Resource Book:

# 3

I-93 Community Technical Assistance Program

CTAP

New Hampshire Communities Planning Together

# Resource Book #3 Proactive Growth Management Strategies

# CTAP: The Community Technical Assistance Program

Supporting comprehensive growth management under the Salem – Manchester Interstate-93 reconstruction project

*Antioch New England Institute (ANEI) created this document and is working under contract with Clough Harbour and Associates, L.L.P on this project.*

# I. CTAP Overview

New Hampshire Department of Transportation (NHDOT) is committed to a five year comprehensive Community Technical Assistance Program (CTAP) to support a region of 26 towns and cities that are in the area influenced by the reconstruction of Interstate 93. As part of this comprehensive growth management initiative, the NHDOT is interested in engaging the public and a wide range of stakeholders including local governments, the non-governmental sector, and state and regional governmental agencies.

CTAP is designed to provide technical assistance to communities in the I-93 corridor area on sound land-use planning practices. The primary purpose of CTAP is to promote beneficial growth patterns that minimize the negative effects of growth on community services, remaining open space, schools, existing traffic patterns, quality of the environment, and existing residential and commercial zones. This initiative will be a joint effort of communities, state agencies, and the non-governmental sector.

Under the CTAP program, NHDOT and its contractors will convene and facilitate a large, multi-stakeholder six-month scoping process designed to achieve consensus on how to best address growth management issues and allocate program funds. The primary outcome of this process will be the preparation of a work plan (or blueprint) that will include a set of proposed actions and a timeline for addressing growth management issues in the region.

This publication is book three of a three-part series designed to provide technical assistance and resource identification that can assist CTAP participants as they move from visioning their region's future to developing a plan of action to achieve that vision. These books examine the challenges of growth and provide an overview of the strategies and tools of proactive growth management. Case studies from New Hampshire and beyond are used to identify success stories and explore the challenges associated with these strategies. The books do not present a comprehensive overview of proactive growth management, but rather they serve as a primer to present possibilities for communities and to identify resources for further exploration.

With each resource book, we have provided footnotes that are intended to serve as references for further investigation. Whenever possible, the footnotes include direct web links to publications cited. In Appendix A of this resource book, we have also included a list of organizations and agencies that may be important resources for the municipalities participating in CTAP.

# II. Introduction: Addressing the Challenges of Growth: Proactive Growth Management Strategies as Defined by the CTAP Vision Map (Part 2)

## A. Introducing How to Grow

In CTAP Resource Book 2, we proposed a framework for how to consider addressing growth issues. This framework contained three main categories, each of which influences the other: 1. Where to Grow; 2. Where not to Grow; 3. How to Grow.

In Book 2, we went on to address the first two pieces of this framework, the determination of where to grow and where not to grow. Book 3 will examine strategies, tools, and case studies concerned with how communities can grow. By "how to grow," we mean determining what types of development a community, municipality, and region want to see in those places it has determined are the best areas in which to grow.

In its largest context, "how to grow" asks questions about what the look and feel of a community will be. Will it contain a mix of uses, or will it segregate housing from commercial activities? Will people be able to walk or bike to the places they work and acquire goods, or will they need an automobile to get there? Will a diverse group of people be able to afford to live in the community, or will housing prices be out of reach for many community members? Will people have access to open space, and will development be allowed to be dense in growth areas so that corresponding undeveloped land can remain open? Will the schools be located at the center of communities? Will municipal services be efficiently available to new development? Will the community be an attractive place for businesses paying living wages to locate?

How to grow also asks site-specific questions: Will individual structures match the scale of the community? Will new developments be designed with energy-efficient principles? Will buildings be oriented to take advantage of passive solar heating? Will design efforts be made to reduce stormwater runoff around new facilities? Will individual efforts at sustainable and minimum-impact development be isolated events, or will they be coordinated throughout projects across a community?

The answers to these and many other potential questions lead us to explore strategies, tools, funding, technical resources, and examples. The following sections look to identify some of those strategies and point to resources for further exploration. The strategies will fall under four large categories, each of which connects back to the others:

- **Healthy Communities**
- **Economy**
- **Transportation**
- **Energy**

# III. Healthy Communities

The desire to create healthy, vibrant communities emerged as a strong theme in the CTAP vision map. There was recognition among participants that many of the particular objectives people shared (i.e. mixed-use development, access to affordable housing, economic development, alternate transportation options, revitalized downtown), all tied together into a larger context of creating communities where people have opportunities, where they feel safe, healthy and connected, and where they feel proud to live.

The challenge of the CTAP process (and beyond) is to formulate a plan to help the I-93 reconstruction corridor create and sustain these healthy communities, and to connect them to other communities. There is no one right or wrong way to accomplish such a task, but a few principles have seemed to help communities both in New Hampshire and other states move toward their goals. These principles include developing innovative partnerships, engaging community members in all steps of the process, and thinking creatively about change and potential opportunities.

Since there is no "silver bullet" approach to creating or sustaining healthy communities, much can be learned through exploring success (and challenge) stories of towns and regions who have attempted to integrate similar objectives to those described by CTAP participants. The following excerpt from a publication of the Funders' Network for Smart Growth and Livable Communities illustrates a case study where many aspects of community development and growth management came together to create a positive new direction for a community. Equally relevant for the CTAP communities is that this case study involved a balance between regional transportation planning and local concerns, and it was focused at the suburban/urban boundary, seeking to blend the best attributes of both locations:[1]

### Winchester Greens, Greater Richmond, Virginia

> The development of Winchester Greens in Greater Richmond, Virginia, combines clusters of genteel townhomes, some for families and others for the elderly (with single-family houses next in production), a child care center, open [playing] fields and recreation space integrated into the design. Shopping is nearby, and more retail space is being developed in tandem with the new housing. The village atmosphere of Winchester Greens blends sound economics, energy efficiency, and good architecture, making an area that is inviting for pedestrians and children at play, where elderly and younger residents intermingle, and shops cater to a steady clientele of neighbors and walk-ins.
>
> As such, it's a good exhibit of the principles of the "new urbanism." Although it's a community development project, it's located not in Richmond, but in a suburb, the aging bedroom community of Chesterfield County. But apart from the suburban locale, what makes it significant to the wider region? The answer is the development's underlying

[1] Proscio, T. 2003. Community Development and Smart Growth: Stopping Sprawl at its Source. Funders' Network for Smart Growth and Livable Communities, and the Local Initiatives Support Corporation.
Retrieved from: http://www.fundersnetwork.org/usr_doc/TP_13_-_Community_Development_&_SG.pdf

purpose: not just to brighten a distressed or neglected piece of real estate, but to help redirect development and transportation patterns inward, away from Richmond's ever-receding sprawl line.

Positioned on a major commuting corridor, the 80-acre development is aimed at attracting residents, merchants, and (most important) transportation to a central place that blends the advantages of city and suburb. Winchester Greens merges suburban quiet, space, and security with urban-style advantages like a mixed population, easy pedestrian shopping, affordable rental apartments and home-ownership possibilities, and (for the first time) good transportation connections to the city and the [outlying areas]. Until the new development, the closest public transportation to the site had been some two miles away. Some of the new transportation was the result of true smart growth negotiations among the project's community developers, the metropolitan Chamber of Commerce, state legislators, and the Greater Richmond Transportation Company. [emphasis added]

Winchester Greens proves several points at once: that balanced, attractive design can make a community out of a stretch of neglected real estate; that such communities can attract both investment and municipal services that would otherwise flow elsewhere; and that all of this can be — in fact, needs to be — a common endeavor of smart regional planners and equally smart community developers.

This case study illustrates the potential for innovative partnerships to develop among municipal decision-makers, regional planners, state and federal agencies, developers, and NGO's. In this instance, those partnerships found creative new ways to improve a suburban community, focus transportation away from sprawl, create a walkable neighborhood, and promote economic development.

# A. Mixed-Use Development

Traditional zoning has often called for single-use areas that separate where community members live from the places they work, shop, and play. This type of segregated use has made it at best difficult and at worst impossible for people to travel to the places they need without an automobile.

An increasing number of New Hampshire communities have recognized this trend, and have developed strategies to promote mixed-use centers throughout their towns. This strategy is perhaps most often employed in established downtown areas, where apartments and condominiums sit above first-floor storefronts and restaurants. Many downtowns have had success in diversifying uses and in allowing for residents to walk to many of their needs and desires. (These successes will be discussed further in the "Local Economy" section of this book.)

But mixed use development can also work in settings other than downtown. The challenge facing many NH communities today is to develop ways to diversify use in both the suburban residential setting and in the commercial "strip" setting. While it seems simple, success in addressing issues such as local traffic congestion, walkability, and community health may well start with getting people closer to the things they need. For example, allowing and encouraging a small grocery store to move in to an otherwise completely residential area could have a large impact on an entire neighborhood. Residents could walk or bike to buy groceries, and in the process establish new relationships with neighbors whom they typically only ever meet when passing in their cars.

## Tools

**Zoning Ordinances:** The first step toward creating mixed use community areas is making mixed use development legally possible through local zoning ordinances. Changing zoning can be a difficult process, and it often requires significant community outreach, education, and engagement. Resistance to change often stems from a lack of specific information and of opportunities for input in the decision-making process.

**Incentives:** Creating a mixed use zoning ordinance doesn't guarantee that use diversification will follow. Many NH towns have found that success comes with the use of a broad package of incentives to help encourage the realization of vibrant and diverse community centers. Incentives may include:

- Building density increases
- Minimum lot size reductions
- Frontage and setback reductions
- Parking requirement reductions
- Landscaping requirement changes
- Tax incentives
- Expense-sharing through partnerships
- Expedited permitting processes

**Performance zoning / performance standards:** Performance zoning allows developers flexibility in the types of projects they can undertake and where they can locate those developments. It also encourages desired development attributes through the use of incentives that either save a developer money or speed up plan approvals for "high performing" developments.

NH Office of Energy and Planning explains the goals of performance standards in their publication, *The Planning Board in New Hampshire: A Handbook for Local Officials.* The following excerpt illustrates the range of impacts that performance standards can be applied to:

> Performance standards allow land to be developed not on the basis of rigid zoning standards, but on the physical characteristics and operations of the proposed uses. Land development under performance standards is then based on certain characteristics of development evaluated against predetermined criteria and standards. Performance standards can include traffic generation, noise, lighting levels, stormwater runoff, loss of wildlife or vegetation, or even architectural style.[2]

The town of Bedford uses performance zoning along its Route 3 corridor that offers a number of the incentives mentioned above to promote the type of development the town wants to see.[3] With performance zoning, particular uses aren't necessarily restricted in given areas along the corridor, but each development proposal is evaluated by its impacts and by how well it meets the town's objectives. These objectives include the preservation of historic structures, conservation of natural features, diversification of the tax base, maintenance of functional traffic flows.[4] Incentives to promote these objectives range from building density increases to decreased setback requirements.[5]

[2] From: *The Planning Board in New Hampshire: A Handbook for Local Officials.* 2006. New Hampshire Office of Energy and Planning

[3] Bedford's performance zoning ordinance can be viewed at http://nh.gov/oep/resourcelibrary/referencelibrary/p/performancezoning/documents/bedford.doc

[4] Moldoff, Ross. 1998. Controlling Strip Development: Case Studies from New England. Proceedings of the 1998 National Planning Conference.

[5] Moldoff, Ross. 1998. Controlling Strip Development: Case Studies from New England. Proceedings of the 1998 National Planning Conference.

## Case Studies

### Mixed Use Development throughout a Downtown
### Downtown Exeter, New Hampshire[6]

Exeter's long history of manufacturing and commerce flourished on the banks of its tidal river. Today, Exeter Mills is a large residential development integrally connected to the downtown. Many of the historic buildings along Water Street have also changed uses over the years. The one constant is a mix of uses - shops, restaurants, and law and real estate firms line the street level, with residential and office uses in the upper levels. The 2002 Master Plan heralds the downtown as "one of the Town's greatest assets. It creates and provides commercial, retail, and visitor services, adds to the tax base, is the Town center for social and civic interaction, and helps establish and reinforce the 'sense of place' of the Town." Its importance has been well recognized by the town government and its citizens, as well as the Chamber of Commerce, American Independence Museum and other organizations.

The Exeter Town Hall was built in 1855. The lower level houses the District Court and Chamber of Commerce. The main hall is still used for meetings, voting, and civic and cultural events. The Town Hall is located across the street from the Town Office building, which was originally built in 1892 for county offices.

The Bandstand, located at the intersection of Water and Front Streets, was a gift to the Town from Ambrose Swasey in 1916. The Exeter Brass Band, founded in 1847, still plays here on Monday nights in July. The 2002 Master Plan recommendations support mixed residential, commercial, and office uses in the downtown, with specific allowance for residential uses on upper floors of downtown buildings. The Master Plan calls for review of parking, setback, building height, and other standards in the Waterfront Commercial district, to determine their adequacy to support, and not discourage, appropriate development density in the downtown.

[6] From: Achieving Smart Growth in New Hampshire. 2002. New Hampshire Office of Energy and Planning

Water Street, Exeter's main thoroughfare, is lined with a variety of small shops and restaurants, popular with locals and tourists alike. The Waterfront Commercial zone was amended to allow residential use in upper floors of downtown buildings. The upper levels of most buildings in the downtown are residential apartments and condominiums.

Swasey Parkway, located in the Waterfront Commercial District, follows the Squamscott River from downtown to Newfields Road. Lined with trees and park benches, strollers can watch Phillips Exeter Academy's rowing teams practice, observe the many birds that frequent the shallow tidal basin, or listen to a summer concert.

Rehabilitation of the historic Exeter Mill structures adjacent to the downtown area, and design of new residential units at the quarter-mile long riverfront site presented extraordinary opportunities and challenges. The buildings presented generous floor areas, ceiling heights, and windows; richly weathered brick, massive wood beams; and decking. The challenge was to humanize the scale of the entire complex, and turn a long neglected stretch of industrial waterfront into a residential district closely linked to downtown Exeter. The National Park Service awarded the project full approval for Historic Certification.

## Mixed Use through Redevelopment of a Property
## The Beaver Mills Project, Keene, New Hampshire[7]

The Beaver Mills property on Railroad Street was vacant, in desperate need of repairs, and assessed for tax purposes at only $450,000. The project began in 1997 when the vacant 60,000 square foot building was offered for sale, with a plan to provide affordable housing and commercial space - while renovating a derelict building in the downtown. Beaver Mills was developed by the non-profit Keene Eastside Development Corporation – a partnership of Monadnock Economic Development Corporation and Southwestern Community Services, Inc.

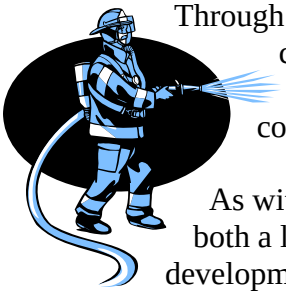
Funding for the over $7 million project came from more than 11 sources. This complex project involved regulatory issues associated with creating residential and commercial condominiums in the same building, tax credits, and listing the Mill on the National Historic Register.

[7] Adapted from: Achieving Smart Growth in New Hampshire. 2002. New Hampshire Office of Energy and Planning

Completed in 2000, the Beaver Mills project is now assessed at $2,425,000 and contributes about $80,000 to the city in property taxes each year. The Beaver Mills property houses:

- 40 elderly housing units
- Monadnock Developmental Services
- Keene Montessori School
- Cheshire Medical Center / Dartmouth - Hitchcock Audiology Department
- Children's Dental Care
- LifePlus
- Ken's Refrigeration

## B. Municipal Services (Affordability and Coordination)



Through the vision map process, CTAP participants identified the need to better coordinate municipal services throughout the region. They also recognized the challenges of providing affordable services and the need for stable and consistent funding.

As with many issues discussed in these resource books, municipal services are both a local and regional concern. The types of ordinances and the distribution of development in one town can have a direct impact on growth patterns in a neighboring town. A community that promotes commercial development as a means to increase the tax base without also developing more housing to support new employees will likely shift the housing and accompanying service obligations to a neighboring town. Likewise, towns that adapt innovative land use controls without coordination with their neighboring towns can, in effect, be pushing challenges just beyond their borders.

Population growth is ongoing in southern New Hampshire, and with that growth comes an increased demand for services. The patterns of development that accompany this growth will have significant effects on the sustained affordability of the delivery of those services.

Research shows that consolidated development yields a cheaper delivery of services.[8] The less distance traveled, the less miles of roads to maintain, the less feet of pipe that has to be laid, etc., which all add up to savings for communities in the long run.

The following excerpt from the US Environmental Protection Agency sums up the essence of this research by examining the impacts of building ever further from established community centers. Interestingly, this case study shows that the costs of sprawling development aren't just borne through tax increases, but also through the subsidization of non-municipal services. [9]

> *Fiscal Concerns* -- Many communities are questioning the practice of abandoning existing infrastructure in older communities only to rebuild similar services on the fringe. Serving

[8] See *The Cost of Sprawl*. 1997. Maine State Planning Office as one example. http://mainegov-images.informe.org/spo/landuse/docs/CostofSprawl.pdf

[9] From: "About Smart Growth" US EPA. Retrieved from: http://www.epa.gov/dced/about_sg.htm

> poorly planned dispersed development stretches limited resources thin. A recent study for the City of Reno, Nevada found that city taxpayers subsidize development in unincorporated parts of Washoe County by more than $16 million each year (Economic and Planning Systems, 5/2000).
>
> These subsidies are often in the form of increased costs of new infrastructure (such as sewers, power, phones) and of providing services (police, fire, schools, libraries) to a growing but scattered population. A regional Bell telephone operating company provided a rough estimate that it, compared to the monthly costs of serving customers in the central business district, costs twice as much to serve households in the rest of the central city and 10 times as much to serve households on the urban fringe. Yet all customers pay the same rates. This subsidization of low-density development is repeated in other services as well. Smart growth can help improve returns on existing public investment, reduce costs for infrastructure extensions and school transportation, and preserve fiscally beneficial farmland.

Coordinating municipal services delivery among the CTAP participant communities will likely require new and creative planning and economic partnerships to emerge. New Hampshire law allows for this innovative cooperation under RSA 53-A "Agreements Between Government Units." According to the statute:[10]

> Such authority shall include, but not be limited to, the power to enter into agreements to share tax revenues resulting from local economic development efforts and with respect to cities and towns, the power to form the entities and conduct the activities provided for in RSA 162-G [concerning the acquisition, development, and disposal of industrial land and facilities[11]].

New Hampshire has a limited history of inter-municipal cooperation and coordination of services, particularly with solid waste disposal, fire and rescue services, and wastewater treatment facilities. Below are a few examples of towns who have engaged in service partnerships.[12]

- Campton-Thornton Solid Waste Disposal
- Londonderry-Pelham Fire Mutual Aid [9 towns and cities]
- Derry Area Ambulance Service [3 towns]
- Northwood-Nottingham Rescue Service
- Nashua-Hudson Wastewater Treatment Facility

Additionally, the towns of Laconia and Gilford jointly developed an industrial park (by sharing infrastructure costs) on property that spanned town lines. The lessons learned from each of these towns may prove useful as communities participating in the CTAP process consider innovative partnerships.

---

[10] From: Title III, Chapter 53-A. Agreements Between Government Units. Section 53-A:3. Retrieved from: http://www.gencourt.state.nh.us/rsa/html/III/53-A/53-A-3.htm

[11] For RSA 162-G, visit http://www.gencourt.state.nh.us/rsa/html/XII/162-G/162-G-2.htm

[12] From: New Hampshire Selectperson Institute. 2005. Participant Handbook. Antioch New England Institute.

The Regional Planning Commissions and the NH Office of Energy and Planning will also serve as primary resources for innovative collaboration. The Department of Resources and Economic Development (DRED) may also be a source of ideas and technical assistance in the area of inter-municipal economic development activities.[13]

Maintaining affordable municipal services may be enhanced by some of the tools of growth management that attempt to place new development in and near existing community centers, and attempt to distribute the cost of services in new ways.

## Tools

### Impact Fees

"The impact fee represents a one-time, up-front charge on new development to pay for future public capital costs serving new development, or to recover past expenditures in capacity to accommodate that development."[14] As such, they are tools designed to keep overall tax bills for a community from rising due to unmet costs of services to new development.

Impact fees are widely used in New Hampshire. As of January 2006, 74 municipalities had an impact fee ordinance, including 22 of the 26 towns participating in the CTAP process.[15] The successes and failures of impact fees in these 22 towns may be instructive as communities evaluate the effectiveness and future uses of this tool.

### Phased Growth Planning / Phased Development

> This growth technique is used to control the rate of development within a community. Before an ordinance of this type can be adopted, the community must have both a master plan and a capital improvement plan in place. There must be a very clear link between these documents in order to ensure that the regulations could withstand a legal challenge. Within communities undergoing rapid growth, slowing the rate of development can be beneficial. It gives a community time to develop needed infrastructure to support the growth and to explore avenues to keep land undeveloped. Most communities specify both the timing of phased development, such as five years, and the number of units to be built in each phase. A phasing plan will normally limit the number of permits issued for a project during a given year, and establish a notice that unsustainable growth conditions exist within the community. [16]

---

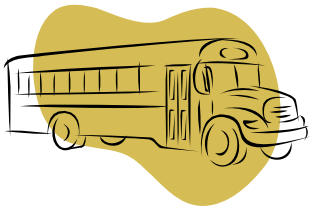
[13] The Department of Resources and Economic Development's website is http://www.nh.gov/dred/

[14] From: Impact Fee Development for New Hampshire Communities. 1999. Prepared by the Southern New Hampshire Planning Commission. Retrieved from: http://nh.gov/oep/resourcelibrary/referencelibrary/i/impactfees/documents/impactfeehandbook.doc

[15] From: Impact Fees: Municipalities with an impact fee ordinance as of 1/5/06 from the Municipal Land Use Regulation Database. NHOEP. Retrieved from: http://nh.gov/oep/resourcelibrary/referencelibrary/m/mlurdatabasereports/impactfees.htm

[16] From: Sprawl and Smart Growth Choices for Southern New Hampshire Communities. 2002. Southern New Hampshire Planning Commission.

# C. Schools



Not unlike roads, sewers and other community facilities, schools are a vital element of local infrastructure and they have a direct impact on how communities function. Traditionally, the decision-making factors that initially determine how and where to site school facilities [have been] primarily economic. However, building new schools, particularly smaller, neighborhood-oriented schools, has important land use implications for residential growth patterns. Good schools are an important determinant in where people choose to live and where companies choose to locate. By building schools close to where people live, communities can encourage quality growth policies that lead to better neighborhoods and more livable communities.[17]

"*Travel and Environmental Implications of School Siting*," released by the EPA on October 8, 2003, is the first study to empirically examine the relationship between school locations, the built environment around schools, how kids get to school, and the impact on air emissions of those travel choices. Over the next few decades, communities making decisions about the construction and renovation of thousands of schools will be challenged to meet multiple goals -- educational, fiscal, and environmental. The study finds that:[18]

- School proximity to students matters. Students with shorter walk and bike times to school are more likely to walk or bike.
- The built environment influences travel choices. Students traveling through pedestrian-friendly environments are more likely to walk or bike.
- Because of travel behavior differences, school location has an impact on air emissions.
- Centrally located schools that can be reached by walking and bicycling result in reduced air emissions from driving.

