to the specific provisions of the various land use regulations. It is through the review process that the municipality has the opportunity to link the individual site to the community.

Sketch Plan

A sketch plan is a general layout of the entire property proposed for development. This optional stage in the development process identifies the proposed use of the land and shows:

- the developer's concept for the land;
- the relationship of the subdivision to adjacent land;
- the road network; and,
- the natural features of the land area.

For more specific details and the suggested elements of a sketch plan see the subdivision and land development ordinance for the appropriate municipality.

Sketch Plan Review

While a sketch plan is not a requirement of the Municipalities Planning Code, it provides an applicant with an opportunity to receive input on an informal basis, prior to major expenditures of money and time on preliminary engineering.

The Chester County Planning Commission provides an unofficial sketch plan review service. This service provides an exchange of public and private objectives in an informal setting without duress of time and regulations. Information and suggestions can be provided on access locations and the internal and external circulation network.

Preliminary Plan Review

Based on information received in the sketch plan, preliminary engineering can be initiated. The preliminary plan must then go through a three level review:

1. The municipal planning commission first determines how the plan relates to policies established in the comprehensive plan and how the plan conforms with existing ordinances. To assist in its review, the planning commission needs to utilize outside resources including the municipal engineer, traffic engineers, PennDOT, and other agencies.

2. The Municipalities Planning Code requires that plans be submitted for review to the county planning commission.
3. The elected body provides a review from a policy standpoint with input from all the previous sources.

The municipal review should focus on compliance with ordinances but should also consider the planning principles and design concepts listed in this chapter.

Traffic Studies

The review process must consider impacts caused by the proposed development. Impacts are determined through traffic impact studies which can be required in a land development ordinance. Municipalities can set guidelines for studies to establish consistency in the format and content. More information regarding traffic impact studies may be found in Chapter 5 – Resources.

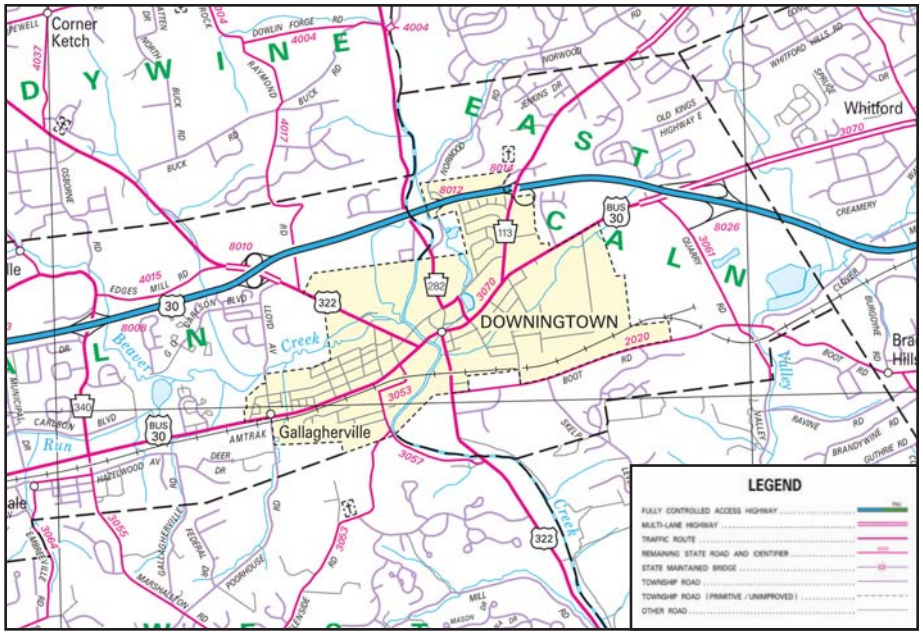
Several municipalities throughout Chester County have retained traffic engineers for the purpose of interpreting traffic studies prepared for proposed developments. This provides the municipality an unbiased, professional interpretation of the impacts and strengthens their ability to discuss and negotiate matters relative to the proposal.

Coordination with PennDOT

Determining Roadway Ownership

The first step in determining if coordination with PennDOT will be necessary is to determine whether or not the roadway associated with the proposed development is Local Road or a State Road. This can be done by referring to PennDOT's Type 10 map for Chester County.

Type 10 maps clearly identify state roads with either the standard keystone shield with route number, or with a 4-digit SR number along the roadway. Local roads are typically in a different color and do not have any designated numbering. Please refer to the sample Type 10 map on the next page:



Example of a PennDOT Type 10 map.

An open, working relationship among PennDOT, the municipality and the developer is an essential ingredient in the implementation of properly functioning access points on state roads. Because of the jurisdictional differences in the control of land use and access, it is critical that municipal concerns about access be conveyed to PennDOT and that PennDOT provide their perspectives on the proposal to the municipality. In some cases, one entity is working on access matters without the benefit of knowing what suggestions or decisions have been made by other jurisdictions.

