



Belmont Citizens Forum

Belmont is Sitting on a Fiscal Cliff

By Max Colice, Elizabeth Dionne, and Dan Barry

Belmont is effectively insolvent. It cannot pay its operating expenses and pension debt without one-time federal aid. Compounding this problem, Belmont's operating expenses are rising faster than its revenue. Unless Belmont increases its revenue, the town may have to cut services drastically.

Like every other town in Massachusetts, Belmont's revenue comes mainly from property taxes. The Board of Assessors assesses each property's value, then computes the property tax by multiplying the property value by the property tax rate. Even though Belmont's property tax rate is relatively low, its single-family property tax bill is the 10th highest in Massachusetts due to relatively high assessed values. So how can Belmont increase its revenue without increasing the property tax burden on town residents or relying on fickle state and federal aid?

The only way to achieve this is by promoting new, profitable growth of Belmont's property tax base. By profitable, we mean real estate that generates more in property tax revenue than it costs the town, whether those costs are for building and maintaining roads and sewage lines or for town services like education, fire, police, or public works.

Dense commercial real estate tends to be particularly profitable because it consumes minimal town infrastructure and services. Commercial real estate also tends to be profitable for two other reasons: it can have a much higher assessed value per acre and it can be taxed at a higher rate than other types of real estate. This means that a commercial building that occupies a small plot and requires fewer roads, sewers, and services can generate much more property tax than recreational land or several larger homes. In other words, even a very small amount of commercial property can generate an outsized amount of property tax revenue thanks to its high value per acre.

Six of the 10 most valuable properties per acre in Belmont are commercial properties. Most of these commercial properties are located in Belmont Center and have assessed values of more than \$17 million per acre, which is about two-and-a-half times Belmont's average assessed value per acre of about \$6.7 million. Together, these six commercial properties occupy about 0.81 acres and generate about \$170,000 in annual property taxes—about 0.2% of Belmont's property tax revenue from about 0.03% of Belmont's land. They also impose few, if any, costs on the town.

Since Belmont has a fixed amount of land, it should strive to achieve an appropriate balance between profitable commercial real estate and less profitable housing and open space. This does not necessarily mean building on open space.



Belmont Center.

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Belmont Citizens Forum Inc. is a not-for-profit organization that strives to maintain the small-town atmosphere of Belmont, Massachusetts, by preserving its natural and historical resources, limiting traffic growth, and enhancing pedestrian safety. We do this by keeping residents informed about planning and zoning issues, by participating actively in public hearings, and by organizing forums.

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Letters to the editor may be sent to
P. O. Box 609, Belmont MA 02478 or to
bcfprogramdirector@gmail.com

belmontcitizensforum.org

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It could also mean making more efficient use of land that is underused, for example, by encouraging redevelopment that generates enough new property tax to offset less profitable (from a town revenue perspective, as defined above) real estate.

Practically, since commercial real estate tends to be more profitable than other types of real estate, the town should promote new commercial real estate development to increase its property tax revenue without driving up property taxes on residential real estate. Right now, commercial, industrial, and personal property accounts for only about 4% of Belmont's total tax levy: For comparison, commercial, industrial, and personal property make up more than 38% of Watertown's property tax levy and over 22% of Lexington's property tax levy (and as far as we know, neither Watertown nor Lexington is considering an override to pay for operating expenses any time soon). Acton, Concord, Hingham, and Sudbury also have significantly higher commercial, industrial, and property tax revenues as percentages of their total tax levies (all percentages are from the Massachusetts Division of Local Services Data Analytics and Resource Bureau website).

According to the Board of Assessors, commercial real estate historically accounted for approximately 10% of Belmont's property tax base, but that has not been the case now for many years, as new construction has focused primarily on homes, not businesses.

So what can Belmont do to encourage new commercial real estate development while maintaining or improving the town's quality of life? Here are a few ideas. None of them will cost any money. But all require work, cooperation, and political will.

Denser construction in commercial areas

To start, Belmont can change its zoning bylaws to encourage the development of dense, valuable commercial real estate in areas that are already zoned for commercial use. Specifically, it can increase the maximum building heights allowed by right in Belmont Center, Waverley Square, and Cushing Square. In Belmont Center, for example, the maximum building height allowed without a special permit is two stories, even

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Why We are Running a Pro-Development Piece

By Vincent Stanton, Jr.

Long-time readers of the *Newsletter* may be surprised to see an article proposing more intensive development in Belmont. The Belmont Citizens Forum was created in 2000 by a group of residents who opposed the scale of development proposed by McLean Hospital on its Belmont Hill campus—initially over 1,000,000 square feet. Much of that development has not transpired, as commercial property developers have not found the McLean location attractive.

The McLean development proposed in the late 1990s came with the promise of substantial new revenue. Specifically, in 1999 the town's financial impact consultant estimated that the McLean development would ultimately yield \$1,818,425 in net tax revenue to Belmont: \$1,191,085 from a senior development (never built), \$193,500 from an R&D building (never built), and \$433,840 from townhouses

In exchange the town gave up, in a phased process, the \$512,450 in taxes that McLean had been paying based on the value of McLean's land as zoned, for single family houses, assessed at \$35 million in 1999. Thus the McLean development—all of it residential—has not made a meaningful difference in the town's financial circumstances; indeed the net impact may be negative in view of the minimal town costs associated with the McLean payment.

Belmont's development prospects are ultimately constrained by a tiny commercial zone. The town occupies 4.71 square miles, of which 44% is owned by the town or nonprofits, leaving 2.64 square miles for development, the vast majority of it occupied by houses. In contrast, Lexington is 16.5 square miles, Waltham 13.76 square miles. Arlington (5.5 square miles) and Watertown (4.1 square miles) are similar in size to Belmont but have larger business districts.

Some members of the Newsletter Committee remain skeptical that aggressive new commercial development is the solution to Belmont's financial predicament, not because it wouldn't increase net revenues, but because the scale of development required to meaningfully address

Belmont's fiscal crunch is almost impossible to imagine and would come at a high price in quality of life.

Surrounding communities, particularly Cambridge, Lexington, Waltham, and Watertown, have been able to attract a much richer class of tenants than exist in Belmont, including Fortune 500 companies and a major biotech presence. That tenant mix allows those communities to set commercial property tax rates higher than residential rates by roughly two fold, amplifying the contribution of the commercial tax base (see table).

Belmont's development prospects are ultimately constrained by its tiny commercial zone.

It is far from clear that the tenant mix in Belmont (many of whom rent under terms that require the tenant to pay property taxes) could afford a doubling of taxes. For Belmont to get from where it is to where the surrounding communities are would be a multi-decade process requiring dedicated town staff, with no assurance of success, and no possibility of achieving the same commercial mix as Cambridge, Lexington, Waltham, and Watertown because of the very limited land for development in Belmont.

All that said, Belmont should of course support its businesses and encourage new business development, but not because that offers a financial panacea; rather, because our quality of life is enhanced by having high-quality goods, services, and restaurants nearby.

Finally, the Newsletter Committee recognizes that with the disappearance of local coverage in the pages of the *Belmont Citizen-Herald*, as well as the elimination of the editorial and op-ed pages, the Newsletter has a responsibility to cover a wider range of issues and offer a broader range of perspectives than in the past.

Vincent Stanton, Jr. is a director of the Belmont Citizens Forum.

Belmont is Sitting on a Fiscal Cliff *continued from page 2*

Municipality	FY2022 Residential and Open Space	FY2022 Commercial, Industrial, and Personal Property
Waltham	41%	59%
Watertown	61%	39%
Lexington	77%	23%
Hopkinton	83%	17%
Hingham	89%	11%
Acton	89%	11%
Sudbury	90%	10%
Concord	92%	8%
Milton	94%	6%
Arlington	94%	6%
Belmont	95%	5%
Winchester	96%	4%
Overall average	83%	17%
Overall average without Belmont	82%	18%

Communities sorted by percent commercial tax levy. Source: Massachusetts Division of Local Services Data Analytics and Resource Bureau.

though 68 Leonard Street — the town's most valuable commercial building on a per-acre basis — is three stories tall. Increased building heights could also contribute to mixed-use development, which tends to strengthen local businesses by putting customers closer to them.

Eliminate or Reduce Parking Minimums

Belmont can also reduce or eliminate parking minimums for new businesses. Parking lots tend to have relatively low assessed values and generate little property tax revenue. They also sit empty much of the time. Reducing the amount of required parking would hopefully increase property tax values, discourage driving, and encourage walking, biking, or taking the bus, particularly in mixed-use areas of greater density.

