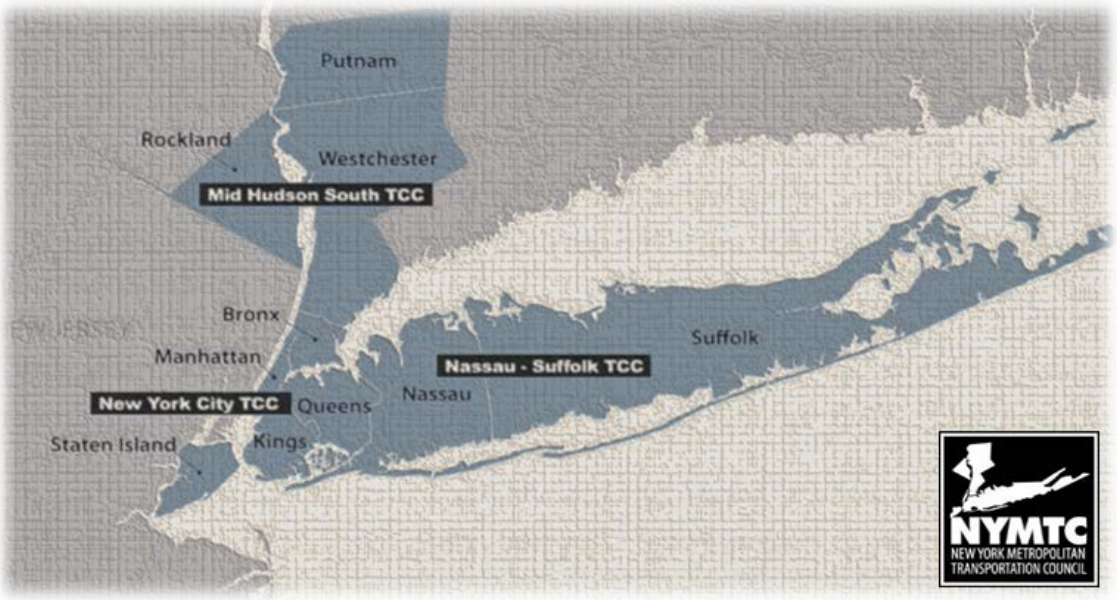
Vertical Integration of Transportation and Land Use in NYMTC Region:

I-287 Corridor Case Study

September 11th Memorial Fellowship Program



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How is Land Use regulated?

Basics for local regulations

In most states land use decisions are made locally by governmental review boards and elected officials. States DOTs typically defer to local governments on land use issues. However, DOTs may have review authority when the development involves access to a state highway or causes traffic impacts on a state highway. By providing transportation facilities and services -- be it through building highways, providing grants for local transportation improvements, or aiding transit services -- a state DOT affects land use patterns in many ways. Similarly, all development and land use decisions will ultimately affect travel patterns and, thus, influence the decisions made by state transportation officials regarding project planning and programming. Transportation is irrevocably tied to land use and land development.

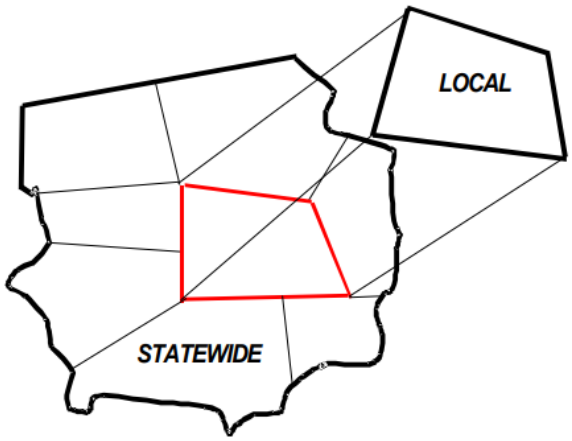

Figure 1. Local vs State

State Land Use Planning Capabilities

A state can provide a range of capabilities to assist local agencies, depending on how involved they want to be in the planning process. As shown in figure 2, these activities would range from providing data collection services for local government (at the passive end), to the utilization of sophisticated land use models and basic research (at the active end). The purpose of transportation/land use models is to predict the future impact of transportation investments on land use. Some of the states using transportation/land use models are Oregon and New Jersey. Intermediate state services would include helping with Geo Spatial Data Bases, policy research and economic forecasting. Also, county can be classified as an intermediate level between local and state governments.

Land Use Controls

Land use control[1] initiatives by states encompass a broad range of authorities from simply including a topic in transportation plans or environmental impact statements to completely controlling land use. The various options available to a state involve different degrees of participation by state and local agencies in project-level control of land use and mitigation of the project's environmental impacts, land use control in environmentally sensitive areas, sustainable growth policies, scenic easements, agricultural and open space preservation, growth management and control of large scale developments. Sustainable growth policies bias the provision of state infrastructure to designated growth areas following state mandated land use plans.

[1] https://thismatter.com/money/real-estate/land-use-controls.htm

For example, the state of Maryland restricts the expenditure of state highway funds to areas designated for development according to local plans that have been written using state guidelines. Florida, Oregon and New Jersey have adopted growth management programs. Development of regional impacts controls, such as those used in Florida, require a developer to demonstrate that sufficient infrastructure exists before proceeding with the project.