Access/Highway Occupancy Permits

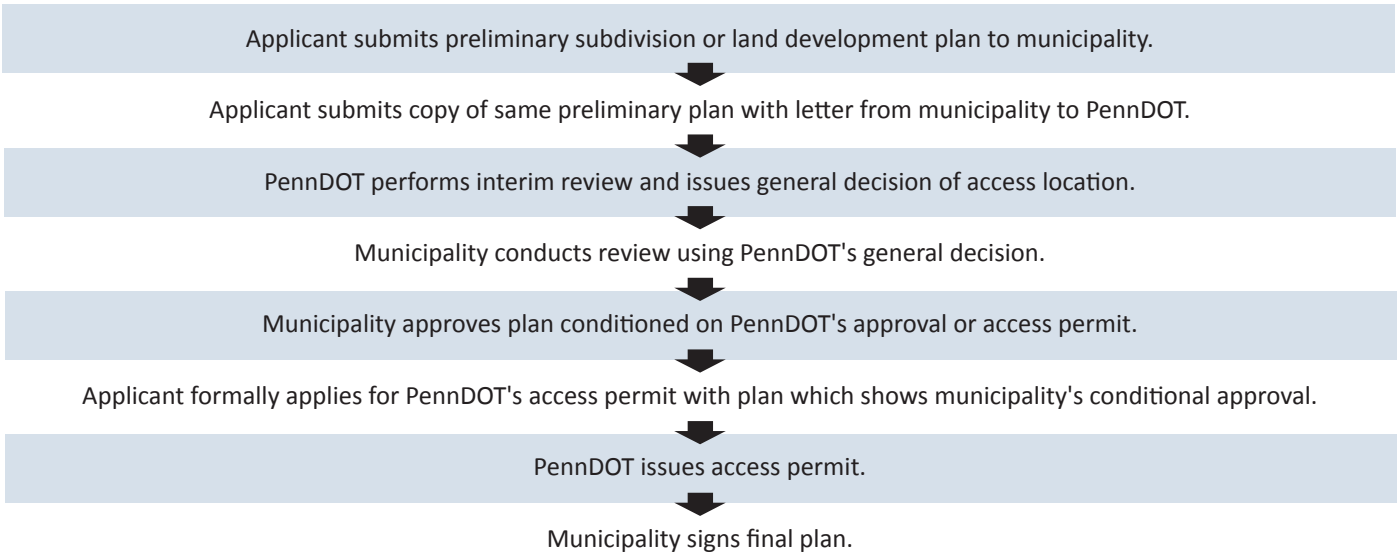
A land owner or developer must obtain permission from PennDOT to build a driveway or intersection accessing a state highway. This is referred to as an access permit or a highway occupancy permit. The specific provisions and procedures of the access permit process are detailed in Pennsylvania Code Chapter 441: ***Access to and Occupancy of Highways by Driveways and Local Roads***. Because access to state roads is a right deeply embedded in common law, PennDOT has limited grounds for denying an access permit.

PennDOT has developed a procedure in which they require notification from the municipality before PennDOT conducts a review. This procedure is established under the provisions of Pennsylvania Code, Title 67, Chapter 441.3(J) and is initiated after the municipality files a request with PennDOT asking to be included on a review list. Once the municipality is included on the list no access permit application will be accepted by PennDOT's permit supervisor without a notice from the appropriate municipality.

There is a statute which indirectly deals with the coordination of municipal and PennDOT reviews. Article V, Section 508 of the Municipalities Planning Code states that plats requiring access to state roads shall not be finally approved unless the plat contains a notice that a highway occupancy permit is required.

An effective method of insuring coordination would be through the use of interim or preliminary approvals. The flow chart below illustrates a step by step process which should be followed to enable municipalities to use PennDOT's recommendations and vice versa. Conscientious developers will basically follow this process on an informal basis even though it is not required by statute or ordinance.

How a Plan Should Relate to the Access Permit



Source: Chester County Planning Commission, 1993

Coordination with Other Municipalities

It is rare to find a major land development that does not have implications on traffic patterns and problems in neighboring municipalities. Any project which has a regional market or labor pool such as a large shopping center or an office park will draw traffic from and through adjacent communities. This is particularly evident where neighboring municipalities share a common expressway or arterial road. It is therefore important to establish direct coordination between municipalities on matters relating to comprehensive plans, zoning ordinances and traffic studies.

Existing enabling legislation provides limited opportunities for inter-municipal coordination. The Municipalities Planning Code indicates that plans and ordinances should be forwarded to adjacent municipalities before adoption. The Traffic Impact Fee law, Act 209, actually precludes the creation of intermunicipal impact fees but does require that one of the necessary studies be forwarded to adjoining municipalities for review.

One aspect of the Municipalities Planning Code which provides opportunities for municipal coordination is joint municipal zoning. This allows municipalities to develop compatible zoning and to offer suggestions in rezonings which occur in the other municipalities. Coordinated zoning can lead to the development of a coordinated circulation network.

The following identifies other specific practices that can be used to improve inter-municipal coordination:

1) In reviewing a subdivision or land development plan, a municipality should identify how the plan relates to the policies, plans and ordinances of the adjacent municipality. This can be done by reviewing the proposal with the zoning ordinance, the highway functional classification and possibly the capital improvements plan of the adjacent municipality or by requesting that the adjacent municipality provide their own review. This can be expedited through a regular exchange of information between municipalities.
2) For projects of a regional nature, PennDOT should supply a copy of their comments on access applications to adjoining municipalities.
3) For land development projects which involve a change in a traffic signal system, coordination with adjacent municipalities on possible signal interconnection can mitigate some traffic problems.
4) All circulation networks need to be coordinated including pedestrian networks, transit routes, park and ride facilities, and spur roads.

Tools for Multimodal Transportation Planning

Access Management and Corridor Studies

Access management is a planning tool used to protect the operating capabilities of the existing road network by providing improved safety and capacity of access points.

The Transportation Research Board's (TRB) Access Management Manual defines access management as:

> *"...the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway. It also involves roadway design applications, such as median treatments and auxiliary lanes, and the appropriate spacing of traffic signals. The purpose of access management is to provide vehicular access to land development in a manner that preserves the safety and efficiency of the transportation system."*

Severe limits on the availability of conventional highway funds from public sources and a growing consciousness of environmental concerns have

dramatically changed perspectives and opportunities for major capacity improvements to the highway network. The inability to provide new highway capacity for most arterial roads leads to an alternative planning approach--one that focuses on finding low cost solutions to preserve and improve operating and safety capabilities. This approach is generally referred to as access management.

