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Infrastructure Planning in Rural Massachusetts

Jeanne H. Armstrong, Meir Gross, John R. Mullin and Robert D. Yaro

Abstract – This paper describes the importance of understanding and dealing with the problems of infrastructure planning and maintenance in rural communities. Infrastructure is defined to include roads, bridges, water and wastewater collection and treatment systems, and public buildings and capital equipment. The authors base their findings primarily on the experience of communities in Massachusetts, but these findings are readily applied to the situation of rural communities elsewhere in the U.S.A. and other developed countries. Three major conclusions are presented in the paper: the need for rural communities to develop long-range plans for infrastructure maintenance and finance; the need to develop effective local institutions to assume this responsibility, and the importance of managing growth in fast-growing rural areas in order to minimize the need for major expansion of infrastructure systems.

Introduction

This paper presents the results of a study of rural infrastructure problems in Massachusetts. While the laboratory was one State in the U.S.A., the results are applicable to situations in mature regions of many developed countries, where tight budgets and decaying infrastructure often go hand in hand. To us, infrastructure means the system of roads, sewers, water lines, electrical lines and structures that are under municipal control.¹

The findings of this study will be relevant to other mature industrial regions in the U.S.A. and other developed countries now experiencing the need for replacement of infrastructure. The deterioration of infrastructure has been discussed extensively in the professional, academic and popular literature in the U.S.A., U.K. and other countries,² and therefore the experience in Massachusetts should be of interest to officials and academics dealing with this problem.

This paper will discuss, first, the problems of rapid growth, fiscal austerity, and administrative lack of information that have led to the decline of rural infrastructure. Second, it will delineate possible solutions to these problems. In both sections, examples based on the experience of rural communities in Massachusetts will serve as illustrations.

Finally, this paper will draw the connection between infrastructure planning and growth management that can and must be made if rural areas are to cope with both issues.

The study area

The Commonwealth of Massachusetts is a small State with remarkable cultural and geographic diversity. Its 7825 square miles are divided into 312 towns and 39 cities. Mountains, forests and farmland and 1200 miles of coastline divide the State into several distinct geographic regions.³

Sixty per cent of the State's population lives in the 101 cities and towns of metropolitan Boston. On the coast and in the western mountains, rural communities

struggle to attract, and then cope with, recreational development and tourism. Between these extremes lie the more typically patterned communities – small central cities with their suburban rings and out-lying rural towns.

Massachusetts' political system is marked by strong State and local governments, with a decidedly weak county system. Local control has been fiercely protected for 350 years and most communities – even some that have grown into cities – maintain the town meeting form of government, whereby all voting residents of the community serve as its legislative body. Local governments tend to be headed by non-professional (and often volunteer, unpaid) elected executives; less than 15% of Massachusetts' local governments are headed by professional town or city managers.⁴ Under this system, part-time elected 'boards of selectmen' serve as the executive branch of town governments. Regional identification, whether among the people of the Berkshire Hills in the west or those on Cape Cod on the south-east coast, often seems stronger than any loyalty to the Commonwealth as a whole. This spirit of autonomism, as will be suggested later, strongly affects infrastructure problems in the State.

The rural infrastructure problem: cases and causes

Growth patterns

Much of Massachusetts' infrastructure is a product of an industrial development and settlement pattern that developed in the last half of the 19th and early 20th centuries. Early in that period, more than 30 mill cities sprung up throughout the State, generally near sources of water power or ports of entry. Many of these cities were planned industrial cities with sophisticated systems of water supply, sewage collection, transportation, and power distribution.⁵

It should also be noted that the problems of rural infrastructure in some Massachusetts communities closely parallel those of the Commonwealth's urban regions (as well as those of other States and industrial countries) given the age of the infrastructure present in these older mill towns.