Develop Underused Government-Owned Properties

Belmont can also promote the development of town-owned land in the major commercial districts. For example, the Claflin Street parking lot and Waverly Square parking lot are excellent candidates for commercial or mixed-use devel-

opment opportunities and are in areas already zoned for commercial development. They are in densely developed parts of Belmont and are close to train stations and bus stops. Selling the properties would lead to immediate, one-time revenue plus new, recurring property tax revenue. Another parcel ripe for development includes the state-owned, five-acre parcel at the east end

of Route 2 (322 Concord Turnpike). This entire parcel is surrounded by Route 2 and access roads and is already zoned for commercial use.

Update Zoning to Promote Commercial Development and Prevent Undesired Development

At the same time, Belmont should review zoning for the largely undeveloped land in the northwest corner of town. In April 2020, the Belmont Country Club sold 13.2 acres on the Lexington side of Winter Street for \$14,223,250 for the development of senior housing near Route 2. The Club could also sell land in Belmont that is currently used as private recreational land but zoned for single-residence use. If the Club sells, a new owner could build a huge development of single-family homes by right. Although these homes would increase Belmont's property tax base, they most likely would not generate enough new property taxes to offset the increased infrastructure expenses and costs in town services for the new residents. In addition to preventing unprofitable development, rezoning also offers an opportunity to promote

commercial development, for example, next to the new senior housing development next to Route 2, within two miles of Route 128, and about eight miles from downtown Boston, and to preserve open space in a way that balances the need for tax revenue with quality of life for Belmont residents.

Commercial development is not an immediate solution to Belmont's financial problems but one that will play out over the next five to 20 years. However, taking steps now to increase Belmont's commercial property tax base should eventually create enough wealth to support Belmont's infrastructure and services so that Belmont can thrive.

Following are some suggested next steps in planning for Belmont's sound fiscal future:

- Convene a citizen committee to study the problem with various stakeholders (this could be similar to the citizens committee that petitioned the Planning Board several years ago to change General Residence and Single Residence A zoning to avoid over-building on small lots)

- Identify potential developers willing to work with the town on appropriate long-term commercial development
- Present a petition to both Town Meeting and the Planning Board to rezone west Belmont in a way that protects Belmont's fiscal and physical future

The authors of this article are contemplating forming a citizens committee to propose changes to Belmont's zoning bylaws that would address commercial development, preservation of open space, and historic preservation in western Belmont. If you are interested in getting involved, please reach out to any of them. Stay tuned for future articles on these topics!

Dan Barry is a Town Meeting Member. He can be reached at danbarbara1@verizon.net. Max Colice is a Belmont resident. He can be reached at max.colice@gmail.com. Elizabeth Dionne is a Town Meeting Member, member of the Warrant Committee, and chair of the Community Preservation Committee. She can be reached at eharmerdionne@comcast.net.

Reflections on "Belmont's Fiscal Cliff"

By Vincent Stanton, Jr.

More extensive versions of the tables in this article may be viewed at belmontcitizensforum.org

Although "Belmont's Looming Fiscal Cliff" makes several important points about Belmont's tax base, some of the details should be clarified for BCF readers.

Lexington and Watertown have both recently raised taxes, largely driven by the construction of new schools. Lexington's most recent tax increase was in June 2022, when voters approved a debt exclusion to fund a \$35.2 million new police station. The average tax bill is expected to increase by \$258/year in the first year. Previously, in December 2017, Lexington voters approved debt exclusions for two new schools and a new fire station with an aggregate price tag of \$85.78 million resulting in a 2018 tax increase.

In terms of future tax increases, Lexington is currently in the planning stages for a new high school, estimated to cost as much as \$400

million. In spring 2022, the Massachusetts School Building Authority voted to accept the Lexington High School project into the MSBA reimbursement program. This spring, Lexington Town Meeting appropriated \$1.85 million for a high school feasibility study, the first step of the MSBA process. Thus, Lexington is where Belmont was about five or six years ago, with a very large tax hike on the horizon, assuming residents pass a debt exclusion for the new school. As a stop-gap measure, Lexington appropriated \$4.9 million in 2015 to build 16,000 square feet of modular classrooms at the high school.

Watertown also increased residential tax rates in 2022. As the Watertown assessor explained to the City Council in November 2021, while new life science developments in Watertown will bring in millions of dollars of new tax revenue, due to state law limits on shifting the tax burden away from residential properties, the average residential tax bill will rise by \$287 or 4.3%, and further increases are expected. Watertown is also engaged with the MSBA on construction

	2021 population	School population 2021-2022	School pop. total pop	% of <18 pop. in public schools	2020 median household income	Residential property tax/\$1K	Commercial property tax/\$1K	Ratio comm: res tax rates
Bedford	14,155	2,602	18%	78%	\$133,824	17.66	17.66	1
Lexington	34,071	6,901	20%	75%	\$185,686	13.8	27.18	2
Wayland	13,724	2,700	20%	75%	\$192,632	18.35	18.35	1
Winchester	22,662	4,496	20%	71%	\$173,058	12.51	11.89	1
Burlington	25,989	3,388	13%	70%	\$121,433	9.95	26.64	2.7
Newton	87,453	12,024	14%	65%	\$154,398	10.52	19.95	1.9
Belmont	26,838	4,356	16%	64%	\$140,500	11.56	11.56	1
Waltham	64,015	5,507	9%	63%	\$95,851	11.14	22.88	2.1
Needham	32,048	5,483	17%	63%	\$174,707	13.37	26.43	2
Weston	11,666	1,906	16%	63%	\$206,250	12.81	12.81	1
Milton	28,388	4,355	15%	62%	\$141,050	12.47	19.12	1.5
Arlington	45,617	5,755	13%	59%	\$114,576	11.42	11.42	1
Brookline	62,726	6,891	11%	58%	\$113,642	10.19	16.56	1.6
Wellesley	30,191	4,432	15%	58%	\$213,684	11.68	11.68	1
Dedham	25,240	2,556	10%	55%	\$101,780	13.35	27.93	2.1
Woburn	41,056	4,279	10%	54%	\$92,084	9.34	22.77	2.4
Lincoln	6,890	1,048	15%	54%	\$140,888	14.93	20.77	1.4
Watertown	35,149	2,526	7%	50%	\$100,434	13.25	21.28	1.6
Medford	62,098	3,943	6%	48%	\$101,168	9.01	17.23	1.9
Cambridge	117,090	6,678	6%	46%	\$107,490	5.92	11.23	1.9
MA	6,984,723	911,529	13%	67%	\$84,385			

This table shows the five cities and towns that border Belmont and all of the cities and towns that border those five communities, plus two other comparable communities, and state-wide data. Note that Belmont is the second smallest community of the 20. The communities are sorted by the fraction of the population that attends public school, a major driver of municipal costs.

In Belmont a relatively high fraction of residents attend public school. Of the six towns with a higher percentage of residents attending public school all but one (Bedford) also have higher median household income, which means they can pay higher taxes. Of the 13 communities with a lower percent of residents attending public school than Belmont, all but two (Newton, Wellesley) also have lower median household income. The fraction of the under-18 population attending public school is related to schools' performance.

Four communities have commercial tax rates comparable to Belmont: Arlington, Cambridge, Wellesley and Winchester. Every other city and town has higher rates. Cambridge can offer low rates because of its surfeit of commercial property.

Sources: [US Census](#), [Massachusetts Department of Education](#)

Biotech, Pharm, and other Health Care Companies near Belmont

Community	Small/medium biotech companies	Top-20 global pharma companies	S&P 500 / company headquarters
Arlington	2	-	-
Belmont	0	-	-
Cambridge	215	Novartis (WW research HQ), Amgen, Bayer, Lilly, Moderna, Pfizer, Sanofi, Takeda	235. Biogen
Lexington	22	Takeda (US HQ)	
Waltham	58	AstraZeneca, Sanofi	355. ThermoFisher Scientific, (also PerkinElmer, #802)
Watertown	24		Athena Health (privately held, valued at \$20 billion)

Biotech/pharmaceutical companies in communities bordering Belmont. Arlington is the only other community that hasn't taken advantage of the leading regional industry.

of a new high school estimated to cost at least \$200 million. The MSBA is to cover \$50 million of that amount, and the rest will be funded by Watertown taxpayers through the regular operating budget, not via a debt exclusion, as the town manager announced in April 2021. Watertown also recently completed building two new elementary schools and thoroughly renovating a third for a total cost of \$220 million, also without a debt exclusion. Thus Watertown, despite the 2022 tax increase, is a better example of the authors' thesis. The city's 34% commercial tax base (vs. 4% in Belmont) really does provide flexibility.