Many communities are discovering the benefits of using smart growth principles in creating schools that meet the needs of both parents and students. “Smart growth” schools:[19]

- Involve the community in school facility planning
- Make good use of existing resources, such as historic school buildings
- Are located within neighborhoods and fit into the scale and design of the neighborhood
- Act as a neighborhood anchor and community center
- Are usually small in size

[17] *Linking School Siting to Land Use Planning*, Atlanta Regional Commission, Georgia , 2003 Available online at: http://www.atlantaregional.com/qualitygrowth/SCHOOLS_TOOL.PDF

[18] *Travel and Environmental Implications of School Siting*, U.S. Environmental Protection Agency, EPA 231-R-03-004, October 2003. Available online at: http://www.epa.gov/livability/school_travel.htm

[19] Smart Growth Schools: A Fact Sheet, National Trust for Historic Preservation, Washington, DC, June 2003. Available online at: http://www.nationaltrust.org/issues/schools/schools_smartgrowth_facts.pdf

Other benefits which may be capitalized on include:[20]

- Inspiring greater community involvement.
- Improved academic achievement.
- Saving money.
- Improved student health.
- Improved environmental quality.

There are several New Hampshire polices that seem to discourage or inhibit community centered schools. State policies may need to be modified in order encourage and make more feasible community centered schools.

**Local Policies that Support Community-Centered Schools[21]**

To encourage renovation and construction of more community-centered schools and to promote better collaboration between school districts and towns, many local jurisdictions are revising regulations, passing new laws, and implementing innovative policies. The efforts described below reflect such actions taken by local governments and may serve as models or ideas for other towns.

- Incorporate State Funds to Create Neighborhood Schools
- Integrate School Construction and Renovation Plans into Neighborhood Revitalization Plans
- Create Relationships with Other School Districts, Counties, and Agencies to Curtail Sprawl
- Incorporate Community-School Principles into School-Building Programs
- Incorporate Community Services and Affordable Housing into Neighborhood School Projects
- Collaborate with Neighboring Institutions
- Create After-School Programs for Students and Community Members
- Encourage Renovation by Accurately Comparing Costs with New Construction
- Offer Bonus Funds for School Construction if Smart Growth Goals Are Met
- Institute a Safe Routes to School Program

[20] Smart Growth Schools: A Fact Sheet, National Trust for Historic Preservation, Washington, DC, June 2003. Available online at: http://www.nationaltrust.org/issues/schools/schools_smartgrowth_facts.pdf

[21] Schools for Successful Communities: An Element of Smart Growth, Council of Educational Facility Planners International, United States Environmental Protection Agency, 2004. On line at http://www.epa.gov/dced/schools.htm

## State Policies That Support Community-Centered Schools[22]

Policies, rules, and programs at the state level can augment and complement efforts at the local level to create community schools. State leadership can also spur movement towards community schools in places where it did not previously exist. Below is a sample of existing state policies that support community-centered schools.

- Promote School Area Safety
- Require Information-Sharing and Coordinated Planning between School Districts and Local Planning Agencies
- Use Schools to Promote Smart Growth Development and Redevelopment
- Coordinate and Integrate School and Land-Use Planning
- Direct State Funds to Schools in Existing Communities
- Set Aside Funds for Aging Schools
- Reduce or Eliminate Acreage Standards for Schools
- Change Grant Criteria to Encourage Renovation Over New Construction
- Protect Historic Schools
- Provide Dedicated Funding for Joint-Use School Projects

## Schools as Joint Use Facilities

The idea of joint-use--generically meaning the development of K-12 schools in combination with other facilities--is key to making schools the centers of their neighborhoods. Today, most educational facilities operate during a 7-8 hour time frame as stand alone institutions with limited access or joint use by other community organizations.

New school facilities should be accessible, day, night and all year round--to the community. Schools should serve as a variety of community needs in partnership with a wide array of public, civic, and private organizations. Smarter designs for new or renovated school facilities can accommodate direct community access to spaces like libraries, gymnasiums, auditoriums, health clinics, athletic and recreational fields, and performing arts space.[23]

[22] Schools for Successful Communities: An Element of Smart Growth, Council of Educational Facility Planners International, United States Environmental Protection Agency, 2004. On line at http://www.epa.gov/dced/schools.htm

[23] New Schools – Better Neighborhoods. Available online at: http://www.nsbn.org/case/jointuse/

## Tools

**Six principles for designing effective learning environments:**[24]

- Enhance teaching and learning, and accommodate the needs of all learners.
- Serve as a center of the community.
- A planning and design process that involves all interested parties.
- Provide for health, safety, and security.
- Make effective use of available resources.
- Allow for flexibility and adaptability to changing needs.

In working to incorporate some of the previouse concepts, communities can take a variety of approaches. The following case studies provide examples from different communities.

# Case Studies

### Littleton High School, Littleton, New Hampshire[25]

Known as one of the best small towns in America, Littleton, New Hampshire, has invested in its [local] high school to provide state-of-the-art educational facilities and solidify the school's role in the community. For years, the rural community of 6000 people debated whether to renovate the existing high school or build a new one elsewhere. With considerable community support, Littleton approved the largest bond issue in town history—$6 million—to renovate and expand the school, ensuring it will remain an important community resource.

The refurbished school was designed with a new lobby leading to overhauled classrooms, a new cafeteria, and music and technology facilities. The renovations were intended to ensure that the school is able to meet future enrollment with additional classrooms on a new second floor, reached by a newly installed elevator. The upgrades are expected to improve the educational performance of an already great school system, selected as one of the 100 best school districts in the country by Offspring Magazine in 2000.

The high school was recently chosen as one of a handful of schools nationwide to participate in NASA's Explorer School Program. The program provides opportunities for schools, administrators, and students and their families to collaborate with NASA to improve learning; participate in authentic experiences with NASA science; apply NASA science, mathematics, and technology to real-world issues and problems; and participate

[24] *Schools as Centers of Community: A Citizen's Guide for Planning and Design*, by Steven Bingler, Linda Quinn, and Kevin Sullivan, 2003. Sponsored by the National Clearinghouse for Educational Facilities, KnowledgeWorks Foundation, Building Educational Success Together, Council of Educational Facility Planners International, and Coalition for Community Schools, 2003. Available online at: http://www.edfacilities.org/pubs/centers_of_community.cfm

[25] Adapted from, Schools for Successful Communities: An Element of Smart Growth, 2004. Published by the Council of Educational Facility Planners International and the United States Environmental Protection Agency. Available online at: http://www.epa.gov/dced/schools.htm

in special events. Partnership leaders hope to introduce and expand a "culture of technology" among students from the primary to the secondary grades. The program recognizes that if students are not exposed to technology in high school, they are unlikely to consider it as a career option in post-secondary training.

At Littleton High, this exposure has already produced results. A physics class recently devised a self-heating system for school walkways in cooperation with the Massachusetts Institute of Technology and local mentors, through a grant from the Lemanson Foundation. In winter, waste heat from the school's boilers will be channeled into the pavement to melt snow. If this system works, it will be incorporated in Littleton's Main Street renovation.

The school has also developed unique partnerships with downtown businesses through "Main Street Academies," created to respond to students' desire to "make the learning real." Students attending the business academy in Chutter's General Store, for example, design the retailer's Web site, advertise, market to targeted customers, and negotiate shipping agreements. Those enrolled in the technology academy work with the town's GIS program (Bingler, "Community-based school planning," 2003).

Long a focal point of the town, the high school's central location allows many students to walk. In fact, only four school buses serve the school, and they are generally only half full. Littleton High School also makes great use of the community's civic amenities to meet its athletic needs. The town-owned Remmick Park, only a hundred yards from the school campus, hosts outdoor athletics like field hockey, soccer, and baseball. Additional fields for softball are only two blocks away. The school uses other town parks and nearby open spaces for events such as downhill and cross-country skiing.

Littleton's commitment to its public high school is part of a larger effort to recruit businesses and employees to this New Hampshire town. Debating the renovation, the chairman of the Board of Selectmen, Burton E. Ingerson, noted, "This decision is not only about schools, it is about the continuation of healthy and viable community and economic development for our collective future. We cannot expect to sustain economic vitality and tax base growth without addressing our school facility's needs" ("Expand and upgrade," 2002). The renovation coincides with substantial investment in the city's downtown. Since 1997, more than $2 million has been invested in building improvements guided by recommendations from the National Trust for Historic Preservation's National Main Street Center. Littleton received the Trust's Great American Main Street Award in 2003.

### Noble High School, North Berwick, Maine[26]

Noble High School in rural Maine participates in the Coalition of Essential Schools, a nationwide organization whose members adhere to a set of principles that encourages innovative teaching. The district uses a project-based, interdisciplinary approach, where

[26] From, Schools for Successful Communities: An Element of Smart Growth, 2004. Published by the Council of Educational Facility Planners International and the United States Environmental Protection Agency. Available online at: http://www.epa.gov/dced/schools.htm

teams consisting of math, science, English, and social studies teachers work with learning communities of no more than 100 students. Noble High School does not place students in classes or learning communities according to ability and/or skill level; rather, all classes are heterogeneous, and traditional departmental structures have been dissolved. Democratic processes, a collaborative environment, and standards-based curricula are central to the educational program of the district. This approach has brought dramatic results, with student scores rising from the bottom third to the top third in state testing.

The district wanted to encourage life-long learning for all ages and to provide much-needed space for community programs in a rural area that had no real community core. Despite needing a space large enough for 1,500 students, the three towns in the district wanted a friendly, small-school ambiance.

The year-long planning and design process was truly democratic, with intensive involvement by faculty, students, administrators, staff, parents and community members. Architects held meetings with the faculty and conducted in-depth interviews with each teacher individually and with all departments. They distributed detailed questionnaires, gathering information on specific needs and general ideas about the design. A student committee developed a survey questionnaire. Student facilitators led discussions in all classes. A half-day workshop was held for faculty, students, administrators, parents and community members. Every element in the school's design was based on determining what was best for students and began with five basic principles. The new facility should:

- Abolish anonymity by creating schools within schools
- Reflect the concept of teacher as coach, student as worker
- Accommodate a curriculum that is collaboratively designed, interdisciplinary and project-based
- Be a community center that embraces the community so community functions are integrated and not separated from education functions
- Be flexible in design, material, and function

These principles were expanded and formed the basis of a school that provides fifteen 100-student learning communities, each taught by four teachers. The result of this extensive planning process is a school that has a warm, small-school ambiance despite its 270,000-square-foot size and that provides space for numerous educational, recreational and community programs.

The school recognizes and establishes a sense of ownership for all three towns in the district. A wood arcade at the main entrance leads to an inviting skylit "Town Square" with three large, permanent display cases, one for each town, serving as a visible reminder that they are all part of the school district.

The need for lifelong learning is embodied in the design of Noble High School, with several community resources co-located in the facility and partnerships that serve the educational program of the school. A day-care center is adjacent to an adult education center and enables community members the opportunity to upgrade their skills and further their education while their children are tended to in an adjoining room. Students in a child-

care training program staff the center, and classes are offered during the day and in the evening.

The need for community health care in the area has resulted in a cooperative arrangement with a nearby hospital. Children from Noble, as well as from other schools in the district, can be treated at Noble's clinic. To provide as much privacy as possible, the clinic has a separate entrance, eliminating the need for parents to use the main entrance of the building. A parking area for the clinic is nearby.

Noble also has a small, 50-person restaurant, staffed by members of the school's culinary arts program. Students prepare and serve meals at a very reasonable cost. Students can practice a profession and community members can interact with them.

Noble's 1000-seat performing arts center ranks among the largest in the region and has professional-quality rigging, lighting and audio equipment to make it a community resource for many organizations. For athletic and fitness activities, the sports fields, gymnasiums and fitness center at the school are available for community use when not needed for scholastic activities. The library is designed with a special area for use by the community volunteers who come to the school to read to children in the day-care center.

### Minnesota Interdistrict Downtown School, Minneapolis, Minnesota[27]

Nine school districts collaborated on a new public school in downtown Minneapolis. The school is culturally diverse and capitalizes on the learning opportunities, resources and partnerships offered by the downtown environment, making it a national model for other urban communities.

Designed for sustainability, the building itself is a teaching tool. Many of the building's design innovations were incorporated into lesson plans at the school.

"The school's experiential program and urban setting drove many of the design decisions," said John Pfluger, project manager from Cuningham Group. "The result is a learning environmental that is dramatically different from a typical, brick-box suburban school."

#### Doing more with less

An interesting challenge was reducing the total square-footage required for the school. Thanks to thoughtful design and its urban location, the school makes efficient use of space, requiring only 0.0002 acres of land per student; a typical suburban school would use 0.04 acres.

Resource use was minimized in other ways:

- Partnerships between the school and downtown businesses and institutions eliminated the need for a separate gymnasium, auditorium and library. The use of existing facilities saved more than money: a gym floor alone would have required the wood of 100 maple trees.

[27] Minnesota Office of Environmental Assistance, 2002, available online at: http://www.moea.state.mn.us/greenbuilding/downtownschool.pdf

- The school was built on top of an existing parking garage, eliminating a new foundation.
- Open classrooms support the school's educational approach and require fewer walls.
- Carpeted areas were minimized.
- The exposed ceiling uses fewer materials and allows observation of the building systems as part of the curriculum.
- Standard dimensions were used in the design of mobile shelving units and installed carpeting, reducing waste from scrap and trimmings.

Materials were selected to reduce impacts on the indoor and outdoor environment over the lifetime of the building. These included low or no-VOC materials, products made from renewable materials, and materials with recycled content. Preference was given to products that required less energy and resources to create and transport, such as WheatBoard™ for mobile shelving units, recycled glass tiles in the restrooms; and low VOC paints and carpeting.

Another goal was energy-efficient operation. The building incorporated the first active solar installation in downtown Minneapolis. SOLARWALL® is a large rectangle of dark, perforated metal mounted flush to the penthouse wall that preheats outdoor ventilation air during the winter. This special feature adds a stylistic element to the building's exterior, and its energy-saving role will be discussed as part of the school curriculum.

Lessons learned

- Nonstandard materials require persistence. New or nonstandard products may require more time to follow through the process, though this investment of time pays off in subsequent projects. The design team's environmental advocates needed to shepherd these choices throughout the design and construction process. One product success story was the use of WheatBoard™, a particle board made from agricultural residues. Although this was a new material for the project's contractors, once their initial concerns were addressed, the design team was very pleased with the performance.

- Work with existing priorities. It is easiest to gain support for those sustainable strategies that enhance the issues already driving a project. There were many reasons in addition to the environment that supported the decisions to use an urban site, share spaces with the community, and have access to daylight. And part of the support for the SOLARWALL® was driven by its educational role as well as its energy savings.

- Success creates advocates. Some design team members were not initially supportive of the project's sustainable strategies and the decisions to incorporate new or non-standard materials. After witnessing these strategies successfully integrated and the client satisfied, the same team members became champions for sustainability in subsequent projects.

# D. Affordable & Mixed Housing

> New Hampshire is facing a critical housing supply problem. This is true of housing units in all pricing categories, but is especially true of affordable units. With more than fifteen thousand new residents annually, and new jobs being created, "workforce" housing units in New Hampshire are becoming scarce. Having a range of housing types for all segments of the population should be a primary concern for all New Hampshire communities.[28]

This quote from the document *Housing Solutions for New Hampshire* raises the challenge that New Hampshire communities are facing in providing a full range of housing stock as their populations continue to grow. Compounding this challenge are the goals of facilitating economic growth, using natural resources sustainably, and maintaining rural character in communities.

Demand for housing in New Hampshire has increased steadily with population growth. The price of housing is related in part to the availability of the housing stock, which is stretched.[29] According to the National Low Income Housing Coalition, in 2004 New Hampshire was the 10th least-affordable state in the country for renters, requiring an hourly wage of $16.79 to afford the average two-bedroom fair market rental unit in the state.[30] The minimum wage in New Hampshire is currently $5.15 per hour.[31]

These challenges can be addressed, and many communities have been taking steps to provide for diverse and affordable housing options.

## Tools and Case Studies

The following recommendations, tools, and case studies are adapted from *Housing Solutions for New Hampshire*, prepared for the New Hampshire Housing Finance Authority by Jeffrey H. Taylor and Associates:[32]

### Regional Cooperation

> • Planning boards can work with regional planning commissions, which under the provisions of RSA 36:47,II, are required to produce periodic regional housing needs assessments that include analysis of "the regional need for housing of persons and families of all income levels."

---

[28] From: Housing Solutions for New Hampshire. 2004. Prepared for the New Hampshire Housing Finance Authority by Jeffery H. Taylor and Associates, Concord, NH. Retrieved from: http://www.nhhfa.org/frd_housingsolutions.htm

[29] From: Housing Solutions for New Hampshire. 2004. Prepared for the New Hampshire Housing Finance Authority by Jeffery H. Taylor and Associates, Concord, NH. Retrieved from: http://www.nhhfa.org/frd_housingsolutions.htm

[30] From: Out of Reach 2004: Least Affordable States. National Low Income Housing Coalition. Retrieved from http://www.nlihc.org/oor2004/table1.htm

[31] From: Employment Standards Administration Wage and Hour Division: Minimum Wage Laws in the States- January 1, 2006. US Department of Labor. Retrieved from http://www.dol.gov/esa/minwage/america.htm#NewHampshire

[32] Adapted from: Housing Solutions for New Hampshire. 2004. Prepared for the New Hampshire Housing Finance Authority by Jeffery H. Taylor and Associates, Concord, NH. Minimal modifications have been made.

## Zoning Impact Review

• Communities should review local zoning ordinances to make sure they do not exclude or unreasonably limit multi-family housing options or run afoul of the provisions of RSA 674:32 regarding siting manufactured housing.

• Communities should assess lot size and frontage requirements with an eye toward regulations that protect environmentally sensitive areas, but do not result in unreasonable barriers to affordable housing opportunities.

• Communities should be cautious about growth control regulations to ensure that they are …motivated by a need to control the timing of growth in order for the municipality to manage the financial burdens of expanding the capacity of municipal services.

## Innovative Land Use Controls

• Communities should look to the innovative zoning techniques permitted under RSA 674:21 as a means of taking new approaches to land use regulation. Among these innovative land use controls is "inclusionary zoning," which are regulations that provide incentives to property owners to produce affordable housing units. Inclusionary zoning techniques include but are not limited to density bonuses, growth control exemptions and a streamlined application process.

## Incentives and Flexibility for Developers

• In New Hampshire private and non-profit developers have been, and will continue to be, the driving force behind the creation of housing units. They have been responsible for a large percentage of the affordable units that have been created throughout the state. Allowing a greater range of housing types in a community will make the creation of new units possible. Incentives, such as density bonuses, will also generate greater interest in producing a variety of housing in different price ranges. This will give the developers in the state more flexibility to meet the market demand for starter homes and affordable apartments.

## Housing Organizations

One approach to keeping the issue of housing and affordability on the table is to partner with, or establish, a housing partnership. Such an organization can effectively keep housing issues on the local agenda. Active housing organizations can be used to raise public awareness of housing issues, work to identify the range of needs and opportunities, and access financial and technical assistance from New Hampshire Housing Finance Authority.

Successful housing partnerships have the support of local officials, create a broad network of interest groups and organizations, and involve housing professionals.

Case Study: Concord Area Trust for Community Housing (CATCH)

Helping a family to become homeowners or find a stable, affordable apartment means changing the quality of life for that family and improving neighborhoods for the long term. Since 1989, the Concord Area Trust for Community Housing has done just that. They accomplish their mission by increasing the supply of affordable apartments, searching beyond city limits to expand housing choices, educating and empowering families to take control of their finances and to purchase their own homes, and nurturing neighborhoods through quality local management.

This mission has been accomplished through the creation of 142 dwelling units, which have helped over 350 people gain access to decent and affordable housing. CATCH has also assisted over 50 families in purchasing their own homes. Their latest development -Willow Crossing- added 24 new affordable rental units to Concord and Penacook.

CATCH has gained local and national recognition for their work, however, they take greatest pride in helping local families and individuals access safe, decent, affordable housing.

State Agencies and NGOs working on Affordable Housing within the CTAP Region:

New Hampshire Housing Finance Authority http://www.nhhfa.org/
New Hampshire Community Development Finance Authority http://www.nhcdfa.org/web/index.html
Concord Area Trust for Community Housing (CATCH) http://www.catchhousing.org/
Families in Transition http://www.fitnh.org/
Habitat for Humanity: Capital Region
http://www.habitat.org/script/link.asp?url=local%2Ehabitat%2Eorg%2Fnew%5Fhampshire%5Fcapital%5Fregion
Habitat for Humanity: Greater Manchester http://www.habitatmanchester.org/
Habitat for Humanity: Greater Nashua http://www.nashabitat.org
Manchester Housing & Redevelopment Authority http://www.manchesterhousing.org/
Manchester Neighborhood Housing Services http://www.mnhs.net/
Neighborhood Housing Services of Greater Nashua http://www.nhsgn.org/ (under construction)
http://nfs.nw.org/report/nworeport_print.aspx?orgid=8199
Rockingham Community Action http://www.rcaction.org/
Southern New Hampshire Services http://snhshome.homestead.com/Index.html

## Inclusionary and Incentive Zoning

*Description:* New development must include affordable housing units as part of the mix of uses in order to receive the incentives or bonuses identified in the ordinance.

*Advantages:* This ordinance provides an incentive to the applicant up front if affordable housing units are included in the project.

*Cautions:* Inclusionary and incentive-based zoning ordinances are designed to operate through internal subsidies, where some costs are shifted from affordable units to market units. Therefore, it requires density bonuses and other subsidies to achieve the desired affordability while ensuring a profitable return for the developer.

In New Hampshire inclusionary ordinances are incentive-based in nature. Some other states do allow for inclusionary zoning that does not provide an incentive, or direct benefit to the developer. State law in New Hampshire does not allow communities to require the inclusion of affordable housing in a proposed development without providing the developer with an offsetting benefit. Density is often the chosen incentive.

If a community decides to adopt an inclusionary or incentive zoning ordinance some of the decisions they need to make are:

- What should the percentage of affordable units be?
- Must the affordable units be comparable in size and amenities to the market rate units?
- Will the community accept payments-in-lieu of affordable units to be used elsewhere in the community for creating housing?
- Will phasing be allowed?

The issue of integrating market and affordable units has become more complex as the types of development have become more diverse (age-restricted, service-enhanced, etc.), and more expensive. Carefully consider whether a payment-in-lieu of units, or the provision of units off-site might better serve your community's identified needs. The first priority should be to increase the number of affordable housing units in the community. Communities can work to protect the affordability of these units into the future, or allow them to float with the market. The design of the units, and the amenities offered, can help regulate how much their value will increase in relation to other nearby properties. This is one technique for limiting the equity without extensive control mechanisms.