Separate enabling legislation gives municipalities powers on land use matters and the Pennsylvania Department of Transportation powers on access matters on state highways. Because of this separation of jurisdictional powers, it becomes necessary to coordinate land use and traffic. Access management studies provide a vehicle for inter-jurisdictional and inter-municipal coordination along highway corridors.

For more information regarding access management, please refer to the PennDOT publication #574: ***Access Management: Model Ordinances for Pennsylvania Municipalities Handbook***

Bicycle/Pedestrian Mobility Plans

A Bicycle/Pedestrian Mobility Plan is a specific study that focuses on the bicycle and pedestrian facilities within a community. Both facility types are inventoried, including sidewalks, walkways, multi-use trails, use-restricted trails, crosswalks, and overall ADA accessibility. From this inventory, gaps are identified and then prioritized for implementation. Findings from these studies may result in recommendations for amending the comprehensive plan and/or adding recommended improvements to an official map.

Circulation Element of a Comprehensive Plan

The comprehensive plan helps a community prepare itself for future changes by documenting actions that need to be taken to guide the community based on the established goals. One of the critical components of a comprehensive plan is the circulation element which contains an outline of current transportation related conditions and recommendations necessary to address current and anticipated problems.

An inventory of existing conditions enables a municipality to determine future transportation needs based on current trends, and the goals and objectives established by the plan. The following is a listing of what should be considered in the circulation element of a comprehensive plan:

- Circulation Inventory
- Analyses
    - o Traffic Volume Studies
    - o Truck Movements
    - o Capacity and Level of Service (LOS) Analysis
    - o Safety Problems

- Access Problems
- Regional Issues Analysis
- Travel Time Analysis
- Functional Classification
- Parking Analysis
- Public Transportation
- Bicycle and Pedestrian Circulation Analysis

- Planning Implications
- Summary of Needs and Recommendations
- Implementation Strategies

Greenways/Open Space & Recreation/Trails Plan

These plans are typically geared towards the recreation elements within a community and may or may not include trails as part of the discussion. Since trails serve recreation and transportation needs, these plans can identify additional facilities that will provide for a complete multimodal transportation system.

The Pennsylvania Department of Conservation and Natural Resources (DCNR) Bureau of Recreation and Conservation provides matching funds to local municipalities towards the development of these plans through their annually funded Community Conservation Partnerships (C2P2) Program. The following ***DCNR webpage*** provides links to their standard scope of work/ contents for each study type.

The recommended trail alignments and/or networks resulting from these plans should be considered as additional transportation elements to a comprehensive plan or added to an official map

Municipal or Area Wide Transportation Studies

The purpose of a municipal or area-wide traffic study is to evaluate the existing highway network to determine the impacts of different land development scenarios and to identify improvements which will be needed to accommodate future traffic demand. The study may focus on a particular area or may include an entire municipality or a combination of municipalities.

Studies conducted in Chester County have been unique to each municipality. The study structure tends to be centered on individual needs or perceived problems of the community. Examples of problems include increased congestion, perceived safety hazards or inadequate parking.

The product of a traffic study should be an inventory of improvements intended to relieve existing and future inadequacies. The study should develop short and long term traffic improvement programs,

estimated project costs, and recommendations for implementation. The recommendations should be incorporated into the comprehensive plan of the municipality.

Municipal or area-wide traffic studies contain items similar to the circulation element of a comprehensive plan, but provide more detailed inventories and analyses:

- Existing Conditions
- Future Land use
- Background Traffic Growth
- Traffic from Future Development
- Future Traffic Volumes
- Levels of Service (LOS)
- Deficiencies
- Immediate Action Program
- Roadway Improvement Program
- Priorities and Implementation

Official Map

The Official Map is an important mechanism which can be used to turn goals of a comprehensive plan into reality. An "Official Map" is not a zoning map, a street map or a map from the comprehensive plan. It is a separate map which identifies public interest and need for the purpose of reserving lands for public use. An official map can be used as a tool to implement the transportation network and other community facilities.

The official map can be used to delineate the following:

- Existing and proposed public streets, watercourses and public grounds, including widening, narrowing, extensions, diminutions, openings or closing of same;
- Existing and proposed public parks, playgrounds and open space reservations;
- Pedestrian ways, bicycle trails and easements;
- Railroad and transit rights-of-way and easements;
- Flood control basins, floodways and flood plains, storm water management areas and drainage easements; and
- Support facilities, easements and other properties held by public bodies undertaking any element of a comprehensive plan.

An official map need not be a fully engineered map. A municipality may use property records, aerial photography, or other methods sufficient for identification, description and publication of the map components.

A municipality does not need to survey the designated lands until the property is to be acquired. For more information refer to ***Article IV of the Municipalities Planning Code***.

Traffic Impact Studies

The Institute of Transportation Engineers (ITE) states that the purpose of a traffic impact study is to evaluate proposed developments and assist in making land use decisions related to traffic. Decisions involve which on- and off-site improvements need to be made to accommodate traffic created by new development.

An impact study is an integral tool to provide an effective, municipal circulation system. According to ITE, if the study is conducted properly it should provide answers to the following questions:

- What are the existing traffic conditions?
- What additional traffic will be generated by the proposed development?
- How will this additional traffic affect existing conditions?
- What type of improvements or changes in the site plan density or use would be necessary to minimize the traffic impact of the proposed development?