Construction in Commercial Areas

Surrounding communities—including some towns no more populous than Belmont (e.g., Bedford, population 14,155, albeit 13.9 square miles)—have attracted tenants who can afford to pay high real estate taxes. Prominent among those tenants are biotech, pharmaceutical, and other research and development companies, whose main criteria in looking for space are top-quality laboratory facilities, an attractive location, and access to a qualified workforce.

In the late 1990s, Belmont had the idea that it could create a biotech campus adjacent to MGH-owned McLean Hospital. The town negotiated with McLean initially for a 200,000 sq. ft. biotech R&D building with 800 parking spots, later reduced to 150,000 sq. ft. with 525 adjacent parking spaces. That plan was approved by Town Meeting in 2000.

A developer (Belmont ValueRealty) bought the right to develop the project but could never find tenants or financing. At the end of the lease period, the rights reverted to McLean, which has not found a new developer. It turns out biotech companies like to be next to other biotech companies. We see that pattern in Kendall Square, and even in Lexington, Watertown, and Waltham, where biotech companies are clustered in one or a few locations. For example, Pfizer, which inherited R&D space on Cambridge Park Drive when it bought Wyeth Pharmaceuticals in 2009, decided in 2014 that it wasn't close enough to the Kendall Square entrepreneurial ecosystem. Pfizer moved its Alewife R&D group to two new buildings on Main Street in Cambridge which house about 1,000 employees in 280,000 square feet of office and laboratory space.

A stroll down Brighton Street on the Cambridge border within walking distance to Alewife Station reveals a diverse assortment of small tenants, with multiple empty storefronts, just blocks from the biotech cluster along Cambridge Park Drive in Cambridge (occupying space vacated by Pfizer). To attract deep-pocketed companies to Belmont would require a major effort by the town, involving demolition of virtually every existing building in the commercial segment of Brighton Street followed by extensive new construction. At a minimum, this would require a full-time director of business development and significant effort from many other town employees and committees—and even then there are no guarantees.

I share the authors' enthusiasm for mixed-use development, but would note that the residential element cuts into the economic benefit. For example, the vast new development in Cushing Square (38,200 square feet of commercial space plus 112 residential units and 202 parking spaces) was estimated to net only \$66,000 to \$115,000 per year in property taxes. While positive, it shows how much development would be required to garner (maybe) another \$1 million in tax revenues—at least 10 Bradfords, and \$1

million is only a down payment on the structural deficit!

Parking

To the extent that eliminating parking minimums would push cars onto adjacent residential streets it is unlikely to be viewed favorably by the public. The Belmont Center Business Association and Belmont Center landlords have been relentless in their advocacy for more parking (even though a 2012 Nelson/Nygaard Study of Belmont Center Parking found that the main problem is misallocation of existing parking spots).

Housing and the Belmont Country Club

The authors write, "In April 2020, the Belmont Country Club sold 13.2 acres on the Lexington side of Winter Street for \$14,223,250 for the development of senior housing. They could also sell land in Belmont that is currently used as private recreational land but zoned for single-residence use. If they sell, a new owner could build a huge development of single-family homes by right."

Assuming that developers would build large expensive houses as they have elsewhere



The Belmont Historical Society awarded a 2015 David R. Johnson Preservation Award to the Northland Corporation for its adaptive re-use of three buildings on the McLean campus: the South Cottage (above), the McLean Hospital Stables, and Upham House.

Projected Development Economics - 1999 McLean Task Force Report

Development	Scale	Assessed Value	Annual Gross Tax Revenue	Annual Net Tax Revenue	Net to Gross (%)	2022 Status
Townhouses	122 Units	\$76,250,000	\$1,078,000	\$433,840	40.24%	built
R&D facility	200,000 sq ft	\$25,000,000	\$353,500	\$193,500	54.74%	not built
Senior Living	456 beds	\$113,500,000	\$1,601,485	\$1,191,085	74.37%	not built
Senior Living - affordable units	30 beds	----	----	----		not built
TOTAL		\$214,750,000	\$3,032,985	\$1,818,425		

Promised economic benefits of the McLean development circa 1999.

This table is from the Fiscal Impacts chapter (page 75) of the February 1999 report of the “Belmont McLean Hospital Land Use Task Force.” The analysis was performed by the town’s economic development consultant John Connery, and was based on “worst case” assumptions regarding municipal service costs (schools, public safety).

The consultant noted that the projected \$1.8 million net annual revenue “represents approximately 4% of the Town’s current annual budget.” The Belmont Warrant Committee’s recommended FY2023 budget is \$146.9 million; 4% would amount to \$5.88 million.

on Belmont Hill, “A huge development of single-family homes,” would almost certainly be tax-revenue-positive for Belmont as the owners would pay high taxes and many would send their children to private schools. What measures Belmont should take in anticipation of the possible sale of part or all of the Belmont Country Club is an important topic which deserves a full airing. In general, however, building a new commercial cluster on Belmont Hill is the opposite of smart development. Belmont Hill is car land, unlinked to transit.

Timing of New Development

The authors write, “Commercial development is not an immediate solution to Belmont’s financial problems but one that will play out over the next 5 to 20 years. However, taking steps now to increase Belmont’s commercial property tax base should create enough wealth to support Belmont’s infrastructure and services so that Belmont can thrive.”

If, as the authors posit, “Belmont is effectively insolvent,” with the excess free cash the town

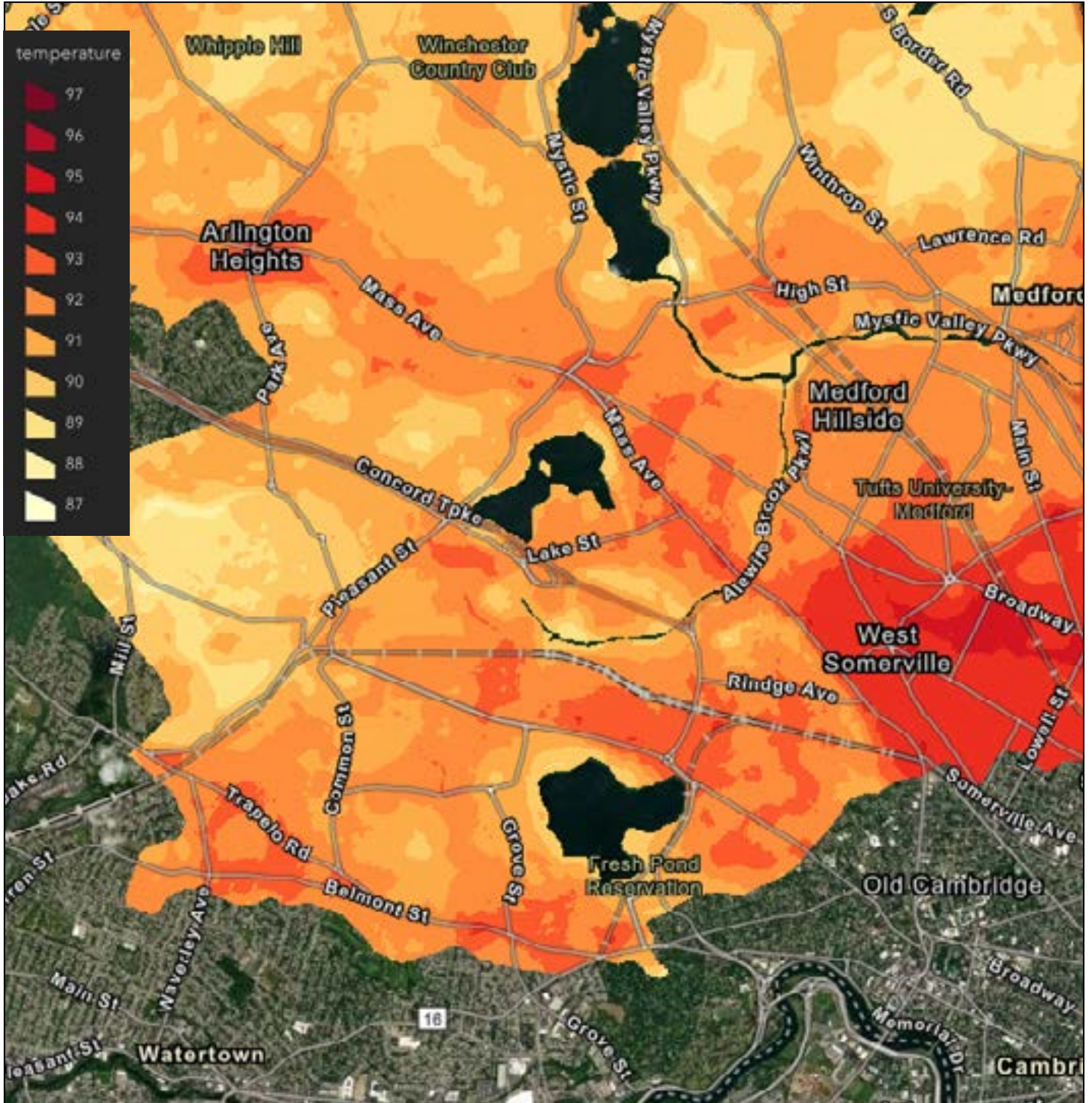
currently depends on used up by 2025, then don’t we need an urgent solution? Why don’t the authors explore an increase in the commercial tax rate?