### Case Study: Watson Road- Exeter, New Hampshire

The Town of Exeter has adopted an affordable housing ordinance that provides a density bonus for the inclusion of affordable housing. The recently approved Watson Road subdivision incorporates affordable housing units and open space to create a mixed income neighborhood.

With a total of 90 new units on 112 acres, this new subdivision includes 153 acres of open space that links to other protected parcels in the area and preserves the existing trail network. Twenty affordable housing units are included in multi-family structures along with some market rate multi-family units, duplex units and single family residences. The development uses a community well and relies on individual and community septic fields.

**Accessory Dwelling Units**

*Description*: Allowing additional independent units within existing structures, or on the same lot.

*Advantages:* Creates additional units and increases the affordability for the owner and the tenant. This is an easy way to increase the number of affordable units in the community with little land use impact.

*Cautions:* Allowing dwelling units in accessory structures needs to be examined carefully at the local level to ensure that such a policy will not impact the community, or adjacent land owners, in a negative fashion.

The structure in this picture, from Plymouth, is a renovated carriage house that now accommodates two apartments.

The communities of Hudson, Exeter, Hollis, Lyme, Bennington, Meredith, Nashua, and Plymouth all allow accessory dwelling units in some fashion. Some of these regulations allow the units in the primary structure, and within existing, or new, accessory structures. This allows extra flexibility to include units over garages, or in remodeled outbuildings.

Also see CTAP Resource Book 1, page 20, for a case study of an accessory dwelling unit program in Santa Cruz, CA.

# E. Infill and Redevelopment

Many New Hampshire communities have found an answer to part of their growth challenges through the reuse of physical structures that already exist in a community as sites for economic redevelopment. Additionally, they have found benefit from filling in additional development at and around sites of former commercial and industrial activity. As described in CTAP Resource Book 2, our state's historic development patterns have left a legacy of buildings and commercial/industrial areas that no longer are needed for their original design purposes: Old mill buildings along our rivers, outdated facilities situated in industrial parks near railroad tracks, old farm buildings in rural areas, and most recently aging shopping plazas along our major road corridors. Each of these types of structures represent former economically-viable buildings that today are either underutilized or outright abandoned, and each offers its own set of opportunities for reuse. In these unused spaces, municipalities are often missing out on the opportunity to create jobs, provide services, meet housing needs, and increase revenues for their communities.

The practices of redevelopment and infill can achieve many results described as desirable through the CTAP vision map process including reduction of the need for new development to sprawl, conservation of open space, and the promotion of development in areas of traditional community activity. It can also help preserve historic structures, create affordable housing opportunities, attract business, and develop mixed-use areas throughout a community.

## Tools

Several New Hampshire towns have had success with infill and redevelopment. The following tools have been used by NH communities to promote beneficial reuse of existing infrastructure:

- Changes to zoning ordinances to allow mixed usage within existing buildings
- Incentives for infill, including setback and parking requirement reductions
- Community Visioning
- Design charrettes [multi-stakeholder planning events]
- Grant funding: Community Development Block Grants
- Innovative Partnerships: municipality, state, local and regional NGOs, businesses, state and federal agencies, regional planning commissions.

## Case Studies

The case studies below illustrate the above-mentioned tools in action to promote reuse of existing structures within a community:

### Commercial Infill and Redevelopment
### Verizon Wireless Arena, Manchester, New Hampshire[33]


Looking to strengthen downtown, the City of Manchester replaced an aging strip mall at the intersection of Elm Street, Granite Street and Lake Avenue with the Verizon Wireless Arena. The 10,000-11,000 seat facility opened in fall 2001. The location brings spillover effects to retailers and restaurants throughout downtown. A key to the Arena's success in fostering downtown economic development was the City's decision to limit on-site parking. A small accessible parking lot was provided on-site, but the arena depends on surrounding neighborhoods for parking. Over 4,000 parking spaces in municipal garages, parking lots, and on-street parking are available within 2,000 feet of the Arena.

### Redevelopment for Historic Preservation and Mixed Uses
### Belmont Mill, on Route 140, Belmont Center

The Gilmanton Village Manufacturing Company began producing cotton and woolen goods in the historic mill known as the 'Brick Cotton factory' in 1833. Demolition was ordered after the property was taken by tax deed in 1995, and the structures surrounding the core building were torn down. A group of concerned citizens petitioned the court to halt the

Belmont Mill 1995

[33] From: Achieving Smart Growth in New Hampshire. 2002. NHOEP

demolition. The order to halt demolition was received the day the bell was removed from the tower.

A design charrette generated possibilities for reuse and the community worked together to find viable options.

Belmont Mill 2001

After the charrette the Town secured Community Development Block Grant funding for a building program that included multiple uses. The building is now a vibrant center of community life. The cupola, which is featured in the Town Seal, again houses the bell that once awoke the village.

A child care center on the ground floor has its own entrance and direct access to the playground. The second floor holds a large community function room and kitchen, and the Community Action Program offices. The third floor is home to a local family health clinic. The top floor Food For Thought Café is run by the NH Technical College collaborative culinary arts program.

### Redevelopment for Historic Preservation and Municipal Services
### Plymouth Town Hall, Plymouth, New Hampshire[34]

Listed on the National Register of Historic Places, this building has been part of local and county government since it was built in 1891. Originally a Grafton County Courthouse, it remained in county use until 1972. The Town of Plymouth purchased the property in 1982, and in 1994, needing to upgrade and replace town offices, Plymouth citizens voted to renovate the building for municipal offices. Plymouth wanted to keep the town offices in the center of town. This choice on Route 3 downtown reflects the town's traditional settlement patterns and helps maintain foot traffic in the downtown area.

### Redevelopment for State Services
### State Hospital, Concord, New Hampshire[35]

The 120-acre campus of New Hampshire State Hospital is located on Pleasant Street in the middle of downtown Concord. The psychiatric treatment center was once home to over 3,700 patients and necessary nursing, medical, and support staff. Decentralization of treatment has reduced space needed for the hospital, and presented a re-development opportunity for the publicly owned

[34] From: Achieving Smart Growth in New Hampshire. 2002. New Hampshire Office of Energy and Planning
[35] From: Achieving Smart Growth in New Hampshire. 2002. New Hampshire Office of Energy and Planning

campus. The State has undertaken a plan to convert 300,000 square feet of hospital space to office use over the next decade. State employees are moving into buildings converted into attractive offices. The Brown Building, shown here, now houses the NH Department of Health and Human Services.

# F. Brownfield Redevelopment

Some property candidates for infill and redevelopment are facilities that contain on-site hazardous contamination. While these sites might be well-placed or designed for redevelopment, the expense and legal liabilities involved in cleaning up these "brownfield" sites has scared off some investors and municipalities from attempting to reconstruct them.

Brownfield redevelopment has gained increasing national attention in recent years as communities across the country face growth challenges similar to New Hampshire. In 2002, President Bush addressed this issue in a speech that accompanied the signing of the Small Business Liability Relief and Brownfields Revitalization Act:

> Further benefit will come as businesses recycle older properties and spare surrounding lands from development… One of the best ways to arrest urban sprawl is to develop brownfields, and make them productive pieces of land, where people can find work and employment. By one estimate, for every acre of redeveloped brownfields, we save four and a half acres of open space. [36]

## Tools

The New Hampshire state legislature passed RSA 147-F, the "Brownfields Program" in 1996. This statute sought to address the challenges of brownfields redevelopment in the state by expediting and facilitating remediation of these sites, and by "providing comprehensive liability protection" to entities interested in redeveloping brownfields who were not involved in the creation of the original hazards.[37]

The Brownfields Program statute provides for two important programs that encourage brownfields redevelopment:[38]

- Brownfields Covenant Program New Hampshire's Brownfields Covenant Program is designed to provide incentives in the form of liability protections for the investigation, cleanup and redevelopment of contaminated properties by persons who did not cause or contribute to the contamination. An eligible person can obtain a "Covenant Not to Sue" from the N.H. Department of Justice (DOJ) and a "Certificate of Completion" from the N.H. Department of Environmental Services (DES) when site investigations and remedial actions are performed in accordance with

[36] Bush, G.W. Jan 11, 2002. Retrieved from http://www.whitehouse.gov/news/releases/2002/01/20020111-3.html
[37] Adapted from Title X: Public Health. Chapter 147-F. Brownfields Program. Retrieved from http://www.gencourt.state.nh.us/rsa/html/X/147-F/147-F-1.htm
[38] Visit the NH DES website "Hazardous Waster Remediation Bureau Brownfields Program for more information. http://www.des.state.nh.us/BrownfieldsNH/

DES cleanup requirements.[39] The covenant provides liability protections for those contamination issues addressed by an approved remedial action plan. After the cleanup is completed, the covenant can be recorded and will "run with the land" such that its protections will accrue to successor owners.[40]

- Brownfields Cleanup Revolving Loan Fund (BCRLF) The BCRLF is intended to be a flexible financing tool that provides "short to medium term," low interest loans to property owners, developers and/or municipalities to fund the remediation of contaminated properties.
  - Loans typically range from $50,000 to $300,000, but there is no set maximum. [41]
  - The interest rate is generally set at 3 percent. Other loan terms are generally customized to the specific needs of the borrower and the project.[42]
  - Loans for environmental remediation may have terms up to 10 years. The actual term is negotiable, but the borrower must justify the maximum term. DES will give preference to short term (6-18 months) "bridge" style loans.[43]
  - A percentage of the loan fund can be utilized to make cleanup grants (that need not be repaid) to eligible entities. These grants are awarded on a competitive basis, as monies become available.[44]

**Additional DES brownfields initiatives include the following**

- Brownfields Assessment Program New Hampshire's Brownfields Assessment Program provides technical assistance on behalf of municipalities and other eligible entities to characterize contamination at brownfields sites. By providing information about potential building hazardous materials, soil and groundwater contamination, and other issues of environmental concern, brownfields assessments provide recipients with the information necessary to position sites for cleanup and reuse. The available assistance includes Phase I site assessments, Phase II site investigations and remedial planning services. The assistance is provided as a grant of services from one of DES's contract environmental consulting firms. The consulting firm performs the work under contract to DES and on behalf of the recipient.

  Eligible entities include municipalities, other units of government, such as local or regional economic development agencies, and non-profit organizations. Eligibility is determined by application to DES. Applications are accepted on a rolling basis and assistance is awarded as funds are available. Funding is provided from federal brownfields grant monies awarded to DES from the U.S. Environmental Protection Agency.

  Upon award of assistance, DES assigns a staff geologist or engineer to serve as project manager. The DES Project Manager works closely with the recipient and the environmental

[39] From "New Hampshire's Brownfields Covenant Program. 2005. NH DES. Retrieved from http://www.des.state.nh.us/factsheets/rem/rem-8.htm
[40] Wimsatt, Michael Brownfields Coordinator, NHDES, 2006.
[41] From: New Hampshire's Brownfields Cleanup Revolving Loan Fund. 2004. NH DES. As amended by Wimsatt, Michael, NHDES 2006. Retrieved from: http://www.des.state.nh.us/factsheets/rem/rem-7.htm
[42] From: New Hampshire's Brownfields Cleanup Revolving Loan Fund. 2004. NH DES. As amended by Wimsatt, Michael, NHDES 2006. Retrieved from: http://www.des.state.nh.us/factsheets/rem/rem-7.htm
[43] From: New Hampshire's Brownfields Cleanup Revolving Loan Fund. 2004. NH DES. Retrieved from: http://www.des.state.nh.us/factsheets/rem/rem-7.htm
[44] Wimsatt, Michael Brownfields Coordinator, NHDES, 2006.

consulting firm to ensure that an appropriate assessment is completed and the site is properly positioned for cleanup and reuse.[45]

- DES/Grantee Brownfields Partnership The U.S. Environmental Protection Agency provides direct grants to municipalities, other eligible government agencies, and non-profit organizations for brownfields assessment and cleanup. These grants are awarded through a competitive application process conducted by EPA during the fall each year. Since the program began in 1996, more than ten New Hampshire communities and organizations have received grants.

  In an effort to help New Hampshire grantees maximize the effectiveness of their grant dollars and the success of their efforts, DES established a policy of assigning a staff geologist or engineer to serve as a brownfields grant liaison. The liaison works closely with the grantee to provide assistance with implementing the grant workplan. The liaison may help the grantee to:

  - develop a brownfields site inventory;
  - select sites for assessment;
  - understand the DES site remediation process;
  - understand technical reports prepared for sites;
  - advertise for and select an environmental consultant;
  - provide local public outreach;
  - coordinate with other DES programs; and
  - coordinate efforts with U.S. EPA.

  While this program does not provide direct financial assistance to recipients, it provides important assistance that helps to ensure the success of EPA grant recipients. It also has helped DES build productive, mutually beneficial relationships with our local communities.[46]

Additional funding opportunities may be available through the US Environmental Protection Agency.[47] In 2004, US EPA awarded four grants totaling $800,000 to New Hampshire to "assess, clean, and redevelop abandoned contaminated parcels known as Brownfields."[48] Grants were awarded to the city of Nashua, the Nashua Regional Planning Commission, the North Country Council, and the City of Keene.[49]

[45] Wimsatt, Michael Brownfields Coordinator, NHDES, 2006.
[46] Wimsatt, M, Brownfields Coordinator, NH DES 2/14/06. Email correspondence.
[47] For more information on the Federal Brownfields legislation, including the benefits it provides, see: "Brownfields Cleanup and Redevelopment: Small Business Liability Relief and Brownfields Revitalization Act" at http://www.epa.gov/swerosps/bf/sblrbra.htm and "Benefits of Brownfields Legislation" at http://www.epa.gov/swerosps/bf/html-doc/2869ben.htm
[48] From "EPA Awards Four Brownfield Redevelopment Grants in New Hampshire; Part of $75.4 Million Funded Nationwide." 2004. Retrieved from http://www.epa.gov/boston/pr/2004/jun/040614.html
[49] From "EPA Awards Four Brownfield Redevelopment Grants in New Hampshire; Part of $75.4 Million Funded Nationwide." 2004. Retrieved from http://www.epa.gov/boston/pr/2004/jun/040614.html

# Case Studies

## Brownfield Redevelopment

The following two New Hampshire case studies show the potential for brownfield redevelopment in our region to create housing opportunities and community destinations.

### Brownfield to Housing Development, Newmarket, New Hampshire[50]

The Essex Mills complex is located on both sides of the Lamprey River in downtown Newmarket, adjacent to a dam that was originally used to power the mill. The original cotton mill was run by the Newmarket Manufacturing Company, and was constructed around 1823. Subsequent uses include shoe manufacturing and the manufacturing of electric wire products.

The brownfields project involves the portion of the complex located on the east side of the Lamprey River on Bay Road. The project is a great example of New Hampshire's integrated approach to brownfields revitalization, wherein public funds are judiciously used in concert with a variety of initiatives to leverage private sector investment in redevelopment. Beginning in 1999, using an EPA Brownfields grant, the NH Office of State Planning-Coastal Program provided site investigation services on behalf of the Town of Newmarket, who had acquired the site. The purpose of the grant of services was to quantify the environmental liabilities associated with the site. As this work progressed, DES negotiated with a responsible party at the site, United Technologies, to perform further investigations into fuel oil contamination and a suspected former manufactured gas plant (MGP) believed to be located on the site. (This work was beyond the scope and available budget of the OSP study.) Around this time, the Town negotiated transfer of the property to the Newmarket Community Development Corporation (NCDC).

During performance of the site investigation work in the fall of 2000, NCDC entered the NH Brownfields Covenant Program, in order to provide itself with liability protection for the contamination issues being addressed by OSP and United Technologies. During 2001, NCDC sold the property to a developer, Bryant Rock, LLC (Chinburg Builders, Inc. of Durham, NH). Bryant Rock then became a participant in the Covenant Program, while implementing its plans to redevelop the site as residential condominiums. The project, to be known as Bryant Rock Condominium, will have 36 units in three existing buildings and one new building. Most notably, the first phase includes the semi-historic preservation of a four story cut granite mill building for use as 26 waterfront residences.

[50] Adapted from: Russell, Carolyn. Environmental Quality Impact Planner. NHDES. 2006

Concurrent with the redevelopment process, United Technologies confirmed the presence of the former MGP facilities, performed a removal of contaminated soils, and installed additional groundwater monitoring wells to monitor groundwater quality. The final components of the remedial action plan are being nailed down, including engineering controls and Activity & Use Restrictions intended to limit exposure to site soils that have residual contamination. The developer will then be eligible for a covenant. The first phase of construction is scheduled to be complete in early spring, 2006.

Total public funds expended for this project were approximately $50,000. Projected redevelopment value is in excess of $5,000,000. The project resulted in the removal of an attractive nuisance and downtown eyesore that posed dangerous site conditions for area youth and other trespassers. In addition, 36 units of housing have been provided in downtown Newmarket, within walking distance of all downtown services. An historic footbridge over the river, which connects the two mill complexes, will be preserved, maintained, and open for public use. A river access point from Bay Road, located on the site, will also be open to the public.

In summary, through modest use of public resources (OSP Brownfields Grant), employment of the self-sustaining Brownfields Covenant Program, and proper application of DES's site cleanup program requirements; an outstanding brownfields redevelopment project has been realized. This success is due to the efforts of the public and private partners who came together to make it happen. They include the Town of Newmarket, NCDC, NHOSP, NHDES, USEPA, Bryant Rock, LLC, and United Technologies.

## Brownfield to Proposed Waterfront Community Park, Former Pillsbury Mill, Tilton, New Hampshire[51]

*Success in Brownfields Assessment Grant Program*

### Overview

In 1998, town contractors conducted an environmental assessment and found waste chemicals, asbestos containing materials (ACMs), storage tanks, and a transformer presumed to contain polychlorinated biphenyls (PCBs) at the site. The town removed all of these hazardous wastes from the property and then demolished the site buildings. In 2001, the N.H. Department of Environmental Services (DES) conducted a Brownfields Assessment to further characterize the environmental conditions at the site. The assessment found site soils were mixed with ash containing lead and barium in concentrations that required the soil to be disposed as a hazardous waste.

### History

The property, located near the town center at 336 West Main Street, was first developed in 1868 as a textile mill and later as a shoe factory. After more than a century of various uses, the mill building was vacated in 1985. In 1995, the town of Tilton acquired the property through tax foreclosure. In 1999, the mill building was demolished, and a portion of the demolition debris was burned, creating lead and barium contaminated ash, which mixed with on-site contaminated soils.

[51] Adapted From: Brownfields New Hampshire Success Stories. NHDES. Retrieved from: http://des.nh.gov/BrownfieldsNH/pdf/Tilton.pdf

### Assessment and Redevelopment

At the request of the Board of Selectman, the DES Brownfields Program assisted the town in understanding the environmental issues associated with redevelopment of the site. In 2001, DES contracted with GZA GeoEnvironmental, Inc. to perform a site assessment to better understand the nature and extent of the environmental conditions at the site. Lead and barium were detected in site soils at concentrations up to 6,800ppm and 5,520ppm, respectively. In 2003, DES requested assistance from the U.S. Environmental Protection Agency Region One (EPA) to conduct an Emergency Removal Action. EPA completed soil excavation and removal during the summer of 2004, thereby preparing the site for future reuse.

### Vision for the Future

Looking to the future, the dream of constructing a downtown riverfront park has been a long term effort by local citizens, including Tilton Selectmen, the Tilton Riverfront Park Committee, volunteers, and numerous civic groups and local businesses. Proposed redevelopment of the property includes construction of a small pavilion with a bell tower to house the bell from the former mill, American Disabilities Act (ADA) accessible boat ramps, and three fishing piers. When completed, the site will provide a scenic waterfront community park, incorporating a sledding hill, a meadow for play, ice skating, swings, ADA compliant paths, and picnic areas located near the center of this small New England town.

Deciding if brownfield redevelopment is the best option for a municipality requires, among other things: A community visioning session(s), environmental site assessment, cost-benefit analysis, an exploration of funding opportunities, and consultations with brownfields redevelopment experts. The above case studies illustrate that, despite seeming initial challenges, these projects can provide great benefits to New Hampshire communities.

## G. Environmental Protection

Preserving natural spaces and protecting the quality of natural resources were strong themes that emerged from the vision map exercise. In managing and guiding development, communities play an important role in achieving these objectives. Federal and state regulations often address only certain resources or certain types of activities, might provide only a minimum standard of protection, and may not apply in many situations – thus, local municipalities are responsible for covering these gaps. Also, local regulations are the guiding force determining the location and design of different types of development within a community (see CTAP Resource Book 2 for some of the guiding regulations in New Hampshire). Often these regulations have a significant effect on the impact of development to the environment and surrounding natural resources. With respect to design, for example, local zoning typically determines whether important resources are adequately buffered from the effects of development, whether homes may be grouped together to preserve open space, or whether new industrial, commercial, or public buildings will be as environmentally-friendly as possible.

There are many ways in which a community might begin to provide for better design and development practices to minimize impacts on natural resources. For example, communities

might pursue zoning and subdivision/site plan regulatory changes to provide for alternative forms of subdivisions that have lower impacts (see Village Development tool below and Open Space/Conservation Subdivision discussed in Resource Book 2) or to review their subdivision design requirements to reduce impacts (see Better Site Design case study). Communities might also pursue a more general approach to minimize the impact of development through performance standards aimed at reducing impacts on a wide-variety of perspectives (see Minimum Impact Development discussion below). Communities might also pursue more specific changes to their zoning and regulations aimed at a particular resource (e.g., overlay zoning) or type of impact (e.g., stormwater management), or offer voluntary design guidelines or plan review checklist to encourage better development.

## Tools

***Minimum Impact Development Standards*:** Minimum Impact Development (MID) is an approach that seeks to minimize any negative effects of new development on the environment by reconsidering the location, siting, and design of subdivisions and individual buildings. Minimum impact development practices focus on reducing energy and water consumption, soil erosion, habitat disturbance, stormwater runoff and pollution, and air and light pollution. Minimum impact development can also serve to reduce waste production and improve indoor air quality.

MID can be achieved through a variety of planning tools and techniques. Communities that have clearly defined MID goals within their municipal Master Plan can implement MID through a combination of tools. These tools include local zoning ordinances, subdivision and site plan regulations, building codes, driveway regulations, and road design specifications.

MID can be applied at both the site and building level as well as to a whole subdivision design. Communities may wish to pursue all or just some MID practices. Generally, these include:

- Limiting Development Footprint/Maintaining Substantial Contiguous Open Space
- Dispersed Stormwater Management with Infiltration Maintained
- Water Conservation Design
- Energy Efficient Design
- Native Species Landscaping
- Wildlife Habitat Protection
- Walkability/Sustainable Transportation
- Recyclable/Reusable Construction Materials
- Maintaining/Providing for Social Connections and Interactions

**Specific Elements of Minimum Impact Development and Design (information compiled by Carolyn Russell, Environmental Quality Impact Planner, NH Department of Environmental Services)**

- Community goals for conservation of important greenway corridors and natural areas are reflected in the design and layout of new developments:
  - Wildlife areas and corridors are preserved.
  - Roadways maintain rural character – scenic roadsides and vistas are undeveloped.
  - Lakes, rivers, streams and wetlands are protected by significant natural buffers.
  - Groundwater recharge areas are maintained in a natural state to maximize infiltration.
  - Agricultural lands and prime soils are preserved.
  - Public greens and recreation areas are provided.
  - Site clearing and grading is minimized.