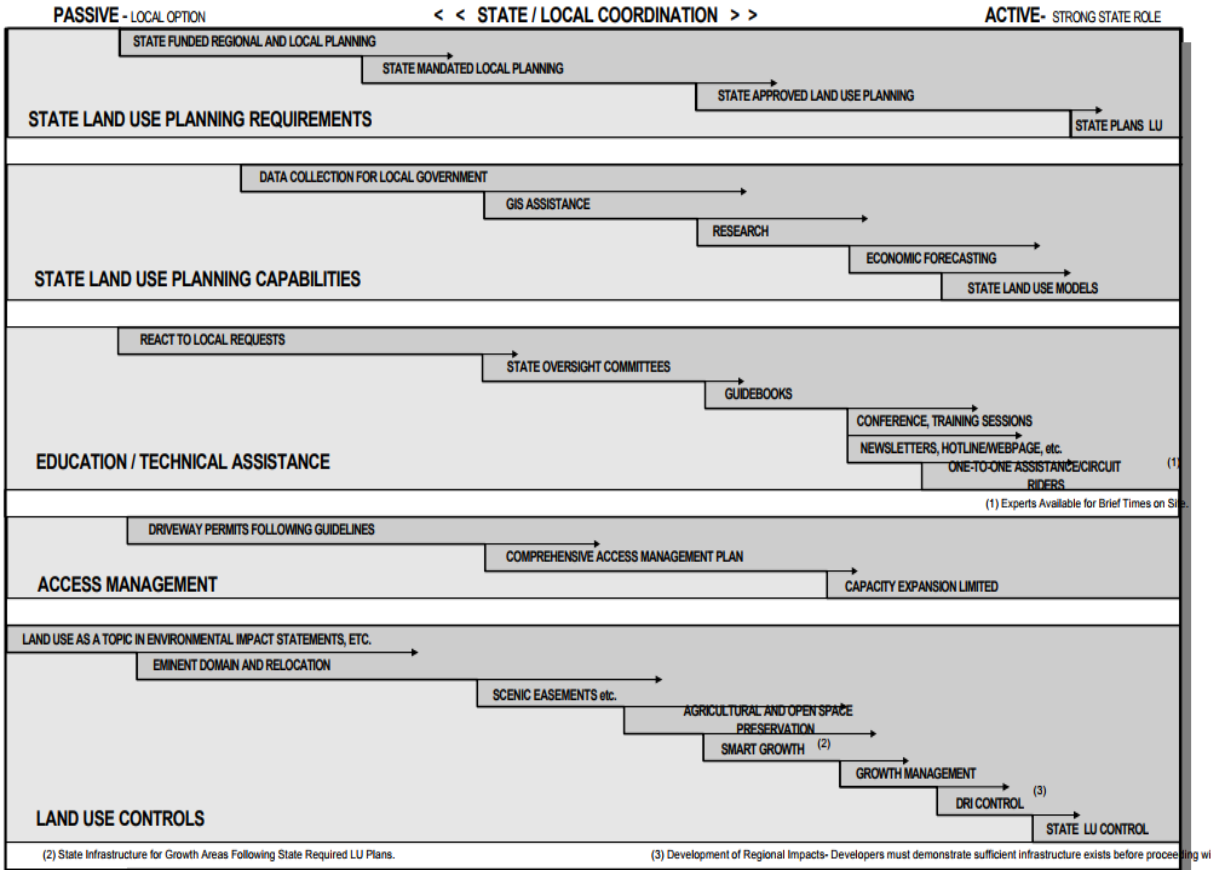

Figure 2. Land use controls

The use of the chart is illustrated by an example of a hypothetical state. In each of the various categories, the state is doing the following. Land use controls consists of government ordinances, codes, and permit requirements that restrict the private use of land and natural resources, to conform to public policies. There are several types of land-use regulations, including subdivision regulations, zoning, building codes, housing codes, curve-cut permit systems, historic preservation laws, and tree cutting laws. The primary public land-use control is zoning, where properties of the same type, such as residential or commercial, are designated for geographic zones. The primary private land-use control is **deed restrictions**, limiting what can be done on the property by the owner. The primary purpose of land-use controls is to limit population density, noise, pollution, and to maintain the aesthetics of the neighborhood.

Legality for Land-Use Controls

The 14th amendment prevents states from depriving people of property or interfering with its use, without due process of law. The United States Constitution delegates the police power to the states, allowing them to issue regulations to protect public health, safety, and welfare.

The 5th amendment of the U.S. Constitution also has a takings clause that states private property cannot be taken for public use, without just compensation. Hence, if property is condemned because the government wants to exercise eminent domain, then the owner must be compensated. Similarly, a landowner may bring

an inverse condemnation action, seeking compensation for the devaluation of his land because of a public taking of adjacent land. For instance, a major highway built near residential units will likely devalue those properties.

Zoning determines:

- Permitted uses for each parcel of land
- Lot sizes
- Types of structures
- Building heights
- Setbacks, being the minimum distance between structures on the property and streets or sidewalks
- Density, either population density or the amount of structures per unit area of land
- Style and appearances of structures
- Protection of natural resources.

Zoning ordinances:[1]

- Must be exercised in a reasonable manner
- Be clear and specific
- Be nondiscriminatory
- Apply to all property in a similar manner
- Promote public health, safety, or the general welfare under the state's police power

New York State Municipal Survey

Rural municipalities challenges:

- Frequent turnover of elected and appointed officials,
- Geographic isolation,
- Fiscal and time constraints,
- Insufficient availability of technical assistance.

Major Land Use Tools:

- Written Comprehensive Plan (local government’s development guidebook)
- Zoning
    - Traditional or “Euclidean” zoning
    - Form-Based zoning
    - Performance zoning
    - Incentive zoning
- Subdivision Regulations,
- Site Plan Review
- Planning Board

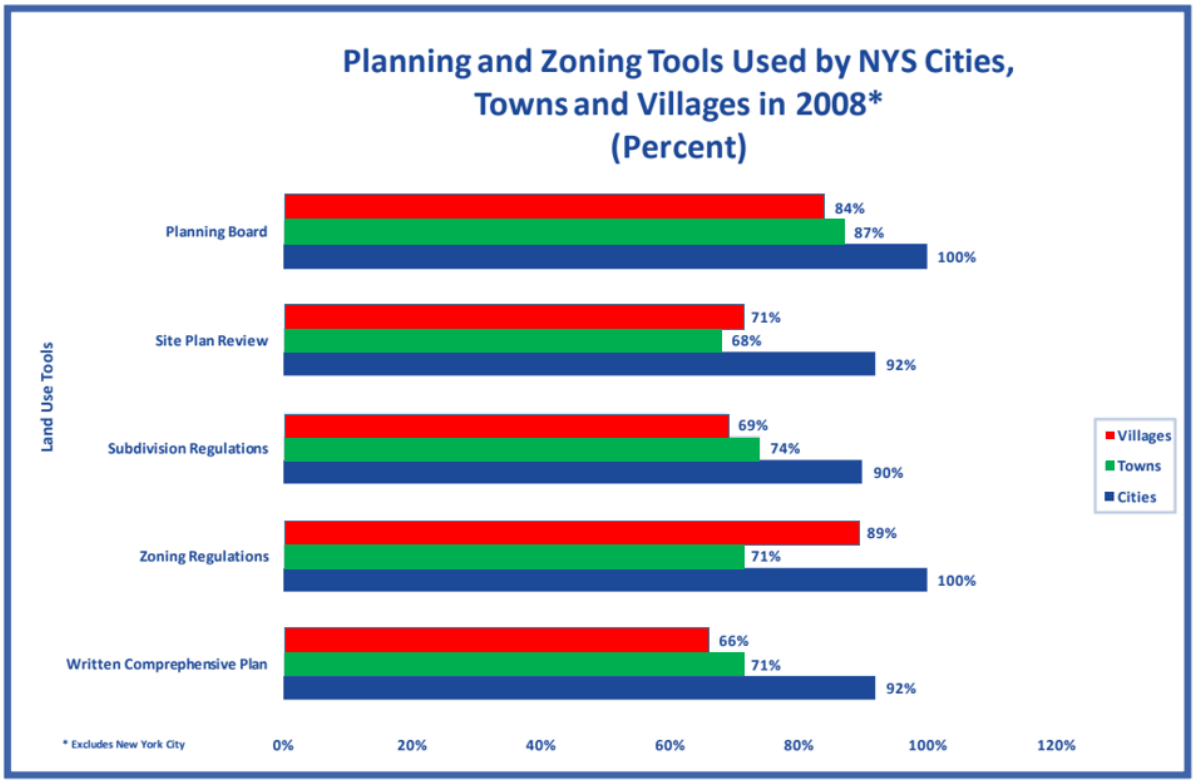

Figure 3. Survey of NYS land use planning and regulations 2008

If the NYS state were to be more active regarding land use transportation and planning, it could consider implementing state mandated local planning, where the state sets mandatory standards for comprehensive planning.

How is transportation planned?[2]

Transportation planning in metropolitan areas is a collaborative process, through the metropolitan planning organization (MPO). The process is designed to foster involvement by all interested parties, such as the business community, community groups, environmental organizations, and the public, through a proactive public participation process conducted by the MPO in coordination with the state department of transportation and transit operators. Transportation planning process includes:

- Forecasting future population and employment growth, as well as development;
- Identifying major growth corridors and analyzing, through detailed planning studies, various transportation improvements;
- Developing plans and programs to preserve and enhance the transportation system;
- Forecasting the impact of the transportation system on air quality within the region; and
- Developing a financial plan that covers operating costs, maintenance of the system, system preservation costs, and new capital investments.

