

Belmont Citizens Forum

Vol. 6, No. 5

A Newsletter for Belmont Residents

September 2005

Town Cuts Municipal Energy Consumption

By Marc Wolman

With the prices of electric and fossil-fuel energy going up, environmental efficiency is becoming not only the right thing to do but the smart thing to do: improving the energy efficiency of our municipal systems and structures will both save money and be good for the environment. And reducing our energy purchases will also reduce the environmental impact of generating electricity and extracting and transporting oil and natural gas. “A Working Vision for Belmont’s Future,” adopted by Town Meeting in 2001, recognizes the importance of energy efficiency, setting a goal of becoming an environmentally responsible community and committing our town to wise spending.

What Is Energy Efficiency?

Like Belmont’s residents and businesses, Belmont’s municipal government purchases energy in the form of electricity and fossil fuel. Lighting and heating systems convert this energy to useful forms.

However, useful heat may be generated but simply not used. For instance, the heat radiating from the ballast of a fluorescent fixture or from the bulb itself is lost to the lighting process. Also lost are the heated flue gases from boilers and furnaces, escaping up the chimney. Unnecessary heat can also be generated: poor control of building heating systems may result in excessive boiler operation.

In all these cases, energy inputs exceed outputs; the difference is simply lost. To find the efficiency of a system, we divide the energy output (such as heat or light) by the energy that is used (such as gas or electricity).

Belmont Increases Energy Efficiency

Energy efficiency and conservation measures that reduce energy consumption are already incorporated into work carried out by Belmont’s municipal electric utility, by managers of existing buildings, and by building committees overseeing new municipal construction projects.

In recent years, the Belmont Municipal Light Department (BMLD) has taken several notable measures to improve the efficiency of the systems it operates. (BMLD sells power—purchased from various generators—to Belmont consumers and also maintains and operates the entire electric-power distribution system in Belmont.) Residents may have noticed that BMLD now provides rebates to consumers who purchase Energy Star-rated appliances.

Also visible to residents are the changes in street

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Environmental Events Calendar

By Michael Stratford

Fresh Pond Ecology Walk. Saturday, September 17, 1 p.m.–3 p.m. Explore three adjacent habitats off the Perimeter Road and observe how seasonal changes affect the plants and animals that live in these ecosystems. This free walk, sponsored by the Friends of Fresh Pond Reservation, begins at the Maynard Ecology Center in the basement of Neville Place, 650 Concord Avenue, Cambridge. Please register by contacting Elizabeth Wylde at (617) 349-6391 or friendsoffreshpond@yahoo.com.

Boardwalk Construction at Arlington's Great Meadows in Lexington. Saturday, September 24 and Sunday, September 25, 8:30am-4pm. Please join the Friends of Arlington's Great Meadows on National Public Lands Day weekend for a day of fun and accomplishment constructing a new boardwalk.. Meet in the East Village nursing home rear parking lot, 840

Emerson Gardens Road (corner of Bryant Road), Lexington. Bring a hammer, work gloves, drinking water, and dress for wet conditions. For more information, please contact Mike Tabaczynski at (781) 861-1537 or mjt1@rcn.com, or see www.FoAGM.org.

Guided Tree Walk at Stonehurst, the Historic Paine Estate. Saturday, September 24, 10 a.m.–noon. Imagine that you are back in the nineteenth century as you enjoy the land and the native and exotic plantings at this 108-acre National Historic Landmark. A rich variety of evergreen and deciduous trees is featured on a hilltop with views of the city. The walk begins at the Olmsted Terrace. Sponsored by the Waltham Land Trust. Please contact George Darcy at (781) 899-2332 or gdarcy@comcast.net for more information.

Wildflower Identification. Saturday, September 24, 1 p.m.–3:30 p.m. Join the Friends of Fresh Pond Reservation and see goldenrods' vivid yellow and asters' varied purples. Use guides and keys to identify a number of species of these and other wildflowers that grow on the Reservation. Meet in the Neville Place parking lot, 650 Concord Avenue, Cambridge. Please register by contacting Elizabeth Wylde at (617) 349-6391 or friendsoffreshpond@yahoo.com.

Fall Bird Walk. Sunday, September 25, 8:30 a.m.–10:30 a.m. Many birds are already heading south for the winter. See ducks as well as local and migrating songbirds. Beginners are welcome to attend this free event, sponsored by the Friends of Fresh Pond Reservation. Bring binoculars if you have them, and meet in the Neville Place parking lot, 650 Concord Avenue, Cambridge. Please register by contacting Elizabeth Wylde at (617) 349-6391 or friendsoffreshpond@yahoo.com.

Photo Show and Print Sale. Wednesday, September 28, 7 p.m.–9 p.m. See a portfolio of nature photographs capturing the beauty of New England by Waltham's John J. Crookes. Crookes will discuss his artwork and equipment during this evening at the Robert Treat Paine Estate. Matted prints will be available for order, starting at \$30. Ten percent of the proceeds will go to the Waltham Land Trust, which is

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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 on key subjects.

Our newsletter is published six times a year (January, March, May, July, September, and November).

Published material represents the views of the authors and not necessarily those of the Belmont Citizens Forum.

Letters to the editor may be sent to
P. O. Box 609, Belmont MA 02478
or to editor@belmontcitizensforum.org

BCF Comments on Three Local Developments

By Sue Bass

Floods of traffic and stormwater were the chief concerns in comment letters on three proposed developments submitted by the Belmont Citizens Forum in July. The expansion of office and R&D space at Cambridge Discovery Park is likely to worsen the already major flooding problems at Alewife, and huge traffic problems are inevitable. Traffic from the construction of 387 apartments on the former Metropolitan State Hospital grounds in Lexington will pour into Belmont from the west end of Concord Avenue. The proposed rezoning of Cambridge near Fresh Pond would bring traffic into Belmont from the east end of Concord Avenue and risk sending stormwater into the Fresh Pond Reservoir.