By the 1950s and 1960s, however, most of these cities were experiencing severe economic decline, and their infrastructure was becoming outmoded and deteriorated. During this period, a major population shift into suburban areas brought with it political pressures for new highways, sewer and water systems and other infrastructure development.⁶

Like most other regions in the country, Massachusetts experienced rapid rural growth during the period 1970-1980, with non-metropolitan areas growing 19% at a time when metropolitan areas of the Commonwealth were slowly losing population. These trends have continued since 1980, with rural areas increasing in population by 5%, while metropolitan areas increased by less than 1%. In many towns on the exurban fringes of Boston and in rural south-eastern Massachusetts, growth rates of 15% per year are not

uncommon, bringing with them pressures for rapid development of infrastructure (Duncan, quoted in Mullin and Thomas, 1985, pp. 119-164).

Given the Commonwealth's booming economy (driven by strong high-technology and service sectors), preferences for rural living, revolutions in communications and long-distance commuting, and major new industrial development on the fringes of metropolitan areas (readily accessible to most rural areas of Massachusetts), it is expected that growth in rural areas and the need for consequent infrastructure development will continue for the foreseeable future.⁷

At the same time, it should be noted that the sprawling, low-density land use patterns occurring in many rural areas, by requiring longer roads and utility lines between structures, make for high infrastructure development costs.

Public attitudes

The pressures created by Massachusetts' growth patterns are worsened by public attitudes wrought during the fiscal crises of the 1970s. Prior to the beginning of the current high-technology boom, the State was experiencing severe decline in its older, mostly nondurable goods-based manufacturing economy, at the same time that its defense and aerospace industries were also experiencing federal cutbacks. By 1975, the State was functionally bankrupt, the cost of local services was among the highest in the nation, and the overwhelming dependence on the property tax for local revenues had fostered the nickname 'Taxachusetts' (Bluestone and Harrison, 1982).

Then, as now, bonds constituted the long-term debt of municipalities. Cities and towns, upon determining the need for infrastructure improvements, entered the bond market where, in return for investor's capital, they pledged their faith and credit to pay back the debt with interest over a period of 20-30 years. The rationale for this approach was to keep the tax rate as low as possible, and to pay for capital improvements over the life of these improvements.

Such long-term debt, however, became increasingly unpopular in the face of more immediate budgetary problems. The amount of money spent on infrastructure continued to decline.

In 1980 the Commonwealth's voters enacted by referendum a rate-capping law modeled after California's Proposition 13. Popularly known as Proposition 2 ½, this law limited local property tax rates to 3.5% of market value. Proposition 2 ½ gave all communities 3 years to reduce tax levels to the 2.5% level, and permitted increases in property taxes of only 2 ½% per year thereafter. The citizens of Massachusetts were concerned that their property tax payments were too high relative to the services they were receiving and relative to taxes in the rest of the nation. After the tax cap was passed, tax payments became quite moderate compared to other States. Once communities reach the 2.5% limit, however, the only way to raise additional property tax

money is through new development, or improvements to existing structures (see Suskind, 1983).

With this as background, one can perhaps more readily understand the desire to control spending and focus solely on 'essentials'. Essentials have not, and to a large degree still do not, include maintaining infrastructure.

The problem of spending

Massachusetts' economy suffered dramatically during the 1970s. With the end of the Viet Nam War came a phasing down of defense industries; with cutbacks in the national space program space-related firms laid off thousands of workers. Thousands of military-related jobs at armories, airbases and army bases were lost. All of this occurred while mature industries were in decline, which combined with a series of national economic recessions to create a fiscal crisis for State government.⁸

From this climate emerged a deeply-ingrained reluctance to spend. Since the mid-1970s local municipalities have continued to cut back on infrastructure maintenance and replacement. Massachusetts, in adjusted dollars, spent 20% less on infrastructure in 1979-81 than in 1974-76. Significantly, 1975 and 1976 were especially bad years for the State economy. What these figures show is that the reluctance to invest in infrastructure is not a new phenomenon. Rather, communities began to shift to other priorities ten years ago.⁹

Proposition 2 ½ contributed significantly to the failure of spending to keep pace with infrastructure needs. A review of State figures shows that the impact was most severe in terms of capital expenditures – although maintenance was cut as well. Needed (and desired) roads, sewer and water system expansions and school proposals were postponed or dropped. Street maintenance programs, which had been curtailed long before Proposition 2 ½ was passed, were further reduced (see Armstrong *et al.*, 1985).