- Roadways, parking areas, driveways, sidewalks and trails are designed to minimize impervious surface, reduce runoff, promote walkability, and provide character:
  - Roadways follow the lay of the land and are the minimum width necessary for safe travel, reducing the amount of impervious surface and increasing safety by slowing general traffic
  - Development setbacks are reduced, parking areas and driveways are limited in size
  - Sidewalks and trail systems connect the development to the surrounding community, providing for a more walkable/bikeable community and reducing the need for automobile use

- The potential for nonpoint source pollution of area lakes, rivers, and streams is reduced:
  - Impervious surfaces are disconnected - stormwater runoff is directed to vegetated areas and managed onsite
  - Opportunities for natural infiltration of stormwater are increased

- Resource needs of buildings and landscaping are minimized:
  - Buildings are designed to minimize heating and lighting needs, reducing air pollution from energy production
  - The area of lawn is reduced and sites are landscaped with native, drought tolerant species to reduce water and fertilizer needs
  - If a sprinkler system is needed, its use is regulated with a rain gauge system

***Village Plan Alternative Subdivision/Village D esign Ordinance:*** Strategies that help to concentrate development in a limited areas not only preserve undisturbed open space, but also provide other environmental, economic, and social benefits to a community. The Conservation Design Subdivision (discussed in CTAP Resource Book 2 in the section on Open Space Zoning/ Cluster Development/ Conservation Subdivision Design, page 42) is one such strategy, along with infill and downtown-focused development. The village plan alternative subdivision is another tool that can help to organize development in a more compact fashion and accomplish several goals highlighted in the CTAP visioning process, including: maintenance of environmental quality, conservation of open space, affordability and consolidation of municipal services, creation of economic development opportunities, and enhancement of vibrant, walkable communities. The ordinance aims to recreate and enhance traditional New England village designs, which are denser areas of development surrounded by open space and working farm and forestlands, while allowing for the full economic development potential of each parcel of land.

NH statute RSA 674:21 further describes the ordinance as:

> [A]n optional land use control and subdivision regulation to provide a means of promoting a more efficient and cost effective method of land development. The village plan alternative's purpose is to encourage the preservation of open space wherever possible. The village plan alternative subdivision is meant to encourage beneficial consolidation of land development to permit the efficient layout of less costly to maintain roads, utilities, and other public and private infrastructures; to improve the ability of political subdivisions to provide more rapid and efficient delivery of public safety and school transportation services as community growth occurs; and finally, to provide owners of private property with a method for realizing the inherent development value of their real property in a manner conducive to the creation of substantial benefit to the environment and to the political subdivision's property tax base. [52]

There are two primary features to this ordinance:[53]

- The entire density permitted by existing land use regulations must be located within 20 percent or less of the entire parcel available for development.

- The village plan must comply with existing subdivision regulations relating to emergency access, fire prevention, and pubic health and safety; however… dimensional requirements having to do with frontage and setbacks, density regulations, and lot size regulations shall not apply.

The remaining undeveloped land in a village alternative subdivision would be subject to a conservation easement or some other form of open space protection. Farming, agriculture, and/or recreation (and the structures necessary for pursuit of those activities) would generally be allowed on those lands.[54]

The Rockingham Planning Commission (RPC-NH) has created a model Village Design ordinance that can serve as a blueprint for towns considering this approach. The model ordinance can be accessed at:

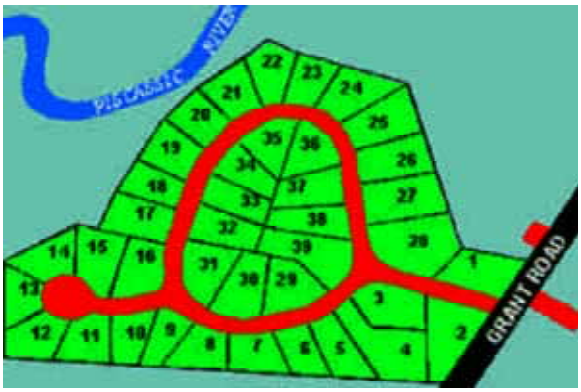
**http://www.rpc-nh.org/Village-Design.htm**

[52] Title LXIV: Planning and Zoning. Chapter 674, Local Land Use Planning and Regulatory Powers. Section 674:21 Innovative Land Use Controls. Retrieved from: http://www.gencourt.state.nh.us/rsa/html/lxiv/674/674-21.htm
[53] From: Village Design Model Ordinance. Rockingham Planning Commission. Retrieved from: http://www.rpc-nh.org/Village-Design.htm
[54] Adapted from: Title LXIV: Planning and Zoning. Chapter 674, Local Land Use Planning and Regulatory Powers. Section 674:21 Innovative Land Use Controls. Retrieved from: http://www.gencourt.state.nh.us/rsa/html/lxiv/674/674-21.htm

## Case Studies

### MID Site Design- Cluster to Protect River Frontage for Habitat and Water Quality
### Piscassic River Village, Newmarket, New Hampshire[55]

Piscassic River Village is a 39 home, open space cluster development located off Grant Road (off Route 152) in Newmarket. The two bedroom homes (maximum floor space 1500 square feet) use municipal water and sewer. A conservation easement protects nearly 12 acres of the 27.5 acre project, including over 2,000 feet of Piscassic River shoreline. The preserved open space, much of it upland, lies primarily at the rear of the property along the river. The Piscassic River corridor is important bird and wildlife habitat, and preserving the undisturbed buffer area between the river and the development further reduces the amount of run-off pollution from the development that will reach the river. The homeowners association maintains walking trails.




The purpose of Newmarket's Open Space Design Ordinance is to encourage residential subdivision designs that create high quality, traditional neighborhoods while protecting important components of the natural landscape. This goal is achieved primarily through reduction in lot sizing with the balance of land placed into common open space. The purpose of the open space must include one or more of the following:

- Protection of prime agricultural lands
- Protection of wildlife habitat
- Protection of open space for aesthetics or passive use
- Preservation of unique natural or man-made features.

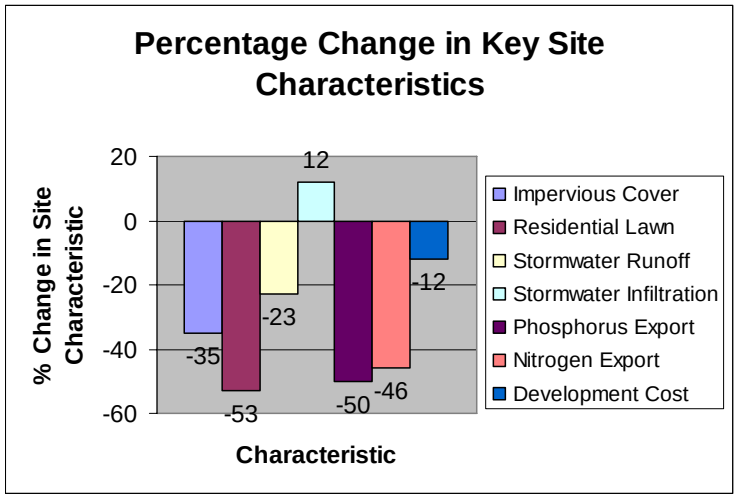
The ordinance requires that at least 1/3 of the gross parcel area be preserved as open space. Additionally, the open space should be a contiguous area of substantial size and should not simply be a thin strip surrounding the subdivision. The minimum required open space provided is five acres. Lot sizing is reduced by 50 percent in all districts where open space designs are allowed. Frontage requirements are reduced by a minimum of 50 percent. Setback reductions are also granted for open space design projects.

[55] From: Achieving Smart Growth in New Hampshire. 2002. New Hampshire Office of Energy and Planning.

## MID Site Design – Water Resource Protection[56]

The Center for Watershed Protection conducted a case study analysis to compare the water quality impacts of an actual conventional subdivision to a conservation design subdivision using better site design principles and improved stormwater management. Under the Better Site Design alternative, the subdivision road is narrower, the homes are closer to the road to create shorter driveways, a significant portion of the property is maintained in an open, natural state and provides a large buffer from the homes to the marsh, stormwater is now captured, treated, and infiltrated in a bioretention area in the center of the road, and the wastewater is treated in a more efficient community system, rather than individual septic systems.

Conventional Design | Better Site Design




As the table showing the percentage change in several key characteristics demonstrates, slight changes in subdivision design can yield significant reductions in the environmental impact of new development.[57]

[56] From "The Benefits of Better Site Design in Residential Subdivisions." *Watershed Protection Techniques. 3(2): 633-646.* Center for Watershed Protection.

[57] Pictures and graph from: The Benefits of Better Site Design in Residential Subdivisions," Watershed Protection Techniques. 3(2): 633-646. Center for Watershed Protection.

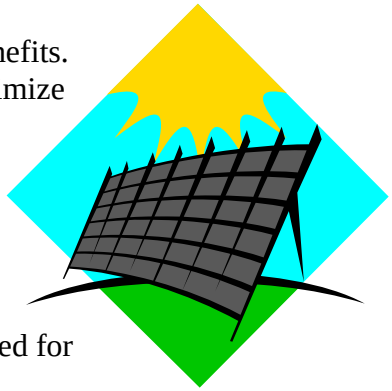
## MID Building Design - EPA New England Regional Laboratory[58]

The Environmental Protection Agency's (EPA), New England Regional Laboratory (NERL), is an award-winning, 66,000 square foot building that incorporates a number of features consistent with MID building design:

**Energy Efficiency**
The building's design is at least 35% more energy efficient than a typical laboratory. Energy efficient systems in the building include six modular gas-fired boilers, two water-cooled chillers, daylight dimmers, occupancy sensors, tubular skylights, energy-efficient lights, high-efficiency motors and variable flow pumping systems, variable air volume heating and cooling systems with night and low occupancy system setbacks, insulated windows, highly-rated insulation, and automated building management and monitoring systems.

**Water Efficiency & Stormwater Management**
Water in the building is conserved with the use of waterless urinals, which save an average of 40,000 gal. per year/per urinal, and restrooms equipped with electronic sensors on the plumbing fixtures. Outside the building, native trees and shrubs are used, which require little water, and stormwater is diverted from the roof through drains designed to replenish on-site wetlands.

**Solar Power**
The building was intentionally sited to maximize capture of solar benefits. Loading docks were located on the south side of the building to maximize snow and ice melt, while offices were located on the north side to reduce demand for heating and cooling. In addition, office windows are shaded with photovoltaic awnings which reduce glare and increase heat gain, ultimately decreasing the amount of cooling needed. The awnings supply a daily average of 2,000 watt-hours to the building's electrical system. Skylights designed with reflective tubing systems bring daylight deep into the building, reducing the need for artificial light.



**Green Power**
EPA New England made a commitment to power the laboratory with 100% green electric power. The Agency's electricity contractor will generate or purchase wind-powered electricity which matches the lab's estimated annual 2 million kilowatt hours of electrical consumption. This will not generate cost savings, but will reduce greenhouse gases emitted from conventional power sources.

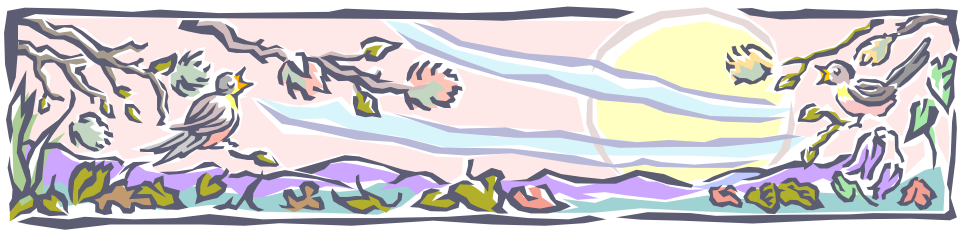
**Landscape Design**
The property's natural landscaping design uses native plants and minimizes turf area, which minimizes the need for irrigation, pesticides, and fertilizer.

[58] Case study write up by Meredith Cooper at the Southwest RPC and adapted by Carolyn Russell, NH Department of Environmental Services.

**Waste Systems**
All wastewater generated in laboratory portions of the building are piped to a state-of-the-art acid neutralization system. This system uses a two-stage neutralization process and a 500-gallon holding tank, which is activated if the wastewater is not completely neutralized during the two-stage process. Sanitary wastewater from the lab will be sent to a regional wastewater facility.

**Indoor Air Quality**
The largest sources of indoor air contaminants are interior building materials, office furniture and equipment. Before any material was used in this building, it was examined for possible effects on indoor air quality in addition to its general environmental impact. Measures taken to protect indoor air quality at the lab included using low volatile organic compound (VOC) materials, strict control of formaldehyde construction materials; off-gassing materials before installation, cleaning of all duct work; replacing filters before occupancy, and using environmentally-preferable cleaning materials.

**Environmentally Preferable Materials**
To avoid generating unnecessary debris and to minimize site demolition, building plans used resources naturally available on-site whenever possible. All soil and gravel on the site was stockpiled and graded for later use as fill or loam. Blasted rock outcroppings were crushed with a portable on-site processing plant and totaled approximately 17,500 tons. The crushed stone was used as base material for concrete paving; sub-base for bituminous concrete pavement; backfill for footings, structures and pipe bedding; and for under-drain filter aggregate. Reuse of materials avoided disposal costs and was sufficient to complete the landscaping and fill work with only a minimal amount of fine grading material (sand) brought in for finish grading. Other materials used in construction contained the highest recycled content available, which eliminated pollution from extraction, transportation and manufacturing of new materials.



# IV. Economy

New Hampshire has long been an attractive destination for businesses. Incentives New Hampshire provides includes no sales tax, no use tax, no broad base income tax, no capital gains tax, no inventory tax, no higher assessment for commercial or industrial real estate, loan guarantees, and tax exempt financing for manufacturers. However, these incentives alone can not maintain a sustainably strong economy. Careful planning and consideration to local economies should be considered when devising development plans.

> When employers can't recruit a reliable workforce because of grueling commutes; when working parents can't find housing that puts them within reach of both jobs and their children; when key industries are scattered randomly so that they have all the disadvantages and none of the important benefits of aggregation; when quality of life begins to erode – people and businesses leave and economies decline. [59]

The good news is that forward thinking communities can consider these potentially deleterious elements and incorporate them into decisions for better outcomes. There are, of course, many components to a healthy economy including thriving businesses, an ample and knowledgeable workforce and sufficient job opportunities. Even the layout of communities can enhance or hamper a local and regional economy.

Concentrating density and improving community accessibility may enhance economies. *Investing in a Better Future: A Review of the Fiscal and Competitive Advantages of Smarter Growth Development Patterns*[60], a discussion paper prepared by The Brookings Institution Center on Urban and Metropolitan Policy, presents the following information which is quoted as summarized by Smart Growth America:[61]

> A study by Ciccone and Hall (1996) found that workers in the ten densest states were 25 percent more productive than those in the least dense states. They attributed most of the difference to the density of economic activity, rather than other factors, such as population. In 2000, Robert Cervero confirmed these findings and extended them, demonstrating that compact, "accessible" cities with efficient transportation links were more productive than more dispersed places. That same year, Nelson and Peterman demonstrated that metropolitan areas that practice growth management actually can improve their economic performance relative to other regions. They found that restraining sprawl can yield sufficient taxpayer savings, efficiency gains, and quality-of-life benefits to boost economic development. At the same time, a 1998 study showed that, to the extent smart growth revitalizes urban centers and reduces core distress it also benefits the entire regional economy. It found that shoring up older urban centers—as smart growth attempts to do—can build wealth for entire metropolitan areas, city and suburbs alike.

[59] http://www.smartgrowthamerica.com/economy.html
[60] *Investing in a Better Future: A Review of the Fiscal and Competitive Advantages of Smarter Growth Development Patterns*, authored by Mark Muro and Robert Puentes. A discussion paper prepared by The Brookings Institution Center on Urban and Metropolitan Policy, March 2004. Available online at: http://www.brookings.edu/urban/pubs/200403_smartgrowth.pdf
[61] http://www.smartgrowthamerica.com/economy.html

This section touches on some of the components of a thriving economy. Resources are provided so that communities can find solutions which are most applicable to their situations.

# A. Local Economy

A thriving local economy starts with a mix of businesses including grocery stores, drug stores, coffee shops, restaurants, barbershops, hardware stores, and a variety of services. To achieve this mix, business owners, residents, politicians, policymakers, and police must organize around a common vision for neighborhood business district revitalization, and then develop a strategy to realize that vision. [62]

Sparking a local economy goes hand in hand with revitalizing downtowns. Bringing business back to the community or working to attract new businesses depends, in part, on a holistic vision of the community center.

Downtowns have long served as the major community center for many New Hampshire communities. Downtowns are also often the focal point of a town's historical legacy. Some NH downtowns are still vibrant community centers, and they attract regional and state recognition for their cultural events, preserved historic architecture, or diverse commercial opportunities.

Other downtowns in the state have declined with changing land use and economic patterns, and they have never regained former vibrancy. But much can be done to restore and enhance downtown areas. Downtowns can serve as community and cultural focal points, and as places where infill redevelopment can be encouraged and to which new development can be linked. They can also serve as models for mixed use where residents live above their places of employment and walk to the market for the day's goods.

## Tools

Revitalizing or enhancing downtown areas and creating vibrant local economies are large goals that take substantial time, energy, and partnerships. There are a number of communities in New Hampshire and beyond, which have undergone this process with dramatic positive results. Some of the tools they have used include the following:

- Development of innovative partnerships between municipalities, business, and NGOs.
- Engagement in community visioning and planning efforts.
- Creation of Downtown revitalization organizations.
- Development of incentives to attract business investment.
- Investment in infrastructure and parking needs.
- Implement traffic controls to slow speeds through downtown or village center.
- Improvement of landscaping and signage to make downtown welcoming and attractive.
- Identification and completion of initial projects to provide success stories and to build momentum for further work.

[62] *A Road Map to Revitalizing Urban Neighborhood Business Districts: How LISC and Community Development Corporations Are Strengthening Neighborhood Markets in the Nation's Inner-Cities* , Local Initiatives Support Corporation. Available on line at: www.liscnet.org/resources.

The National Main Street Center of the National Trust for Historic Preservation[63] and its New Hampshire affiliate**,** New Hampshire Main Street[64], offer an approach and a set of principals to assist communities looking to revitalize and enhance their downtowns. These programs have been very successful in communities. More information can be found at:

**http://www.nhcdfa.org/mainstreet.html**

## Case Studies

The following case studies illustrate three communities, one in New Hampshire and two outside of New England, that have had great success in revitalizing local economy by enhancing vibrant downtown and central areas. The purpose of providing these varied examples is to illustrate the different approaches and tactics employed to build consensus and achieve project objectives for a thriving local economy.

### Downtown Keene, New Hampshire [65]

The City of Keene has a long tradition of pride and stewardship of its downtown. Keene's downtown today tells a story of a community that cares about the planning and maintenance of its center. Downtown Keene has become a cultural center and magnet for the Monadnock region. Along with redevelopment projects and improvements, the initiative and active involvement of the citizens of Keene has brought more activity and interest to the downtown. Community spirit and creativity have allowed for and encouraged downtown activities such as Keene's First Night and the now famous Halloween Pumpkin Festival celebrations. The result is an active, vital downtown which is a source of community pride and identity. In the early 1990s a non-profit group formed to acquire the grand old Colonial Theater. Another group working on overall downtown improvement joined with the Theater group and the local economic development corporation to devise a financing plan for major renovations to the theater. This beautiful, restored old Theater has become a cultural and entertainment mainstay for the entire Monadnock region.

The Monadnock Economic Development Corporation played a role in redeveloping the EF Lane Block, which created a beautiful downtown hotel in a historic department store building. The City added a parking deck on land behind the EF Lane Block, for hotel and general downtown parking. Keene's downtown, with its traditional New England architecture and civic design, is attractive and inviting. The restaurants, theatre, museums, civic buildings, and variety of stores offer places for people to socialize, shop, learn, dine, do government business, and generally enjoy the downtown's beauty and ambiance.

[63] The National Main Street Center of the National Trust for Historic Preservation is online at: http://www.mainstreet.org/content.aspx?page=1&site=1

[64] The New Hampshire Main Street center can be reached on line at: http://www.nhcdfa.org/mainstreet.html

[65] From: Achieving Smart Growth in New Hampshire, 2002. New Hampshire Office of Energy and Planning

Former City Manager Patrick MacQueen attributes Keene's success to several factors:

1) A long tradition of community planning and caring about downtown.

2) Keene's relative geographic and transportation isolation.

3) Willingness of many residents and local businesses and industry to make the time, energy, and financial commitments necessary to the long and protracted work of developing, selling, and implementing improvements to the downtown.

4) Recognition that when local residents and visitors think of a community, they think first and foremost of the downtown.

5) Recognition that the downtown serves as the 'Welcome Mat' for any community, and should be the cultural, business, educational, entertainment, transportation, government, and community center for the municipality.

6) Recognition that spreading these functions out through the entire community is poor planning that creates sprawl and destroys the downtown center that is the focal point of identity for the community.

7) Citizens, citizen groups and organizations, and local business and industry have been the driving forces of downtown change, working with local government rather than relying on local government as the primary driving force.

## Westfield, New Jersey[66]

In the 1970s, family-owned stores began closing as Westfield's shoppers headed to newly opened malls in nearby communities for appliances, clothing, and household goods. Moviegoers deserted the downtown theater in favor of a multiplex in a neighboring community, and food chains on the highway lured diners out of town. Aware of the growing threats to downtown, Westfield's citizens fought a successful campaign to prevent development of a major indoor mall less than two miles away.

Still, by the late 1980s, downtown Westfield was on a downhill slide. "Virtually every storefront facing the town square was covered over with plywood," remembers one resident. "The downtown was dead…and the buildings ghosts of the past." The store vacancy rate steadily rose, reaching nearly 40 percent in the early '90s. Other problems compounded the district's retailing woes. Poor traffic flow hurt downtown parking as did the use of key spaces by store employees. Commuter parking at the train station was outpaced by steadily increasing demand.

[66] *2004 Great American Mains Street Awards*. Main Street News, No 207, May 2004.

Recognizing the need for action, former Mayor Richard Bagger, now a state senator, formed a committee of property owners, business leaders, and residents to investigate downtown's problems. The committee recommended Main Street. In 1993, Westfield became a New Jersey Main Street community; in 1996, Westfield's Main Street program played a key role in the passage of a city ordinance creating a Special Improvement District called the Downtown Westfield Corporation (DWC).