Cambridge Discovery Park

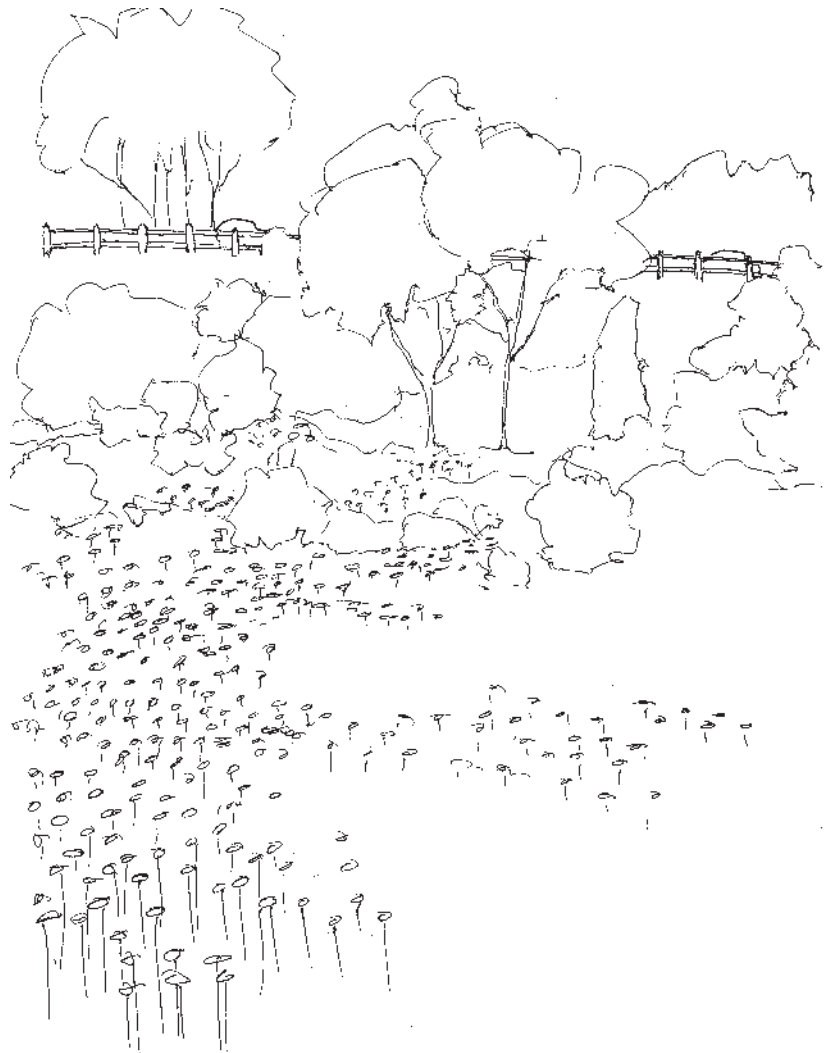
Cambridge Discovery Park is the name for the new development on the Arthur D. Little (ADL) site just north of Route 2 at the Alewife T station. The project calls for tearing down all 416,000 square feet of the former ADL buildings and erecting approximately 820,000 square feet of new office/R&D space. Six such buildings are planned, plus two garages. One is already under construction, under a waiver granted last year by the Executive Office of Environmental Affairs. The other structures will be built in several phases.

All the new buildings will be located north of Acorn Park Drive. As a condition of the zoning approved in 2001 by the Cambridge City Council, the developer—the Bulfinch Companies—will restore as open space both the land between Acorn Park Drive and Little River as well as a portion of the adjoining Alewife Reservation that ADL had leased for parking for many years. Asphalt has already been removed from the former parking lot. Bulfinch is also hoping to restore a marsh on its property, perhaps with state aid.

While praising some features of the development, the Citizens Forum called the stormwater plans inadequate. “The entire

project site and adjoining Reservation and properties have virtually no capacity to safely absorb or recharge additional or displaced floodwater, stormwater, and groundwater,” the comment letter said. “These factors explain why the area has experienced frequent flooding over the years. Flooding is a particularly acute problem when the ground is frozen or fully saturated due to snow melt or extensive rainfall ... Despite such conditions, the [Draft Environmental Impact Report] indicates that buildout will rely on recharge and drainage as the ultimate means of coping with its creation of displaced and additional floodwater, stormwater and groundwater.”

In his reply to the 16 comment letters sent by state *continued on page 4*



BCF Comments *continued from page 3*

agencies, organizations, and individuals, Stephen R. Pritchard, secretary of Environmental Affairs, required the Final Environmental Impact Report (FEIR) to address various stormwater and traffic concerns. The FEIR should include a “detailed discussion of the compensatory flood storage system to sufficiently demonstrate its unrestricted hydraulic connection to the Little River” and should show how Bulfinch “proposes to provide adequate flood storage compensation,” Pritchard’s July 29 letter said. “Where will the groundwater and stormwater go which currently infiltrates and inflows the project site’s existing sewer and stormwater systems upon completion of the proponent’s proposed sewer improvement and stormwater management plans?”

Pritchard also required more information about Bulfinch’s plans for reducing traffic, including details on sidewalks, footpaths, bicycle facilities, and sheltered bus stops on the Discovery Park campus.