Proposition 2 ½ virtually eliminated the remaining capital improvement planning efforts at the local level. It should also be noted that the tax cap was put in place at the same time that the Federal Government was cutting back on its grants to local communities for infrastructure assistance.¹⁰ The combination forced communities to live with what they had whether it was well or poorly maintained.

A look at one city's investment in parks equipment will show the scope of the problem. In 1968, the city of Chicopee floated a bond to bring all of its equipment up to date. Since that time, three major firms left the city, a nearby military base closed and Proposition 2 ½ reduced money available for the local budget. In 1982, the city closed much of its parks programs, cut back its staff and junked much of its equipment – it was simply beyond repair. The problem became so severe that in 1983 the parks department staff, which also did cemetery maintenance, was forced to hand-dig graves. Three years later, the city has not replaced its equipment. All of this occurred in a city with a sound fiscal standing, a good bond rating and relatively few unemployed. There was clearly no

reason to allow this equipment to deteriorate, other than a reluctance to invest in the city's future capital needs (Mullin, 1983).

This study identified this attitude in many of the communities examined. Local communities have so little confidence in the health of the economy that they are unwilling to make large financial commitments. Thus, expenditures are largely short-term and repair-oriented rather than maintenance- or enhancement-oriented.

In reality, most communities can afford to invest in infrastructure. Over the past two decades Massachusetts cities and towns have been steadily decreasing their long-term debts. The net result is that the debt of these cities and towns is well below the national average and likely to move even lower as money borrowed in the 1960s is repaid. This means that the ability to raise funds is not a major problem from the standpoint of debt but it is a problem politically.¹¹

More and more, local officials appear to be meeting their constituents' demands for sound fiscal planning by ignoring expensive, if necessary, infrastructural improvements. Forms of infrastructure that cannot be seen – e.g. water, sewer and other utility lines, and drainage systems – result in little public awareness of political benefits to elected officials, and tend therefore to receive a low priority when limited available funds are allocated.¹²

Perhaps more importantly, approximately one-third of Massachusetts' towns, mostly in rural areas, have no bond rating from Moody's, have no bond counsel and no underwriting house. Moody's Investment Service is a New-York-based nation-wide investment analysis firm that provides detailed evaluation of the capabilities of cities and towns to pay back bonds. Generally, a well-governed, economically healthy, low-debted city will have a high rating. A city with questionable government practices, a weak economic base and high debt will, on the other hand, score quite low. This means that these communities, before even entering the market, must put time, effort and money into the process. Because the overwhelming majority of these towns rely on non-professional executives and volunteers, the more sophisticated financing options are rarely taken.

This phenomenon is illustrated by the example of a small Berkshire County community which is now considering whether to 'float' a bond for needed infrastructure improvements. The cost of preparing for the bond issue (of approximately \$1,300,000) has been estimated at more than \$10,000. The figure itself may seem slight, but in a town with no surplus funds, and where taxes cannot be raised further, it means that something else must be cut. Often in town meetings, where budgetary decisions are made, the \$10,000 will be compared to the cost of a needed service such as a teacher's salary. The net effect is that bonds are rarely floated in small, rural towns (interview with J. De Rosa, Co-Chairperson, Governor's Task Force on Economic Development in the Northern Berkshires, 20 May 1985; see also Armstrong et al., 1986b).