Since its inception, Main Street has brought 29 new retailers and 25 restaurants to downtown Westfield. Many of these new businesses have been national chains, ranging from the GAP and Banana Republic to Trader Joe's and Williams-Sonoma. The downtown occupancy rate has risen to 98 percent and the sales volume of downtown businesses skyrocketed from $60 million in 1993 to nearly $200 million a decade later. And despite the mushrooming of chains, DWC has worked hard to balance them with independent stores, which still make up a slim majority of downtown retailers.

The appearance of downtown has received equal attention: 75 of the district's 200 buildings have undergone major renovations; half of the 200 offices on upper floors have been remodeled; and 75 of the downtown's 175 apartments have been renovated. A façade incentive grant program has leveraged more than $100,000 in private improvements to downtown storefronts.

Building improvements have been bolstered by enhancements to the streetscape, especially the district's gateways. New lighting, sidewalks, and trees have enlivened one entryway; a memorial to the victims of 9-11 has given new stature to another; and restoration of a scenic lake overlook has rejuvenated a third.

DWC also worked closely with the New Jersey Department of Transportation to revamp the town's historic train station. The platform was elevated to ease access to trains and a new underground walkway lined with historical murals was added. The $6 million project ensured that Westfield remained the number one commuter stop on the New Jersey Raritan Valley Line.

Unfortunately, bolstering its role as a commuter town exacerbated the community's long-standing parking problem. In 2000, a study of downtown parking revealed that demand exceeded supply by 20 percent. Further, nearly a thousand residents in need of commuter parking were on a waiting list, with an average wait of four years. The report's findings came as no surprise. Westfield's parking woes had escalated over 40 years as traffic congestion throughout the region increased. In 2001, however, the community took definitive action. The mayor established a citizen's committee, which conducted a commuter survey, used a model to forecast parking demand for the next five years, studied traffic flow, and conducted a financial analysis. The result was a comprehensive report recommending construction of multiple parking facilities.

The town council responded by approving an innovative public-private partnership for construction of two parking decks—one for shoppers and one for commuters—at an estimated cost of $30 million. To "mask" the 700 new parking spaces the decks will provide, plans call for retail space on the first floors as well as apartments on the upper levels. Progress on the parking front has already sparked other development, including a

private investors plan for 40 condominiums, a $20 million project, in an adjacent downtown area.

DWC is not only working to improve the appearance and function of downtown; it also seeks constantly to promote the district. Through newsletters, flyers, banners, and a website, DWC communicates downtown news and happenings to residents of Westfield and surrounding communities. *Destination Westfield*, a bulletin that describes opportunities downtown; *Talk of the Town*, a newsletter covering current happenings; and a "Shopping Directory" that promotes each Westfield business and its specialties are sent to 60,000 area households.

DWC has also rallied media attention to good cause, instigating a public campaign that saved the Rialto Theatre, a 1920s movie house, which was expanded and renovated by a new owner. Westfield's downtown is a reflection of its residents—town officials, volunteers, local businesses, and community organizations that have worked tirelessly to revitalize the heart of their community.

"Not long ago, the downtown was practically deserted after 5:00 p.m.," recalls one Westfield resident. "Now there is a bustle of activity almost every day and evening—the restaurants and theater shows are full, the stores are busy. That is the real indication of a thriving downtown."

## Salt Lake City, Utah[67]

Salt Lake City has enjoyed—and continues to enjoy—significant revitalization. Part of the City's redevelopment efforts were sparked by the anticipation of the 2002 Winter Olympics, but now, three years later, Salt Lake City continues on a path of smarter growth. Two areas that have undergone a transformation, and continue to redevelop, are the Central Business District—which is getting extended—and the Gateway area.

### Visionary Leadership

Within the last decade, Salt Lake City has become a leader at creating a vibrant, transit-oriented, livable city. The city opened TRAX, its light rail system, in December 1999, and ridership surpassed all expectations. The Federal Transit Administration estimated that ridership would be 14,000 per day in 2020, but in 1999, there were already 20,000 daily riders on the North-South light rail line. TRAX has been so popular that in 2000, voters approved a tax increase to extend light rail. The City's leadership, non-profit community, business leaders, and environmentalists have promoted redevelopment within Salt Lake City, and a strong public transportation network in order to create a more thriving city.

Several players at the local and state level have made this transformation possible. Envision Utah is a group of business and political leaders, formed in large part by Bob Grow, a local businessman, in 1998. Envision Utah promoted a transparent planning process for the greater Salt Lake City area that looked at different patterns of urban

[67] From: *Building Better: A guide to America's Best Development Projects, Sierra Club*. This report can be found on the Sierra Club's Web site at *www.sierraclub.org/sprawl/report05.*

growth, and brought key leaders into the process. Ultimately, the plans that received the most consensus were: 1) those that promoted light rail and commuter rail over roads; 2) those that concentrated development around transit; and 3) those that would redevelop existing urban areas. This process helped establish a blueprint for how the region could best chart a course for the future.

Mayor Rocky Anderson and the Salt Lake City Redevelopment Agency also provided strong leadership and helped focus efforts on revitalizing and contributing toward Salt Lake City's renaissance. The Church of Latter Day Saints is also investing in the city's downtown to the tune of at least $500 million to redevelop a blighted mall in the central Business District.

### Central Business District: An Improved Downtown

Many players, including the Salt Lake City Redevelopment Agency, sought an expansion of the Central Business District (CBD). This area, considered the "downtown" of Salt Lake City, is home to many of the arts and cultural centers of the region, it is where many office buildings are located, and it is home to the convention center and hotels. The Central Business District is also an area that is home to the Church of Latter Day Saints, and the downtown also has retail and department stores.

Traditionally, however, the CBD has not included housing. To remedy this, the Redevelopment Agency, among others, has been working to add housing to the downtown mix. These efforts are leading to new housing construction as well as warehouse conversions downtown, and it is helping create a more lively area in Salt Lake City. Adding housing in the CBD means that residents can live, work, and play all within a short radius that is easily accessible by walking or light rail. In this decade, over 2,000 new housing units are expected to be added to downtown—that's on top of 960 units that were added in the 1990s. Over 10,000 residents will be living in the Central Business District by 2010. The Redevelopment Agency of Salt Lake City has been focusing low-interest loans on the CBD for housing, and has a specific program for converting warehouses to housing. The arrival of housing in the CBD creates more business for local restaurants and retailers, and reduces the need of residents to drive, lessening traffic and air pollution.

### Gateway Area: From Warehouses to Urban, Transit Community

A few blocks from the Central Business District is the 650 acre Gateway Project Area. The Gateway Area is becoming a dense, transit-oriented community, anchored by the new Multimodal Hub. This transit station is on the south side of the Gateway district. Today it serves as a station for buses and Amtrak trains, but it will soon also be a station on the TRAX light rail system, as well as for the new commuter rail line, which broke ground in August 2005. The Multimodal Hub was once the site of the "Am-shack"—a storage facility for Amtrak trains, but now the new facility has many transportation functions, connecting commuters to bus, light rail, inter-city rail, and commuter rail.

For generations, the Gateway area, which is adjacent to Salt Lake City's downtown, was a railyard, warehouse, and industrial area. In recent years, however, the area has been in significant decline. The area was considered a brownfield" site, with contaminants from oil, gas, and creosote, and including pollutants like barium, lead, chromium, selenium and

arsenic. The Salt Lake City Redevelopment Agency worked with the federal Environmental Protection Agency and developers to alleviate these contaminants and redevelop the site.

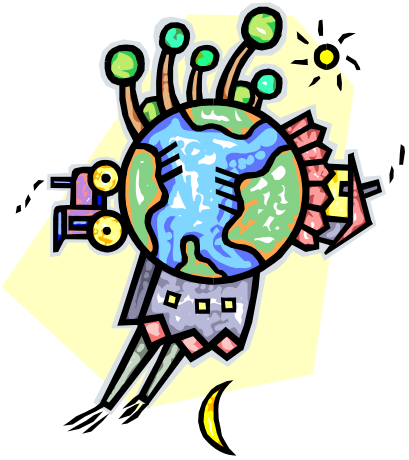
After receiving federal Economic Development Administration grants, and federal Housing and Urban Development grants, the local Redevelopment Agency was able to help assemble properties for redevelopment.

Today, the redevelopment includes a refurbished, historic Union Pacific Train Depot, which includes retail; a public plaza celebrating the 2002 Olympics; restaurants, culture and entertainment venues—including an IMAX theater and a 12-screen movie multiplex—and a significant mix of uses. There are 650,000 square feet of office and 650,000 square feet of retail space in the Gateway development. It includes 350 apartments and 150 condominiums. Among these residential units, 135 are affordable housing. Other investments in the district include new curbs, gutters, and sidewalks and improvements to create an attractive streetscape.

During the course of the project, concerns were raised about the project potentially drawing department stores away from Main Street. In response to these concerns, several disincentives were built into the leasing of the Gateway's retail space to discourage leasing to Main Street stores.

### A Bright Future

Salt Lake City has established priorities and invested in initiatives to create a strong, transit oriented urban core and a healthy mix of offices, retail, and housing. The City has shown real leadership by making Salt Lake City a livable place.



# B. Job Creation

A major benefit of proactive growth management is job creation. The principles of proactive growth management (see CTAP Resource Book One, page 15) are more able to create jobs than traditional suburban and sprawl development.[68] [69] For example, creating alternative modes of transportation and improving public transport creates more jobs than building a new road or bridge (see Figure 1).

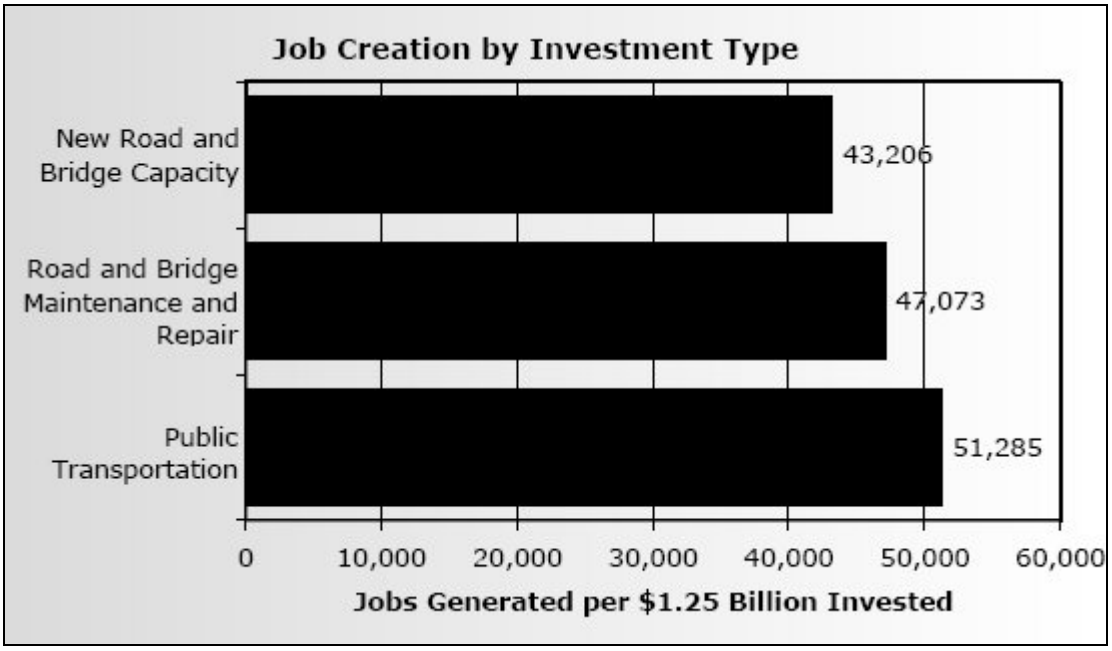



**Figure 1 Decoding Transportation Policy & Practice #11, *Setting the Record Straight Transit, Fixing Roads and Bridges Offer Greatest Job Gains*, the Surface Transportation Policy Project. Available online at: www.transact.org.**

Additionally, buildings associated with higher density like those in centralized development also create more jobs than buildings typically associated with suburban and sprawl development patterns. Philip Mattera and Greg Leroy explain in their paper *Jobs are Back in Town* that: [70]

> According to Toby Millman of Eakin/Youngentob Associates, an infill developer in the Washington, DC area, "infill projects have inherently more work to do; for example, the need to tie into 200-year-old sewer mains…The projects are more complicated." David Agnew of the South Carolina-based New Urbanist firm Civitas LLC, said "the homes are more expensive [than those in sprawling tract development], so there's more labor needed to do higher quality work."

[68] Setting the Record Straight: Transit, Fixing Roads and Bridges Offer Greatest Job Gains, 2004. Decoding Transportation Policy & Practice #11 The Surface Transportation Policy Project. Available online at: www.transact.org

[69] Jobs are Back in Town: Urban Smart Growth and Construction Employment, 2003. Philip Mattera with Greg Leroy, Good Jobs First. Available online at http://www.goodjobsfirst.org/pdf/backintown.pdf

[70] Jobs are Back in Town: Urban Smart Growth and Construction Employment, 2003. Philip Mattera with Greg Leroy, Good Jobs First, P 21-22.

What stands out, first, is that single-family houses—the type of building most commonly associated with sprawl–are the *least* labor-intensive category when it comes to labor as a share of construction bare costs. Apartment buildings, which are most commonly associated with higher-density urban environments typical of smart growth, are the *most* labor-intensive. The other categories we associate with smart growth— town houses and office buildings—are more labor-intensive than single-family homes, but less than apartment buildings. Department stores are also in the middle.

## C. Workforce Development

Sprawl reduces opportunities for low-skill workers and contributes to the geographic concentration of poverty. Thoughtful and deliberate planning, policies and practices can help keep jobs, education, and training accessible to core-area workers. According to the Funders' Network second Translation Paper, "[f]or the geography of work, sprawl means the decentralization of entry-level jobs in the manufacturing, wholesale, and retail sectors, moving work further from concentrations of low-skilled, unemployed workers". [71]

Having skills to acquire good jobs and having fair access to quality employment is a core value of workforce development. Proactive growth management also sees workforce development as central to the aim of proactive planning. A skilled and knowledgeable workforce may be able to assist stabilizing neighborhoods and the stemming of urban flight.

There is an increasing trend of higher levels of education needed to secure jobs with enough income to support a family. However, because jobs are increasingly relocating to more suburban and rural locations that are not serviced by transport systems, there is an increasingly disproportionate concentration of poverty in urban centers. The flight of business to fringe areas and beyond exacerbates negative impacts of a diminishing tax base in these central communities. This type of situation creates a cycle which can be very difficult for families and individuals to break free from.[72]

[71] Workforce Development and Smart Growth: Opportunities for Linking Movements, Translation Paper 2, Second Edition. The Funders Network, 2005. Available online at: http://www.fundersnetwork.org/info-url_nocat2778/info-url_nocat_list.htm?attrib_id=7553

[72] Workforce Development and Smart Growth: Opportunities for Linking Movements, Translation Paper 2, Second Edition. The Funders Network, 2005. Available online at: http://www.fundersnetwork.org/info-url_nocat2778/info-url_nocat_list.htm?attrib_id=7553

**The Cyclical Nature of the Business/Workforce Relationship**

- Businesses relocate to fringe and suburban locations due to tax breaks and other incentives
- Only those individuals and families wealthy enough are able to follow these businesses
- Businesses out of range of public transit exclude employment of less wealthy individuals
- Tax bases increase in these fringe and suburban areas
- Tax base decreases in central and core areas
- Workforce becomes less skilled in central areas due to low levels of training and educations augmented by low tax base
- Workforce becomes more skilled in fringe and suburban areas resulting from increased tax base
- Business are attracted to fringe and suburban areas because of skilled and educated workforce
- Businesses avoid locating in central and core areas because of low skilled workforce
- Individuals in central and core areas are less able to acquire work skills and educations
- Individuals in central and core areas are less able to find jobs with livable wages
- Central and core areas become increasingly poor as fringe and suburban areas become increasingly wealthy

# V. Transportation

*"If you plan cities for cars and traffic, you get cars and traffic. If you plan for people and places, you get people and places."*

-Fred Kent, Founder and President of Project for Public Spaces

As municipalities and regions plan for growth it is important to consider future transportation needs and community aspirations. The influence of transportation decisions resonates through community economics, health, housing, environmental protection, and job markets. As the National Cooperative Highway Research Program explains in *Transit-Oriented Development: Developing a Strategy to Measure Success*: [73]

> Public investment in infrastructure is too often made without fully understanding the outcomes. This not only holds true for highways, which encourage automobile-dependent land uses, but also for poorly planned transit systems that do little to encourage sustainability. For example, sometimes new rail systems are planned with little thought about the land uses at the stations. This lack of coordination between land use and transportation planning can lead to disappointing results.

The State of New Hampshire has adopted a context sensitive solutions (CSS) approach throughout its projects. The Federal Highway Administration (FHWA) defines CSS as follows:[74]

> Context sensitive solutions (CSS) is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist.

The CSS website goes further to describe qualities of excellence in transportation design as:[75]

- The project satisfies the purpose and needs as agreed to by a full range of stakeholders. This agreement is forged in the earliest phase of the project and amended as warranted as the project develops.
- The project is a safe facility for both the user and the community.
- The project is in harmony with the community, and it preserves environmental, scenic, aesthetic, historic, and natural resource values of the area, i.e., exhibits context sensitive design.
- The project exceeds the expectations of both designers and stakeholders and achieves a level of excellence in people's minds.

---

[73] The National Cooperative Highway Research Program, Research Results Digest 249. This digest summarizes key findings from NCHRP Project 20-65(5), "*Transit-Oriented Development: Developing a Strategy to Measure Success*," conducted by John L. Renne and Jan S. Wells of the Alan M. Voorhees Transportation Center, Edward J. Bloustein School of Planning and Public Policy, Rutgers University. Available online at: http://www.reconnectingamerica.org/pdfs/nchrp_rrd_294.pdf

[74] Available online at ContextSensitiveSolutions.org

[75] Derived from the "Thinking beyond the Pavement" Conference, held in Maryland 1998. Available on the CSS website.

- The project involves efficient and effective use of the resources (time, budget, community) of all involved parties.
- The project is designed and built with minimal disruption to the community.
- The project is seen as having added lasting value to the community.

More information on this approach can be found online at:

**www.contextsensitivesolutions.org**

In order to move forward and avoid repeatedly making the same mistakes, planners and policymakers can evaluate the failures or successes of similar projects before embarking on new ones. To begin looking for existing projects in New Hampshire the reader can visit the Department of Transportations web page (other examples are provided in the proceeding sections):

**www.state.nh.us/dot/municipalhighways/tecmag/index.htm**

## Tools

New Hampshire has initiated numerous programs under the Federally-funded Transportation Enhancement program. Examples of these projects include:

- **Plymouth, New Hampshire** - This Transportation Enhancement project included renovation of the historic Boston & Maine Railroad Station into a local Senior Citizens Center as well as a stop for New Hampshire's Hobo Railroad attraction.
- **Lincoln, New Hampshire** - Over 2.5 miles of sidewalk and multi-use path were constructed using Transportation Enhancement money in Lincoln, New Hampshire. The new trail offers local residents and visitors the opportunity to enjoy the area's scenic beauty without the fear of proximity to the motoring public.
- **Nashua, New Hampshire** - The completion of sidewalk connections along Manchester Street, from the schools to surrounding neighborhoods, improved safety for pedestrians of all ages. Projects such as these bring a community closer together by improving mobility.

**Other projects include:**

- Installation of fire protection systems for two covered bridges in Winchester and Conway, New Hampshire.
- Construction of a sidewalk across the Connecticut River on US Route 2 from Lancaster, New Hampshire to Guildhall, Vermont.
- Design and construction of pedestrian bridges to link 2.5 miles of the Heritage Trail in Bedford, New Hampshire.
- Acquisition of 43.2 miles of the Cheshire Branch Railroad corridor in the towns of Fitzwilliam, Troy, Marlborough, Swanzey, Keene, Surrey and Walpole.
- Additional projects are listed in the TE Status Report[76]

[76] The TE Status Report is available online at: http://www.state.nh.us/dot/transportationplanning/pdf/TEStatusReport.pdf

Another way to approach transportation planning is from a congestion mitigation viewpoint. Below are a few of the many Federally-funded Congestion Mitigation and Air Quality (CMAQ) construction projects undertaken since the programs inception.[77]

- Acquisition of passenger motor coaches to expand commuter bus service to Boston
- Construction of intermodal park-and-ride facilities in Concord, Portsmouth, and Nashua
- A statewide Vanpool Incentive Program
- Installation of a coordinated traffic signal system on NH Route 101A in Nashua
- Establishment of a Transportation Management Association for the Manchester Airport area, with development of traffic reduction regulations.
- Construction of a system of multi-use paths in Derry connecting schools, recreation, businesses and residential areas.
- Rehabilitation of an existing railroad bridge for pedestrian and bicycle use along an abandoned railroad corridor in Raymond.
- Development and implementation of a series of public service announcements focused on "Clean Driving" in New Hampshire.
- Construction of sidewalks in Nashua residential neighborhoods to provide safe routes to schools, reducing automobile and bus trips.
- Construction of rail platforms for the new Boston-to-Portland service.
- Modifications to a parking garage in downtown Nashua to become an intermodal transit facility.
- Purchase of commuter rail locomotive

Because transportation influences the viability of so many projects, one way of looking at development is to orient it around transportation. This section introduces transportation oriented development (TOD) and other types of transportation approaches such as bike ways and walkable communities.

[77] For more information on the New Hampshire Department of Transportation's Transportation Enhancement/Congestion Mitigation & Air Quality program go to: http://www.state.nh.us/dot/municipalhighways/tecmaq/index.htm

# A. Transportation Oriented Development (TOD)

According to the Massachusetts Bay Transit Authority:[78]

> Transit oriented development (TOD) is compact, walkable development centered around transit stations. In general, TODs include a mix of uses, such as housing, shopping, employment, and recreational facilities within a design that puts a high priority on serving transit and pedestrians. Besides providing direct access to transit, TODs can offer a variety of destinations close to one another, making it possible to move around without exclusive reliance on a car. Ideally, TODs should incorporate an attractive public realm—for example, streets with trees, furniture, and plazas—to encourage pedestrian activity.

Key features of TOD include:

- A Mix of Uses
- Moderate to High Density
- Pedestrian Orientation/Connectivity
- Transportation Choice
- Reduced Parking
- High Quality Design

The President of Reconnecting America, Hank Dittmar, believes that "[TOD has] the potential to provide residents with improved quality of life and reduced household transportation expenses while providing the region with stable mixed income neighborhoods that reduce environmental impacts and provide real alternatives to traffic congestion."[79] Figure XX provides two types of definitions for TOD.[80]

**A Descriptive Definition of Transportation Oriented Development**

- Development occurs within 1/2 mile of a transit stop..
- Links a network of walkable/bikeable streets.
- Contains a rich mix of uses-- retail, residential, workplaces.
- Has appropriate treatment of parking.
- Has density appropriate to its setting.

**An Outcome-Based Definition of Transportation Oriented Development**

TOD promotes:

- Location Efficiency.
- Expanded Mobility, Shopping and Housing Choices.
- Financial Return and Value Recapture.