There are ten basic components that should be included in a traffic impact study:

1. Description of Development Proposal
2. Description of Existing Roadways
3. Traffic Volumes (Present and Future)
4. Accident Analysis
5. Capacity Analysis (Present and Future)
6. Trip Generation
7. Background Traffic
8. Trip Distribution
9. Trip Assignment
10. Signal Warrant Analysis

The CCPC recommends the following thresholds for determining the need for a traffic impact study for any development which intends to access an arterial or collector road:

1) The proposed development consists of more than:
    - 45 dwelling units (single family detached),
    - 80 dwelling units (all other residential uses),

- 10,000 square feet gross leasable area of commercial uses,
- 2,000 square feet gross leasable area of a restaurant or convenience store,
- 17,000 square feet of office uses,
- 50,000 square feet of industrial uses, or
- 30,000 square feet of institutional uses.

2) Any combination of uses which will generate more than 1,500 vehicle trips per day. (PennDOT classifies a high volume driveway as having more than 1,500 vehicles per day.)
3) The proposed development is located near roadways, or intersections which are already heavily congested, or are operating at or below a level of service "D". This step requires a review of existing documentation such as the comprehensive plan or an area wide traffic plan. In some cases, new analyses consisting of traffic counts and level of service may be necessary.
4) The proposed development will impact roadways which have been identified as having inadequate or unsafe circulation or stopping distances.
5) The proposed access is within close proximity (less than 200 feet) to an existing or proposed medium or high volume (over 750 average daily traffic) driveway or intersection.
6) Traffic from the development would be significant enough to change the designated functional classification of adjacent roads.

A traffic impact study should be required for any development which intends to access a local road when any of the following conditions are met:

1) The proposed development consists of:
   - Any non-residential or non-agricultural uses,
   - More than 45 dwelling units (single family detached) with only one access point,
   - More than 80 dwelling units (all other residential units) with only one access point, or
   - Any residential use generating more than 100 total peak hour trips.

2) Traffic from the development would be significant enough to change the designated functional classification of adjacent roads.

The traffic impact study should be provided when the preliminary plan is submitted for municipal review. If there are significant revisions to the preliminary plan, the impact study should be revised and resubmitted with the final plan.

If a state road is to be accessed, the impact study should be submitted to the Pennsylvania Department of Transportation as part of the highway occupancy review process. For more information, please refer to: ***PennDOT's Policies and Procedures for Transportation Impact Studies Related to Highway Occupancy Permits***.

It may be necessary in some cases for the applicant to conduct the initial analysis of existing traffic counts and level of service to determine if a full traffic impact study is required.

Traffic Impact Fee Studies

Traffic impact fees are charges that can be made to developers by municipalities to provide the portion of the costs used to make capital improvements to the transportation system made necessary from development. Pennsylvania's Traffic Impact Fee Law, Act 209 of 1990, defines an impact fee as "a charge or fee imposed by a municipality against new development to generate revenue for funding the costs of transportation capital improvements necessitated by and attributable to new development."

The law requires that there must be a demonstrated linkage between the development and the need for transportation improvements. This linkage is known as a "rational nexus" relationship.

Act 209 requires the following documents be completed before an impact fee ordinance is adopted:

- Comprehensive Plan;
- Zoning Ordinance;
- Subdivision and Land Development Ordinance;
- Land Use Assumptions Report;
- Roadway Sufficiency Analysis Report; and,
- Transportation Capital Improvements Plan.

The roadway sufficiency analysis and capital improvements plan must be prepared by a transportation planner or engineer. Both must be specific to the transportation service area and used as a base in the preparation of the Traffic Impact Fee Ordinance.

A traffic impact fee advisory committee is required to assist the municipality in the planning stages of the ordinance. Act 209 requires that at least 40 percent of the members must be residents involved in real estate, commercial or residential development, the building industry or who conduct the aforementioned businesses within the community.

Funds raised through impact fees can only be used for costs incurred for improvements designated in the transportation capital improvements plan and may not be used for the following:

- Constructing, acquiring or expanding facilities not included in the transportation capital improvements plan;
- Upgrading, updating, expanding or replacing existing capital improvements to remedy problems not attributable to new development;
- Repairing, operating, or maintaining existing or new capital improvements;
- Preparing or developing the land use assumptions report or capital improvements plan; and,
- Improving the interstate highway system, bicycle lanes, bus lanes, busways, pedestrian ways, rail lines or tollways.

For more information, please refer to PennDOT's ***Transportation Impact Fees: A Handbook for Pennsylvania's Municipalities*** guidance document.

Pennsylvania Transportation Partnership Act (Act 47)

The ***Transportation Partnership Act*** (Act 47 of 1985 as amended) was created to enable partnerships to be formed between the public and private sectors to assist the financing of necessary road improvements. The act establishes guidelines for private sector participation for the benefit of both the public and private sectors. The legislation became law in 1985 and was later amended in 1986.

Act 47 resulted from limited public funds and increasing traffic problems. Alternative funding methods had to be explored to accelerate transportation improvements in growing areas. This act provides municipalities with the ability to join together in forming Transportation Development Districts.

The creation of a transportation district must be based on a planning study which contains these items:

- History and Project Need: The actions that precipitated the need for improvements and the transportation studies which support the recommended improvements and partnership.

- Description of Proposed Project: A base map illustrating the proposed district and improvements included in the description of the project.
- Cost of Proposed Project: The total cost of the project, breakdown of costs for the individual improvements, timeframe, priorities of improvements and individual expenditures from the participating agencies, i.e., PennDOT and municipality.
- Plan of Financing and Method of Assessment: A list of possible financing options which will be used to finance the improvements. Also, an indication of who will be assessed in order to finance the projects and the formula that will be used to determine the assessment.