The problem of management

With the exception of northern Maine, all of New England is divided into political subdivisions, which in many cases for more than 350 years have been responsible for delivery of nearly all public services. Unlike the rest of the country, county government and regional planning have never taken root in Massachusetts and elsewhere in the region, and annexation of urbanizing areas is unheard of. For these reasons, in most of rural New England public services are the responsibility of town governments led by part-time, volunteer officials. The local legislative bodies – town meetings – get together but once a year, in a not always well-organized fashion, to pass budgets and adopt necessary bylaws.

Although this system has worked well for a long time, the governments of fast-growing rural communities are besieged by the combined pressures of expanding workloads, State and Federal red tape, and the need to develop roads, water and sewer systems and other services for new residents, many of whom insist on services they received in their former urban and suburban hometowns. Volunteers simply cannot keep up with these demands. In most Massachusetts towns, for example, subdivision bylaws exist stating the conditions under which a developer can build in a particular area. Detailed site plans must be submitted and approved by the town before any work can be started. This creates so much work for the town, however, that little time remains to do strategic planning. Likewise, conservation commissions (local bodies created by State law, to plan for conservation of each town's natural resources), are so busy monitoring development proposals that they have no time for open-space planning or other conservation efforts.¹³

There are more than 130 towns in Massachusetts with no full-time administrators. With only part-time, voluntary leadership, little innovation, day-to-day management, or even grant writing is likely to occur. The small town of Pelham, in western Massachusetts, is an excellent example: the community has had a number of serious infrastructure needs, including deteriorating roads, an open-air road salt storage site which was polluting local water supplies, and a much needed new municipal building. While grants were (and are) available to handle all three problems, it took more than five years for volunteers to handle just the first two while each year the problems become more difficult to correct. The third problem has only recently been addressed, at a time when the granting agency is cutting back on its programs.

Division of responsibilities for infrastructure among several town departments is common, and it exacerbates the problems of voluntary, non-professional and decentralized management. Local highways are the responsibility of town public works departments, while water and sewer systems are controlled by local, yet separate water and sewer departments each under the supervision of separate appointed boards made up of citizen volunteers. Each department maintains its own systems according to its own methods and standards. The net result is that it is difficult to monitor, evaluate and control the various agencies as they use and maintain the systems and facilities. Why

does a truck last twice as long in one department then another, given equal use and age? The answer is inevitably tied to differing maintenance standards.

Each department has the responsibility of preparing an annual budget covering its annual operating expenses. Typically, the Board of Selectmen (the town's 'executive') will demand a budget with an increase of no more than 4%, including salary raises. The department heads follow directions and, fully realizing there is no money for additional expenditures ignore any infrastructural improvements beyond the most critical of emergencies. Once the budget is resolved and if the town is still below its tax cap maximum, it may then provide some funds for capital improvements.

One of the great ironies of the present situation is that despite rapid growth in rural areas, a number of small cities located in rural regions continue to lag in employment, income and other indices of economic well being. Possessed with a rich architectural and cultural heritage, and a well-developed infrastructure system, each of these communities has the potential to serve as a magnet for new development in its region. In 1975, the Government of Massachusetts began to encourage economic development in these cities. Several such efforts continue but no systematic effort is in place to lessen the pressure of development on rural or exurban areas by encouraging development in the cities which have the necessary infrastructure and the willingness to accommodate new development.

Problems caused by State infrastructure planning efforts

Beginning in the 1970s, Massachusetts' State Government became increasingly and directly involved in many aspects of local decision-making. Nowhere was this more evident than in terms of infrastructure development. At present there are 24 State-supported and Federal local aid programs that address capital improvement needs. However, with the exception of aid for water supply systems, these State and Federal programs are heavily weighted toward supporting new construction rather than upgrading and maintaining existing systems.¹⁴ Several problems have emerged from these State and Federal programs.