[78] Massachusetts Bay Transit Authority. Available online at: http://www.mbta.com/projects_underway/what_is.asp

[79] *Transit Orient Development: Moving from Rhetoric to Reality* by Dena Belzer and Gerald Autler. A Discussion Paper Prepared for The Brookings Institution Center on Urban and Metropolitan Policy and The Great American Station Foundation, June 2002. Available online at: http://www.smartgrowthamerica.org/transportation.html#smarttrans

[80] *Fundamentals of Transit-Oriented Development*, a PowerPoint presentation by Hank Dittmar President of Reconnecting America and Shelly Poticha Director of Reconnecting America's Center for Transit-Oriented Development, June, 2003. Available on the Reconnecting America Website at: http://www.reconnectingamerica.org/html/TOD/intro.htm

Nashua New Hampshire has already dealt with many of these issues. For a link to several Nashua transportation publications please go to:

**www.nashuarpc.org/publications/transpo.htm#**

## Case Studies

### Concord, Massachusetts[81]

The Town of Concord, located 15 miles west of Boston, was established in 1635 as a farming community. Train service first arrived in the late 1860s, with stations built in Concord Center and West Concord. The Concord Center station is located about 1/3 mile from the historic business center of Concord, which today is recognized as a major tourist destination. The station serves commuters heading to jobs in Boston as well as tourists headed to historic sites in Concord.

Before the advent of the automobile, the train stations played a central role in shaping development patterns in Concord. Businesses and residents were built in close proximity to the stations, which provided direct access to downtown Boston. After automobile use became widespread, development in Concord became more dispersed, and locations around the stations became less desirable. A 2.71-acre site directly across the train tracks from the original station building was converted to a lumber yard, which operated on the site until the early 1990s. Small retail businesses opened up along Thoreau Street across from the station. Other sites surrounding the station were converted to a range of uses including a gas station, a supermarket, and a Friendly's Ice Cream restaurant.

#### Planning for Transit Oriented Development

In 1987 the town prepared a long range plan intended to direct development in Concord. The long range plan identified the Concord Center station as an important node for future higher density commercial and residential development. The town particularly recognized the potential to redevelop the lumber yard site with uses that might benefit from a location in close proximity to the commuter rail station.

#### The Concord Common TOD

The resulting Concord Common development comprises three mixed-use buildings with retail space, office space, a restaurant, and rental apartments. The town strongly urged the developer to include two affordable units at the site, although the final agreement required that he provide four affordable units at another location in the town, allowing all the units at the station to be rented at market rates. The zoning required 146 parking spaces for the mix of uses proposed. However, the developer negotiated a reduction of 20 spaces by demonstrating that shared parking could be successful in meeting demand. The project included 15 spaces dedicated to commuter parking.

#### Open Space and Pedestrian Amenities

The developer agreed to provide a landscaped pathway from Sudbury Road to the platform, creating a pleasant pedestrian accessway. The planning board also negotiated a reduction in the impervious lot area from 2.15 acres to 1.93 acres, and the inclusion of a

[81] From the Massachusetts Bay Transportation Authority. Avaibable online at: http://www.mbta.com/projects_underway/tod_examples_concord.asp

landscaped garden area for residents. Finally, because the Concord Common development directly abuts an established residential neighborhood, the developer designed the building facing the residential street at a scale that blended well with the existing housing.

Manchester-by-the-Sea, Massachusetts
Traditional Community, Transportation[82]

Because many New Hampshire communities are built around a core central or village area they are perfectly situated to foster transit oriented development.

Like many older New England communities, the village center of Manchester-by-the-Sea is already built on a human scale and is pedestrian friendly. This makes it an ideal setting for a transit oriented development project. Homes and businesses at 10 and 12 Summer Street are walking distance from the local stores and town services, 1000 yards from the harbor, a mile from a beach, and minutes from public transportation. Though there is adequate parking for the dwelling units, bike riding throughout Manchester-by-the–Sea is a popular mode of transportation. It is also highly encouraged, and there are two volunteer town committees committed to improving the streetscape downtown and to making it more bike and pedestrian friendly.

## B. Walkable and Bikeable Communities

*"The first step in winning back our communities is realizing that cars should not rule the roads."*

-Fred Kent, Founder and President of Project for Public Spaces

During the Vision Map process at the December 1st CTAP kick off event several highly desired features emerged including walkable and bikeable neighborhoods (see Appendix A to the CTAP Resource Book 2 for the minutes from this meeting). There are many commonalities between walking communities and biking communities. When considering the planning and implementation of one, it is often the case that you are able to accommodate the other. However, connected walkable neighborhoods and bike trails are dependant on thoughtful planning.

Walkable and bikeable communities encourage the use of bicycles and walking for pleasure, recreation, and as a viable transportation alternative to the single occupant automobile. Pedestrian-oriented design and architectural standards for retaining community character may foster such desirable neighborhoods and communities.

[82] From: *Building Better: A guide to America's Best Development Projects*, Sierra Club. This report can be found on the Sierra Club's Web site at www.sierraclub.org/sprawl/report05.

A good example of New Hampshire community that enacted a pedestrian/bike way is Derry. A citizen group did a plan for a comprehensive pedestrian/bike route. One component of the plan completed a downtown loop that went from a park to downtown to senior housing to two schools and then returned to the park. Sections of an abandoned rail corridor were paved, new sections were built and low traffic volume neighborhoods were signed to complete the loop.

The Nashua Regional Planning Commission has also done extensive work developing a regional bicycle and pedestrian plan. Their comprehensive report form 2005 can be found online at:

**www.nashuarpc.org/transportation/transproj_bikeped.htm**

The League of American Bicyclists suggests that Bicycle Friendly Communities (BFCs)-and for our purposes pedestrian friendly communities-possess a number of attributes in the following categories:[83]

**Engineering -** A Bicycle/Pedestrian Friendly Community has streets and highways where users of all ages and levels of experience feel comfortable and safe riding and walking on the road or trail. Bicyclists are part of traffic and the system—signs, signals and markings—works for them. Facilities are well maintained, and secure, convenient bicycle parking is available.

**Education -** A Bicycle/Pedestrian Friendly Community teaches motorists and bicyclists of all ages to be respectful, safe road users. "Share the Road" isn't so much a request, it's an expectation. People are taught to ride and operate a bike safely beginning in elementary school. As drivers they are taught and reminded to drive with respect for cyclists and pedestrains.

**Encouragement -** A Bicycle/Pedestrian Friendly Community actively encourages people to ride their bicycles or walk for journeys to work, to visit friends, run errands, or to simply have fun and enjoy the community. A wide variety of public relations campaigns and incentive programs create a culture where bicycling and walking is welcome and valued. City government sets an example.

**Enforcement -** A Bicycle/Pedestrian Friendly Community actively enforces traffic laws that relate to bicycle and pedestrian safety. Motorists, bicyclists, and pedestrians are held accountable for their actions. Police officers and other public safety personnel regularly use bicycles and pedestrian ways.

**Evaluation & Planning** A Bicycle/Pedestrian Friendly Community has a vision of what it wants to be for bicycling and pedestrians, and a plan for getting there that is implemented and regularly updated. Local area plans, comprehensive plans, and other plans help realize the vision. The city routinely collects data about bicycle and walkway use, safety, trends, and attitudes about bicycling and walking.

[83] *Bicycle Friendly Communities: Enhancing Cities Through Cycling,* League of American Bicyclists, 2003.

## Tools

In 1998, a summit held in California identified guiding principles for bicycle friendly communities. Over 60 people represented almost 40 local and state government offices, public safety organizations, transportation agencies, businesses, and advocacy organizations. The group was charged with establishing principles for bicycle-friendly communities and charting actions to make bicycling a safer and more commonly used mode of transportation. At this summit, the representatives developed four key objectives and specific action steps. These guiding principles, objectives, and action steps can also serve to assist the creation of walkable communities and they are as follows:[84]

### Guiding Principles for Bicycle Friendly Communities

*A bicycle-friendly community values bicycling and takes action to include it as an integral part of the social and physical infrastructure. This means:*

- A well-designed network of roadways, bicycle lanes, paths and trails throughout the community makes bicycling safe, convenient and enjoyable. The transportation system accommodates access to bicycle users of varying skill and socioeconomic backgrounds.
- Planning and design decisions promote a compact urban form with a variety of land uses in every neighborhood.
- Policymakers institutionalize bicycle use through regulatory documents such as community general plans, design guidelines and public works standards.
- Motorists and bicyclists use roadways in a manner that respects the needs and safety of each other. Education is provided to motorists and bicyclists on sharing the road safely.
- The public transportation system encourages and provides for intermodal use by bicyclists.
- Bicycle and pedestrian modes receive high priority for funding when transportation improvements are considered.
- Vehicle Code laws and local ordinances are equitably enacted and enforced. Traffic law enforcement protects bicyclists and motorists alike.
- Local leaders set a good example and create a positive media profile for bicycling. Public awareness and marketing campaigns are implemented to promote safe, healthy, fun and efficient bicycling.

### Objectives and Action Steps

To move closer to realizing the vision of bicycle-friendly communities, Summit participants developed four key objectives. For each objective, specific actions steps were proposed as summarized below.

### Objective 1

### Through education, improve safety, design, political support, and awareness of bicycling

- Train planners and engineers in the design of bicycle-friendly communities.
- Develop partnership-based statewide bicycle safety programs.
- Involve students in design and safety programs.

[84] *The California Bicycle Summit: toward bicycle friendly communities*, 1998.

- Inform elected and appointed officials of the value of bicycle transportation.
- Provide consumer-oriented bicycle safety information at point of purchase.
- Implement bicycle traffic schools.
- Conduct a statewide bicycle study to determine usage, crash types, and injury and fatality rates.
- Provide education to law enforcement on bicycling and laws affecting bicyclists.

Objective 2

Pursue the equitable allocation of transportation funds to bicycle projects

- Establish policies or legislation that integrates bicycle facilities into transportation project planning and design. Require that transportation projects that degrade bicycle, pedestrian or transit use will not be funded.
- Determine an equitable funding split for new bicycle facilities and for the repair and maintenance of existing facilities.
- Develop fund collection systems that reflect the true cost of automobile driving.
- Improve funding for the education of motorists and bicyclists on safely sharing roadways.

Objective 3

Integrate bicycling into the land use and circulation decisions of each community

- Develop coalitions for advocacy of bicycle-supportive land use decisions at the federal, state and local levels.
- Encourage the inclusion of Summit principles and objectives in local general and specific plans.
- Develop and implement land use patterns that encourage a mix of uses conducive to bicycle use.
- Provide all elected officials and candidates with copies of the Ahwahnee Principles for Resource-Efficient Communities adopted by the Local Government Commission and the Federal Highway Administration report on Best Practices: Improving Conditions for Bicycling and Walking.

Objective 4

Develop partnerships to increase bicycle usage

- Create or enhance local bicycle advisory committees in each community.
- Link local, regional and county bicycle advisory committees.
- Charter a diverse statewide bicycle advisory committee, including Summit sponsors.
- Request legislation to establish a statewide bicycle/pedestrian task force.
- Conduct community organizing workshops, including training in “how government works.”
- Identify allies and look for ways of achieving mutual goals.

Dan Burden, a nationally recognized authority on pedestrian and bicycle facilities and programs, published the following ten keys to walkable communities. These items are measures taken or indicators to achieve prosperous, walkable, healthy, livable communities. They have been adapted from their original form published in *Planetizen.*

## Ten Keys to Walkable Communities[85]

1. **Compact, Lively Town Center** (or many compact villages in larger towns or cities). Buildings frame streets; block lengths are short. Merchants take pride in their shops' appearances. Great varieties of stores offer local products and services. Significant housing is found at downtown or village center sites. There is unique and distinct personality or character to the place.

2. **Many Linkages to Neighborhoods** (including walkways, trails and roadways). People have choices of many routes from their homes to the center. The most direct paths are walking routes. All sidewalks are five feet wide, or wider, and most are buffered from streets by planting strips, bike lanes or on-street parking. Well-maintained sidewalks are found on both sides of most arterial and collector roadways. Sidewalks are cleared during winter months if necessary. Most neighborhood streets have sidewalks on both sides. Bike lanes are found on most principal streets. Streets with higher volume or speeds, almost always have bike lanes. Most streets have good ADA access to and from each block in all directions. ["Cul de sac" housing developments are discouraged and neighborhood designs with through streets are encouraged].

3. **Low Speed Streets** (in downtown and neighborhoods - 20-25 mph common). Motorists are expected to yield to pedestrians. Motorists make their turns at low speed. Few places force motorists to stop. Yield conditions are most common.

4. **Neighborhood Schools and Parks**. Most children are able to walk or bicycle to school and small nearby parks. There is limited or no busing of school children and at least 40% of all school trips are by foot or bicycle. Most residents live within 1/2 mile (preferably 1/4 mile) of small parks or other well-maintained and attractive public spaces.

5. **Public Places Entice People of all Ages**. Many services and facility designs support and attract many children, teens, people with disabilities and senior citizens to most public spaces. Public restrooms, drinking fountains and sitting places are common all over town and especially downtown.

6. **Convenient, Safe and Easy Street Crossings**. Downtowns and village centers have frequent, convenient, well-designed street crossings. Pedestrians using these areas rarely have to walk more than 150 feet from their direct lines-of-travel to reach crossings. People crossing at intersections, whether signalized or not, rarely wait more than 30 seconds to start their crossings.

7. **Inspiring and Well-Maintained Public Streets**. Streets are attractive, balanced, colorful, with sidewalks, planter strips, medians, (when appropriate) and handle a diversity of needs. Many streets feature on street parking and larger volume streets have bike lanes. There is little or no off street parking. Sidewalks are centered and surrounded with attractive edges, a planter strip to the street side, and an edge or attractive transition to the private property.

[85] http://www.planetizen.com/

8. **Land Use and Transportation Mutually Beneficial**. The built environment is of human scale, with attributes that invite positive interaction and compliment the surrounding neighborhoods. Heritage buildings and places are respected. Small, local stores help create community as well as convenience. Residents find ways to include affordable homes in most neighborhoods. Transit connects centers of attraction with schedules so frequent that times need not be posted. All residents feel they have choice of travel modes to most destinations. Most people live within walking distance - 1/2 mile (with the majority within 1/4 mile) – of many of the services and products they need on daily or weekly basis. These services include small grocery, pharmacy, hardware, bank, medical services, day care, dry cleaning, post office and other essential services.

9. **Celebrated Public Space and Public Life**. Streets, plazas, parks and waterfronts are fun, festive, secure, convenient, efficient, comfortable and welcoming places. Suitable places exist to host parades or give public speeches; and many people take part in community parades, festivals, outdoor concerts and other public events. Public space is tidy, well kept, and respected. Many of these favorite places are surrounded by residential properties, with many eyes-on-the-streets to add security and ownership of these spaces. These areas have many places to sit. Few or no buildings have large blank walls, and few or no open parking lots exist off-street. Any existing parking lots have great edges and greens. Natural beauty and quality of community environment are not only appreciated, but celebrated, with annual awards given to best developers, neighborhood parks, buildings, retailers, and private placement of new park benches. Barbershop quartets, brass bands, string quartets, small dance troupes, local theater groups and other venues for community participation are alive and well. People can find public places for practice, fun and spontaneous play. The community has many "green" streets, with trees and landscaping. The town form respects the need for plenty of green and open space. Heritage trees line many streets. Development practices call for street trees and planter strips; homes are clustered to maximize green space. Trails and passageways through natural areas are featured in many parts of town. Landscaping is respectful of place, often featuring native species and colorful materials.

10. **Many People Walking**. Many diverse people are walking in most areas of town. The community has no rules against loitering. Lingering in downtowns, village centers, schools, city hall, civic centers, waterfronts and other public places is encouraged. Street musicians and entertainers are welcomed. Children rarely need to ask parents for transportation, especially to school, parks and downtown.

## Case Studies

There are several ways to approach creating a more bicycle and pedestrian friendly communities and no one way is more correct than another. However, there are some approaches which have been tried in other towns and cities that may provide useful lessons. These case studies were chosen to provide the reader with some of the preliminary steps which communities took to make their streets and bikeways more comfortable and assessable to users.

### Pedestrian Covered Bridge, Dover, New Hampshire[86]

The pedestrian bridge built across the Cocheco River in downtown Dover in 1996 is reminiscent of the state's historic covered bridges. The former pipe bridge was adapted for pedestrian use as part of the downtown beautification project begun nearly 20 years ago and is part of the expanded Riverwalk among the old mills of Dover. The 155-foot prefabricated bridge was shipped to North Carolina and pressure treated, then returned to Dover, assembled on the shore, and floated into place. Look for Cocheco Falls Mill Courtyard on Central Avenue, directly across from First Street.

### Riverwalk, Laconia, New Hampshire[87]

The riverfront park and walkways in downtown Laconia provide pedestrian access to downtown shopping, city hall, and the textile museum. Strollers can enjoy concerts and other community activities in the park, or simply walking or jogging in the beautiful surroundings of the Lakes Region. Take Route 3 or Route 106 into the city center.

### Restrooms on Main Street, Meredith, New Hampshire[88]

Provision of amenities that make walking a more enjoyable and welcoming experience encourages pedestrian activity. An often overlooked element is publicly accessible restrooms for the downtown area. Meredith's Main Street offers public restrooms as part of a package of pedestrian amenities. People are more likely to walk or shop longer if clean and convenient restrooms are provided.

### Keene Bike Path, Keene, New Hampshire[89]

#### Bike Path History

Enthusiasm for an organized bicycle/pedestrian (running, jogging, walking, strolling) transportation system within the City of Keene gradually grew through the 1980's. In the early 1990's, the Planning Department sponsored a public meeting, at the Keene Public Library, to address the City Council's mandate that a system of public pathways be developed throughout Keene.

---

[86] Achieving Smart Growth in New Hampshire, State of New Hampshire, Office of Energy and Planning. Available online at: http://www.nh.gov/oep/programs/SmartGrowth/index.htm

[87] Achieving Smart Growth in New Hampshire, State of New Hampshire, Office of Energy and Planning. Available online at: http://www.nh.gov/oep/programs/SmartGrowth/index.htm

[88] Achieving Smart Growth in New Hampshire, State of New Hampshire, Office of Energy and Planning. Available online at: http://www.nh.gov/oep/programs/SmartGrowth/index.htm

[89] More information Available from the Pathways for Keene website at: http://www.tlaorg.org/pathways/history.html

A Bicycle/Pedestrian Path Advisory Committee was formed composed of concerned citizens representing an assortment of City residents with a wide variety of biking and pedestrian interests, such as jogging, walking for pleasure, biking to work, biking to school and so forth. City staff from the Public Works, Parks and Recreation and Facilities, and Planning Departments also served on the committee.

A series of public workshops were held in order to engage citizens and determine preferential routes. With City Council support and the information from the public workshops, the Planning Department proceeded to develop a bicycle/pedestrian plan for the City.

In 1994 the City Council voted unanimously to authorize the City Manager to apply for the ISTEA funds. A condition of this was that the Keene community needed to raise 20% matching funds.

The Conservation Commission created a subcommittee to begin to address the fund raising task. A group of citizens responded to the Conservation Commission's plea for help by forming Pathways for Keene, Inc. The new nonprofit organization's prime mission was to raise and solicit funds for the 20% match and to seek final approval of the project by the New Hampshire Department of Transportation (NHDOT). Within less than a year, local funds amounting to $49,964 were raised by Pathways for Keene and on May 4, 1995, the City Council approved a resolution to take all appropriate steps necessary to implement a Downtown Bike Path project along the former Cheshire Branch rail bed corridor.

## C. Public and Alternative Transportation

Public and alternative transportation can help communities meet their visioning goals. Safe reliable public and alternative transportation systems impact several aspects of a community. Potentially positive influences include: increased public safety, improved public health, energy conservation, environmental protection, increased mobility, and assistance in preserving small urban and rural communities.

Research by Cambridge Systematics was compiled and presented in *The Benefits of Public Transportation.* Some of their findings have been adapted and presented below. Further information and statistics can be found in the complete document.[90]

### Safety and security

Compared to road systems, transit systems are significantly safer. Trips with similar destinations result in 200,000 fewer deaths, injuries and accidents when made by public transit than by car, adding up to between $2 billion and $5 billion per year in safety benefits. The National Safety Council estimates that riding the bus is over 170 times safer than automobile travel.

[90] The Benefits of Public Transportation, Second Edition, 2002. Researched by Cambridge Systematics, Inc and produced by Reichman Frankle Inc. Available online at: http://www.apta.com/research/info/online/ben_overview.cfm

### Increased resiliency and redundancy— helping in emergencies

Time and time again, the availability of public transportation in times of emergency—both natural and man-made—has proven to be critical in maintaining basic access, mobility and safety for individuals who come in harm's way. The value of public transportation services in providing essential redundancy and resiliency in our transportation network cannot be overstated.

### A cleaner environment

Emissions from road vehicles are the largest contributors to smog. Over 200 million passenger cars and light trucks log almost 2 trillion miles on American roads every year. These vehicles account for about 50% of air pollution nationwide—even higher in polluted cities.

### Connects and extends transportation networks

The most successful systems are those that provide easy-access links within and among all forms of modern travel—highway, air, water, bus and train. Across the U.S., multimodal transit systems are reaching greater numbers of people, providing travelers with optimum choices.


### Expands labor pool, job accessibility and reliability

Employers around the country are taking advantage of the expanded labor pool that public transportation provides. Almost half of the nation's Fortune 500 companies, representing over $2 trillion in annual revenue, are headquartered in America's transit-intensive metropolitan areas.

### Helps the bottom line

Businesses that support public transportation options are realizing substantial savings in several ways. Benefits include savings on employee time lost to delay, accident and injury on the road. Also, by relieving roadway congestion, public transportation helps speed freight and commerce.

### Education

Approximately 12% of public transportation users are en route to schools of various types; and school districts, educators and concerned parents are finding that greater reliance on expanded public transportation services helps improve educational systems. Across the country, "Unlimited Access" transit pass programs at 35 universities provide free, system-wide service to 825,000 college students, faculty and staff, expanding access, reducing auto-related expenditures, and saving universities millions.

### Preserving small urban and rural communities

Small urban communities throughout the country are symbols of fundamental American values—a hard work ethic, self-reliance, mutual support, creativity, innovation—as well as emerging focal points for today's economy. In light of the fact that nearly 10% of all households in small urban areas are without a car, the freedom, mobility and access that public transportation services provide in these settings are key ingredients in sustaining their character.