Act 47 allows municipalities to create transportation development districts to assist in the financing of transportation facilities and services. Roads, railroads, public transit, waterways and airports are included in the Act as eligible items.

The principal value behind the Partnership Act is that it enables municipalities and municipal authorities to use any of the following funding mechanisms from both public and private sources:

- Assessments upon business properties;
- Assessments upon each benefitted properties;
- Proceeds from any tax otherwise permitted by law;
- Notes and bonds; and,
- Grants, gifts or donations.

When an assessment is made on a property owner, the assessment must be "fair and reasonable" and there shall be no exception given to any affected property.

The proceeds collected are to be used only for new or improved transportation facilities and services and should not exceed the total costs identified in the district's multi-year transportation program.

This legislation enables municipalities to combine Act 47 with the following statutes to make the district more effective: Business Improvement Act; Municipal Authorities Act; and other financial legislation.

If property owners who represent more than 50 percent of the assessed valuation within the proposed district formally object, the district cannot be created.

A plan of the district must be submitted to the county and the designated metropolitan planning organization. This enables the plan to be reviewed and incorporated in the county-wide and regional Transportation Improvement Program. The improvements can then be included in the state's Twelve Year Program.

The Transportation Partnership Act may not work in every situation. It is evident from previous partnerships that a district works best when formed in a concentrated business corridor. The Route 29 corridor in East Whiteland and Tredyffrin Townships is a good example.

Partnerships created under the provisions of Act 47 can be more effective and in some cases more flexible when used in conjunction with other statutes as described above.

Because of certain provisions of Act 47 related to public input, it is essential that public and private sector interests be included in every aspect of the formation of a partnership district.

Public Private Transportation Partnerships (Act 88)

The following is PennDOT's Fact Sheet regarding Public Private Partnerships (P3):

Act 88 of 2012 authorizes public private transportation projects in Pennsylvania. This tool will allow PennDOT and other transportation authorities and commissions in the state to enter into agreements with the private sector to participate in the delivery, maintenance and financing of transportation-related projects.

What is a P3 Project?

A P3 project is a contractual agreement between a public entity and private entity that:

- Transfers the responsibility of a facility's engineering, construction, operation and/or maintenance to the private sector for a defined period of time;
- Allows the private sector to perform by contract a service previously provided by the public sector; and
- Ensures the private firm receives payments either from existing revenue sources or through the collection of new tolls or user fees.

The two basic P3 project types are:

- New Build Facilities – Adding capacity to the system by building something new.
- Existing Facilities – Improving capacity or performance of the current system through a P3 arrangement.

Public Private Transportation Partnership Board:

- Purpose: To approve potential Public-Private Transportation Projects;
- 7 Members include:
    - The Secretary of Transportation (Chair);

- The Secretary of Budget;
- Governor's Appointee; and,
- Four Legislative Appointees (one from each caucus).

- Must meet and report its actions to the General Assembly at least annually; and
- Must adopt guidelines for receiving and reviewing solicited and unsolicited proposals.

For more information, please refer to the ***PennDOT P3 webpage***.

Zoning Ordinance

The establishment of zoning regulations has a direct relationship to the transportation network of a community, because it is the distribution and density of land uses which generates the travel demands on the transportation system. By carefully considering the transportation impacts of zoning districts, a community can actually impact future traffic patterns. Municipalities can improve traffic flow, reduce congestion and save the costs associated with new road construction by adjusting their current zoning, if necessary.

Typically, there are several elements of a zoning ordinance that can assist in integrating circulation and land use. They are:

1) Zoning districts

- Permitted uses; and,
- District location based on highway functional classification.

2) Bulk and area requirements

- Lot area;
- Setbacks;
- Bulk; and,
- Coverage.

3) Environmental considerations

- Landscaping;
- Screening;
- Buffering; and,
- Open space.

4) Parking

- Off-street parking;
- Number of parking spaces;
- Shared parking;
- Bicycle parking;
- ADA accessible parking;
- Ingress/egress to parking facilities; and,
- Landscaping of parking facilities.

These elements have an impact on the circulation network of a community in a variety of fashions including:

- Determining the potential number of vehicular trips;
- Establishing the amount, location and size of parking;
- Determining the length of the road network and the width of individual roads;
- Mitigating impacts by buffering land uses from highway operation;
- Impacting the operation of adjacent roadways; and,
- Affecting the potential for providing public transportation.

Different zoning techniques allow municipalities to develop strict performance standards. Innovations for linking transportation to land use include the use of bonus or incentive zoning, whereby density bonuses may be granted if a developer provides improvements such as constructing a transit center, operating an employee shuttle service, or locating adjacent to a regional rail station. An overlay zone or a special district may be created at an intersection, interchange or around a rail station, to allow more intense and efficient use of land, a unique mix of uses, or to require the provision of certain amenities. Planned Residential Development (PRD) zoning is used to encourage coordinated, mixed-use development of larger tracts of land while permitting more creativity and flexibility.

One of the most essential techniques used to integrate circulation and land use includes the locating of zoning districts according to the highway functional classification. Zoning districts and permitted uses must be compatible with the intended function of individual roads. For example, a zoning district which would allow a regional retail facility should be located near an interchange of a limited access highway or along an arterial road. This would focus the traffic on the higher classification of roads rather than on collectors and local roads. This technique emphasizes the need to have an updated, accurate functional classification.