Most of the communities surrounding Belmont have a two-tier tax regime with commercial property tax rates often about double residential rates. In absolute terms, Belmont has among the lowest commercial tax rates inside Route 128. Doubling the rate would immediately increase the share of taxes paid by commercial property owners from 4% to 8%.

Unfortunately, unlike Lexington and Watertown, which have large biotech, pharmaceutical and other relatively price-insensitive tenants, Belmont businesses are overwhelmingly small operations that could not take the increase. Landlords would surely pass on the costs; indeed, most tenants now sign triple-net leases where they are responsible for taxes.

Vincent Stanton, Jr. is a director of the Belmont Citizens Forum.

Wicked Hot Mystic Maps Summer Heat



Detail of a map of surface temperatures recorded by Wicked Hot Mystic, a collaborative project of the Museum of Science, Boston, in partnership with the Resilient Mystic River Collaborative (RMC), Mystic River Watershed Association, and the Metropolitan Area Planning Council. On August 12 and 13, 2021, over 80 volunteers joined MOS and MyRWA in measuring ground-level air temperature, humidity, and air particulate matter using special sensors mounted on cars and bikes. This data was collected August 12 at 3 pm. Note that the McLean conservation land is 10F cooler than surrounding areas.

For more information see www.mos.org/explore/public-events/wicked-hot-mystic

Town Plans Sustainable Library

By Marty Bitner and Clair Colburn

The proposed new library, designed by Oudens Ello Architecture, is an all-electric, highly sustainable building, but what are those sustainable features? What is the process of designing a holistically sustainable building?

Right-Sizing

Buildings contribute to 40% of global energy consumption and 33% of greenhouse gas emissions. Since heating buildings is the largest source of carbon emissions in Belmont, the first goal in sustainability is to make sure that our new library is no larger than it needs to be. Having the right size building means that space is not being unnecessarily heated and cooled over the next 100 years and that the embedded carbon (all the CO₂ emitted in extracting raw materials and producing, transporting, and installing building materials) is not greater than it needs to be.

For the Library Building Committee (LBC) to determine the right size for the new library, we had to assess the space needs in several ways. The first was to adjust the current library program to comply with the Americans with

Disabilities Act (ADA) and updated building codes. These legal requirements demand more space than our current library provides.

The current library is only ADA accessible at the lower Children's Room level. The library's main floor, which constitutes the adult section, cannot be accessed by a wheelchair from either the main entry or the lower level because the elevator is too small. Except for one restroom, the restrooms do not meet ADA requirements, and there are not enough toilet fixtures to meet the current plumbing codes. Additionally, the shelving layout is inaccessible to wheelchair users because there is no way to turn around.

Next, we needed to determine how the space must evolve to suit the current and future demands of the library. The current library lacks small collaboration rooms, and the Young Adult room was carved out of the Reference Room. Libraries have evolved into community hubs that provide services, resources, materials, and programs. At peak times, the Children's Room is too small and overcrowded, which is why the proposed design expands the Children's Room to provide different types of play and learning spaces like a story-time area and a crafting room.



LOUDENS ELLO ARCHITECTURE

A view of the proposed library lobby.



A view of the proposed library's exterior.

Sustainability Strategies

After having considered the space requirements, we then turned to sustainability strategies that will help to reduce the energy required to run the building. The main goal of this exercise was to drive down energy usage with efficient building systems and highly insulated exterior walls. Natural lighting, water usage, site landscaping, impervious surfaces and water runoff, renewable energy, and wellness features were also considered.

Energy Use Intensity (EUI) measures how much energy is required to run a building. The goal was reduce the EUI down as much as possible and then add renewable energy sources to offset the energy usage. The Energy Star national library average EUI is 71.6. The goal laid out by the design team is an EUI of about 23, which was achieved by all-electric heating systems according to the Zero Net Energy Report 2019.

This all-electric heating system is part of the overall goal of making the entire building run on electricity. This is consistent with the Belmont Energy Committee's Climate Action Roadmap which calls for electrification of building heating to meet carbon reduction

goals. Because electric building systems are more efficient, all-electric buildings are already less carbon intensive than fossil-fuel heated buildings using current electricity sources.

On-site electricity generation via solar panels coupled with Belmont Light's commitment to moving to fossil-free electricity will further enhance the benefit of going all electric. Since the project is in schematic design and the building systems have not yet been fully developed, energy modeling will be required to assess the project's actual EUI. For resiliency purposes, the mechanical and electrical equipment will be housed in an elevated mechanical penthouse which helps to prolong the life of the equipment and decouples roof repair/replacement with mechanical equipment.

Exterior Envelope

The LBC revised early exterior elevations to reduce the window glazing from about 46% to 39% for greater energy savings. Glass is a terrible insulator, so using glass that's been insulated with argon gas needs to be weighed against energy consumption.

Windows provide views and natural daylighting, which have benefits to offset their



LOUDENS ELLO ARCHITECTURE

A view of plans for the library's brookside edge.

energy inefficiency. For the library, many of these views will be onto the Wellington Brook and the trees adjacent the library site. Natural light throughout the library significantly decreases lighting energy loads.

Since the library has a wide footprint, clerestory windows were introduced to bring natural light into the middle of the building where natural light from perimeter windows would not be able to reach. This is an example of balancing the energy impacts with wellness effects. The design team felt that the current design of 39% of glazing meets both of those goals. The solid exterior walls and the roof, however, will be heavily insulated to achieve an R-value of R-40 and R-60 respectively, to offset the energy loss from the glazing.

Water

Although libraries are not water-intensive buildings, low-flow faucets and toilets will be installed to further reduce water usage, and the water will be heated using an all-electric heat pump system. No site irrigation beyond establishing native species is proposed for the landscape. Rain gardens on the site will naturally filter pollutants draining from Concord Avenue and the parking lot into Wellington Brook.

Site

The new library will be located closer to the Underwood Pool to reduce impervious materials.

The new design consolidates parking in one place with the same number of parking spaces. This arrangement greatly reduces the amount of asphalt needed while providing space for accessible pathways and seating for library programs. The library entrance will be equipped with bike rack storage, and the parking lot will provide charging stations for electric cars.

Renewable Energy

Photovoltaic (PV) solar panels will be installed across the 10,000 sq ft upper roof, which has the greatest solar exposure and the fewest interruptions due to rooftop vents and drains. It is expected that the PV system will be able to offset about 46% of the library's energy usage. There is not enough roof area to offset its energy usage entirely with on-site renewable energy because the parking area is surrounded by trees. Off-site PV, community solar, renewable energy credits, or carbon offsets would be required to fully offset the library's usage.

Overall, the library and its site will be a highly sustainable, energy-efficient, nonfossil fuel building that celebrates the Belmont community and promotes wellness.

Marty Bitner serves on the Library Building Committee and as co-chair of the Belmont Energy Committee. Clair Colburn, AIA, LEED BD+C, is an architect and the chair of the Library Building Committee.

Spare a Thought for Lone Tree Hill

By Dean Hickman and Leonard Katz

Between Pleasant Street and Trapelo Road to the south, Concord Avenue to the north, and Mill Street to the west, Lone Tree Hill wraps around McLean Hospital and sits above Belmont, providing us with a peaceful and secluded mix of woods and meadows where we can escape the hustle and bustle of suburban life down below. It is also Belmont's gateway to Rock Meadow on the other side of Mill Street as well as to the more secluded trails of the Western Greenway which head west into neighboring Waltham and Lexington.

Anyone looking for a break, or a peaceful place to walk and think, would do well to take the short walk into these woods and beyond. Arguably the best time to experience this Belmont wonder is the cool early morning at first light before the distant hum of traffic and gardening equipment takes some of the magic of Lone Tree Hill's quiet nature away. However, at any time of day you will find the air healthier and 10 degrees cooler, thanks to the tree cover and meadows which you don't find in the urban environment below.