AvalonBay at Lexington Square

Lexington Town Meeting has granted AvalonBay Communities zoning permission to build 387 apartments on the former campus area of Metropolitan State Hospital. All the traffic from the complex will exit onto Concord Avenue—an estimated 2,476 vehicle trips daily. Before obtaining a zoning change from Lexington Town Meeting, AvalonBay negotiated traffic-mitigation measures for Lexington. However, no mitigation was offered to Belmont, which is likely to receive a large portion of the additional traffic.

Nevertheless, the Executive Office of Environmental Affairs ruled that AvalonBay need not file an Environmental Impact Report.

In response to AvalonBay’s filing of an Environmental Notification Form, the Citizens Forum noted that the project represented a 42 % increase in vehicle trips on Concord Avenue and commented that

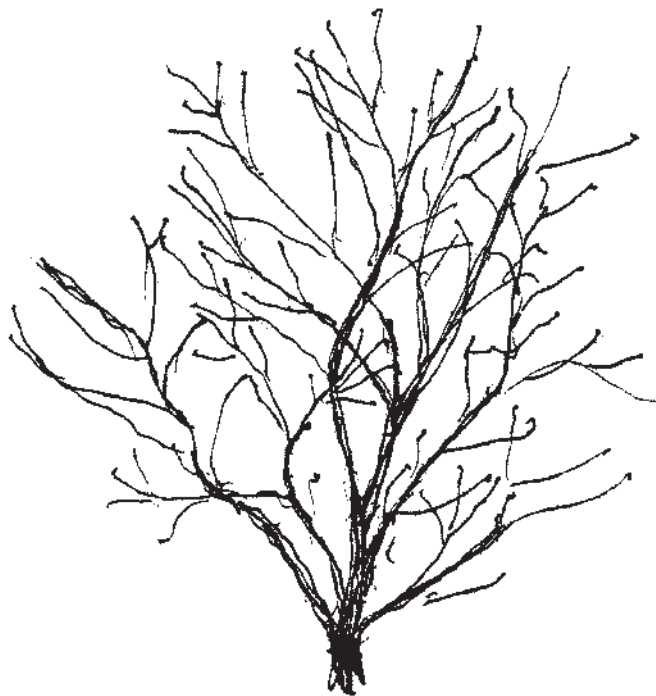
“much more work needs to be done to mitigate traffic.” The Citizens Forum particularly recommended that AvalonBay investigate construction of two bicycle paths: one connecting to the Wayside Rail/Trail, either along Concord Avenue or through the open space being preserved on the former Met State land as an expansion of Beaver Brook Reservation; and the other connecting to the Minuteman Rail/Trail, through a protected path along Pleasant Street in Lexington. “Those two bicycle paths would likely encourage many more bicycle commuters—and virtually every person on a bike takes a car off the road,” the Citizens Forum said in its comment letter. “Beyond the contribution to traffic mitigation, these bike paths would be a very attractive amenity to potential residents.”

The town of Belmont complained in its comment letter that “the traffic impacts on the town are completely underestimated and that no appropriate remediation for these impacts will be provided by the developer. Additionally, the town is quite concerned about the development’s impacts on the surrounding open space, especially given the number of proposed

housing units and families that are expected to live there.” Belmont’s letter noted that the traffic information provided to the state was not the latest available. “It is difficult to comment on a development without all the information,” said the letter from Belmont’s planning coordinator, Jeffrey A. Wheeler.

The developer’s attorney was allowed to file a rebuttal after the deadline for submitting comments

and before the August 8 deadline for the state to reply to those comments. In his letter, Steven Schwartz of Goulston & Storrs said that the reuse plan for the Met State land agreed to by Belmont, Lexington, and Waltham provided that the redevelopment “should not generate more than the 350 peak-hour trips that were



determined to have been generated in the late 1980s when the hospital was in full operation.”

The state’s decision not to require an Environmental Impact Report (EIR) surprised both the town and the Citizens Forum. Massachusetts Environmental Policy Act (MEPA) regulations mandate at least one EIR (and requiring two is more usual) if a development will generate 3,000 or more average daily vehicle trips or create 1,000 new parking spaces. The regulations give the Secretary of Environmental Affairs the discretion to require EIRs if a development will add 1,000 more daily trips and create 150 or more parking spaces. Since the AvalonBay development will add nearly 2,500 daily trips to Concord Avenue and create about 615 additional parking spaces, it is far closer to the mandatory report limits than to the bottom of the discretionary range. Richard Bourré, who reviewed the project for the MEPA Office, said that the decision was within the Secretary’s discretion. No appeal is available.

Con-Ale Rezoning

The Concord-Alewife area of Cambridge includes the Fresh Pond Shopping Center; a section—known as the Quadrangle—bounded by Concord Avenue, Alewife Brook Parkway, the Fitchburg commuter railroad tracks, and the Cambridge Highlands neighborhood east of Blanchard Road; and a section—known as the Triangle—between the commuter-rail tracks and Cambridge Park Drive. Aside from the shopping center, most of this area generates relatively little traffic. However, a petition now being considered by the Cambridge City Council for rezoning the area could increase enormously the amount of traffic, especially on Concord Avenue.

The petition, submitted in April by the Cambridge Planning Board, would increase the density dramatically in all three sections of the Concord-Alewife area. In the shopping center, where buildings

are now limited by zoning to a height of 55 feet, new structures could rise as high as 105 feet. Buildings in parts of the Quadrangle, which is now mostly occupied by low-lying warehouses, could also rise to 105 feet. In the Triangle, buildings could rise to as high as 125 feet.

During the three years this rezoning has been studied, limited information on traffic has been presented, and those data have all involved peak-hour traffic rather than total daily trips. However, the plans for the area include housing as well as businesses. The total number of vehicle trips a day is a much more meaningful number for developments that include a lot of housing. The predicted addition of 1,000 trips during the afternoon peak hour—a 25 percent increase—would translate into thousands of additional daily trips, many of them heading into Belmont on Concord Avenue.