[2] http://www.des.ucdavis.edu/faculty/handy/TTP220/MPOBriefingBook86.pdf

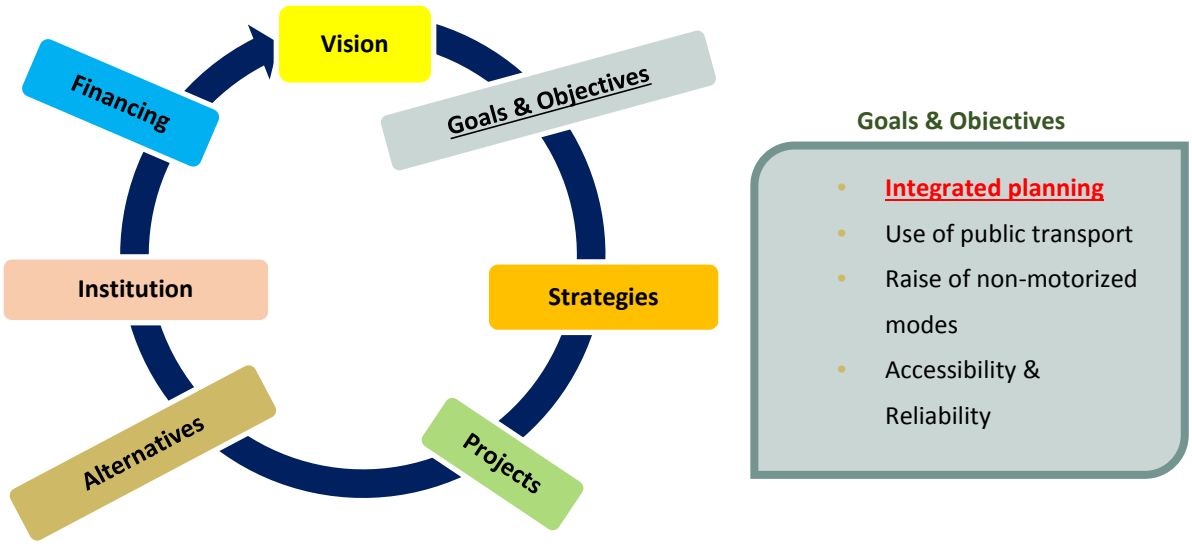

Figure 4. Transportation planning process

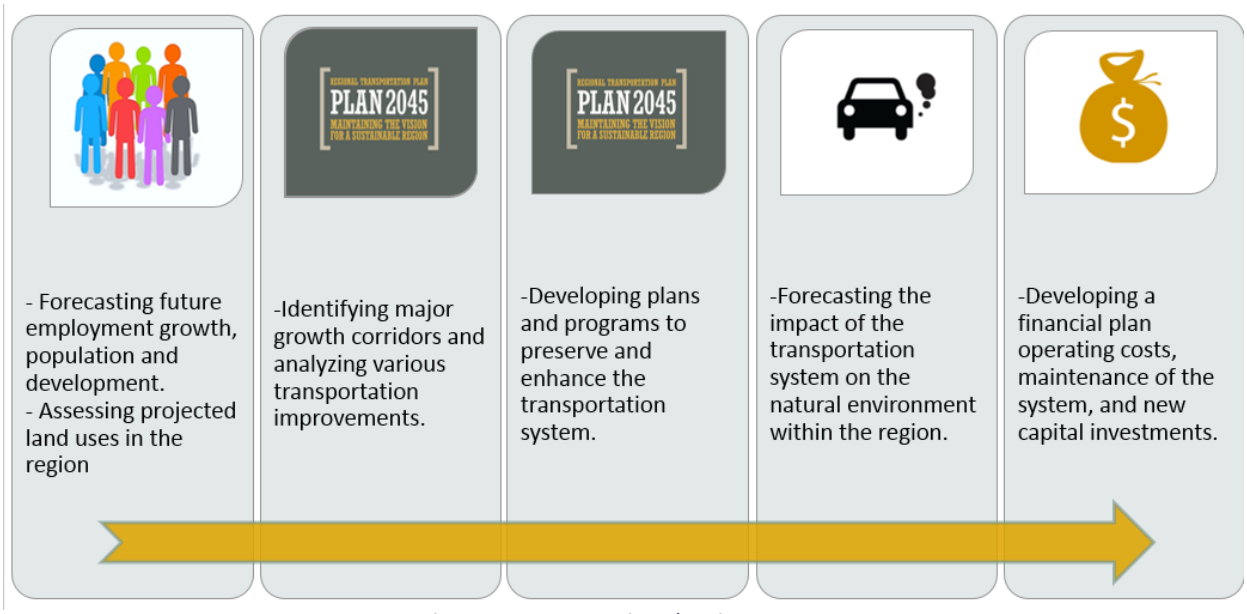

Figure 5. Transportation planning process

How is federal transportation funding provided to metropolitan areas?[3]

The funding for transportation plans and projects comes from a variety of sources including the federal government, state governments, public authorities, assessment districts, local government contributions, impact fees, and tolls. However, in most metropolitan areas, federal funding, transferred first to the state to be distributed to metropolitan areas, is the primary funding source for plans and projects. (See appendix for a description of the most important federally aided transportation programs.). Financing provisions are obtained through the Highway Trust Fund and supplemented by general funds. It is important to remember that most sources of federal funding are sent to and administered by the state DOTs , then they allocates the money to urban and rural areas, based on local priorities and needs. Most transit funds for urban areas are sent directly from the FTA to the transit operator. (Transit funds for rural areas are administered by the state DOT.)

What are the requirements for considering land use in the transportation planning process? [3]

Federal planning regulations place considerable importance on the link between transportation planning and land use, though there are no federal laws mandates for specific actions. According to the 1993 joint FHWA/FTA regulations for metropolitan and statewide planning, the metropolitan transportation planning process should consider "the likely effect of transportation policy decisions on land use and development and the consistency of transportation plans and programs with the provisions of all applicable short- and long-term land use and development plans...." The regulations also state that the plan itself should "reflect, to the extent that they exist, consideration of: the area's comprehensive long-range land use plan and metropolitan development objectives; national, state, and local housing goals and strategies; community development and employment plans and strategies...."

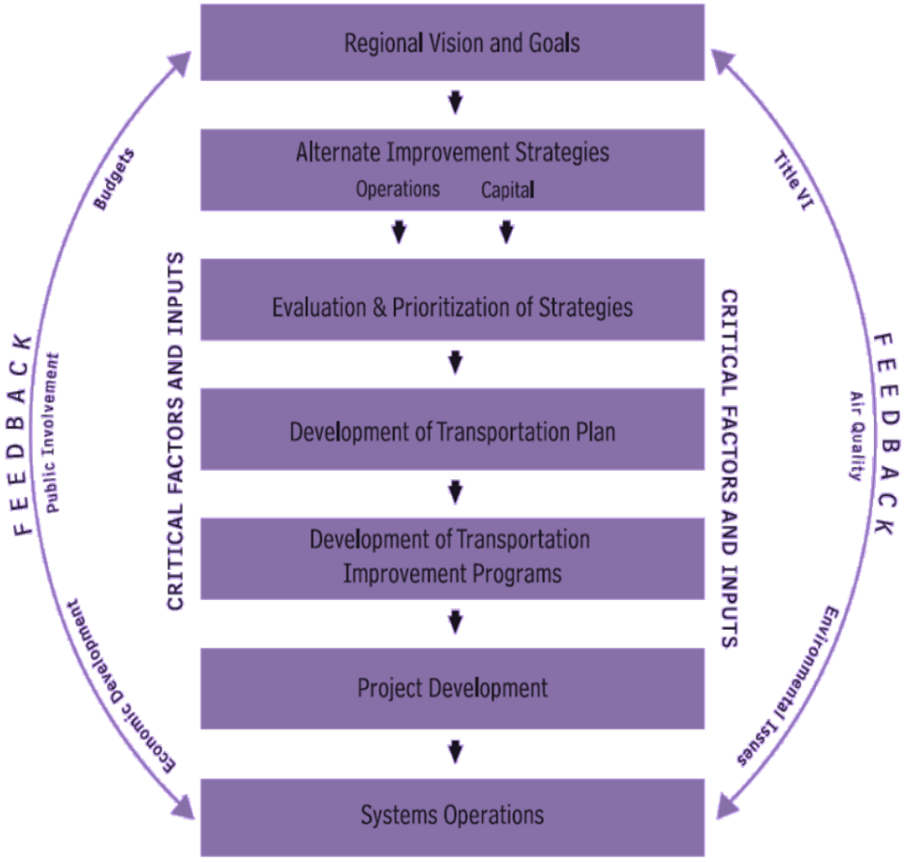

Figure 6. Transportation planning process

How do Transportation Agencies Cooperate and Coordinate?