## Tools

The Public Transportation Partnership for Tomorrow has developed 10 ways to enhance public transportation in communities. The aim of the following ten ideas is to help communities make the most of their public transportation systems.[91]

1. Make Public Transportation a Planning Priority. When your public transit system serves a mix of residential and commercial uses, you'll help reduce vehicle trips and make residents less dependent on their cars. Make sure that public transportation services are part of the decision-making process when you are considering new public facilities and when developers are proposing new commercial projects. Remove barriers to traditional urban design, and consider changing zoning and building codes, including any parking requirements.
2. Make Public Transportation the Center of Your Community. The best place to build public transit centers and bus stops is in the heart of your community. This helps create lively activity and a center of commerce that can become a community landmark, while also reducing the use of costly land for parking spaces.
3. Make Public Transportation Look Fantastic. The more comfortable people are in your public transit facilities, the more often they'll use them. So ensure that they look great. Make your facilities easy to get to and easy to use. Keep them clean, safe and secure. Provide sidewalks and eliminate barriers. Don't hide your facilities—design them as part of the community. Plant shrubs, trees and flowers, and then make sure they're well-maintained. And think about attractive lighting. It's as important for safety as it is for enhancing the character of your community.
4. Make Public Transportation "Easy Street" for Pedestrians. Riders often walk to public transit stops and stations. So consider the sidewalks and routes around the stops. Narrow streets, for example, reduce vehicle speeds, resulting in streets that are safer for pedestrians. When you configure your sidewalks to be wide and appealing, people feel safe and comfortable. And take the time to make sure they are well-lit. Also remember that planning smaller, interconnected streets fosters easy access to neighborhood destinations. This provides pedestrians with optional routes and shorter walking distances.
5. Make Public Transportation the Hottest Ticket in Town. Help public transit bring people to holiday events, fairs, festivals and sporting events in your community. Be sure to team with your local public transit system—not only will they often help advertise your community event, they may offer special promotions for people who get there by public transit. Also consider building public transit kiosks, where representatives can hand out schedules, brochures, coloring books, promotional passes and more.
6. Make Public Transportation Everybody's Business. Help increase ridership by getting local businesses involved. They may not realize that, thanks to the federal Transportation Equity Act for the 21st Century, they can now offer their employees a tax-free monthly benefit of up to $100 for commuting costs on public transit or in vanpools.
7. Make Public Transportation a Next-Door Neighbor. Why encourage residential homes near public transit facilities? It's convenient, reduces traffic and adds vitality to a downtown. It also pays off for the homeowner. A study by the University of North Texas reports that housing along the Dallas Area Rapid Transit light rail line is valued 25 percent higher than similar homes located elsewhere in the city.

[91] Unleash the Power of Public Transportation, a report underwritten by the American Public Transportation Authority's private sector business partners and its Public Transportation Partnership for Tomorrow initiative.

.

8. Make Public Transportation a Canvas for New Ideas. The ways you can make better use of public transportation in your community are limitless. Engage your citizens and get their ideas. Try different things. Your own community members can be inspirational resources for new and exciting projects.
9. Make Public Transportation a Community Partner. Partnering with your local public transportation system is one way to serve your community better. From municipal to regional to state levels, officials are not only finding new ways to factor public transportation into their planning equations—they're making them happen.
10. Make Public Transportation a Wise Investment. When federal, state and local entities partner with the private sector, and when you participate in the regional transportation planning and programming process, you can ensure that your money is being used most effectively. For example, most states are working to include transportation components in their welfare reform projects. Grants have been awarded to states to develop strategies to help welfare recipients gain access to employment through better transportation opportunities.

New Hampshire already has in place has a number of public transportation and alternative transportation options. The Seacoast Metropolitan Planning Organization offers a Regional Alternative Transportation Guide. They provide the following information: [92]

### Local & Regional Bus Service

COAST (the Cooperative Alliance for Seacoast Transportation) and Wildcat Transit both offer public transit service in the Seacoast area. COAST serves eleven communities in the Seacoast with concentrated service along the Rochester-Dover-Newington-Portsmouth (Spaulding Turnpike) corridor. Wildcat Transit service focuses on connections between Durham/UNH and adjacent communities of Dover, Newmarket, Newington, and Portsmouth.

Also, there are many area Health & Human service providers which offer demand responsive transit services to their client populations and in some cases the general public. These agencies have developed transportation services because many of their clients do not have access to an automobile or are for some other reason unable to drive.

### Using Interstate Bus & Rail

Many interstate commuters bound for Boston or Portland choose bus or rail travel over driving because it allows them to reduce driving stress, accomplish other things on the way to work, and reduce the costs and hassle of parking and additional vehicle maintenance.

C & J Trailways and the Coach Company both provide interstate bus commuter services; while Amtrak operates passenger rail service between Portland and Boston with daily stops in Dover and Exeter, and Friday through Monday stops in Durham.

[92] The Seacoast Metropolitan Planning Organization Regional Alternative Transportation Guide is available at: http://www.rpc-nh.org/Transit/seacoast-transit-home.htm

Because of the dispersed development patterns in the region, especially away from the Spaulding Turnpike corridor, most intercity passengers "park and ride" - that is, they use their personal vehicles for the short trip to the bus or train station (another option is "kiss and ride" - a spouse or friend provides the drop off!). The New Hampshire Department of Transportation is working to facilitate this by constructing new park and ride facilities and improving ones.

COAST also offers a connection to Boston-bound C & J Trailways bus service at the Portsmouth Transportation Center at the Pease International Tradeport; and links to the Amtrak rail stations in Dover and Exeter. Wildcat Transit offers connections to the Dover and Durham stations.

### Ridesharing

Carpooling or Vanpooling is often a good option for commuters who cannot get where they need to go using any of the regular bus or train services, or for those who simply prefer such an arrangement. New Hampshire and Massachusetts both have rideshare programs which include computerized ridematching services to any interested commuters. In Massachusetts, I-93 has High-Occupancy Vehicle lanes approaching Boston. Find out if your employer offers any incentives for ridesharing.

Riding in a vanpool drastically reduces commute costs. Vanpoolers share gas costs, tolls, parking costs, and other expenses. Based on figures provided by the American Automobile Association, driving alone to work 50 miles each way can cost over $8,000 a year. The same commute in a 14-person vanpool can cost as little as $1,300 annually.

### Park & Ride Facilities

The New Hampshire Department of Transportation maintains Park & Ride lots in Epping, Hampton, Lee, Portsmouth, and Somersworth which allow ridesharers in the region to meet at central locations convenient to the Spaulding Turnpike, US Route 4, and I-95.

### Bike Commuting

Many of the region's residents work in the community where they live, or in a bordering town. For these individuals, biking or walking to work is a real possibility much of the year. Bicycle commuting can offer the benefits of improved health, reduced stress, and cost savings to the individual; and the potential for reduced congestion and air pollution for the region.

The Seacoast MPO is facilitating safe bicycle travel by working with the region's communities and the state to implement a network of safe bicycle routes, mainly consisting of four foot shoulder lanes on selected roads.

It is easy to connect to transit with your bike as well. COAST and Wildcat Transit both offer bike racks on the front of buses that allow you to take your bike with you on the bus. In

addition, the state is now installing bicycle lockers at many of its Park & Ride facilities, including those in Portsmouth and Epping. Individuals using park and rides are now able to bike to their bus or carpool.

Employers can also encourage bicycle commuting by providing secure storage areas for bicycles and by making shower and changing facilities available to their employees who bike or walk to work. Ask your employer what they would be willing to do to make bicycle commuting work for you!

## Case Studies

### Upper Valley Rideshare (UVRS), Vermont and the New Hampshire Upper Valley Region[93]

Upper Valley Rideshare (UVRS) has been assisting commuters with carpooling in the Hanover-Lebanon area since 1991. UVRS is operated by Advance Transit, the regional public transportation agency for the Hanover-Lebanon-White River Junction area. UVRS was the first regional ridesharing program established in New Hampshire, and remains the only such program operated through a local transit agency. They receive financial support from the Vermont Agency of Transportation and the New Hampshire Department of Transportation. The funding from Vermont and New Hampshire supports the operating expenses of the rideshare program, including direct expenses for marketing and outreach to commuters through various media.

UVRS serves 54 New Hampshire towns in addition to 71 towns in Vermont. About 68% of the clients work in New Hampshire; 52% are Vermont residents and 47% are New Hampshire residents.

UVRS was instrumental in obtaining recognition by EPA in 2004 as the first "Best Workplaces for Commuters" district in New England, and the only such district in a rural area in the United States. UVRS has also helped the Dartmouth-Hitchcock Medical Center, Mascoma Savings Bank, and Advance Transit to win recognition as "Best Workplaces for Commuters". UVRS has received a number of awards for its ride-matching efforts, and has active partnerships with over two dozen Upper Valley businesses to assist ridesharing efforts.

### COAST, the Seacoast region, New Hampshire[94]

The Cooperative Alliance for Seacoast Transportation (COAST) has served the seacoast region of New Hampshire (Rockingham and Strafford Counties) and Berwick, Maine, with affordable, safe transportation since 1981. In that time, COAST has carried over 7.5 million passengers and traveled over five million miles. COAST offers public transit service in the Seacoast area and serves eleven communities in the Seacoast with concentrated service along the Rochester-Dover-Newington-Portsmouth Spaulding Turnpike corridor.

[93] Information provided by the New Hampshire Department of Transportation. For more information on the UVRS please visit their website at: www.uppervalleyrideshare.com

[94] You can visite the home page to COAST at: http://www.coastbus.org/

## Enterasys Employees Relocation, Merrimack Valley, New Hampshire[95]

Enterasys Networks the Secure Networks Company TM, recently closed its Rochester, NH facility and moved approximately 120 employees to its corporate headquarters in Andover, Massachusetts. The move left many employees wondering how they were going to handle the expense and stress of a significantly longer commute.

Enterasys, a member of the Merrimack Valley Transportation Management Association (TMA), sought help from the TMA to develop a commuter program that would meet the needs of its employees. Andrea Leary, the TMA's Executive director, stated, "Vanpools seem to be the most cost-effective solution." A vanpool is a group of 7 to 15 people who commute on a regular basis in a roomy, comfortable vehicle.

One person volunteers to be Enterasys driver/coordinator of the vanpool and normally rides free. The other riders share the cost of operating the vanpool. The group determines its daily schedule and route and riders can meet at designated pick-up locations, such as a Park 'n Ride lot or a shopping center.

Lori Hannay, Vice President, HR at Enterasys, had nothing but great things to say about the vanpool program, "We felt vanpools were the answer to many of our employees' commuting needs. We were thrilled when the TMA brought in VPSI, Inc., the nation's largest vanpool provider, to assist in negotiating the details of the vanpool program." To support the program and encourage participation, Enterasys is paying the full cost of the vanpool lease during the first year of operation – the employees share the cost of gas and tolls. Hannay continued, "Employees have been extremely pleased with vanpool program. Folks that had been concerned about the commute now saw a viable option of getting to the Andover site."

In addition to the subsidy from Enterasys, Ms. Leary noted, "the company's TMA membership – provided through its lease agreement with Brickstone Properties, gives Enterasys employees further benefits and savings". The Merrimack Valley TMA's Worksite Incentive Program provides a $70 gas card for the first 3 months a new vanpool is on the road. Additionally, the TMA's Guaranteed Ride Home Program (GRH) provides employees with piece of mind. The GRH program pays for a free ride home by taxi or rental car for employees who vanpool, carpool, take transit, or bike/walk to work at least two days per-week in the event of an emergency or unplanned overtime.

"The employee's interests in the vanpool program far exceed anyone's expectations," stated Ms. Hannay. There are currently four 15-passenger vanpools in operation at Enterasys. Two of the vanpools originate in Rochester, NH, one in Dover, NH, and one in Portsmouth, NH. They all travel to Enterasys's Andover location.

According to Derek Lanoutte, who drives for the Portsmouth van, "Vanpooling has been great so far, especially with the gas prices being so high. The riders are very pleased with

[95] Retrieved from the Merrimack Valley TMA, Commuter News and Notes. Online at: http://www.merrimackvalleytma.com/MVCNN-12_05.html#2

the comfort of the commute, and especially the huge cost savings compared to if we were to drive alone. We share the gas and toll expenses and save wear and tear on our personal vehicles."

Melissa Zampitella, Manager of VPSI's New England area praised Enterasys officials "For their foresight in anticipating their employees' transportation needs. Particularly with today's rising gas prices, the vanpool program has enabled Enterasys to retain valued employees by giving them a convenient and cost-effective alternative to driving alone."

See Achieving Smart Growth in New Hampshire for more case studies including:[96]

- Portsmouth Transportation Center, Portsmouth
- Dover Railroad Station, Dover

[96] Achieving Smart Growth in New Hampshire, State of New Hampshire, Office of Energy and Planning. Available online at: http://www.nh.gov/oep/programs/SmartGrowth/index.htm

# VI. ENERGY

Not since the early 1970s have energy issues consumed as much national attention. From California's rolling blackouts and deregulation problems, to concerns about the environmental and public health effects of energy use, to present national security interest in reducing dependence on foreign oil, energy issues are near the top of the public policy agenda. Yet a critical piece missing from present energy discussions is the recognition of the role that land use decisions play in current energy policy. The way communities are designed, planned, and built has significant influence over the amount of energy used, how energy is distributed, and the types of energy sources that will be needed in the future. In addition, daily decisions concerning how and where to build communities can help or hinder national goals of energy efficiency and energy independence.[97]

With this perspective on energy, communities in the I-93 expansion corridor may begin to reflect on how they want to grow. Considering present energy consumption patterns and projected energy expenditures allows communities to proactively guide their future.

Energy is used in a variety of ways and places in our communities. Each year the majority of energy in the United States is invested in residential buildings, commercial buildings, and the transportation of people and freight. On a community level, transportation can account for 40 to 50 percent of total energy use, and residential buildings use another 20 to 30 percent. [98]

In addition to industry regulations, New Hampshire has several state wide energy efficiency policies. More information on this can be found in Appendix B.

[97] From the Funders' Network for Smart Growth and Livable Communities, 2004. Translation Paper number 15, *Energy and Smart Growth: It's about how and where we build*, p 2. Available online at: http://www.fundersnetwork.org/info-url_nocat2778/info-url_nocat_show.htm?doc_id=229179

[98] Ibid

## Tools

The Funders' Network provides several ideas concerning how and where communities grow that can impact overall energy consumption levels. These ideas are presented in the following box.[99]

***"How to Build" – Improved Neighborhood/Building Design***

- **Solar street and building orientation** reduces the use of fossil fuels and increases daylighting.
- **Energy efficient design** (including efficiency upgrades and insulation) can reduce energy usage by 30 percent and plays a key role in community development/affordable housing projects.
- **Increased use of shade trees and green space** lessens demand for cooling and can sequester carbon dioxide from the atmosphere.
- **Narrower streets and reduced parking requirements** can reduce the "urban heat island effect" and building cooling costs.
- **Paying attention to where buildings are situated** can maximize opportunities for co-generation (producing energy from waste heat).
- **Solar thermal hot water systems** installed on the rooftops of buildings (such as on existing big box stores) can reduce natural gas and electricity demand for water heating.
- **Solar panels and distributed energy generation** provide electricity back-up and cushion communities from the effects of power outages.
- **Prevention oriented land use and design decisions** can help communities withstand the impacts of extreme weather events, which may be on the rise with the advent of global warming.
- **Greenspace expansion and the preservation of rural and urban forests** allows for sequestration of carbon dioxide from the atmosphere.

***"Where to Build" – Location Efficiency***

- **Developing areas in or near city centers and public transportation** can reduce vehicle miles traveled and petroleum usage.
- **Locating residential development near commercial development and other services** can increase walking and decrease dependence on automobiles.
- **Directing development away from remote locations** can increase the efficiency of water and electricity distribution and reduce infrastructure subsidization.
- **Siting schools in an efficient location** can increase walking and biking, lessening fuel usage and increasing opportunities for exercise.
- **Integrating land use and energy planning** can increase opportunities to site smaller scale energy facilities closer to customer loads including cogeneration, solar, wind, and fuel cells.

[99] From the Funders' Network for Smart Growth and Livable Communities, 2004. Translation Paper number 15, *Energy and Smart Growth: It's about how and where we build*, p 5.

# A. Energy Efficiency Strategies

This section provides some strategies for energy efficiency. The goal of this section is to present the reader with ideas and, more over, act as a spring board for creative and thoughtful approaches to energy efficiency. In order to accomplish this purpose we will provide several resources that can assist communities in planning for energy efficiency.

## Case Studies

### Society for the Protection of New Hampshire Forests--French Wing (SPNHF--French Wing) – a LEED Certified Project[100]

Overview

- Location: Concord, NH
- Building type: Commercial office
- New construction
- Urban setting
- Completed 2001

Photo credit: Alex Wilson

Founded by a handful of concerned citizens in 1901, the Society for the Protection of New Hampshire Forests (SPNHF) has today grown into one of the country's most effective statewide land conservation groups. The addition currently houses six other nonprofit organizations, in addition to providing office space for SPNHF. In keeping with the organization's mission and the nature of its work, the new French Wing addition to its Concord headquarters showcases a number of innovations from the realms of conservation and sustainable design.

Environmental Aspects

The French Wing of SPNHF's Concord headquarters is a state-of-the-art workplace. SPNHF used local trees from the site to help build the new wing, including the white pines cut to facilitate the move of the existing house. Other native lumber, green-certified lumber, and engineered lumber (made from small-diameter trees) also were incorporated. Other features include natural daylighting, heating with solar energy and a wood-chip gasifier, composting toilets, and a graywater system for watering interior planters.

Energy

The French Wing addition includes numerous energy conservation technologies. A 1998 renovation of the headquarters included the installation of a photovoltaic array and wood-chip gasifier, both of which now contribute to the French Wing.

[100] Case study retrieved from the U.S. Green Building Council LEED Certified Project List. This database information was made available through the U.S. Department of Energy's High Performance Building initiative. Available online at: https://www.usgbc.org/LEED/Project/project_list.asp

### Lighting

A south-facing clerestory running the length of the wing and four moderate-sized north-facing skylights illuminate the corridor. Each office is daylit with two outside windows positioned close to the side walls to provide more even distribution of daylight. High-efficiency, occupancy-sensor-controlled, single-lamp fluorescent fixtures and task lighting are used in offices. Three decorative metal halide pendant fixtures light the corridor with stepped daylight dimming. Occupancy sensors are used in the kitchen, bathrooms, copier room, and conference rooms.

### Envelope Design

"Superinsulated" windows were used in combination with R-25 (RSI-4.4) walls and an R-42 (RSI-7.4) roof. Walls are framed of 2x6 (50x150 mm) studs with horizontal 2x3 (50x75 mm) strapping, providing a 7-in. (180 mm) cavity blown with dense-pack cellulose insulation. A total of 12 in. (300 mm) of cellulose were installed in the I-joist rafters. Air sealing measures were taken to achieve measured airtightness of 0.16 cfm/ft2 at a 50 Pascal pressure difference across the envelope. Low-e coated, gas-fill, operable windows were installed in all offices. Low-e fixed glazing was used in the clerestory.

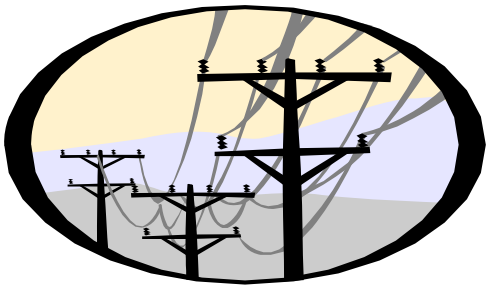
### Air Conditioning

Only the centralized copier room has mechanical air conditioning. Elsewhere, cooling is provided by a whole-building night-flush fan that is turned on at night and off in the morning. Operable transom windows above each office door aid this cooling strategy.

### Lessons Learned

Contractor inexperience posed some problems in the project, particularly in the attempt to recycle waste accumulated during construction. Close coordination between the project manager and contractors was necessary to successfully overcome conventional practices.

## Burlington Electric Department: Burlington, Vermont[101]
## Alliance to Save Energy Star of Energy Efficiency, 2005



This small utility earned this award in recognition of its significant efforts and outstanding contribution to energy efficiency over the last 15 years. To date, BED has invested more than $25 million ($12.7 million directly and an additional $12.7 million leveraged through its customers) in energy efficiency efforts that have correspondingly helped to avoid the release of 43,340 tons of CO2/year with anticipated savings of 645,000 tons over the estimated life of the installed measures.

Despite being a small utility, BED has had a high impact in the area of energy efficiency in

[101] Case study retrieved from Greenerbuildings and available online at: http://www.greenerbuildings.com/case_studies_detail.cfm?LinkAdvID=65095

part because of its commitment to supplying electrical needs through improved energy efficiency and its ability to leverage private funds to maximum effect. Despite significant commercial growth during the 1990's, the City of Burlington used less electricity in 2004 than it did in 1989. To achieve this phenomenal result, BED has led and/or been involved in numerous efforts to promote energy efficiency while protecting the environment and improving the economy. From its promotion of LEED certification and high standard energy codes for buildings, to the implementation of IS0-based load response programs that help to curtail load during periods of high cost, to innovative energy efficiency ordinances for residential rental properties at the time of sale, BED has shown true leadership in targeting energy efficiency investments for its entire customer base.

## Cambridge Cohousing, Cambridge, Massachusetts
## Energy Efficient Community Planning[102]

Cambridge Cohousing is an infill residential project consisting of 41 units of housing on a narrow 1.5 acre site between the street and a railroad track. The housing units range from large, 3-story townhouses to 1-, 2-, and 3-bedroom flats. The project also includes communal facilities: a large kitchen, dining area, childcare and recreational facilities, a library, and shared gardens.

### Environmental Aspects
The GreenVillage Company and community participants focused primarily on site, transportation, energy, material use, indoor air quality, economics, and human health. The project is part of the U.S. Department of Energy's Building America program.

### Predesign
The major design initiatives were effective and efficient use of land, energy, and materials while promoting indoor air quality, reduced costs, reduced environmental impact, and increased human health and productivity—all within a community-based endeavor.

### Energy
Cambridge Cohousing is designed to require a minimum of energy for heating and cooling. These loads are met with a district heating/cooling system consisting of heat pumps and a boiler. Each unit is connected to a unique air distribution system that draws off water circulated from the central plant to provide heating, cooling, and ventilation.
The most technologically innovative aspect of the project is the HVAC system, designed by GreenVillage engineers Mark Kelley and Paul Raymer. The entire project is heated and cooled from a central plant, consisting of eight 10-ton (35.2 kW) ground-source heat pumps. These heat pumps are served by coolant loops in three 1,500-foot-deep (460 m) wells on site. The heat pumps produce water at 120 degrees F (49 C) for circulation to individual air handlers in each dwelling unit. A gas boiler boosts the temperature further to provide domestic hot water and to increase the heating capacity of the system for very cold weather. During the summer, the heat pumps are switched to the cooling mode.

[102] Information on this case study was retrieved from the U.S. Department of Energy – Energy Efficiency and Renewable Energy. This database was made possible through the U.S. Department of Energy's High Performance Building initiative. Available online at: http://www.eere.energy.gov/buildings/database/

The townhouses also have an innovative new air handler. This system has up to nine separate ducts coming out of the fan coil enclosure, serving the various rooms or zones. Instead of the usual large blower, each duct contains its own small fan, controlled by a thermostat in each zone. According to Raymer, these fans collectively draw a maximum of 530 watts, compared with 1,200 watts for a typical blower. This electricity savings, together with the zoned controls, allow for significant overall energy savings. A prototype installed in another GreenVillage house used an estimated 40% less energy than a standard heating system. With Cambridge Cohousing, says Raymer, they learned that vertical duct runs are very tricky to connect in prefabricated housing units.