First, local planners tend to think of investment needs in terms of how to obtain State funds. Local objectives are shaped, not by careful consideration and community consensus regarding the long-term future of the town, rather by what the State will finance. Local officials, often citizens' committees, are caught up in the grant-writing cycle, chasing after doubtful funding for capital expenditures, the actual needs for which the citizens have not completely considered. Indeed, in many rural towns, part of the problem rests with the town planner, or grantsperson, who is under considerable pressure to bring dollars into the community. The amount of money becomes more important than the actual need for which it is intended.

Most governmental grants-in-aid for infrastructure improvements (among others) come to communities either on an entitlement basis (the communities get them automatically) or on a discretionary basis (they must apply for the funds). Usually, the

smaller the community, the less likely it will be to be eligible for entitlement funds. Left to compete for discretionary funds, however, rural towns often lack that expertise to negotiate programs created by more sophisticated urban administrators. Nor can they afford to hire more people to do it for them. In short, discretionary grants go to the professionally-run, well-financed towns. They do not go to small, volunteer-run communities.

The third problem with State infrastructure programs is that changes in the formulas that determine State aid make it virtually impossible for towns to budget over time. A formula can be based, for example, on population, unemployment, age of housing, percentage of people on welfare or, among others, the number of school-age children. It can even be a combination of factors. The problem is that the legislature has constantly tinkered with the formula to the point that it is impossible to predict from year to year how much State aid will be given to a particular community. The net effect is that the funds go to short-term projects free from long-term commitments.

Finally, the State will often provide assistance to a community only if it meets conditions that have nothing to do with the grant in question. For example, each city and town, in order to be eligible for State grants must submit a Fair Housing Plan. The plan must show that the community is making a good faith effort to house the region's poor. The town of Hadley in the Connecticut River Valley recently applied for a grant to restore its historic town common and make infrastructural improvements. From all accounts, the town had met the letter and spirit of the rules for entry and ranked high enough to gain the funds on the rating scheme prepared by the professional staff. However, since it did not have its Fair Housing Plan in order, the grant was denied. One can argue the merits of such an approach. The net result however is the loss of a grant designed to meet a local need.

Summary of problems

When combined with the already urgent requirements for reconstruction of urban infrastructure, the phenomenon of rapid rural growth will make the infrastructure needs of the Commonwealth's rural areas as compelling in the 1980s and 1990s as were the needs of suburban areas in the 1950s and 1960s.

In the light of the dearth of public support for infrastructure investments, the lack of professional management in town government, and the financial constraints imposed on communities by Proposition 2 ½ and expected cutbacks in Federal aid, rural communities will be compelled to find new ways to design, finance and manage infrastructure improvements. State and local governments must create growth management efforts to foster those development patterns that minimize expensive infrastructure investments.

The remainder of this paper will outline some of the options available to local and state officials which could achieve these objectives.

The rural infrastructure problem: towards a solution

Philosophical changes

The first step in solving Massachusetts' infrastructure dilemma is a change in the basic approach to infrastructure planning by local governments.

Communities as diverse as Ramapo, New York, Petaluma, California, Boulder, Colorado, and Montgomery County, Maryland have made infrastructure plans an integral part of comprehensive plans to manage rapid suburban and exurban growth.¹⁵ Such plans can be employed to control the costs and timing of infrastructure improvements by: placing water and sewer lines, roads and other improvements only where growth is desired; making decisions about the size and capacity of improvements in the light of growth plans for areas to be served by those improvements; making land-use decisions based on the carrying capacity of underlying natural systems, e.g. subsurface hydrology, surface drainage and floodplains, and the ability of soils to handle anticipated septic loads. If Massachusetts communities were to adopt this approach to infrastructure planning, they could improve the quality of both their growth management and infrastructure planning. Growing rural communities, for example, could determine development locations and densities that would be consistent with the availability of groundwater and the ability of soils to handle septic loads. In this way, they could accommodate growth, and still preclude the need for expensive municipal water supply and wastewater collection and treatment facilities. This strategy will become increasingly attractive as the U.S. Environmental Protection Agency (EPA) grants for water supply and wastewater treatment facilities are phased out. In areas such as Cape Cod, which is dependent on a sole-source aquifer for all its potable water, this approach could mean the difference between sustainable development and the destruction of the natural system upon which the habitability of the region is based.¹⁶

Design and engineering changes

One way of reducing the costs of necessary infrastructure improvements will be to develop new design and engineering standards for public improvements which meet the needs of rural communities.