In a letter to the Planning Board, the Citizens Forum noted that the original vision for the area, developed by the consulting firm Goody Clancy, “was for a public-transit-oriented development with more open space and much less impervious surface.”

But the proposed rezoning would not accomplish many of those goals, the letter said. The zoning does not require stormwater improvements and public access and but instead merely encourages them.

“The Quadrangle is an enticing but difficult spot for development. Since it is close to the Alewife T station, it seems to offer an opportunity for dense, transit-oriented development

with minimal traffic,” the Citizens Forum letter said. “But because the Quadrangle is separated from the T station by commuter rail tracks, the station is not in fact easily accessible from even the closest building lots. Without first solving the access problem—



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perhaps with a new commuter rail stop at Alewife that would incorporate an easy pedestrian and bicycle crossing—you cannot seriously contemplate the major development projected for the Quadrangle.”

The letter also noted that the area proposed for development was historically part of the Great Swamp. “More than half of the Quadrangle is lower than the 100-year flood level. The Quadrangle offers Cambridge the opportunity to vastly improve the stormwater retention of the area. Unless the city uses this opportunity, the floods that already plague Alewife ... will only get worse,” the Citizens Forum said in the letter. “Cambridge also faces the prospect of floodwater spilling over Concord Avenue and polluting Fresh Pond Reservoir.”

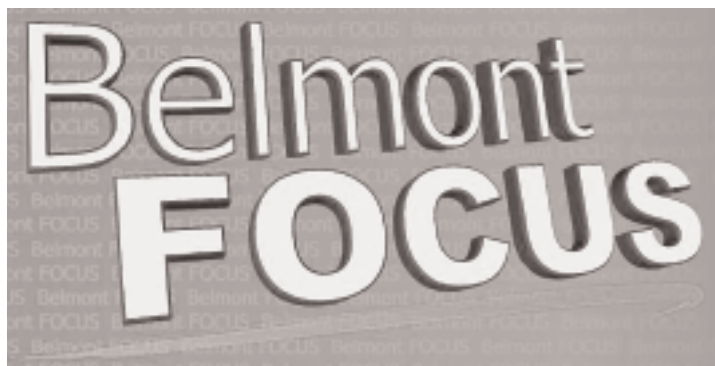
The Cambridge City Council’s Health and Environment Committee scheduled a hearing on Monday, August 29, and invited the Citizens Forum to provide testimony. However, the hearing was postponed at the last minute. The City Clerk’s office told the Citizens Forum that the meeting would be rescheduled.

— Sue Bass is a Precinct 3 Town Meeting member and a board member of the Belmont Citizens Forum.

The Belmont Citizens Forum Wants to Write About YOUR Group!

The January 2006 Belmont Citizens Forum newsletter will feature a review of Belmont’s environmental organizations. If you would like your group included in that issue, please contact the editor, Meg Muckenhoupt, by December 1, 2005, at editor@belmontcitizensforum.org.

Please include contact information, a brief summary of your group’s recent activities, and a logo, drawing, or photo of your group, (if one is available).



Focus on the Belmont Land Trust

What’s involved in protecting land with a conservation trust? What are the benefits to the property owner? Are there costs to the town? Is the Belmont Land Trust interested only in large properties?

These are just a few of the questions to be aired and answered on Belmont’s newest cable television program. *Belmont Focus* aims to provide multiple viewpoints on issues affecting Belmont, whether they involve community pride or concern, controversy or agreement, or affect one constituency or many. The monthly programs start in September with the Land Trust, and repeat at least weekly. The second program, scheduled to air October 20, is about Alewife and the Belmont Uplands.

**Watch Belmont Cable, Channel 8
every Thursday evening, 8 to 9 p.m.**

Energy Efficiency *continued from page 1*

and traffic lighting. Belmont has replaced mercury vapor street lamps with high-pressure sodium vapor (HPSV) lamps. Using 250-watt bulbs, HPSV lamps provide more visible and useful light than the 400-watt bulbs they replaced.

The Light Department has also replaced incandescent traffic-signal bulbs with light-emitting diodes (LED). An LED lamp consumes about one-fifth the power of a 90-watt incandescent lamp. The lifespan of an LED is on the order of 10 years, as compared to 12 to 18 months for incandescent bulbs.

Less visible to the ordinary resident, but no less important in terms of energy conservation and efficiency, the Light Department has a long-term program to convert the town's entire electric-power distribution system to higher voltage. Increasing the voltage would reduce the amount of energy lost during distribution.

The most dramatic townwide improvements will likely come from the efforts of the Facilities Energy Management Project Committee (FEMPC), established by Town Meeting in April 2004 to oversee an energy audit of certain town facilities and to implement improvements. The town has contracted with Noresco, an energy-services company, to install energy-efficiency measures, including more efficient lighting fixtures, boilers, controllers, and building-wide energy-management systems. These are designed to meet the growing demand for light and heat while reducing energy consumption.

Noresco will also enact water- and energy-conservation measures, such as low-flow toilets and aerators, swimming-pool covers, and vending-machine controllers.

According to Jennifer Fallon, the FEMPC chair, the savings from the entire Noresco program are projected to be approximately \$200,000 a year, with lighting improvements responsible for nearly half that amount. The project encompasses all six school buildings, along with the Vigliolo Skating Rink, the public library, and the police, highway, and water-department buildings.