Using Transfer of Development Rights (TDR) or variations of TDR allows a developer to purchase the development rights from a landowner whose property lies within an area of a municipality where development is severely restricted. The development rights may be transferred into another area within the same municipality or from one municipality to another if the two municipalities have a joint municipal zoning ordinance. This allows development to occur in areas where it is more appropriate. The use of TDRs also discourages development in areas without appropriate infrastructure.

Another "hybrid" form of TDR can be used to acquire land as a road right-of-way. A developer or landowner can dedicate land for right-of-way and still develop the parcel at the same density, square footage or bulk as though the land for right-of-way was never subtracted from the original lot area of the parcel.

Performance zoning can have transportation applications. For example, in certain zones a higher density of development could be permitted if a project reduces its traffic volume through such items as a shuttle bus, ridesharing or increased pedestrian circulation. The emphasis on pedestrian circulation can be achieved through village type zoning. Performance zoning can be used to create an overlay district that might provide incentives for establishing public transit facilities or dedicating additional right-of-way width.

One method of trying to encourage alternative modes of travel is by limiting the amount of parking at new development. If a proposed development is located near public transit facilities or can be integrated into a pedestrian or bicycle network, then municipalities should consider ordinance requirements to limit the amount of parking. A plentiful supply of free parking only encourages more automobile travel.

Caution needs to be used with this technique. Some land uses require considerable parking regardless of the availability of other modes of travel. An inadequate supply of parking can have economic impacts on a business community and can lead to overflow parking into adjacent parcels or streets.

Setbacks are a transportation related function of zoning. They should be determined according to the functional classification of the road regardless of municipal boundaries and zoning districts. This allows a road to function properly by providing a uniform distance between all structures and the road. Uniform sight distances can lead to a larger safety zone which may lower the accident rate. Regional zoning or, at a minimum, regional cooperation can address such issues as uniform setbacks along specific transportation corridors.

Subdivision and Land Development Ordinance

By preparing and adopting site design standards within a subdivision ordinance, a municipality can provide specific guidance for the layout and construction of new developments. Municipalities should update their ordinances to reflect new techniques dealing with access management and safety issues.

There are several elements of a subdivision and land development ordinance that can help integrate multimodal circulation and land use. These elements are:

- Street classification and layout;
- Street width and length;
- Street alignments and grades;
- Sight clearance;
- Private streets and driveways;
- Curbs and sidewalks;
- Pedestrian; bicycle and public transit facilities;
- Driveways and intersections;
- Intersection spacing;
- Utility easements and drainage;
- Screening and landscaping;
- Right-of-way and ultimate right-of-way widths;
- Parking facilities; and,
- Guidelines for a traffic impact study.

An effective technique in integrating circulation and land use is the blending of highway functional classification into the land development and subdivision ordinance. Specific design standards are applied to roads to accommodate varying functions. Coordination of the standards at the state, county and municipal levels assures consistency in the design and function of roads.

Municipalities should change the requirements for measuring streets from cartway width to lane width. Using one value for all cartways does not allow for flexibility in street design. Cartway widths should be more flexible and site specific according to lot sizes, the desire or need for on-street parking, the functional classification of the road and the overall design of the subdivision.

Municipalities should consider requiring an ultimate right-of-way along major transportation corridors such as arterial and collector roads. Ultimate

rights-of-way serve two functions. Land is preserved for eventual acquisition and widening of the road. If building setbacks are applied from the ultimate right-of-way, they have the added function of protecting adjacent land uses by providing a buffer between structures and the widened road. See the **RIGHT-OF-WAY design element in Chapter 3** for more information.

Subdivision ordinances should allow flexibility in the area of building placement. Standards should be flexible enough to allow structures within a development to directly relate to the various transportation networks that serve that site including pedestrian, bicycle, vehicular and transit networks. For example, buildings in an office complex located along a public transit corridor should have minimum setbacks to encourage pedestrian links to the transit route. Greater use of transit can reduce the overall parking demand.

Pedestrian circulation standards should be established in the ordinance for sidewalks, pathways, bikeways, and transit facilities such as bus stops or shelters. Sidewalk standards should comply with the Americans with Disabilities Act. Specific design standards should be provided along with recommendations on how to interconnect different land uses. For example, sidewalks should be provided to schools and high pedestrian traffic generators.

Municipalities may find it difficult to require a walking or bicycle path that interconnects with other properties when no complete pathway system exists. An official map can be used to designate a particular non-vehicular circulation system and require developers and land owners to interconnect. This same system can be used to identify specific roads and adjacent parcels of land that should be required to provide accommodations for transit vehicles.

Intersections need to be addressed in subdivision ordinances. Every intersection contains several potential vehicular conflicts. The conflicts can be alleviated by providing adequate sight distances. Ordinances should provide specific criteria for intersection sight distance and clear sight triangle. Both are illustrated in the **Chapter 3 INTERSECTIONS** design element.

A uniform sign program should be maintained not only at major intersections but at intersections within subdivisions. Uniformity is useful for simple location purposes but more importantly for emergency 911 services.

Ordinances need to provide standards which are consistent with the provisions of PennDOT's Liquid Fuels program. If a road is constructed to specifications that are not consistent with PennDOT standards, the municipality will not receive Liquid Fuels funds to maintain that road.