Many more people have come to appreciate this public space since COVID-19 gripped society in 2020. While attending the Belmont Citizens Forum's 8th Lone Tree Hill Volunteer Day last April, mostly to remove the trash which routinely pollutes the roadside and verge along Pleasant Street and defies gravity by blowing up the Coal Road, I met Leonard Katz. Leonard is a

person I can only now describe as a guardian of Lone Tree Hill.

A Belmont resident and associate at Harvard University's Philosophy Department, Leonard came to the same event, but with a different purpose. He was leading volunteers in removing invasive plants.

Eager to learn more and to help with Leonard's mission, I joined a smattering of other volunteers on subsequent Saturday mornings under the direction of the Land Management Commission to remove invasive non-native plants from Lone

Tree Hill. We learned that many of these plants, with their prolific seeds, deep roots, and no natural adversaries, crowd out native plants or poison the fungi the native plants depend on by secreting chemicals into the soil. Removing them helps native Massachusetts plants thrive and take back the land where they evolved, providing native insects and pollinators the food they need to survive and us residents a natural oasis adjacent to where we live.

When I asked Leonard about his journey to the present-

day guardian of Lone Tree Hill, he responded:

"As a teenage hiker and for years later, I used trails others built and maintained, through landscapes and forests others protected. Except for occasional minor unplanned trail clearing efforts that were incidental to my hiking, I didn't do my share, except for a single Sierra Club service trip working on California wilderness trails.



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"This changed in the past decade as I gradually took responsibility for my neighborhood woods. Walking up Lone Tree Hill's Coal Road trail, I found I couldn't pass through the quasi-clearing near the seasonal stream crossing between trail markers nine and 10 without brushing Japanese knotweed stems on both sides. This endangered walkers and bikers who might unwittingly pick up ticks. So I didn't just pass by but broke off every trail-encroaching stem.

"Soon I realized that a drought was causing a die-back of other knotweed stems, which ordinarily flower and then seed in late summer before dying back to their underground rhizomes at first frost. This offered an opportunity to go after the rest of the knotweed patch when it was weakened by drought.

"I received permission from Lone Tree Hill's Land Management Committee and, that year and later, removed much of it, allowing the native shrubs that had been overtopped by towering annual knotweed growth their place in the sun. This allowed regrowth of the carbon-storing three-tier tree/shrub/herbal ground cover native forest in this disturbed area of an otherwise largely intact ecosystem, into which the invasive knotweed was starting to spread.

"I originally had nothing against Japanese knotweed or European garlic mustard. I even enjoyed eating them seasonally. Only later did I learn that garlic mustard poisons the underground fungi that feed needed minerals to trees and also to the trout lilies that I love. Such invasive plants impair the biodiversity of our native plant and wildlife communities, in which plants feed local insects and other wildlife.

"Last spring the Land Management Committee resumed permission for my work on invasive plants. I led volunteers on Saturday mornings, mainly removing garlic mustard from areas near the boundary of Lone Tree Hill and Rock Meadow, near Mill Street. While I've done some work on knotweed recently, I'm waiting for soaking rains to lubricate the roots and rhizomes to enable pulling this out efficiently, while drought once more helps by causing knotweed stems to die this year.

"Sustaining and continuing this work of monitoring and removing regrowth will need



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Japanese knotweed at Lone Tree Hill.

others participating and eventually taking over, doing our parts toward a sustainable Belmont in which humans and native plants each have their parts to play locally in maintaining a livable planet. But this work is also immediately rewarding in the moments of peace in nature that we experience in getting to notice and love close-up our native flowers, ferns, shrubs, and seedling trees, which we would otherwise miss, as those of us who steward our conservation land learn to do."

If you would like to learn more about native plants in our local woodland and get involved you can sign up at bit.ly/BCF-LTH-Form to join a growing group of volunteers in our community restoring and advocating for Lone Tree Hill conservation area.

Dean Hickman is chair of Sustainable Belmont, a nonprofit organization that educates and advocates on environmental issues for Belmont. Leonard Katz serves on the Invasives Working Group of the Land Management Committee for Lone Tree Hill.

Belmont Bus Routes to Shift in Spring 2023

By Meg Muckenhoupt

Belmont's mass transit users may have very different travel options under the MBTA's proposed Bus Network Redesign. The MBTA is proposing changes including eliminating the the #74 bus route to Harvard Square and adding a new #54 bus route from Arlington Center to Riverside, Newton. You can view the complete proposal presented at Belmont's July 28 Traffic Advisory Committee meeting at bit.ly/BFC-New-Bus. The new routes will be rolled out in 2023,

Belmont residents have repeatedly expressed concerns about the new #54 route which runs from Belmont Center through the tunnel under the commuter rail tracks and

down Waverley Street to Waverley Square.

Constituents commenting on State Senator Will Brownsberger's blog wondered if the MBTA's buses are too tall for the tunnel, and stated that Waverley Street is narrow and sometimes impassable. Attendees at a July 8 public meeting about Belmont's new bus routes mentioned Waverley Street problems including weekend parking at Town Field, traffic bottlenecks, and blind driveways, according to an article in the *Belmontian*.

The MBTA began the Bus Network Redesign project in 2018 in an effort to modernize the bus network, which "hasn't changed much in the last 100 years," as Caroline Vanasse, MBTA project manager for the Bus Network Redesign,

commented in an MBTA video. Meanwhile, the Boston region's needs have shifted. People are commuting to new work areas, the Boston area's demographics have shifted, traffic has increased, and travel patterns have changed.

Part of the problem is that the MBTA's subway, rail, and bus routes were largely designed to carry suburbanites to and from an urban core for work, as detailed in the Urban Land Institute's 2012 report *Hub and Spoke: Core Transit Congestion and the Future of Transit and Development in Greater Boston*. Today, more Boston-area residents commute between suburbs and need to travel outside of rush-hour congestion.

Belmont's current bus routes provide service every 15 minutes or less midday and weekdays between

The network, today



Belmont's current MBTA bus network

Our proposal

All details and full-sized maps are available at:
mbta.com/bnrd



Belmont's future MBTA bus network

Waverley Square and Harvard Square on the #73 route, and every 30 minutes less on the #74 and #75 routes from Belmont Center to Harvard Square. The new plan includes:

- Service every 15 minutes or better from 5 AM to 1 AM every day between Waverley Square and Harvard Square on the new T73 bus.
- Service every 30 minutes or less from 6 AM to 10 PM on the #75 bus from Belmont Center to Harvard Square.
- Service every 30 minutes or less from 6 AM to 10 PM on the new #54 bus, which runs from Arlington Center down Pleasant Street to Belmont Center and Waverley Square before continuing to Beaver Street, Waltham, and on to the Riverside MBTA station in Newton.

- Less frequent buses on the #78 route on Blanchard Road, with buses running every 60 minutes or less seven days a week.

The MBTA states that this new schedule provides more Sunday service on the #75 route, better access to Belmont, Waltham, and Arlington via the #54 route, and more consistent seven-day-a-week service on four Belmont routes.

The MBTA closed its public comment period on July 31, 2022. A final map of the new bus system is scheduled to be published this fall. For more information, see www.mbta.com/projects/bus-network-redesign.

Meg Muckenhoupt is editor of the Belmont Citizens Forum Newsletter.

Your Name in Print!

The Belmont Citizens Forum is looking for volunteer writers, photographers, and illustrators to contribute to print and online editions of the bimonthly **Newsletter**.

Volunteers can propose topics they'd like to see in the newsletter or ask to be assigned articles and graphics. We are always looking for pictures of Belmont's natural world, including flooding, ecological landscaping, and native plants.

No experience is required. To apply, email BCFProgramDirector@gmail.com.

Alewife Brook, Little Pond Get D Grades Again

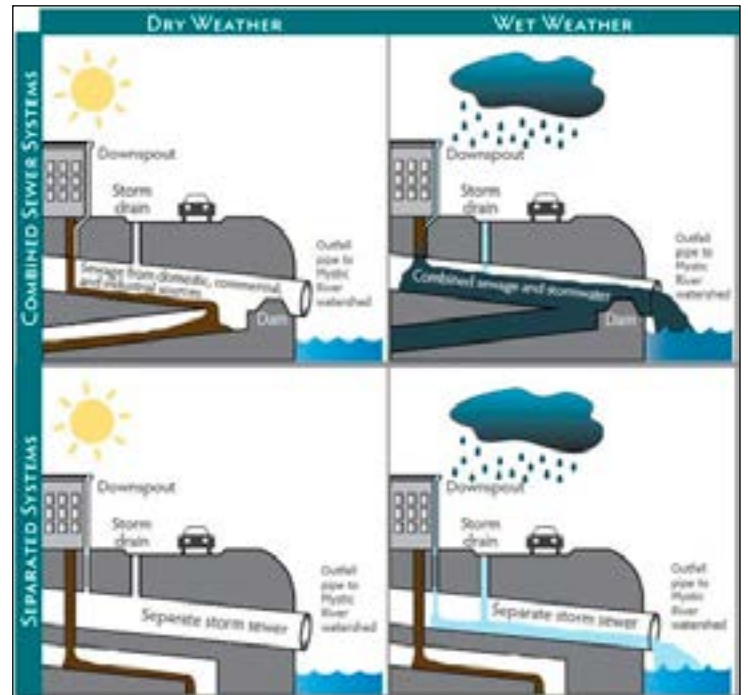
By Meg Muckenhoupt

In 1972, the Clean Water Act called for all waterways to be “fishable and swimmable” by 1983, and for all pollution discharges to end by 1985. That still hasn’t happened, as is shown by the new annual water quality report card issued by the Environmental Protection Agency (EPA) for the Mystic River in July. All of Belmont’s brooks received a D or D+ grade because they failed to meet state E. coli bacteria standards for boating in 45% to 55% of samples taken in 2021.