Belmont Begins Green Building Design

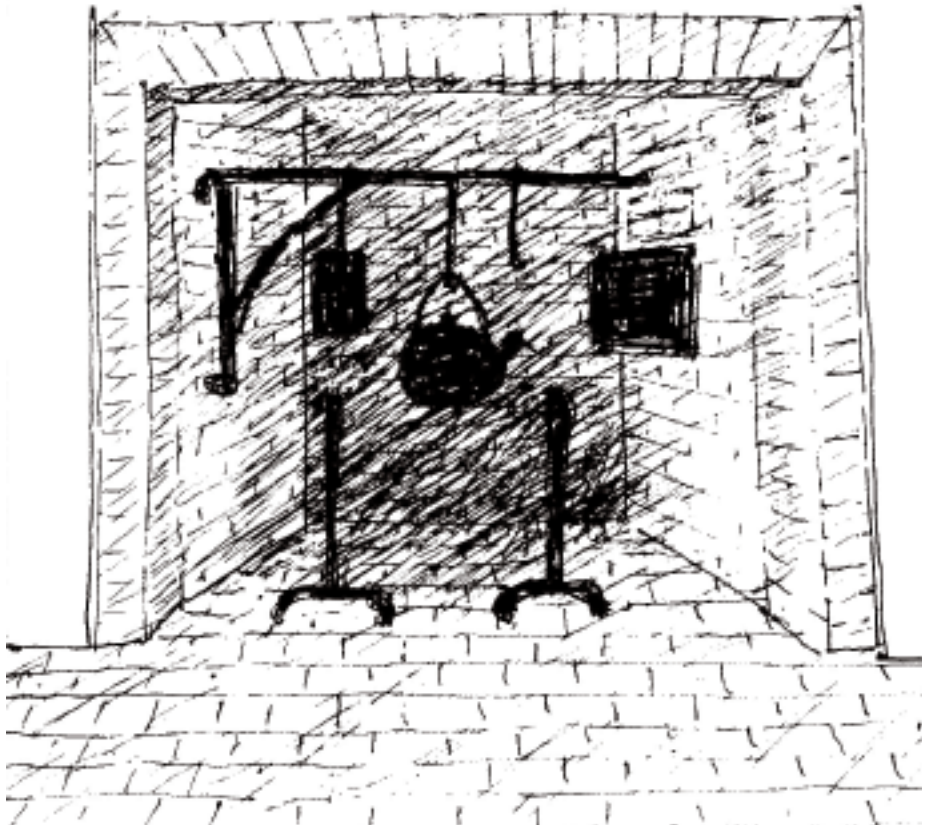
The U.S. Green Building Council (USGBC) describes "green design" as:

"Design and construction practices that significantly reduce or eliminate the negative impact of buildings on the environment and occupants in five broad areas:

- Sustainable site planning
- Safeguarding water and water efficiency
- Energy efficiency and renewable energy
- Conservation of materials and resources
- Indoor environmental quality."

Belmont has recognized the value of green design and construction. According to Jennifer Page, Belmont Vision 21 Implementation Committee chair, Selectman Paul Solomon arranged for the Fire Stations Building Committee and the Senior Center Building Committee to attend a workshop on green-building design presented by the Green Roundtable, the New England affiliate of the USGBC. The Permanent Building Committee has also been introduced to the principles of green design and to the

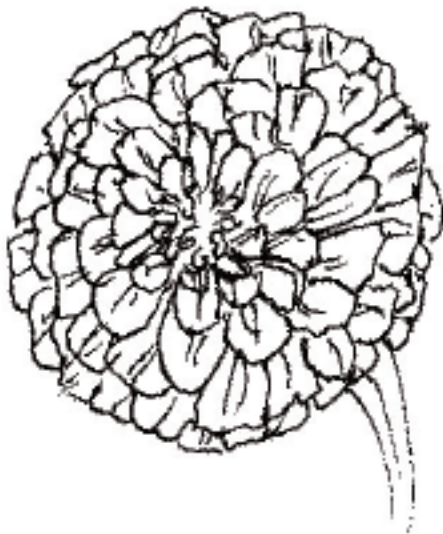
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Energy Efficiency *continued from page 7*

LEED (Leadership in Energy and Environmental Design) Green Building Rating System, a system developed by the USGBC for designing, constructing, operating, and certifying the world's greenest buildings.

The committees have taken the green-building concepts to heart. Page reported that the senior-center design team includes a LEED-accredited architect and that the design may qualify for LEED certification as a high-performance, sustainable project. Page also said that the new affordable-housing units being built by the Belmont Housing Trust on B Street and Brighton Street will be Energy Star-qualified. Energy



ZINNIA

Star-qualified new homes are certified as meeting strict energy-efficiency guidelines set by the U.S. Environmental Protection Agency (EPA).

Sustainable Belmont is a sub-group of the Vision 21 Implementation Committee. Its charge is to develop ways to help Belmont become an “environmentally responsible” town. The Board of Selectmen recently endorsed Sustainable Belmont’s request to join the Massachusetts Climate Action Network (MCAN), a cooperative effort dedicated to halting global climate change. There are 14 local groups and 4 regional or statewide environmental groups in MCAN, all working to reduce emissions of greenhouse gases—principally carbon dioxide—in our communities and the state. The groups’ efforts are principally devoted to conducting public education

and influencing municipal governments in their home communities. Since fossil-fuel combustion is the principal source of greenhouse-gas emissions, MCAN projects encourage increasing residential energy efficiency, purchasing fuel-efficient vehicles for municipal fleets, and buying “green power”—electric power generated from renewable and non-combustion sources such as the wind, the sun, and water.

Newton Reduces Energy Use, Plans Reductions

According to Newton’s Energy Action Plan, at www.ci.newton.ma.us/sunergy/EAP021005.pdf, “Since 1998 energy consumption by [Newton] municipal operations has declined by six percent overall. This progress is in part attributable to the city’s commitment to energy efficiency in buildings, as well as a marked reduction in fuel consumption by city vehicles and a large-scale traffic light efficiency project. Over thirty energy retrofit projects have been completed in public buildings and schools since 1998 including upgraded lighting systems, energy management systems and new technology for traffic lights.”