Bibliography

Publications

American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, 6th Edition *https://bookstore.transportation.org/collection_detail.aspx?ID=110*

AASHTO, Guide for the Development of Bicycle Facilities *https://bookstore.transportation.org/Item_details.aspx?id=1943*

AASHTO Guide for Park-and-Ride Facilities, 2nd Edition *https://bookstore.transportation.org/item_details.aspx?id=121*

AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities *https:\bookstore.transportation.org\item_details.aspx?id=119*

Airport Corridor Transportation Association, Rethinking the Suburban Bus Stop *http://www.landscapes2.org/transportation/circulation/pdf/Rethinking-TheSuburbanBusStop.pdf*

Airport Corridor Transportation Association, Safety & Security at Suburban Bus Stops *http://www.landscapes2.org/transportation/circulation/pdf/SafetySecurity-SuburbanBusStops.pdf*

Alta Planning & Design, Cycle Tracks: Lessons Learned *http://www.landscapes2.org/transportation/circulation/pdf/ALTA-Cycle-Track-Lessons-Learned-Study.pdf*

American Public Transportation Association, Design of On-street Transit Stops and Access from Surrounding Areas *http://www.apta.com/resources/hottopics/sustainability/Documents/APTA%20SUDS-RP-UD-005-12%20On%20Street%20Transit%20Stops.pdf*

Chester County, Landscapes2: Chester County Comprehensive Policy Plan *http://www.landscapes2.org/ls2online/ls2document.pdf*

Chester County, Passenger Rail Stations Technical Memorandum, January 2005 *http://www.chesco.org/DocumentCenter/View/2586*

Chester County, Public Transportation Plan *http://www.landscapes2.org/publications/transportation/PubTransPlan.cfm*

Chester County, Road Functional Classification Technical Memorandum, June 2004 *http://www.chesco.org/DocumentCenter/View/2587*

Chester County, Trail and Path Planning Guide *http://www.chesco.org/DocumentCenter/View/415*

Delaware Valley Regional Planning Commission (DVRPC), The Automobile at Rest: Toward Better Parking Policies in the Delaware Valley ***http://www.dvrpc.org/asp/pubs/publicationabstract.asp?pub_id=08081A***

Duany Plater-Zyberk & Company SmartCode (Version 9.2) see also ***http://www.dpz.com/uploads/Books/SmartCode-v9.2.pdf***

Federal Highway Administration (FHWA), Manual on Uniform Traffic Control Devices (MUTCD) ***http://mutcd.fhwa.dot.gov/***

FHWA, Memorandum regarding Bicycle and Pedestrian Facility Design Flexibility, August 20, 2013 ***http://www.chesco.org/DocumentCenter/View/33695***

FHWA, Technical Summary on Roundabouts (FHWA-SA-10-006) ***http://safety.fhwa.dot.gov/intersection/roundabouts/fhwasa10006/***

Illuminating Engineering Society of North America (IESNA) Lighting Handbook, ***http://www.ies.org/handbook/***

IESNA, Roadway Lighting ***http://www.ies.org/store/product/roadway-lighting-ansiies-rp814-1350.cfm***

Initiative for Bicycle and Pedestrian Innovation at the Center for Transportation Studies, Bicycle Boulevard Guidebook, ***http://www.pdx.edu/ibpi/sites/www.pdx.edu.ibpi/files/BicycleBoulevardGuidebook%28optimized%29.pdf***

Institute of Transportation Engineers (ITE), Parking Generation and Guidelines for Parking Facility Location and Design: A Recommended Practice ***http://www.ite.org/tripgeneration/parking.asp***

ITE, Designing Walkable Urban Thoroughfares: A Context Sensitive Approach ***http://library.ite.org/pub/e1cff43c-2354-d714-51d9-d82b39d4dbad***

Pennsylvania Act 47 of 1985 as amended: Transportation Partnership Act ***http://www.legis.state.pa.us/WU01/LI/LI/US/PDF/1985/0/0047..PDF***

Pennsylvania Act 88: Public-Private Transportation Partnerships ***http://www.penndot.gov/ProjectAndPrograms/p3forpa/Documents/Full%20Act%2088%20Text.pdf***

Pennsylvania Code, Title 67, Chapter 212, Official Traffic Control Devices ***http://www.pacode.com/secure/data/067/chapter212/chap212toc.html***

Pennsylvania Code, Title 67, Chapter 441, Access To and Occupancy of Highways by Driveways and Local Roads ***http://www.pacode.com/secure/data/067/chapter441/067_0441.pdf***

Pennsylvania Code, Title 67, Chapter 445, Outdoor Advertising Devices
http://www.pacode.com/secure/data/067/chapter445/chap445toc.html

Pennsylvania Code, Chapter 33, Rules of the Road
http://law.justia.com/codes/pennsylvania/2010/title-75/chapter-33

PennDOT, Access Management: Model Ordinances for Pennsylvania Municipalities Handbook, Publication 574
http://www.dot.state.pa.us/public/PubsForms/Publications/PUB%20574.pdf

PennDOT, Bicycle and Pedestrian Checklist – Design Process
http://www.dot.state.pa.us/public/PubsForms/Forms/D-310.pdf

PennDOT, Design Manual 2 – Chapter 2 –Design Elements ***http://www.dot.state.pa.us/public/Bureaus/design/PUB13M/Chapters/Chap02.pdf***

PennDOT, Design Manual 2 – Chapter 5 – Lighting ***http://www.dot.state.pa.us/public/Bureaus/design/PUB13M/Chapters/Chap05.pdf***

PennDOT, Design Manual 2 – Chapter 6: Pedestrian Facilities and the Americans with Disabilities Act ***http://www.dot.state.pa.us/public/Bureaus/design/PUB13M/Chapters/Chap06.pdf***

PennDOT, Design Manual 2 – Chapter 16: Bicycle Facilities ***http://www.dot.state.pa.us/public/Bureaus/design/PUB13M/Chapters/Chap16.pdf***