The exterior walls of the housing are all 2x6 (38x140 mm) construction with R-19 (RSI-3.3) fiberglass batt insulation. Cellulose insulation was blown on-site into the band joist areas and roofs. Steel studs are used in the full basements, for interior partition walls, and around the perimeter to hold insulation at the exterior walls. Windows are aluminum-clad and low-e.

Actual fuel bills (from 2000) have been compared to 1998 fuel estimates of both the project as designed and the same project built only to standard gas and electric technologies (without systems engineering). Total cost of energy (gas and electric) used is $44,870 annually compared to a standard practice estimate of $92,000.

### Lessons Learned

Fast-track is for profit developers and builders, not Cohousing participants.
Allow sufficient time for various participants to do their jobs properly. This includes both professionals and Cohousers.

Do not allow a project to go forward with task forces yet to gather (e.g., the project was 6 months into construction before the landscape committee finalized their plans).
Cohousing participants want to design their own community, and they should. But they should make sure the professionals are given enough time and fee to accommodate the input. As the car mechanics' poster says, "If you want to watch, it's free.... If you want to help, it'll cost you more." If we had spent more time in design, we'd have spent less in changes.

Performance standards are essential. They must be codified and written into the contract language. Standards must be understood and agreed upon by all parties.
Independent commissioning agents should be part of the original team and contract.

With innovation and customization, the client should hire a clerk of the works. The clients cannot, and should not, try to do this work themselves.

Do not allow a contract to go ahead without full contract documents, and full partnering amongst the stakeholders. Make sure the contractor and her/his subs understand and are contracted to do what the owner has bought. Do not allow adversarial relationships to fester.

## Stop & Shop: Energy-Saving Building Design, Foxboro, Massachusetts[103]
## Clean Air - Cool Planet Case Study, 2004

Many communities in New Hampshire have faced challenges associated with the introduction of a "big box" retailer. We offer this case study as an example of how energy efficient building design can benefit both businesses and the overall energy efficiency of a community. The information presented here is abbreviated from its original form. Please visit the Greener Buildings website for a more thorough discussion on this project.[104]

### Introduction

The average American family visits the grocery store 2.2 times a week, stopping on the way home to pick up a few items or making that regular pilgrimage to stock the pantry. Chances are, the last thing they think of at the store is how much it costs to keep that container of milk, butter or ice cream at the ideal temperature.

But behind the aisles of fresh produce, chilled meat and refrigerated coolers, the electric bills represent one of the most significant costs for the industry, where the trend is to build ever-larger super stores. And because supermarkets operate at miniscule profit margins, savings on those bills can translate into significant improvements to the bottom line. In a typical scenario, new energy- and money-saving equipment is introduced incrementally, and total gains grow over a period of years as individual systems such as lights, building controls and freezer cases are upgraded when stores are renovated.

Faced with a 17% jump in electric rates, highly volatile natural gas markets, and with a goal of being socially responsible, New England's largest grocery chain, Stop & Shop Supermarket, chose to take a different approach. The Quincy-based company set out several years ago to design and build a pilot superstore that would use significantly less energy and be more environmentally friendly then existing facilities. The company believed that reducing energy costs could significantly improve profit margins and increase the competitiveness of its stores.

### The Project

Stop & Shop designed the new prototype to use between 25% and 30% less electricity than comparable designs in the region, while also including a number of earth-friendly features. The store, dubbed Low Energy Superstore (LESS), was built in Foxboro, MA; it opened November 8, 2001. The company and its parent, Netherlands' based Ahold, consider this experiment a success: It matched the initial goal by achieving a 27% electricity savings while successfully demonstrating building techniques that could be adapted to Ahold supermarkets globally. The reduction of energy use at the LESS, translates to an annual savings of 8,000,000 kWh and has eliminated emissions of 987 tons of carbon dioxide annually, equivalent to leaving in the ground 374 tons of coal or 650 barrels of oil each year. What's more these savings are likely to extend over the full life of the new store.

[103] Case study retrieved from Greenerbuildings and available online at: http://www.greenerbuildings.com/
[104] http://www.greenerbuildings.com/case_studies_detail.cfm?LinkAdvID=64708

The process leading to the Low Energy Superstore began back in 1998, with the formation of a special project team. The team brought together representatives of Stop & Shop, sister divisions, joint-venture partners, and leading suppliers of the supermarkets heating, ventilation, and cooling equipment.

The Stop & Shop team labored over design decisions concerning the building envelope and materials, interior and exterior lighting, the general heating and cooling systems, product refrigeration, and water usage. At each step, the group compared the current practices employed by the chain with state-of-the-art alternatives, some of which were new and relatively unproven in a retail setting. This design process continued with monthly meetings for nearly three years until an architectural/ engineering team and a potential building site were selected. Next, the designers took the most viable suggestions and integrated them into a complete blueprint for the building and site. The team's computer simulations, mock-ups and scale models demonstrating the benefits of day lighting and other design features were instrumental in conveying the concept to key decision makers.

Once senior management at Stop & Shop approved the design concept a full-scale mock-up was created in a vacant supermarket not far from corporate headquarters. The full-scale mockup provided a unique opportunity for stakeholders to fully experience the visual effect of the proposed skylights and high-tech fluorescent lighting designs, with actual store shelves and produce displays. Simultaneously the company was performance testing advanced refrigeration designs proposed for LESS at the manufacturer's test facility and at the stores other divisions' stores located in the mid-Atlantic region.

In addition to design features to enhance the performance and comfort levels within the store, the project team also explored a number of areas outside the store. Since the Main Street location previously housed a retailer, there were already well-established patterns of vehicles accessing the site. However, the team was sensitive to adjoining residential neighborhoods, taking into consideration noise both from delivery trucks and shoppers, the visual impacts of a supermarket, storm water runoff, the process of demolishing the old building, and the impact of a lengthy construction period.

## The Results

Due in part to the thorough design and review process, the Foxboro Stop & Shop successfully delivered an energy savings of 30% over similar sized stores in the chain. Experience to date seems to support national surveys, including one by the Herhong Mahone Group, which found that retail stores with significant levels of natural light register higher sales, as people linger longer, and return more frequently than customers in more traditional establishments. In this store, light is task oriented, with the focus on the product rather than the ceilings and floors. In addition, subtle design features enable customers to easily distinguish between departments, creating a less stressful environment, encouraging them to explore the store, a benefit not lost on the chain's marketing department.

The designers kept an eye on the future. While renewables power failed to make the cut into this design, the building was hard wired so that, sometime in the future, photovoltaics, which convert sunlight into electricity, could be integrated into a pair of awnings near the front entrance.

Throughout the project, a team from Stop & Shop worked closely with the architects and engineers to assure that their goals were being met at every step. In some cases this meant providing training to contractors working the site, according to Steve Krupski, who said many of the carpenters, masons, and plumbers needed to understand why this project was so different from those they had worked on in the past.

The design team also had to convince workers accustomed to certain traditions to think outside the box in working with a cement-based siding product. It was chosen because it would “stand up to the extremes of New England’s weather while eliminating the need to cut down cedar trees for the traditional look of our stores,” Krupski said, adding that “this project represented, for many of them, a completely different way of looking at building construction.”

# VII. Conclusion

Through these three resource books, we have attempted to give municipal decision-makers and community members useful information and resources with which to explore the opportunities and challenges surrounding growth in their region, their state, and beyond.

Book 1 took an overview approach to examining growth in New Hampshire and the I-93 reconstruction corridor. It looked at impacts and opportunities, and it introduced some of the strategies of proactive growth management. Book 2 explored the history of land use patterns in New Hampshire, identified contemporary challenges, and examined particular tools and strategies for planning where communities want to grow and where they don't want to grow. Book 3 continued this exploration, focusing on strategies for determining how communities want to grow. The goals and objectives derived by CTAP participants at the vision mapping session have served as the template for the tools and strategies we have discussed.

The three books are by no means a comprehensive look and land use and growth management. They are instead intended to introduce both new and familiar concepts and to offer resources for further exploration. Web site addresses have included in the citation footnotes whenever possible, and these links should allow anyone with internet access to investigate any topic presented in the books in far greater detail. We have also included in Appendix A of this book a list of organizations and agencies that might serve as important resources for the municipalities participating in CTAP. Again, this list is not comprehensive, so it will be important for individuals and organizations to spread the word about additional resources and information.

Additionally, the website www.rebuildingi93.com is intended as a resource for the I-93 corridor communities. These resource books can be accessed in electronic version at the site, and additional materials are also available there.

We hope the materials in these books have or will prove useful as communities move forward with creating vibrant, sustainable communities.

# Appendix A – Internet Resources for Municipalities

This is a partial list of internet resources. Resources are also listed in the footnotes of each of the CTAP Resource Books, which are available online on the I-93 Reconstruction and CTAP website (link provide below). This website also has more specific information regarding the services provided by agencies and organizations cooperating on the CTAP project. Some websites may be repeated depending on the topics they cover. In addition to the ones listed hare, many other free resources are available online.

**I-93 Reconstruction & CTAP Website:**
www.rebuildingi93.com/

**CTAP Agencies:**
Federal Highway Administration: www.fhwa.dot.gov/
New England Environmental Protection Agency: www.epa.gov/NE/
New Hampshire Community Development Finance Authority: www.nhcdfa.org/
New Hampshire Department of Cultural Resources: www.nh.gov/nhculture/
New Hampshire Department of Education: www.ed.state.nh.us/education/
New Hampshire Department of Environmental Services: www.des.state.nh.us/
New Hampshire Department of Fish and Game: www.wildlife.state.nh.us/
New Hampshire Department of Health and Human Services: www.dhhs.state.nh.us
New Hampshire Department of Transportation: www.nh.gov/dot/
New Hampshire Division of Historic Resources: www.nh.gov/nhdhr/
New Hampshire Office of Energy and Planning: www.nh.gov/oep

**CTAP NGO's:**
Concord 2020: www.concord2020.org
Easter Seals NH: www.nh.easterseals.com
The Jordan Institute: www.thejordaninstitute.org
Local Government Center Legal Services: www.nhlgc.org
Local River Management Advisory Committees: www.des.state.nh.us/rivers/desigriv.htm
New Hampshire Celebrates Wellness (NHCW): www.nhcw.org
The New Hampshire Charitable Foundation: www.nhcf.org/
New Hampshire Housing Finance Authority: www.nhhfa.org
New Hampshire Main Street: www.nhmainstreet.org
New Hampshire School Administrators Association (NHSAA): www.nhsaa.org/
NH Sierra Club: www.nhsierraclub.org
Plan New Hampshire: www.Plannh.com
Society for the Protection of New Hampshire Forests: www.ForestSociety.Org
University of New Hampshire Cooperative Extension: www.ceinfo.unh.edu/

**Planning, General:**
Southern NH Planning Commission: www.snhpc.org/
Rockingham Planning Commission: www.rpc-nh.org/
Nashua Regional Planning Commission: www.nashuarpc.org/
Central NH Regional Planning Commission: www.cnhrpc.org/
NH Office of Energy and Planning: www.nh.gov/oep/
Plan New Hampshire: www.plannh.com/
American Planning Association: www.planning.org/
Planning Commissioners Journal: Planners Web: www.plannersweb.com/

**Local Government Resources:**
Local Government Center: www.nhmunicipal.org/Home/
New Hampshire Local Government: www.nh.gov/government/local.html
Local Government Environmental Assistance Network: www.lgean.org

**Proactive Growth Management / Smart Growth**
Achieving Smart Growth in New Hampshire:
www.nh.gov/oep/programs/SmartGrowth/index.htm
Concord 2020: www.concord2020.org/
Environmental Protection Agency: Smart Growth: www.epa.gov/dced/
Funders' Network for Smart Growth and Livable Communities: www.fundersnetwork.org/
National Center for Smart Growth Research and Education: www.smartgrowth.umd.edu/
Smart Growth Network: www.smartgrowth.org/
Smart Growth America: www.smartgrowthamerica.com/
UNH Center for Integrative regional Problem Solving (CIRPS): http://cirps.sr.unh.edu/
Vermont Forum on Sprawl: www.vtsprawl.org/

**Affordable, Mixed Housing:**
New Hampshire Housing Finance Authority: www.nhhfa.org/
New Hampshire Community Development Finance Authority: www.nhcdfa.org/web/index.html
Concord Area Trust for Community Housing (CATCH): www.catchhousing.org/
Families in Transition: www.fitnh.org/
Habitat for Humanity: Capital Region:
www.habitat.org/script/link.asp?url=local%2Ehabitat%2Eorg%2Fnew%5Fhampshire%5Fcapital%5Fregion
Habitat for Humanity: Greater Manchester: www.habitatmanchester.org/
Habitat for Humanity: Greater Nashua: www.nashabitat.org
Manchester Housing & Redevelopment Authority: www.manchesterhousing.org/
Manchester Neighborhood Housing Services: www.mnhs.net/
Neighborhood Housing Services of Greater Nashua: www.nhsgn.org/ (under construction),
nfs.nw.org/report/nworeport_print.aspx?orgid=8199
Rockingham Community Action: www.rcaction.org/

**Agriculture:**
NH Department of Agriculture, Markets & Food: http://agriculture.nh.gov/
Natural Resources Conservation Service- NH: /www.nh.nrcs.usda.gov/
UNH Cooperative Extension: ceinfo.unh.edu/
American Farmland Trust: www.farmland.org/

**Brownfields Redevelopment:**
NHDES Hazardous Waste Remediation Bureau Brownfields Program:
www.des.state.nh.us/BrownfieldsNH/

**Economic Development:**
NH Department of Resources and Economic Development: www.nh.gov/dred/
NH Community Development Finance Authority: www.nhcdfa.org/web/index.html
Business & Industry Association of NH: www.nhbia.org/
American Institute of Architects- NH Chapter: www.aianh.org/
Home Builders & Remodelers Association: www.hbranh.com/index/index
New Hampshire Small Business Development Center: www.nhsbdc.org
Small Business Administration of New Hampshire: www.sba.gov/nh
New Hampshire Business Owners: www.nh.com/growth

**Energy:**
NH Office of Energy and Planning: http://nh.gov/oep/
Northeast Sustainable Energy Association: www.nesea.org
United States Department of Energy: www.sustainable.doe.gov

**Environmental Quality / Natural Resources:**
NH Department of Environmental Services: www.des.state.nh.us/
NH Fish and Game Department: www.wildlife.state.nh.us/
Environmental Protection Agency: New England: www.epa.gov/NE/
The Jordan Institute: www.thejordaninstitute.org/
Local Rivers Management Advisory Committees: www.swrpc.org/nat_res/lac/index.htm
NH Sierra Club: www.nhsierraclub.org/jahia/Jahia
New Hampshire Minimum Impact Development Partnership: www.nhmid.org

**Historic Resources / Downtown Revitalization:**
NH Division of Historic Resources: /www.nh.gov/nhdhr/
NH Preservation Alliance: www.nhpreservation.org/html/home.htm
NH Main Street Center: www.nhcdfa.org/mainstreet.html
National Trust for Historic Preservation: Main Street: www.mainstreet.org/

**Land Conservation, Economics of Open Space, Green Infrastructure:**
The Society for the Protection of New Hampshire Forests: www.forestsociety.org/
The Nature Conservancy: www.nature.org/
The Trust for Public Lands: www.tpl.org/
The Rockingham Land Trust: http://rockinghamlandtrust.org/
American Farmland Trust: www.farmland.org/
Amherst Land Trust: www.amherstlandtrust.org/
Bear Paw Regional Greenways: www.bear-paw.org/
Bedford Land Trust: www.bedfordlandtrust.org/
Five Rivers Conservation Trust: director@5rct.org
New England Forestry Foundation: www.newenglandforestry.org/
Nichols-Smith Conservation Land Trust: www.nsclt.org/pages/1/index.htm
Piscataquog Watershed Association: www.mv.com/ipusers/pwa/

**Transportation:**
American Public Transportation Association: www.apta.com/research/info/online/
Center for Transportation Excellence: www.cfte.org
Federal Highway Administration: www.fhwa.dot.gov/
Nashua Regional Planning Commission Regional Bicycle and Pedestrian Plan**:**
http://www.nashuarpc.org/transportation/documents/bikepedplan_ch1.pdf
New Hampshire Department of Transportation: www.nh.gov/dot/index.htm
New Hampshire Rideshare: www.nh.gov/dot/nhrideshare/
New Hampshire Bicycle/Pedestrian Information Center: www.nh.gov/dot/nhbikeped/
Upper Valley Rideshare: www.uppervalleyrideshare.com

**Schools:**
NH Department of Education: www.ed.state.nh.us/education/
NH School Administrators Association: www.nhsaa.org/

**Social Capital:**
BetterTogetherNH: www.bettertogethernh.org
Pew Partnership for Civic Change: www.pew-partnership.org/index.html
National Civic League: www.ncl.org/
Center for Democracy and Citizenship: /www.publicwork.org/home.html
Democracy Collaborative: www.democracycollaborative.org/index.html
Kettering Foundation: www.kettering.org/
Study Circles Resource Center: www.studycircles.org/

**Vibrant, Healthy Communities:**
NH Department of Health and Human Services:
www.dhhs.state.nh.us/DHHS/DHHS_SITE/default.htm
NH Department of Cultural Resources: /www.nh.gov/nhculture/
NH Celebrates Wellness: www.nhcw.org/
Easter Seals NH: http://nh.easterseals.com/site/PageServer?pagename=NHDR_homepage
NH Charitable Foundation: www.nhcf.org/
UNH Cooperative Extension: http://ceinfo.unh.edu/
Foundation for Healthy Communities: www.healthynh.com/index-fhc.php?healthynh

**New Hampshire Statutes:**
State of New Hampshire Revised Statutes Online: www.gencourt.state.nh.us/rsa/html/indexes/

# Appendix B – New Hampshire Statewide Energy Efficiency Policies

In addition to industry regulations, New Hampshire has several statewide energy efficiency policies. The *Alliance to Save Energy* provides useful information on these policies which has been expanded upon and updated by the New Hampshire Office of Energy and Planning (OEP). It should be noted that the OEP edits do not correct the ASE site, but they do address inaccuracies in the information cited there for New Hampshire.[105]

**New Hampshire Statewide Energy Efficiency Policies**

**Appliance Standards**
There are no state energy- efficient appliance standards in New Hampshire.

**Public Benefits Fund**
As part of New Hampshire's electric restructuring law (1996), the Legislature created a system benefits charge to support energy efficiency programs. This fund helps to fund energy efficiency education and the purchase of energy-efficient items such as light bulbs and appliances.

A bill passed in June 2005 requires any utility that collects funds for energy efficiency programs to set aside, on a yearly basis, one-third of those funds for eligible public school construction or renovation projects designed to improve indoor air quality or energy efficiency.
For more information go to:
http://www.gencourt.state.nh.us/legislation/2005/HB0129.html

**Transportation Initiatives**
The Granite State Clean Cities Coalition http://www.granitestatecleancities.org/ works to mitigate air pollution through a variety of means, including funding support for municipal use of clean fuel alternatives such as biodiesel. In addition, the program promotes improved energy efficiency for municipal buildings, equipment and infrastructure.

**Energy Efficiency Tax Incentives**
Currently, there are no energy efficiency tax incentives in New Hampshire. However, state law (RSA 72:61-72:72, http://www.gencourt.state.nh.us/rsa/html/indexes/72.html) permits municipalities to offer local homeowner property tax exemptions for certain renewable energy installations. A Net Metering Rule, http://www.puc.state.nh.us/Regulatory/Rules/puc900.pdf, permits credit, at current market value, of excess electricity generated by small renewable energy installations such as photovoltaic panels on a household rooftop.

[105] Alliance to Save Energy online at: http://www.ase.org/content/article/detail/2572

**Carbon Cap & Trade**
In 1994, New Hampshire implemented the Ozone Transport Commission Memorandum of Understanding, which called for regional reductions in seasonal NOx emissions starting in 1999 through a cap and trade system.
For more information go to: http://www.des.state.nh.us/ARD/pdf/ctfs.pdf

In 2002, New Hampshire passed the Clean Power Act, which established a cap and trade program to reduce emissions of NOx, SO2, CO2 and mercury from fossil fuel power plants in the state. The legislation sets the levels of the emissions caps, which must be achieved by December 31, 2006.
For more information go to: http://www.des.state.nh.us/ARD/CleanPowerAct.htm

New Hampshire is part of the Regional Greenhouse Gas Initiative (RGGI), along with eight other northeastern states. RGGI is a cap & trade program designed to reduce greenhouse gases and slow climate change.
Click here for more information go to: http://www.rggi.org/

**Building Codes**
Residential: 2000 IECC is mandatory statewide.
Commercial: ASHRAE/IESNA 90.1-1999 is mandatory statewide.
For more information go to: http://www.puc.state.nh.us/EnergyCodes/energypg.htm

**High Performance Schools**
A bill passed in July, 2005 establishing criteria to define a high performance school, a classification which makes a school district eligible for additional school building aid.
For more information go to:http://www.gencourt.state.nh.us/legislation/2005/HB0129.html

**Industrial Energy Efficiency**
The New Hampshire Office of Energy and Planning (OEP) collaborates with WasteCapNH, http://www.wastecapnh.org and the NH Department of Resources and Economic Development (DRED), http://www.nheconomy.com/nheconomy/dredweb/main/index.php, in efforts to increase the energy efficiency of NH businesses, thereby increasing their competitiveness.

**Other**
An Executive Order issued by Governor John Lynch in July of 2005 directs New Hampshire state government to reduce energy use in its facilities by 10 percent in accordance with the ENERGY STAR Challenge, using measures such as raising the highway fuel economy rating requirement for all new government passenger and light duty vehicles, directing state agencies to purchase only Energy Star equipment, etc.
For more information go to:
http://www.energystar.gov/index.cfm?c=leaders.bus_challenge

For a more comprehensive treatment of energy and planning topics in New Hampshire, visit the New Hampshire Office of Energy and Planning (OEP) site, www.nh.gov/oep


Materials for this resource book were compiled, adapted, and prepared by Shawn Margles and Tyler Miller.

**ANEI Project Staff**

James Gruber
Jack Calhoun
Paul Markowitz
Jan Fiderio
Darlene Ayotte

**ANEI Student Staff**

Jody Anastasio
Shawn Margles
Tyler Miller
Marilyn Priest
Dee Robbins
Sarah Swain

*For more information on CTAP, the Community Technical Assistance Program, please contact:*

Ansel Sanborn, Administrator

Bureau of Planning and Community Assistance

NH Department of Transportation

7 Hazen Drive, Concord, NH 03302-3344

*Antioch New England Institute (ANEI) created this document and is working under contract with Clough Harbour and Associates, L.L.P on this project.*



*This document was prepared by Antioch New England Institute*

*Of Antioch New England Graduate School*

40 Avon Street, Keene, NH 03431

603-357-3122, ext.344