The Newton Energy Action Plan details the city’s accomplishments to date, future plans, and recommendations for long-term measures, targeted both at municipal operations, residences, and businesses.

Greenhouse gases (GHG) are gases such as carbon dioxide and methane that contribute to the greenhouse effect. Newton’s plan documents a reduction of 1,423 tons of GHG emissions from municipal operations. Newton’s next goal is to improve the energy efficiency of public buildings and of street lighting by 20 percent and to reduce municipal cars’ fuel use by ten percent. The city will also purchase electric power from renewable sources and install solar-energy systems and distributed generation equipment (combined heat and power devices that allow users to sell surplus electricity to the power grid).

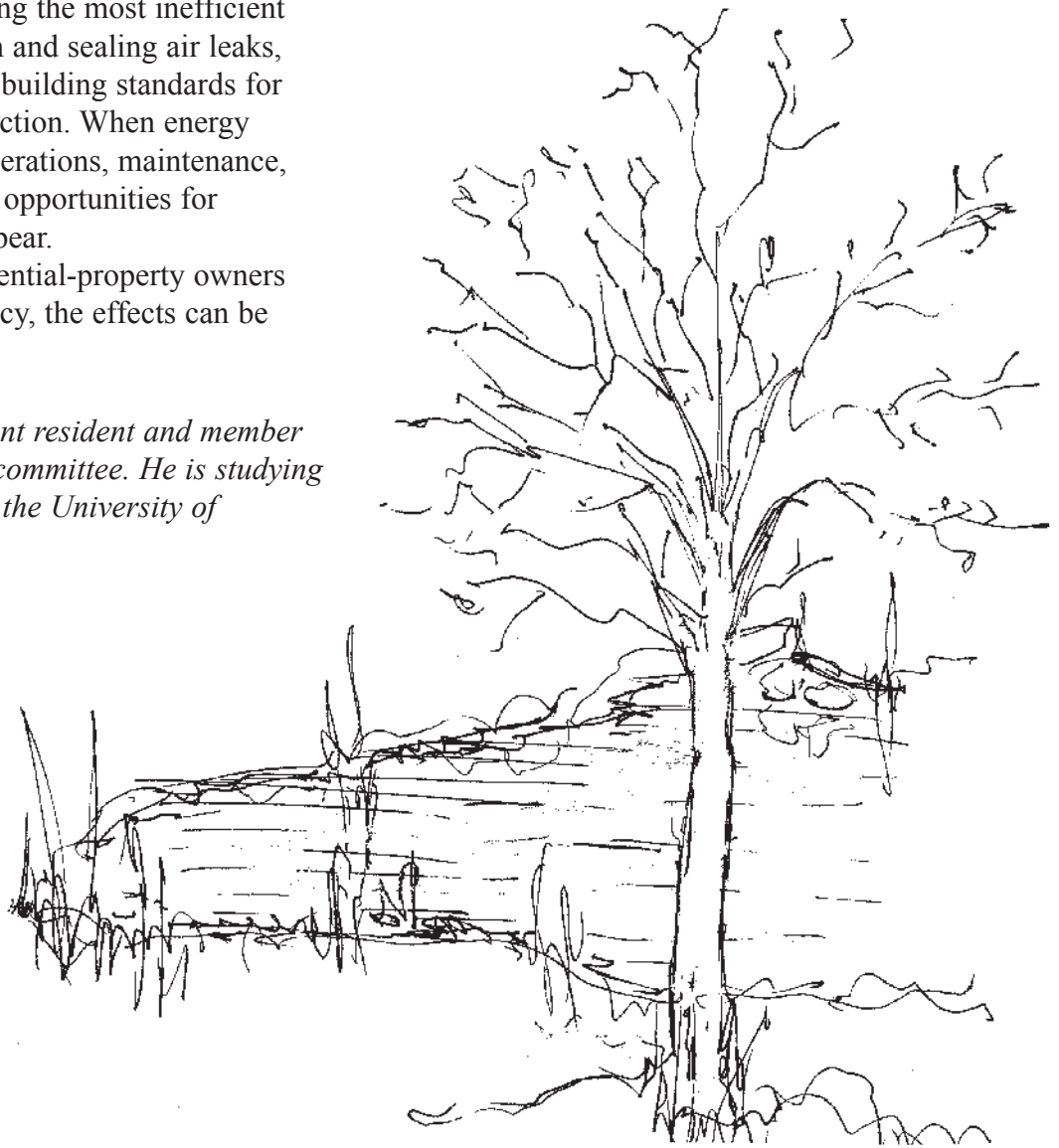
The Newton plan considers commercial, residential, and municipal consumption in its energy plan. Municipal energy use accounts for only two percent of citywide energy consumption, while the transportation, commercial, and residential sectors make up, respectively, 30 percent, 28 percent, and 40 percent. The Newton approach has the city leading by example, showing the other sectors how to reduce energy costs.

The city is also improving energy systems in

existing buildings by replacing the most inefficient equipment, adding insulation and sealing air leaks, and using high-performance building standards for renovations and new construction. When energy efficiency is factored into operations, maintenance, and planning functions, new opportunities for improvement continue to appear.

If commercial- and residential-property owners also embrace energy efficiency, the effects can be multiplied twentyfold.

— *Marc Wolman is a Belmont resident and member of the Sustainable Belmont committee. He is studying solar-energy engineering at the University of Massachusetts at Lowell.*



Events Calendar *continued from page 2*

cosponsoring the event with the Waltham Historical Commission and the Waltham Historical Society. Please contact Inge Uhlir at (781) 899-2844 or 75122.1245@compuserve.com for more information.