Pennsylvania Department of Transportation (PennDOT), Guidelines for the Design of Local Roads and Streets, Publication 70M ***http://www.dot.state.pa.us/public/bureaus/design/pub70m/incover.pdf***

PennDOT, Mid-block crosswalk engineering and traffic study ***http://www.dot.state.pa.us/public/PubsForms/Forms/TE-113.pdf***

PennDOT, Pavement Markings and Signing Standards TC-8600 and TC-8700, Publication 111 ***http://www.dot.state.pa.us/public/PubsForms/Publications/PUB%20111.pdf***

PennDOT, Pavement Policy Manual, Publication 242 ***http://www.dot.state.pa.us/public/PubsForms/Publications/PUB%20242.pdf***

PennDOT, Pedestrian Facilities Pocket Guide ***http://www.dot.state.pa.us/public/Bureaus/design/ADA/PocketGuide.pdf***

PennDOT, Pennsylvania's Traffic Calming Handbook, Publication 383
http://www.tcrpc-pa.org/Planning-Toolkit/Transportation/Documents/Pennsylvania%27s%20Traffic%20Calming%20Handbook.pdf

PennDOT, Policies and Procedures for Transportation Impact Studies Related to Highway Occupancy Permits ***http://www.dot.state.pa.us/public/Bureaus/BOMO/MC/FinalTISGuidelines.pdf***

PennDOT, Project Level Highway Traffic Noise Handbook, Publication 24 ***http://www.paturnpike.com/constructionprojects/mpA20toA31/lib/pdf/PUB24.pdf***

PennDOT, Smart Transportation Guidebook ***http://www.state.nj.us/transportation/community/mobility/pdf/smarttransportationguidebook2008.pdf***

PennDOT, Specifications, Publication 408 ***http://www.dot.state.pa.us/Internet/Bureaus/pdDesign.nsf/ConstructionSpecs408and7?readForm***

PennDOT, Traffic Engineering Manual, Publication 46 ***http://www.dot.state.pa.us/public/PubsForms/Publications/Pub%2046.pdf***

PennDOT, Traffic Signal Design Handbook, Publication 149 ***http://www.dot.state.pa.us/public/PubsForms/Publications/PUB%20149.pdf***

PennDOT, Traffic Standard Drawings, TC-8800 Series, Publication 148 ***http://www.dot.state.pa.us/public/PubsForms/Publications/PUB%20148.pdf***

PennDOT, Transportation Impact Fees: A Handbook for Pennsylvania's Municipalities ***http://www.dot.state.pa.us/public/Bureaus/Cpdm/ImpactFees.pdf***

PennDOT, Sound Decisions About Highway Noise Abatement ***https://www.patpconstruction.com/mpa31toa38/library/SoundDecisions.pdf***

Philadelphia Parks & Recreation, Recommended Street Tree List ***http://www.phila.gov/ParksandRecreation/environment/Documents/PPR%20Approved%20Street%20Tree%20List.pdf***

Southeastern Pennsylvania Transportation Authority (SEPTA), SEPTA Bus Stop Design Guidelines, 2012 ***http://septa.org/strategic-plan/reports/SEPTA-Bus-Stop-Design-Guidelines-2012.pdf***

Spillar, Robert J., P.E., Lead Transportation Engineer, Parsons Brinckerhoff Quade & Douglas, Inc., Park-and-Ride Planning and Design Guidelines, October 1997 ***http://cdn.wspgroup.com/8kzmue/park-and-ride-planning-and-design-guidelines.pdf***

Transportation Research Board, Highway Capacity Manual ***http://hcm.trb.org/?qr=1***

Transportation Research Board, National Cooperative Highway Research Program (NCHRP) Report 672: Roundabouts: An Informational Guide ***http://www.trb.org/Main/Blurbs/164470.aspx***

Urban Land Institute, Residential Streets ***http://uli.bookstore.ipgbook.com/residential-streets-products-9780874208795.php***

Websites

Brandywine Conservancy: Native Plants
http://www.brandywine.org/conservancy/landowner-resources/support-your-local-ecosystem-replacing-invasive-species-right-native

Chester County Landscapes2: ***http://www.landscapes2.org/***

Federal Highway Administration (FHWA): Bicycle and Pedestrian Design Guidance ***http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/index.cfm***

FHWA: Pedestrian and Bicycle Information Center
http://www.pedbikeinfo.org/

National Association of City Transportation Officials (NACTO) – Urban Bikeway Design Guide ***http://nacto.org/cities-for-cycling/design-guide/***

Pennsylvania Municipalities Planning Code, Article IV: Official Map
http://mpc.landuselawinpa.com/mpc_full4.html

Pennsylvania Department of Conservation and Natural Resources (PA DCNR): Planning Project Forms and Guidance Documents ***http://www.dcnr.state.pa.us/brc/elibrary/forms/planningforms/index.htm***

PA DCNR: Emerald Ash Borer
http://www.dcnr.state.pa.us/forestry/insectsdisease/eab/

PennDOT: Bicycle and Pedestrian Information Page
http://www.penndot.gov/ProjectAndPrograms/RoadDesignEnvironment/RoadDesign/Bike%20and%20Pedestrian/Pages/default.aspx#.VzOLVOIrJhE

PennDOT: Roundabouts ***http://www.penndot.gov/ProjectAndPrograms/RoadDesignEnvironment/RoadDesign/Pages/Roundabouts.aspx#.VzOLc-IrJhE***

PennDOT: Public Private Partnerships Office
http://www.penndot.gov/ProjectAndPrograms/p3forpa/Pages/default.aspx#.VzOLkeIrJhE

US Access Board Guidelines and Standards
http://www.access-board.gov/guidelines-and-standards

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