Over the course of each calendar year, the Mystic River Watershed Association (MyRWA) works with volunteers to take samples from 15 different sites to assess the river’s health. The results of those samples are reported to the EPA, which issues report cards for Boston-area rivers in July each year; the Charles River and Neponset River Watershed Associations also participate in this program.

These scores have improved slightly since the EPA started breaking out the Mystic River’s score by segment in 2014 instead of assigning a single score to the entire river. The Little River is now at least swimmable on average about 52% of the year compared to 46% in 2014, and Winn’s Brook has improved from an F to a D. However, it’s clear that there is still far too much pollution damaging Belmont’s waterways.

The 2022 report card stats reflect data from 2019–2021. The scores average each segment’s bacterial counts over three years to account



for varying weather. For example, in years where there are several heavy rains, there will be more combined sewer overflows (CSOs). A CSO happens during heavy rains in towns where stormwater drains and sewage drains are connected. The stormwater reaches a high enough level inside the pipes that it sweeps raw sewage out into local waterways— including the Alewife Brook.

Cambridge still has many CSO pipes. Belmont has historically had some household sewage pipes misconnected directly to the storm drain system, and some old sewage pipes that leak into storm drain systems. (See the BCF’s Stormwater Fact Sheet at www.belmontcitizensforum.org/stormwater/belmont-stormwater-fact-sheet and “Finding Sewer Leaks Means Detective Work,” BCF Newsletter, March 2018.)

The Mystic River is also polluted by stormwater runoff that contains car oil, dog waste, fertilizer and other lawn and yard care products, salt, and other debris. All the water that flows off roofs, roads, sidewalks, driveways, and lawns goes into storm drains which send the pollution directly into Belmont’s brooks, Little Pond, and the Mystic and Charles rivers. (See “Stormwater Threatens our Waterways,” BCF Newsletter, November 2021.)

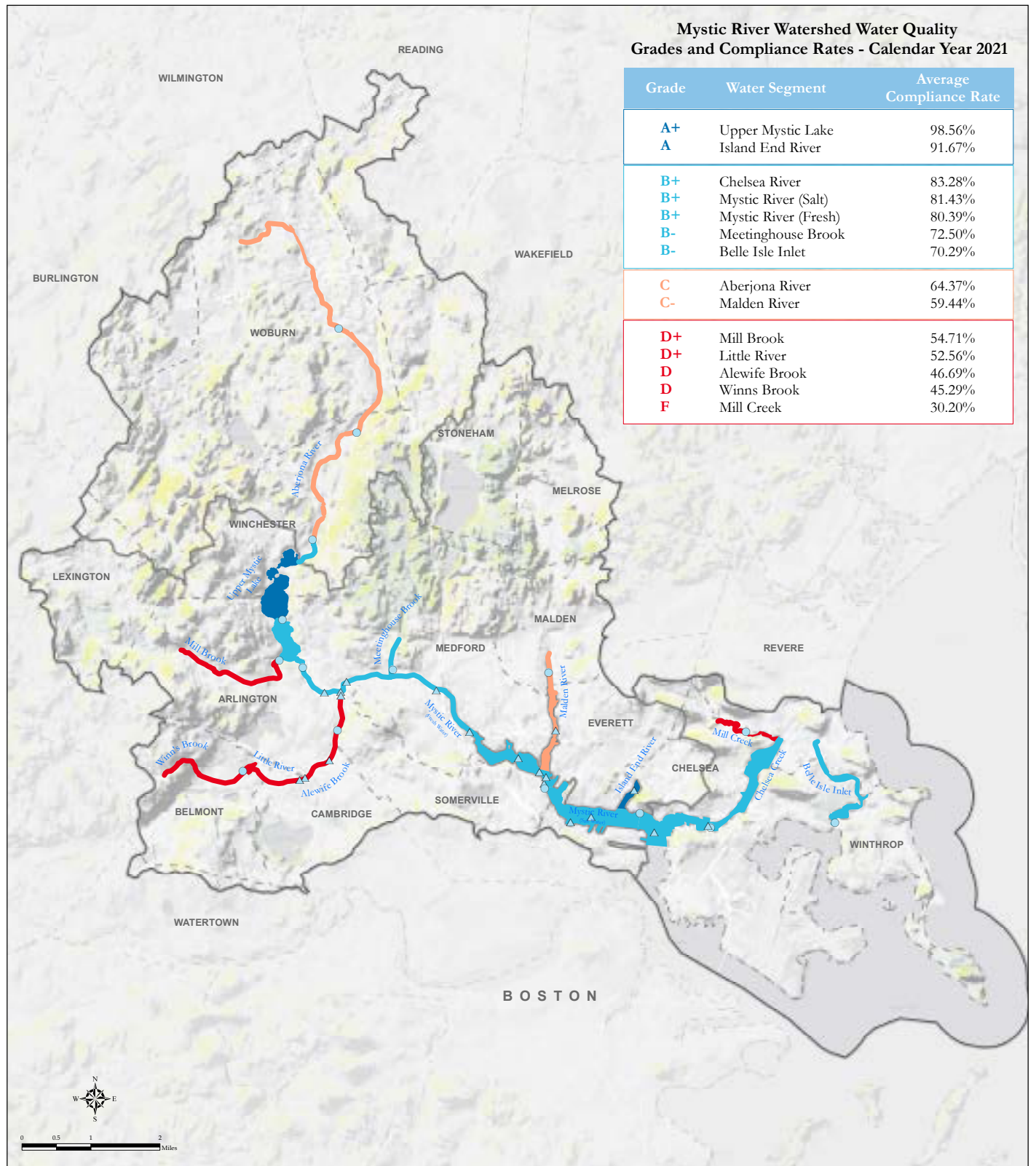
Site	2021		2014	
	Grade	Total	Grade	Total
Alewife Brook	D	47%	D	46%
Little River	D+	53%	D-	40%
Winns Brook	D	45%	F	33%
Mystic River	B+	80%	B+	85%

Source: EPA, www.epa.gov/mysticriver/mystic-river-watershed-report-cards

An EPA 2017 consent order gave Belmont five years to stop underground sewage from leaking into local waterways. In 2021, Belmont continued to struggle with high E. coli counts in local streams and brooks despite extensive town work on sewer issues. (See “[Belmont Has One](#)

[Year to Clean up Waterways,” BCF Newsletter, May 2021.](#))

Meg Muckenhoupt is executive editor of the Belmont Citizens Forum Newsletter.



Regionalization Could Boost Services

By Aaron Pikcilingis and Paul Rickter

Providing high-quality town services amid budgetary constraints requires us to use every strategy at our disposal. The Structural Change Impact Group (SCIG) was charged with evaluating potential strategies that could reduce costs, improve efficiency, or improve the quality of service for our town. Of the strategies we evaluated, regionalizing town services is one of the most promising. Belmont already participates in several regional arrangements, but the SCIG identified new opportunities for consideration.

Benefits of Regionalized Town Services

Reduced costs

Regionalized municipalities can benefit from group purchasing because individually, smaller municipalities don't buy enough material to negotiate lower prices. Belmont participates in multiple regional purchasing consortiums, including consortiums for fuel for town vehicles coordinated by the town of Brookline and road salt coordinated by the city of Newton. We also participate in a program of household hazardous waste collection that is coordinated by the town of Lexington and purchase heavy equipment such as fire department vehicles through a program run by the Metropolitan Area Planning Council.