Beaver Brook Reservation Walk. Saturday, October 1, 10 a.m.–noon. Jim Levitt will introduce participants to the history of the Waverley Oaks and the surrounding landscape. Levitt is director of the Program on Conservation Innovation at the Harvard Forest. Meet at the Beaver Brook Reservation parking lot on Waverley Oaks Road, near the intersection of Trapelo Road. Sponsored by the Waltham Land Trust. Please contact Marie Daly at (781) 893-1572 for more information.

Sustainable Belmont Meeting. Wednesday, October 5, 7 p.m.–9 p.m. Flett Room, Belmont Public Library. For more information, contact Jan Kruse at jan_kruse1@yahoo.com.

The Phantom Among Us: Save Money by Capturing Energy Loss in Your Home. Tuesday, October 18, 7:30 p.m. What are the most cost-effective actions you can take to conserve energy? Find out at this fun, interactive forum featuring expert speakers. This free event will take place in the Belmont High School's Little Theater. For more information, contact Heather Tuttle at hat@deardorff.com.

Sustainable Belmont Meeting. Wednesday, November 2, 7 p.m.–9 p.m. Flett Room, Belmont Public Library. For more information, contact Jan Kruse at jan_kruse1@yahoo.com.

Belmont's Rocks Reveal Violent Past with

By Sumner Brown

If you could watch Belmont's geological history in action, you would see volcanoes, earthquakes, and a mile-thick sheet of ice. A good place to start looking at Belmont geology is the road cut for Route 2 at the Mormon temple. The rock on display here is old bedrock, solidly connected with the rock that forms the foundation of North America. This light gray rock could easily be a billion years old. One of my favorite displays is located about 150 steps west of the temple entrance, behind and to the left of a pine tree.

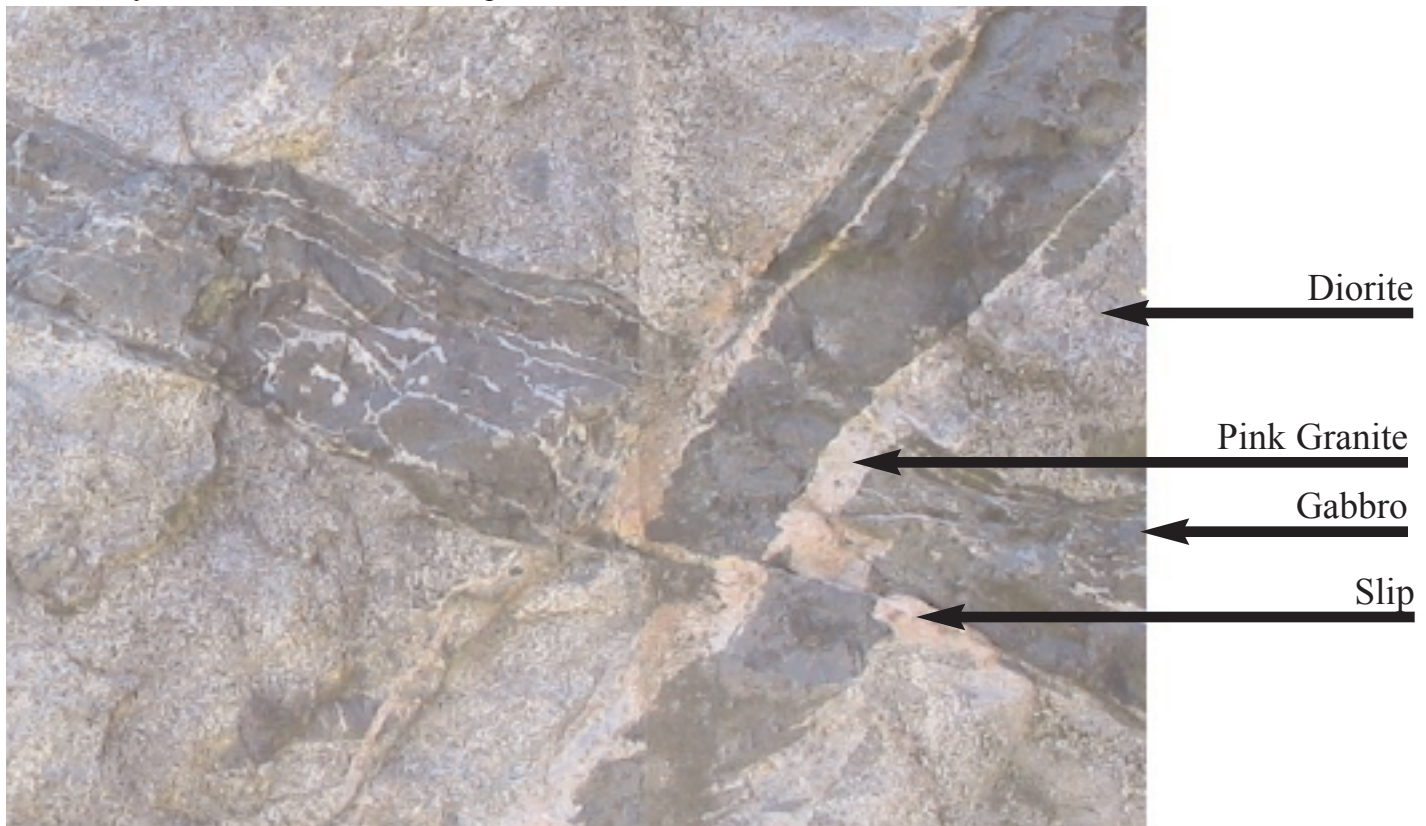
Route 2's Volcanoes

As you walk to this site, notice the drill holes where explosives blasted the rock in the 1960s in order to widen Route 2. Also notice the green hardware used to stabilize the rock after blasting was carried out for the temple. At 150 steps, look for dark stripes of rock, about 10 inches wide, that form an X. Five sudden geological events are recorded here.