In metropolitan areas, MPOs are responsible for actively seeking participation during the planning process from the public and all relevant transportation agencies and stakeholders, including the State and public transit operators.

Outside of metropolitan areas, state DOTs and Rural Planning Organizations (RPOs) are responsible for these activities in cooperation with local transportation officials from nonmetropolitan areas.

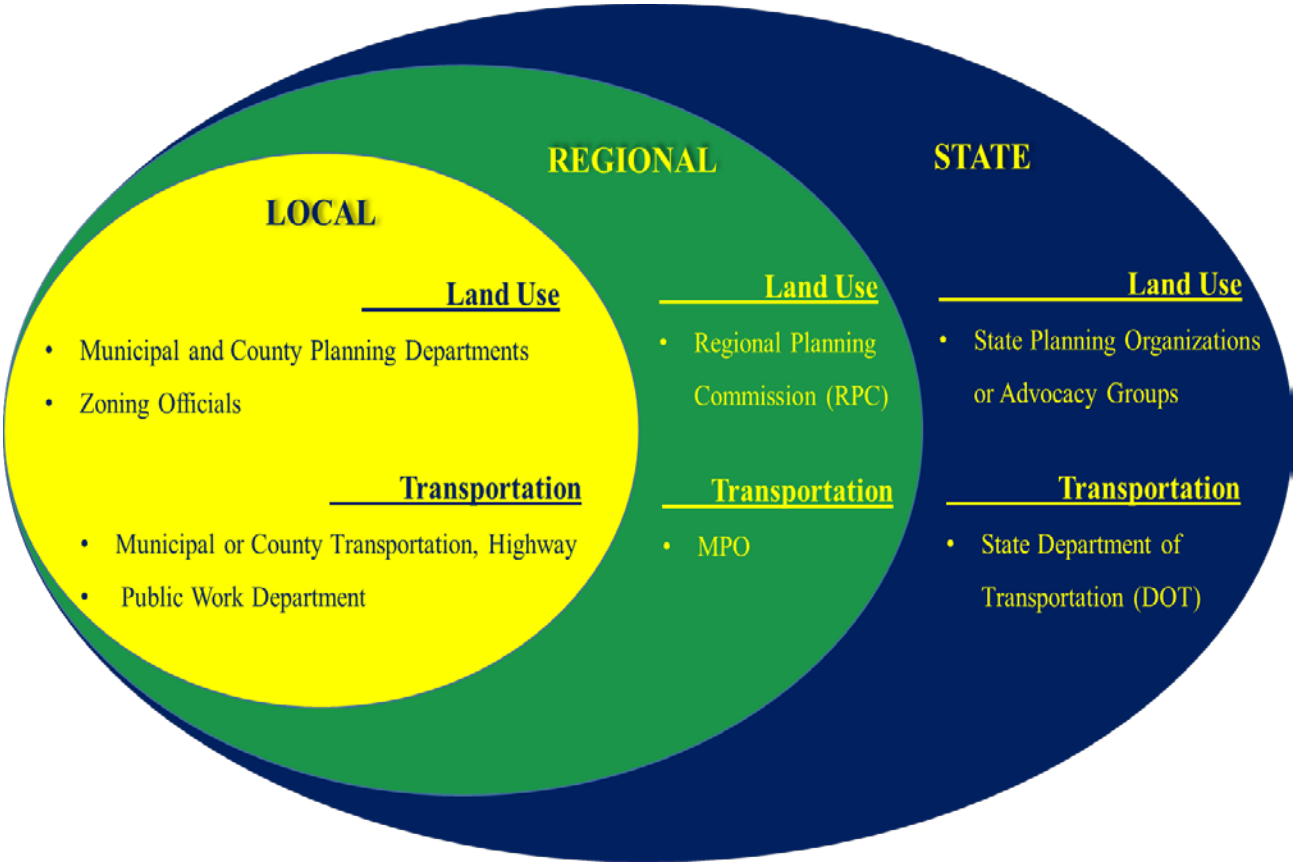

Figure 7. Land use – transportation hierarchy

- Local governments, derive land use planning and regulations authority from
  - state enabling legislation,
  - home rule provisions,
  - the state constitution,
  - municipal charter.

- Land use controls, such as zoning, are typically the responsibility of local governments, such as municipalities or counties.
- The level of authority exercised by these entities will vary depending on states' enabling legislation.

Many agencies are collaborating to prepare transportation plans.

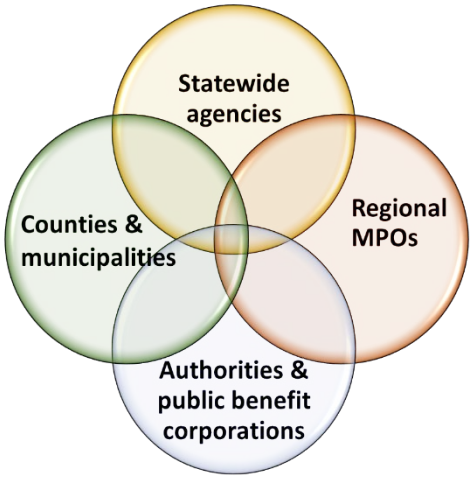

Figure 8. Agencies interaction

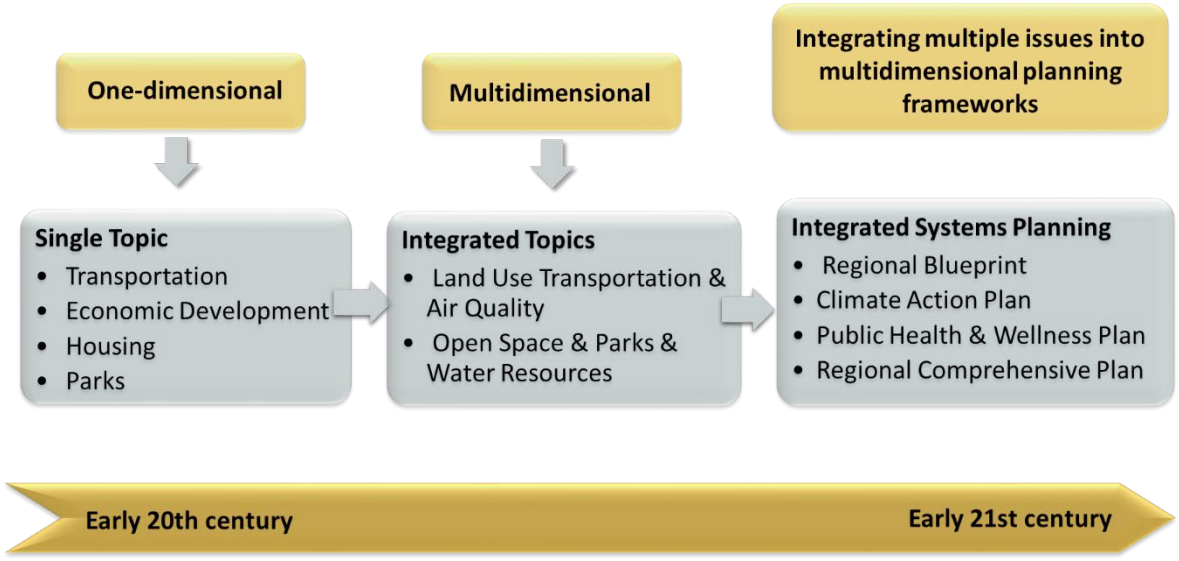

Figure 9. The Overall Evolution of Urban Planning Issues

Integrated planning

Challenges for Integrated Planning:[3]

Conflicting Institutions

- Different institutions have responsibility for different aspects of the domain
- transportation investments are coordinated by MPOs
- Land use plans are controlled by cities and within unincorporated areas by counties, as delegated by individual states.