Service gaps addressed

Smaller communities like Belmont are often faced with a dilemma when it comes to staffing for specific services. Our level of need doesn't justify a full-time hire, but it's difficult to attract and retain talent for part-time positions, and outsourcing some functions can result in inconsistent service. It is sometimes possible to solve this dilemma by sharing a staff position with another municipality. For example, Belmont currently shares a nursing position with Lexington. In the recent past, Belmont shared two gas and electrical inspectors with Watertown. This agreement allowed Watertown to add capacity to their busy inspection services and allowed Belmont to meet our demand for those services without hiring full-time staff

ourselves. Due to Watertown's ongoing building boom, they opted not to renew this agreement, and it dissolved in April 2022.

Improved services

The LABBB Collaborative regionalized special education program has resulted in improved services. Working together across communities, each school district in the five-member LABBB Collaborative can provide specialized services for specific groups of students, something that simply wouldn't be possible within a smaller district like Belmont. This specialization allows member districts to provide focused resources for groups such as students with autism spectrum disorders in one location to better meet those students' needs. Belmont participates in other regional efforts that result in improved service including the Minuteman Library Network, NEMLEC, mutual aid for public safety, MAPC, and more.

Regionalization opportunities

The SCIG gathered and evaluated many suggestions to regionalize specific functions, but also undertook a broader review of regionalization as a potential mechanism to reduce costs and improve quality for any function of the town. At a high level, the town needs to:

Identify which functions we want to regionalize. Evaluating services and functions for regionalization is partly about assessing whether collaboration would result in cost savings or



JEFFREY NORTH

quality improvement while aligning with long-term town goals. We need to take steps to align our internal efforts so that we are ready to form long-term regional agreements with our neighbors when opportunities arise.

To be ready to regionalize, we should start by updating our Comprehensive Master Plan to ensure the updated Plan reflects the needs and goals of our residents. This approach will also help address a common challenge to regionalization: resisting change.

We also should continually evaluate whether the things we do are appropriate for potential regionalization. A key recommendation from the SCIG is to design and implement a process for this type of assessment at decision points such as contract renewals and staffing changes for any town function.

Identify partner communities. Once we have a sense of the functions we want to regionalize and are ready to act, we still need to find partners whose needs and goals align with ours. This alignment includes not only the sharing of a given service, but also the scale, timing in hires and contract dates, and other considerations.

It's difficult to know what resources other communities have, what resources they need, and their willingness to act. We might want to join regular meetings among town administrators and managers of neighboring communities and include a standing agenda item to discuss regionalization. This type of proactive approach should greatly improve our ability to pursue regionalization agreements, and would allow us to learn about new areas to regionalize.

Opportunities to Regionalize

We should seek new partners whose inspectional service needs are similar to ours to regionalize gas and electrical inspections. Our agreement with Watertown was successful for years before Watertown's needs changed, so it stands to reason that finding a new partner for a similar agreement would likely work as well.

Regionalized purchasing has consistently helped reduce costs. For other items we purchase as an individual town, we should assess whether we could save money by purchasing them as part of a purchasing group, and if we can either join or form one.

There are sound arguments both for and against regional 911 dispatches. Regionalizing the service warrants further exploration because there are many established and new regional dispatch hubs throughout Massachusetts. We have learned that our advanced life support services may be in demand from surrounding communities that have been disappointed in their current contracted service providers. We should continue conversations with those communities and explore a regionalization agreement.

Belmont and Watertown held discussions about regionalizing our solid waste contracts in the early 2010s. A key reason we didn't enter a regional agreement was Belmont's insistence on a four-day weekly pickup schedule, which avoids the need for occasional Saturday pickups but carries additional costs Watertown was not willing to bear.

As our current contract nears its end, we should seriously consider moving to five-day pickup and restart discussions with Watertown about entering into a new solid waste and recycling contract. The SCIG referred this information to Belmont's Solid Waste and Recycling Committee, a temporary committee charged with assisting the town in procuring a new collection contract and considering possible enhancements in recycling efforts.

We can find ways to improve efficiency by collaborating with other communities. We are already doing that in several areas, but the challenge of regionalization is that it's not always easy to identify areas where we can collaborate and we need partner communities who are willing to work with us. We and our partner communities must be willing to consider changing the ways we deliver services. The potential advantages of regionalization, in lower costs and more efficient, potentially higher-quality service, make this an approach that town leaders and residents should be open to embracing.

Aaron Pikilingis and Paul Rickter served on the Structural Change Impact Group (SCIG) and are both Town Meeting members. Paul Rickter is a member of the Warrant Committee and Aaron Pickilingis is a member of the Vision 21 Implementation Committee.

Letter to the Editor

To the BCF editor:

Anne Paulsen's recent column [["Do We Need a High School Parking Lot?"](#) BCF Newsletter, July 2022] argued that if parking were eliminated west of Harris Field, then there would be "plenty of room for tennis courts and some open space as well."

Whether tennis and a rink could both fit has been studied intensively by numerous informed parties: the High School Building Committee, a sports architect from Perkins+Will, rink architect Ted Galante, the Select Board, the School Committee, and the Preliminary Rink Design Committee.

None of these efforts found a layout that could accommodate a rink, 110 parking spaces, and five tennis courts at ground level. The architects made concept sketches with elevated tennis courts, either on a deck above a parking area (Perkins+Will) or on a rink roof (Galante). Elevated courts would cost approximately \$5 million.

Anne says eliminating the parking would make room for a rink and five courts. But she makes a mistake that kills her argument.

She writes that a tennis court is 2,106 square feet and that the total space requirement for five courts would be "just under 11,000 square feet." Not true. Five regulation tennis courts require at least 30,240 square feet. That mistake changes everything.

If you leave the rink in its current location and take down the White Field House, you couldn't nearly fit five tennis courts between the rink and Concord Avenue. Moreover, a new rink needs to be larger to replace some of the capacity of the Field House, which leaves less space for courts.

Anne also fails to consider that a rink requires a driveway and vehicle access from Concord Ave even without a parking lot. That also reduces space for tennis courts.

A rink fronting on Concord Avenue perhaps could leave space behind for tennis courts but there has been no support for this approach from the residents and our public safety officials also do not recommend this layout. Galante

determined that a rink set back by the tracks is not workable.

One could fit tennis with a rink by reducing the other playing field space west of Harris Field, which is not acceptable to the School Committee.

When you consider the actual size of five tennis courts and the realities of the site, the choice is really between a rink or tennis, or a large cost to elevate the courts to have both. Anne's assumptions about eliminating parking do not provide a solution.

Roy Epstein

Member of Select Board, Town Meeting Member, Precinct 6

Paulsen responds:

To respond to Mr. Epstein's letter about my article in the July/August BCF Newsletter, I would say that Mr. Epstein missed the underlying theme of the article: "What is the best use of limited space in a small community?"

It is true that I used the square footage of the courts themselves and did not include the surrounding area, but the Perkins+Will presentation to the School Committee last January showed the rink in an east/west position with a 110-space parking lot in front. Tennis courts were on top. Since a parking lot of 110 cars consumes about 30,000 square feet, the same as five full tennis courts, take away the parking lot, lower the tennis courts, and voila! I continue to think that tennis courts are a better use of space than a parking lot.

Mr. Epstein, in his eagerness to "kill" (such a violent term in this day and age) my argument, never reveals his position on how to make the best use of limited space. He now supports the latest design of the rink project presented by a new architect that keeps an expanded rink in its present location, a location which slightly increases field space but prevents any new uses except for one: some expanded parking and an off-street drop-off.

The proposed design shows additional parking by extending the jug handle lot along Concord Avenue almost to the entrance to the football area along with a sweep of pavement to allow a drop-off at the rink door. This can add about



Aerial view of one proposed plan for new ice rink and parking by Perkins+Will

30 more spaces. While being constructed as part of the rink project, it will also allow for more off-street student parking.

Mr. Epstein has expressed support for this expanded parking. But at what cost? It will require the elimination of mature shade trees and leave the three houses across the street with a roadway and parking lot in front instead of a view dominated by shade trees.

I know that Mr. Epstein has supported "no parking during certain hours" on streets across from the Belmont Middle and High School so no students will park on these side streets. Is it fair to champion no parking on some streets and then support an expansion of off-street parking in front of other people's houses?

Parking lots are hot spots. We are reminded this summer why we do not need any more hot spots. Parking lots are dirty and the runoff lands in streams and rivers. Expanding parking along Concord Avenue will reduce the shade canopy and make the neighborhood hotter and less pedestrian friendly.

Furthermore, as I stated in my article, Myrtle Street has parking on one side of the street halfway up and then changes to the other side for the rest of the street. It does not prevent parking but does prevent cars from narrowing the street and making it unsafe for moving vehicles. This has been a major concern of the neighbors affected by high school parking. Since the new "no parking during certain hours" does not extend to Myrtle Street and Cottage Street,

residents on these streets will now bear the burden of student parking while other streets are parking free.