In the area of rural roadway design, for example, adherence to design standards of the American Association of State Highway & Transportation Officials (AASHTO) results in roads which are incompatible with rural landscapes and far more costly to construct than necessary.

The recent proposal to realign several miles of Route 2 through the Wendell State Forest in western Massachusetts illustrates the point. AASHTO standards for the proposed road would require 14-ft travel lanes, paved shoulders and deceleration lanes, grades and sight lines allowing 55 mph travel and reconfiguration of slopes and vegetation to allow winter sunlight onto the roadway to reduce icing. Also required would be the usual collection of expensive safety features including reinforced concrete

safety barriers (known as ‘Jersey Barriers’), and steel ribbon guardrails. The resulting design yields a 600-ft wide right-of-way and massive destruction of State forest land and produces construction costs of several million dollars per mile. All this ‘over design’ results in a realigned two-lane roadway yielding a 59-second reduction in travel time when compared to the existing alignment.

Reevaluation of such excessive and inappropriate Federal and State highway design standards could yield huge savings in both natural and financial resources. On the local level, subdivision bylaws often include excessive design standards for roadways, drainage, lighting, underground utilities and other public improvements that cost developers and homebuyers more in the short run, and cost communities more in maintenance and replacement expenses in the long run. This has occurred in some instances in rural Massachusetts towns which adopted ‘carbon copy’ subdivision bylaws, literally copied by consultants or town officials from other, often more urban, community bylaws.

In the central Massachusetts town of Monson, for example, the subdivision bylaw adopted by the town several years ago includes grading requirements for roadways which simply cannot be met in this hilly town without creating a major quarry or sand removal operation at the site of each new subdivision road. When combined with excessive roadway widths, drainage, lighting, sidewalk, and underground utility requirements, such bylaws can increase the infrastructure costs to new residents by several thousand dollars per housing unit.

The resulting subdivisions are so costly, in fact, that in rural towns like Monson few subdivisions are built. Instead, development spreads up and down existing roads in frontage lots, requiring longer utility lines and damaging the visual character of the community.

For this reason, both State and Federal agencies should review development standards for appropriateness to rural areas, and where applicable, new standards should be developed which are more cost-effective and compatible with rural needs.

Administrative changes

As we have seen, the way towns allocate funds to infrastructure needs is basic to their infrastructure problem. As long as the capital budget is considered only when some money is left over after the operational budget is completed, there will be no improvement. Capital planning and budgeting cannot be lumped together with operational budgeting. Rather, the capital budget must be considered an on-going and constant part of the budget allocation process.

The first step in carrying out this capital planning process is to inventory the infrastructure assets in the community. Few communities have a comprehensive listing of their assets. The town of Amesbury, for example, is now in the midst of developing its first inventory of capital facilities since 1921.

A second critical step is an evaluation of these physical assets. The condition of the facilities, their effectiveness, and future needs of the community, need to be determined. The problem of leak detection for water and sewer systems is particularly crucial. Many of these systems were built at the turn of the century and have become outdated. The problem has become so severe that the State government is now willing to pay 50% of the cost of leak detection and repair if the municipalities pay the remaining half. Infrastructural systems must be evaluated if our increasingly scarce and costly resources are to be protected (for an analysis of this problem, see Male *et al.*, 1985, pp. 1-20).