Conflicting Scales

- Scale mismatch between different levels (local vs states and regional) and perspectives.

Conflicting Policies

- Conflicting policies at the federal level and state or local levels do not make the integration of land use and transportation planning any easier.

Lack of Coordinated Planning Process in Local or Regional Level can lead to:[4]

- Preventing the development and implementation of comprehensive, integrated plans addressing all related aspects of urban travel.
- Serious organizational problems and inefficiencies in, for example, the provision of public transport services.

Coordinated Planning Requirements[5]

- Identify current transportation providers and services
- Identify Service Gaps and Unmet Needs

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[3] *Integrated Land Use and Transportation Planning and Modelling: Addressing Challenges in Research and Practice https://www.researchgate.net/profile/Paul_Waddell/publication/237018507_Integrated_Land_Use_and_Transportation_Planning_and_Modelling_Addressing_Challenges_in_Research_and_Practice/links/02e7e51c8626718606000000/Integrated-Land-Use-and-Transportation-Planning-and-Modelling-Addressing-Challenges-in-Research-and-Practice.pdf*

[4] European Conference of Ministers of Transport (2001:p19)https://s3.amazonaws.com/academia.edu.documents/42836823/The_integration_of_land_use_planning_tra20160219-31463-hi3f87.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1510084190&Signature=Cz7bNKve6SEO4RKazrrNk3sOVuA%3D&response-contentdisposition=inline%3B%20filename%3DThe_integration_of_land_use_planning_tra.pdf

- Discuss and identify strategies to address those needs
- Prioritize Strategies
- Identify Stakeholders
- Conduct Outreach Activities (e.g. offer training for entities responsible for developing coordinated plans)
- Coordinate with Other Planning Processes
- Design and Administer Competitive Selection Process

Types of Policy Integration:[5]

- Vertical Integration—between different levels of government
- Horizontal Integration—between sectors or professions within one organization (i.e. inter-sectoral)
- Inter-territorial Integration—between neighboring authorities or authorities with some shared interest in infrastructure and/or resources
- Intra-sectoral Integration—between different sections or professions within one department (i.e. for transport sectors such as roads, public transport, cycling or walking)

Integrated Policymaking Depends on[5]

- organizational factors
- behavioral or individual factors
- political factors
- economic or financial factors
- process or instrumental factors
- contextual factors

Transportation and land use planning coordination ways:

- Ensuring that transportation strategies are adopted into the comprehensive plan;
- Adopting transportation policies into the zoning ordinance as development standards;
- Transportation agency review of site plans for developments that have an impact on traffic operations;
- Outreach to the public on planning outcomes;
- Partnership efforts with local agencies; financial incentives for local action to support the regional vision.

Examples of obstacles to policy integration between different levels of government

- Different Perspectives
  - Policy-makers vs the end-user of services
  - Different departments (e.g. transportation planning vs environmental planning)
- Weak or Perverse Incentives
  - There is little or no reward, for helping someone else to achieve their objectives
  - Recognition tends to be given to individuals skilled in perceptive policy analysis
  - Inter-sectoral working can mean significant costs falling on one budget while the benefits accrue to another
  - The skills required for successful inter-sectoral working are different from those required to promote a departmental brief
- Lack of management mechanisms
  - Mechanisms for reconciling conflicting priorities between sections can be weak
  - Appraisal systems are often incapable of identifying and rewarding a contribution to a successful inter-sectoral project, which reduce the incentive to work together effectively
- Professional and departmental culture
  - Departments tend to defend their budgets, which are generally allocated on a departmental or sectional basis, rather than to policies or functions, even where these overlap sectoral boundaries
  - Departmental objectives often take priority over corporate goals

What is the role of MPOs in land use and transportation?[2]

The role of the MPO prescribed by federal regulations and varies according to state and locality. In some areas, MPOs are responsible for reviewing local land use decisions considered regionally significant. In others, land use decisions are solely the prerogative of local officials. [5] Regardless of the MPO's role in decision making, transportation planners must make every effort to consider the comprehensive land use plans of the region and local jurisdictions, and create a constructive dialogue with land use officials. In that way, each group is informed of actions that might affect the other.

Role of Metropolitan Planning Organizations in Transportation Planning[6]

• The Intermodal Surface Transportation Efficiency Act of 1991, which authorized federal highway and transit funding programs, significantly expanded the role of MPOs in the transportation planning process. Under the legislation, MPOs received federal funding and state transportation officials were required to coordinate with MPOs on project prioritization for the first time. [7]

• Many MPOs are now responsible for influential planning documents such as the Unified Planning Work Program, which lists the planning studies and tasks the MPO will perform to support the planning process for a one- or two-year timeframe; the Metropolitan Transportation Plan, which every four or five years looks out 20 years to identify future goals, strategies and projects; the Transportation Improvement Program, also known as the Plan, which details transportation investments and strategies every four years; and the Public Participation Plan, a periodic review of public engagement strategies and goals. [8]

Not all MPOs are created equal.

• The geographical areas MPOs serve vary widely with the smallest covering 34 square miles and the largest covering 38,649. [9]

• The population sizes MPOs serve also vary widely with the smallest covering tens of thousands and the largest covering more than 18 million individuals.[10] Metropolitan transportation planning occurs only in urbanized areas with a population of 50,000 or greater.[11]

• Analysts have noted that the powers of MPOs often are limited simply to listing road projects and don't extend to the implementation of systematic, strategic transportation planning. Many lack the power to implement the transportation improvement plans they recommend.[12]

• In addition, many MPOs don't have sufficient geographic reach to be able to have an impact on a cohesive regional transportation plan.[10]

What is Vertical Integration of Land Use and Transportation?

Vertical integration involves attempts to integrate all facets of an operation in one spot.

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[5] MPOs have no authority over land use decisions (CDTC linkage program)

[6] THE COUNCIL OF STATE GOVERNMENTS. http://knowledgecenter.csg.org/kc/system/files/CR_metro_plan.pdf

[7] National Transportation Library. "Intermodal Surface Transportation Efficiency Act of 1991." Accessed from: http://ntl.bts.gov/DOCS/istea.html

[8] Federal Highway Administration. "The Transportation Planning Process Briefing Book." Accessed from: http://www.fhwa.dot.gov/planning/publications/briefing_book/part01.cfm#Toc420927567

[9] Federal Highway Administration/Federal Transit Administration. "Transportation Planning Capacity Building: Planning for a Better Tomorrow: Metropolitan Planning Organization Database." Accessed from: https://www.planning.dot.gov/mpo.asp

[10] Ibid

[11] United States Code. "Title 23 – HIGHWAYS, Chapter 1 – Federal-Aid Highways, Section 134 – Metropolitan transportation planning." Accessed from: http://www.gpo.gov/fdsys/pkg/USCODE-2013-title23/ html/USCODE-2013-title23-chap1-sec134.htm

[12] 7 William H. Hudnut III. "It's Time to Wake Up the Sleeping Giants." Citiwire.Net. July 31, 2009. Accessed from: http://citiwire.net/columns/its-time-to-wake-up-the-sleeping-giants/