The town, which is supporting solar energy and trying to meet zero-net energy goals, should not be in the business of creating more off-street parking, which adds to the warming of the atmosphere. We can develop bylaws and regulations that protect the natural resources and discourage environmental degradation. We should not cut down shade trees for convenience.

Efficient use of street parking preserves land. We already have public streets that can accommodate parking, and we can develop rules that prevent unsafe parking, but we, as residents, should view the streets and street parking as shared resources, not as private spaces.

The school system must work with the town and with the students and parents to discourage driving to school. Can we rethink our school bus use and rates? Right now it is probably cheaper to drive to school than take the bus.

Every school can take steps to inform parents of the dangers of unsafe parking on our streets during school hours and especially at drop-off and pickup times and work with surrounding neighbors to make our school zones safer.

There are ways to reduce the impact of cars in our neighborhoods, but expanding any off-street parking is not one of them.

Anne Paulsen

Belmont's Invasive Species: Ailanthus



DAVE JACKSON/ PENN STATE EXTENSION

Typical Ailanthus stem Note the opposite leaflets attached to a central stem.

By Jeffrey North

Tree-of-heaven (*Ailanthus altissima*), typically called ailanthus, is a rapacious deciduous tree native to China. It was first introduced into the United States when it was imported as an ornamental plant to Philadelphia in 1784 and later to New York in 1820. On the West Coast, immigrants brought the plant from Asia and planted it in California in the 1850s.

The tree was initially valued as a fast-growing ornamental shade tree that was tolerant of poor soils and a broad range of site conditions. It tolerates vehicle exhaust and other air pollution quite nicely. It was widely planted all along the Northeast Corridor, especially from Washington, DC, to New York City, for a hundred years, until the early 1900s, when it gradually lost some of its popularity. Its “weedy” nature, prolific root sprouting, and foul odor caused a drop in the plant pop charts.

Today tree of heaven has spread to 46 states and much of Canada to become an all-too-common invasive plant in urban, agricultural, and forest edge areas. We are not alone. The tree also has been introduced in Argentina, Australia, and Africa. Ailanthus spreads from human settlements, with roads, railroads, and areas of disturbed soil providing the migration routes.

But that does not mean that you have to tolerate it.

So What's The Problem?

Ailanthus altissima crowds out native species, damages pavement and building foundations, and fails to supply food or habitat to native creatures. Its roots can damage sewer lines. It grows almost anywhere, in cracks in turnpikes and bridge abutments, deforested parcels, parking lots, along rivers and streams, along woodland edges, roadsides, railways, in forest openings, and urban wilds. Tree of heaven will quickly colonize disturbed areas and take advantage of forests weakened by insects or damaged by wind and storm events or fire.

Tree of heaven serves as host to the brown marmorated stink bug, *Halyomorpha halys*, in California and, especially worrying in the Northeast, the spotted lanternfly, *Lycorma delicatula*. As if all that were not enough, tree of heaven also produces allelopathic chemicals in its leaves, roots, and bark that poison other species' root systems, slowing or preventing their growth. Ailanthus is truly a plant for the zombie apocalypse.

Identification

The best way to identify the tree is by its leaves. Ailanthus resembles native sumac and hickory species, but it is easily distinguished by the glandular, notched base on each leaflet. Just remember the phrase, “sumac is serrated, but tree of heaven is smooth.” It can grow to 80

feet tall and 3 feet or more in diameter. Its bark is smooth and brownish-green when young, eventually turning light brown to gray, then slightly furrowed, resembling the skin of a cantaloupe.

Tree of heaven leaves have a central stem to which leaflets are attached on each side. One leaf can range in length from one to four feet with anywhere from 10 to 40 leaflets. The leaflets are lance-shaped with smooth margins. At the base of each leaflet is one to two protruding bumps called glandular teeth. When crushed, the leaves and all plant parts give off a strong, offensive odor.

Look-a-likes

This species is easily confused with some of our native trees that have compound leaves and numerous leaflets, such as staghorn sumac, black walnut, and hickory. The leaflet edges of these native trees all have teeth, called serrations, while those of tree of heaven are smooth. The foul odor produced by the crushed foliage and broken twigs is also unique to tree of heaven.

Reproduction and Conquest

An *Ailanthus* tree is either male or female, and typically grows in dense colonies, or “clones.” All trees in a single clone are of the same sex. Female trees can produce more than 300,000 seeds annually, and sprouts as young as two years old are capable of producing seeds. The seeds are dispersed by the wind.

Established trees spread by continually sending up root suckers as far as 50 feet from the parent tree. A cut or injured tree of heaven may

send up dozens of stump and root sprouts. This characteristic has important implications for the control of this invasive tree species.

Human Health Concerns

Tree of heaven can adversely affect human health. The tree is a great producer of pollen that can cause allergic reactions for some. Skin irritation or dermatitis can occur from contact with leaves, branches, seeds, and bark, and in rare cases myocarditis (inflammation of the heart muscle) can result from exposure to sap through broken skin, blisters, or cuts.

Anyone faced with extensive exposure to the tree should wear gloves and protective clothing. Avoid contact with the sap. Seek medical attention if you experience fever or chills, chest pain (especially if it radiates down both arms), and shortness of breath.

Treatment

Young seedlings with stems two inches or less in diameter can be dug up and removed if the soil is moist and the entire root system can be



Detail of *Ailanthus* leaves showing small bumps called “glandular teeth” near the base of the leaf.

removed. Like other non-native invaders, the plant can regrow from just a root fragment. Due to its extensive root system and its resprouting ability, tree of heaven is difficult to control. Seedlings can be easily confused with root suckers, which are nearly impossible to pull by hand. According to experts, treatment timing and multiyear follow-up are critical to success.

University extension programs offer good guidance on the treatment of this and other invasive plant species. The College of Agricultural Science extension program at Penn State University suggests that when attempting to remove or neutralize tree of heaven, applying an herbicide is necessary. This is best done by a licensed applicator. Herbicide must be carried down into the root system to stop further sprouting. When symptoms of herbicide exposure develop (approximately 30 days), then cut down the tree.

Systemic herbicides should be applied in mid-to late summer when the tree is moving carbohydrates to the roots. Herbicide applications made outside this late growing season window will only injure above-ground growth. Following

treatment, repeated site monitoring for signs of regrowth is critical to prevent reinfestation.

Herbicides applied to foliage, bark, or cuts on the stem can be effective at controlling tree of heaven. Applying herbicide to stumps, however, does not prevent root suckering and should not be utilized. For most treatments, use herbicides containing glyphosate or triclopyr because they have little or no soil activity and pose little risk to nontarget plants.

Well-established tree of heaven stands are only eliminated through repeated efforts and monitoring. Initial treatments often only reduce the root systems, making follow-up measures necessary. Persistence is the key to success.

Any removal efforts within 100 feet of wetland resource areas will require approval from the Belmont Conservation Commission.

In Support of Biodiversity in Belmont

The Invasive Working Group (IWG) of Belmont's Land Management Committee is currently developing a plan to remove or neutralize the trees of heaven on Belmont's Lone Tree Hill conservation land. Contact bcfprogram-director@gmail.com or lonetree-hillbelmont@gmail.com for more information or to be connected with an IWG volunteer.

Alternatives

The following native plants can serve as a good replacement for *Ailanthus* according to the Concord, MA, Division of Natural Resources:

- Hickories (*Carya* spp.)
- Green ash (*Fraxinus pennsylvanica*)
- Butternut (*Juglans cinerea*)
- Smooth sumac (*Rhus glabra*)
- Staghorn sumac (*Rhus typhina*)

Jeffrey North is the managing editor of the Belmont Citizens Forum and chair of the Invasives Working Group of the Land Management Committee for Lone Tree Hill.



Ailanthus seeds.



White pine at Lone Tree Hill.

Thank you to our contributors

WRITERS

Dan Barry • Marty Bitner • Clair Colburn • Max Colice • Elizabeth Dionne • Dean Hickman • Leonard Katz • Meg Muckenhoupt • Jeffrey North • Anne Paulsen • Aaron Pikcilingis • Paul Rickter • Vincent Stanton, Jr.

PHOTOS/GRAPHICS

Jeffrey North

COPY EDITORS

Sue Bass • Fred Bouchard • Evanthia Malliris • Vincent Stanton, Jr.

NEWSLETTER COMMITTEE

Sue Bass • Fred Bouchard • Virginia Jordan • Evanthia Malliris • Vincent Stanton, Jr.

MAILING MAESTRO

Ken Stalberg

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