The greatest need at the local level, in terms of the capital planning process, is the formation of a capital improvement committee, staffed by knowledgeable citizens who have the confidence of policy-makers, department heads and the public at large. Above all, it should have a banker and a lawyer, for if a bond is required their services will be invaluable. The reason for this is that the legal and financial process is extremely complex. A person with legal experience and/or banking experience can ensure that the process is carried out correctly and with a mind toward prudent investment. Very few of our cities and towns have such organizations and even fewer have effective ones.

Other management innovations can enhance the development of capital planning at the local level. If a town is fearful of floating a bond or spending capital to purchase a piece of equipment then leasing may be an option. For example, the Town of Andover, Massachusetts, recently sold its town hall and leased back space within it. The assets of such an approach are several: (1) maintenance of the building is no longer a public function; (2) the property, no longer a public building, is on the tax rolls, and (3) the city has more cash in its coffers. The city of North Adams, Massachusetts is considering such an option as a means of attracting a State courthouse: the city will buy a building, renovate it, sell it to a developer and then guarantee the developer that the court will be a tenant for ten years.

A second example is the development of mutual aid pacts on equipment. Neighboring towns often invest in identical equipment that is not used more than occasionally. Capital outlays would clearly go further by towns sharing the cost, use and maintenance of such equipment. Most rural areas of Massachusetts participate in regional school districts; this concept could be adapted for delivery of other public services, such as highways, water supply, wastewater treatment, solid waste management. State incentives should be made available to communities which pursue this approach.

A third example, and perhaps the most simple one, involves the setting of fees to recover the cost of operation and maintenance of infrastructure systems from those who use them. For example, if a new subdivision of 100 homes is to be connected to the local sewer system, the cost should be borne by the developer and new residents.

State assistance to local governments must be provided if such innovations are to be effected. One approach would be to develop the expertise of local officials through university training programs in finance, planning, management, etc.

At the same time the administration of State and Federal grant programs can be tailored to rural communities' needs, for example by streamlining the guidelines and application procedures for grant programs which in many cases are designed for urban communities and their professional staffs. Grant programs for rural infrastructure programs should be designed with volunteer governments in mind, with simplified application requirements. 'Circuit riders' should be made available to provide technical assistance. The term 'circuit rider' is used in Massachusetts for State paid experts in local management who will travel between small towns to help the communities keep their management systems in order. The program, at present, is quite small.

Most importantly, towns should consider hiring professional staff, perhaps with assistance from high levels of government. Towns should also find ways to consolidate often fragmented administrative structures currently dealing with capital improvements.

The need for statewide infrastructure and strategic planning

The Commonwealth of Massachusetts now recognizes the urgency of its infrastructure problems, as evidenced by continuing, but as yet unsuccessful efforts to pass legislation authorizing creation of the Massachusetts Infrastructure Bank ('MassBank'), which would finance both State and local infrastructure investments, and act as a wholesaler for locally initiated infrastructure bonding. One of the factors exacerbating Massachusetts' infrastructure crisis is the complete lack of strategic or growth management planning at the State level. Massachusetts is now the only State in the north-east without a strategic planning office in State government. Consequently, at a time when the State's economy is rapidly expanding, there is no unit of government responsible for assessing the cumulative impact of rapid industrial and residential development on the natural resources, communities and infrastructure of Massachusetts. Clearly what is required is effective strategic planning at the State level for Massachusetts' infrastructure needs.

A Strategic Planning or State Planning Office (or expansion of the role of the existing Governor's Office of Economic Development from its current short-range planning responsibilities) could improve the coordination of various State agencies engaged in infrastructure planning and investment, and could aid local governments in their infrastructure planning. One immediate priority for such a new entity would be a systematic Statewide assessment of infrastructure needs for individual communities, regions and the Commonwealth as a whole. This effort should be carried out in cooperation with local governments, given the strong role of municipalities (noted earlier) in infrastructure planning and development. This effort should also be coordinated with a Statewide effort to identify resource conservation priorities which could be safeguarded through comprehensive planning for infrastructure investments.