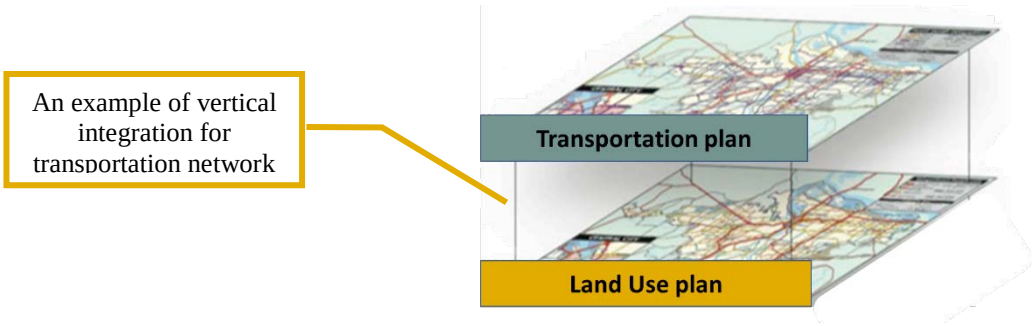

Figure 10. Vertical integration of land use and transportation

Integrating Land Use and Transportation Strategies

1. **Create specific funding programs for transportation projects that support community and land use goals**
   - San Francisco Metropolitan Transportation Commission's **MTC**
   - North Central Texas Council of Governments **NCTCOG** (2002-2004). Provided $41 million in STP and CMAQ funds for 19 transportation improvements supporting TODs and mixed-use developments.
2. **Include land use goals as part of scoring criteria for analyzing potential transportation projects**
   - Atlanta Regional Commission **ARC** (2025 Regional Transportation Plan). For federal STP funds included support of local land use, which can provide a maximum of 15 points out of 135 total.
   - Denver Regional Council of Governments DRCOG (2005-2010 TIP plan) Include up to 16 points (out of 100) for various local actions supporting the regional Metro Vision.
   - Puget Sound Regional Council's **PSRC** (2002 TIP plan)
3. **Transit Oriented Development (TOD) Projects**
   - TOD is regional planning, city revitalization, suburban renewal, and walkable neighborhoods combined.

Table 1. Transit oriented development

	New Development	Existing Development
New Transport	Self contained development anchored solely on a new transport node or corridor	Route or stop in an under-served or inaccessible area. Diversifying or changing land uses, increasing activity along side the new transport
Existing Transport	Infill development around an under utilised node or corridor	Improving capacity or quality of transport in under-served or inaccessible area. Diversifying or changing land uses, increasing activity along side the upgraded transport

4. **Node-place approach**
   - Developed in Netherland In 1999 and mostly used in Europe.
   - Is the process that assesses land use-transport networks in a comprehensive and integrated way and provides opportunities for both new and existing developments to better integrate.

- Nodes are densities of urban structure, and they consist of buildings, infrastructure & people. On a local level they are entities like buildings and blocks. On a regional level they are parts of a town, small towns or villages.
- Nodes are densities of urban structure, and they consist of buildings, infrastructure & people. On a local level they are entities like buildings and blocks. On a regional level they are parts of a town, small towns or villages.

The basic idea of Node-Place model is that improving the transport provision (or the node value) of a location will, by improving accessibility, create conditions favorable to the further development of the location. In turn, the development of a location (or an increase in its place value) will, because of a growing demand for transport, create conditions favorable to the further development of the transport system. Using Node-Place approach we can assess nodes value based on its place value. The Node-Place model distinguishes five ideal-typical situations for a target area (e.g. station area, highway exit area, etc.). Each situation reflects a relative position of a target area on the node and place scale, or, in other words, its position in the node or place hierarchy of an urban region.[13]

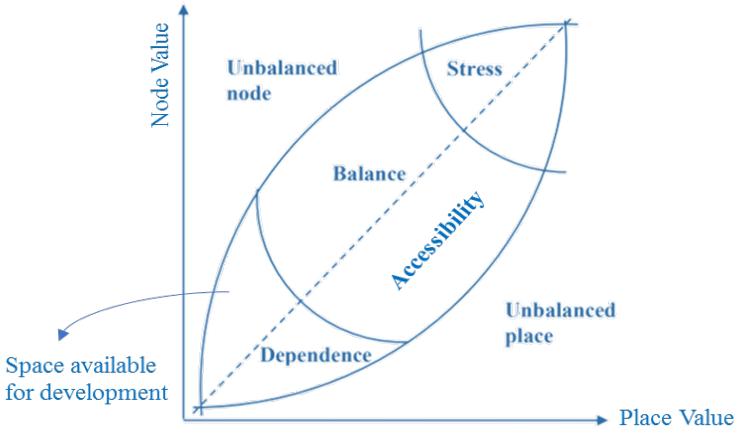

Figure 12. Node-Place model (Bertolini 1999)

Place= the urban activities
Node= the transportation supply

Each category has its own meaning:

1. Balance: A node and a place are as strong (found along the middle line).
2. Stress: locations where both the node and the place have been used to the fullest. The intensity of both mobility flows and urban activities are maximal (At the top of the line). Further development in these areas can become problematic as multiple claims on the limited amount of space can easily cause conflicts.
3. Dependence: Located at the bottom of the diagonal line. There is no competition for free space, and the demand of infra flows is so low. Both the node and the place values are relatively so weak that factors other than internal Node-Place dynamics (e.g. subsidization) must intervene for the area to sustain itself.
4. Unbalanced node: Located above the middle line. Where transportation systems are relatively much more developed than urban activities (e.g. a newly opened station on the urban fringe).

[13] Paul Chorus, Luca Bertolini An application of the node place model to explore the spatial development dynamics of station areas in Tokyo, doi: 10.5198/jtlu.v4i1.145

5. Unbalanced place: Located below the middle line. The urban activity is more intense than transportation supply. (e.g. old or ancient part of the city with low accessibility to transit system).

The unbalanced locations are the most interesting because they have, according to the model, the highest development potential (in terms of either land use or transport). However, the realization of this potential is not a certainty, but may be affected by other factors.[17]

Node and place Indicators

The node value is a measure for the:

- ✓ Accessibility of the locations
- ✓ Type of connections (by rail or road from all types)
- ✓ Number of directions connected

The place value is a measure for the:

- ✓ Intensity of the activities at the location
- ✓ Land Use diversity

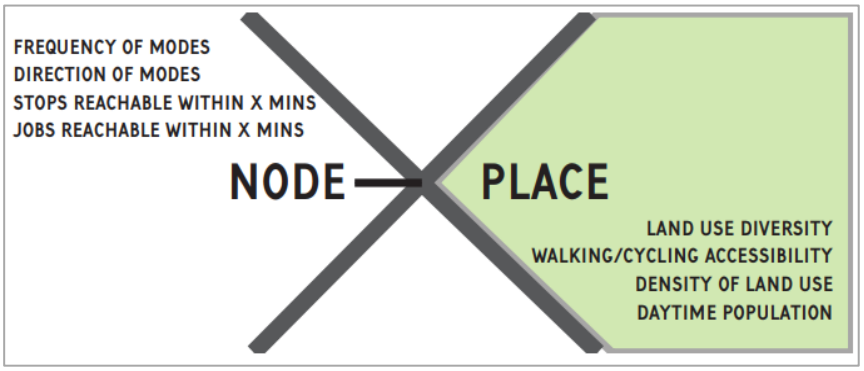

Figure 21. Node-Place indicators

Node-place Benefits

- •Deep collaboration between transport and land use planners.
- •Develop a strong base of evidence that provides decision makers and the public with a clear guide of how transport and land use work together.
- •Provide a robust basis for decision makers to distribute infrastructure/land use development or change according to their objectives.

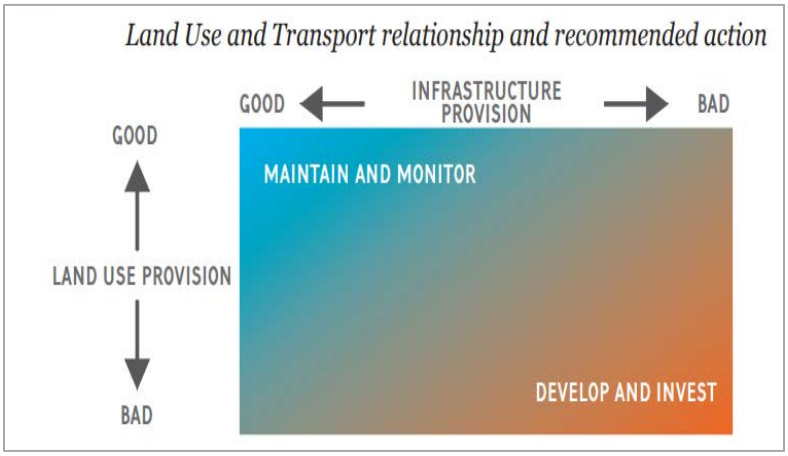

Figure 303. Node-Place relations

Case study (I-287 corridor CDEA)

There are Sustainable Development Centers in seven municipalities along with this corridor:

- Village of Tarrytown
- Village of Elmsford
- Town of Greenburgh
- City of White Plains
- Town of Harrison
- Village of Rye Brook
- City of Rye
- Village of Port Chester

To evaluate target areas with potential for future growth and development we focused on the areas close to the corridor in each municipality and review their land use plans to highlight the lots with further development potential (figure 15). Some municipalities have larger potential areas for future growth such as Tarrytown, Greenburg and village of Portchester.

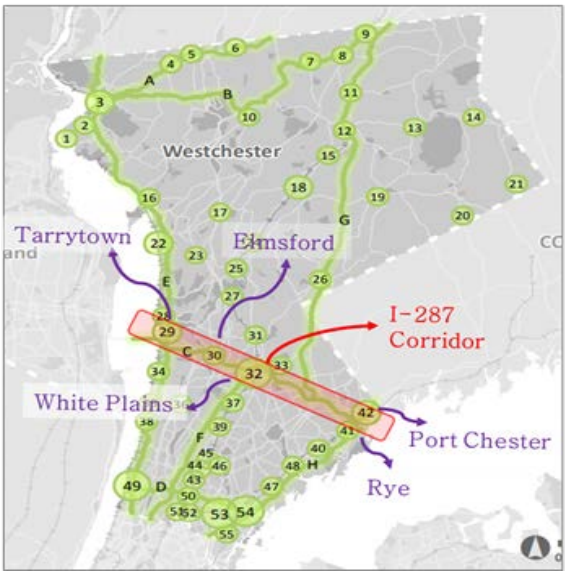

Figure 14. I-287 corridor (CDEA)

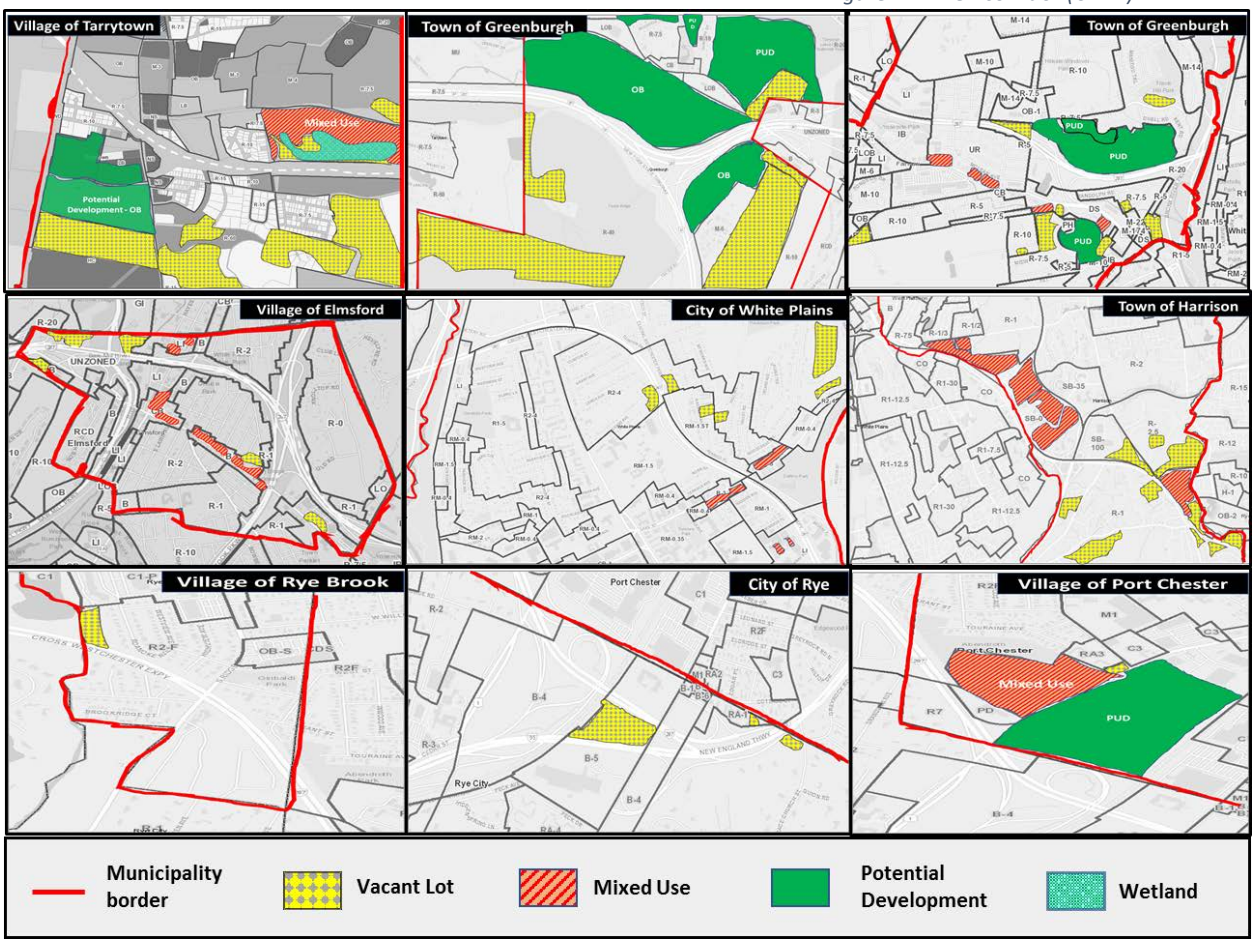

Figure 15. I-287 CDEA adjacent area-potential lots

To evaluate potential for future growth and development along with this corridor we apply Node-Place method to the areas close to the highway exits in each municipality. The aim of this approach is not to predict or advise a development path for the study area, but rather to gain a better understanding of development dynamics. The Node-Place model has been used to gain insight into the development dynamics of I-287 corridor areas in Westchester County. The present research utilizes the Node-Place model with its focus on the I-287 corridor exits and nearby surrounding areas as a tool in the development process. The node function describes the transport activity and connectedness of the area to other places of interest. The place function describes the quantity and diversity of possible activities near the corridor exit. Node-Place indicators are introduced in following table. The approach used by Reusser *et al.* (2008)[14] for Switzerland served as the reference for plotting results of the Node-Place model in this research.