The Commonwealth must recognize the inter-relationship between infrastructure planning and growth management planning at the State and local level. Without this function at the highest level in State government, Massachusetts will continue to suffer from inadequate or outmoded infrastructure which will undercut needed economic

development efforts in some regions, while allowing inappropriate development in other areas which may be in conflict with the Commonwealth's resource conservation objectives.

Conclusion

Rapid growth in rural Massachusetts communities has brought new pressures to bear on their infrastructure systems. Small-town volunteer governments are ill-equipped to plan for the design requirements and expense of infrastructure development. Hampered by public reluctance to spend and their own lack of information, small-town officials often end up ignoring the deterioration of their infrastructure altogether.

It must be recognized that the infrastructure needs of rural communities are different from those in urban settings. Small-town officials must be helped to inventory and evaluate their physical assets and identify local needs. They need to share expertise, train volunteer administrators and use innovative techniques such as leasing, mutual aid pacts, and fee-setting to reduce infrastructure costs. They must also adopt design and engineering standards appropriate to rural areas and keep capital planning and budgeting separate from operational budgeting.

Using such techniques, rural communities, both in Massachusetts and elsewhere in the U.S.A. and overseas, can begin to gain some control over the condition of their infrastructure. Perhaps most importantly, however, rural communities must work with the State or higher level of government to make infrastructure planning an integral part of the strategic growth management process.

¹ For an overview of the infrastructure problem in a national perspective see Choate and Walter (1983) and Barker (1984).

² For an overview on the issue of deteriorating infrastructure, and the relationship between infrastructure and economic development, see Webley (1985), Reid and Sullivan (1984) and Reid (1984). For a discussion of similar trends and problems elsewhere in the U.S. see Associated General Contractors of America (1983) and Subcommittee on Economic Goals and Intergovernmental Policy (1984). For a discussion of Britain's infrastructure problems see Confederation of British Industry (1984) and Department of Transport (1983).

³ For a review of the problems and opportunities facing the Commonwealth see Mullin and Thomas (1985).

⁴ This problem is discussed at some length in Massachusetts Taxpayers Foundation (1984).

⁵ For a review of the characteristics of these towns see Dunwell (1978).

⁶ These problems are described and analyzed in Polenske *et al.* (1983).

⁷ For a discussion of the impact of this booming economy see Marsh (1986).

⁸ This problem, amongst others, is analyzed in the Governor's Commission on the Future of Mature Industries (1984).

⁹ Recent data collected on 17 cities and towns in Massachusetts shows that the trend is continuing. See Armstrong *et al.* (1986).

¹⁰ This need is clearly delineated in the United States Conference of Mayors and the National League of Cities (1983), see, for example, p. IV.

¹¹ Data collected from our recent surveys shows that all seventeen cities and towns reviewed had the ability to meet their infrastructure needs through bonds while staying below the State-imposed tax cap. See Armstrong et al. (1986, pp. 28-29).

¹² A by-product of this attitude is that new housing is being placed on larger lots. This means that buyers have to be more affluent. In effect, the less willing a community is to provide modern infrastructural improvements, the more likely this community is to be of the upper income class. See Hirsch (1983).

¹³ The Conservation Commission Movement gained increasing momentum in Massachusetts throughout the late 1950s and early 1960s and ultimately became encoded in law in the late 1960s. For approximately a decade the movement met its mandate with zeal. Now with the environmental crisis increasingly out of the public eye, many of these commissions are becoming increasingly bureaucratic (interview with Andrew Scheffey, conservationist and professor of regional planning, 29 January 1986).

¹⁴ For a further explanation see Wallace, Floyd, Ellenzweig, Moore Incorporated (1978).

¹⁵ For a review of how this management occurs see Floyd (1981). In particular see Chapter 29, 'Land-use Policy Issues'.

¹⁶ For an analysis of this problem as it relates to Cape Cod see the University of Massachusetts Department of Landscape Architecture and Regional Planning (1985). The report was prepared for the New Alchemy Institute.

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