Table 5. Indicators used to calculate node and place indices

Node Index

y_1 = Average Annual Daily Traffic (AADT)

y_2 = Number of highway lanes

y_3 = Connection to other highways

y_4 = Number of train station (within 15 min of travel)

y_5 = Number of bus lines (r < 1 mile)

y_6 = Land Use (Vacant lands and Mixed Use < 1 mile)

y_7 = *D*istance to next highway exit

Potential node Index*

Car parking capacity	No data available
Bicycle parking capacity	No data available
Bicycle access	No data available

Place Index

x_1 = Population (r < 1 mile)

x_2 = The number of workers in labor force

x_3 = Degree of functional mix

$$x_3 = 1 - \frac{\left(\left(\frac{a-b}{d}\right) - \left(\frac{a-c}{d}\right)\right)}{2} \quad \text{with} \quad \begin{cases} a = \max\{x_1, x_2\} \\ b = \min\{x_1, x_2\} \\ c = \frac{1}{2}(x_1 + x_2) \\ d = (x_1 + x_2) \end{cases}$$

The node and place indicators – y_i and x_i, respectively – were used as defined in the table. All indicators were log-transformed in order to reduce the skewness of their univariate distribution. Additionally, all indicators were rescaled to have a minimum of 0 and a maximum of 1 (Normalized). The node index was defined as the sum of all node indicators; the place index analogously as the sum of all place indicators. Before plotting the Node-Place diagram, the two indices were Z transformed in order to obtain comparable scaling (i.e., distances in the diagram are in standard deviation units). To inspect the proposed balance between node and place functions we tried to verify whether most highway exits lie along or tend to approach a diagonal between node and place index.

Figure 16 represent the results of the Node-Place analysis in the I-287 CDEA area. As it is clear highway exits are classified into five classes (balanced, stressed, dependence, imbalanced nodes and imbalanced places).

[14] Reusser, D., P. Loukopoulos, M. Stauffacher, and R. Scholz. 2008. Classifying railway stations for sustainable transitions – balancing node and place functions. Journal of Transport Geography, 16(3):191–202.
doi: 10.1016/j.jtrangeo.2007.05.004.

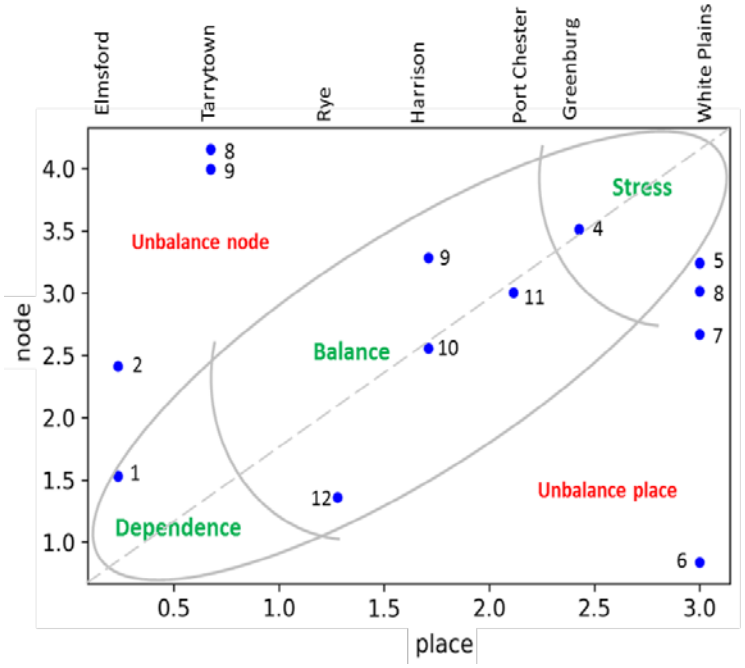

Figure 16. Node-Place results for I-287 exit in Westchester county.

Dependence area

Exit 1 located at Elmsford is belongs to the dependence class which shows there is no competition for free space, and the demand of infra flows is so low. Both the node and the place values are relatively so weak that factors other than internal Node-Place dynamics (e.g. subsidization) must intervene for the area to sustain itself. The area around this exit have very low AADT and population.

Stress area

Exit 4 located at Greenburg is placed in the stress category which means the intensity of both mobility flows and urban activities are maximal (At the top of the line). Further development in these areas can become problematic as multiple claims on the limited amount of space can easily cause conflicts. This exit has the highest AADT and is one of the most populated areas among other exits studied in this report.

Balanced area

Exits 9,10,11 and 12 are belong to the balanced class. This means nodes and places are as strong.

Unbalanced nodes

Where transportation systems are relatively much more developed than urban activities such as exits 2, 8 and 9.

Unbalanced place

The urban activity is more intense than transportation supply. All of the exits located in white plains is belong to this group (exits 5,6,7, and 8).

Conclusion

The present research utilizes the Node-Place model with its focus on the I-287 corridor and nearby surrounding areas to gain insight into the development dynamics. This method suited to the aim of evaluating neighboring areas of the corridor from the perspective of integrated land use and transportation. More specially, it has been used here to identify the transport and land use factors responsible for structuring I-287 corridor area redevelopments, and to determine the extent of their influence. To this end, Bertolini's

(1999) Node-Place model was applied to the study area, showing the hypothesized relationship between node and place functions. The node function describes the transport activity and connectedness of the highway exits to other places of interest. Categorization of the highway exits produced an interpretable five-cluster solution that fostered the discussion process with respect to finding suggestions for further development (described below).

Making recommendations for the (re)development of existing corridor requires a method of assessment as a first step in the development process. A recently proposed distinction of corridor exit's in terms of node (the connectedness with other places) and place (possible activities in the adjacent area) is used in the present research and applied to assess all the I-287 exits in the Westchester County. The framework includes aspects other than mobility in the evaluation. The resulting classification permits class-specific suggestions as input for discussions in the development process to be made.

Of course, which developmental path should or ought to be followed is beyond the scope of this report. What the present research shows is how the Node-Place model may be a useful means by which to screen railway stations and by which to initiate a discussion process for future actions. Results from this model-driven exercise are useful for pre-selecting stations needing further investigation in the planning process. Further research can determine whether this preselection can be achieved using a simpler model requiring less data. Therefore, the Node-Place model is a tool for the planning processes allowing the derivation of areas for discussions and further research. The selection of specific development options, however, is related to values and preferences, thereby necessitating a more process-oriented planning, such as communicative, participatory, collaborative, or deliberative planning (Forester, 1999; Innes, 1998)[15]-

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[16]. In sum, despite the discussed limitations and potential improvements, the present case study is a first step in improving the understanding and evaluation of railway stations and provides an interesting assessment tool in the planning processes for sustainable development. The Node-Place model cannot predict development, but can be used to gain a better understanding of development dynamics. Other findings are:

- An insight into these alternatives could help the government promote balanced growth throughout the I-287 corridor area. Also, showing how the CDEA develop over time would make it possible to determine if the development dynamics follow the expectations of the Node-Place model.
- Vertical integration of land use & transportation planning can be enhanced in NYMTC's planning area
  - The Node-Place approach, or similar appraisal method, can identify potential for improved vertical integration
  - The land use component of the regional transportation plan can guide the application of the appraisal method
- Local officials must be brought to the planning table in a targeted fashion
- Local officials can be incented through the following:
  - Assessments of development potential
  - Technical assistance
  - Funding for transportation projects and studies
  - Collaboration with implementation partners
- Land use goals can be applied to scoring criteria for potential transportation projects

[15] Forester, J., 1999. The Deliberative Practitioner: Encouraging Participatory Planning Processes. MIT Press, Cambridge, MA.

[16] Innes, J.E., 1998. Information in communicative planning. Journal of the American Planning Association 64, 52–63.

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