All the rocks in sight are igneous rocks, which means they were formed from hot, liquid rock that

escaped from the earth's interior and then cooled. If an igneous rock has clearly visible crystal grains, it is most likely granite or diorite, particularly if there are grains of different colors. Granite and diorite blend together, but granite is lighter in color. They form under land, typically when continents collide, and cool slowly. By contrast, basalt comes from molten rock released from the earth's interior when an ocean floor spreads apart. Basalt is a dark igneous rock with no visible grains. The molten rock cools quickly in water, and this rapid cooling prevents crystals from growing to a visible size. Gabbro is the same material as basalt, but it cools more slowly; it is also dark, but with tiny grains that are visible under magnification.

The dark rock that forms the X next to the temple looks like gabbro, and the lighter gray rock in which the X is embedded is diorite. Within these rocks are cracks filled with other types of rocks. These fillings are called igneous intrusions. For an igneous intrusion to happen, the filling rock had to be hot enough to be a liquid. If you look above the X, you can see blobs of different-colored rock embedded in the diorite.



The X alongside Route 2, in front of the Mormon temple.

Evidence of Earthquakes and Glaciers

When the diorite came up close enough to the crust of the earth to cool, it pushed quickly into the preexisting rock, causing that rock to suddenly heat and crack. As blobs of this older rock broke off, they became embedded in the new diorite.

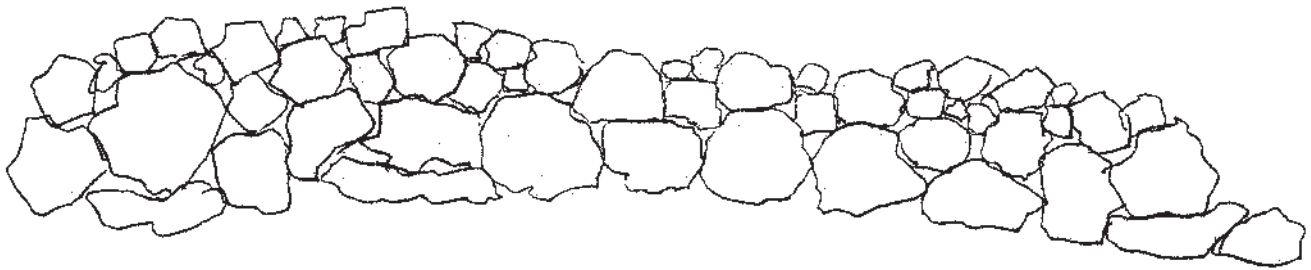
Later, the diorite cracked, and the crack was filled with the dark gabbro. This line of gabbro runs from the upper left of the X down to the lower right. The crack-filling gabbro has light-colored swirls: it is rock that the gabbro melted and picked up as it flowed.

Next, the granite and the first gabbro intrusion cracked twice and filled with three more igneous

from larger rocks. You can see glacial gravel and clay in a few spots on Habitat's paths where wear gets ahead of trail maintenance.

That ice did not just sit there; it moved at a glacial pace. Rocks, sand, and clay were carried by the glacier, and when the glacier melted, the rocks dropped. Large quantities got dumped where the glacier reached its southern extreme and melted, forming a conveyor belt of sand and gravel. This traveling gravel formed Cape Cod.

Since the glaciers moved from north to south, our sand and gravel come from further north. One source



intrusions. One intrusion is light-colored and about a half inch wide, and is located a few feet to the left of the center of the X. Another intrusion is the second bar of the X, which runs from the lower left to the upper right. It has pink granite edges and a dark, broad gabbro center. The pink granite came first, and then it split to admit the dark gabbro. Finally, the rock below the first gabbro intrusion moved to the right, creating a slip.

Notice that along the final slip of our featured rock, the rock is not broken or open but solidly joined. This slip may have occurred in a few seconds in an earthquake. The rocks were far enough inside the earth—perhaps ten kilometers (six miles) down—that the heat and pressure allowed the rock to fuse.

Habitat's Glacial Walls

The next stop on our geological tour is Habitat Education Center and Wildlife Sanctuary. The stone walls found here are a consequence of the glacier that covered Belmont about 15,000 years ago and of human activity in the last few centuries. Notice how round the stones are. They were ground together under the mile of ice that covered much of North America from roughly 50,000 to 10,000 years ago. The glacier also made a lot of sand, gravel, and clay

is the White Mountains and North Conway granite. The glaciers also ground up the right sort of rocks fine enough to produce clay. As the glaciers melted, clay got deposited in several local spots, including Clay Pit Pond.

Belmont got a light coating of glacial till, the mixture of clay, sand, pebbles, and boulders that the glacier picked up as it traveled. When Europeans starting farming New England, many of the rocks were buried in the ground. Some authors believe that clearing the trees for agriculture exposed the ground to harsher extremes of heat and cold, which promoted the raising of stones by frost heaves. As stones reached the surface, the farmers dragged them off the land to the nearest dumping spots between fields.

Met State's Esker and Drumlin

The next stop on our tour is located on the grounds of the former Metropolitan State Hospital. This spot is best reached from Rock Meadow. Cross Beaver Brook on the footbridge. From this bridge, follow the paths taking every right turn, and after about five minutes of walking, you will be at the top of a 25-foot-tall esker.

Eskers are long deposits of sand, gravel, and stone

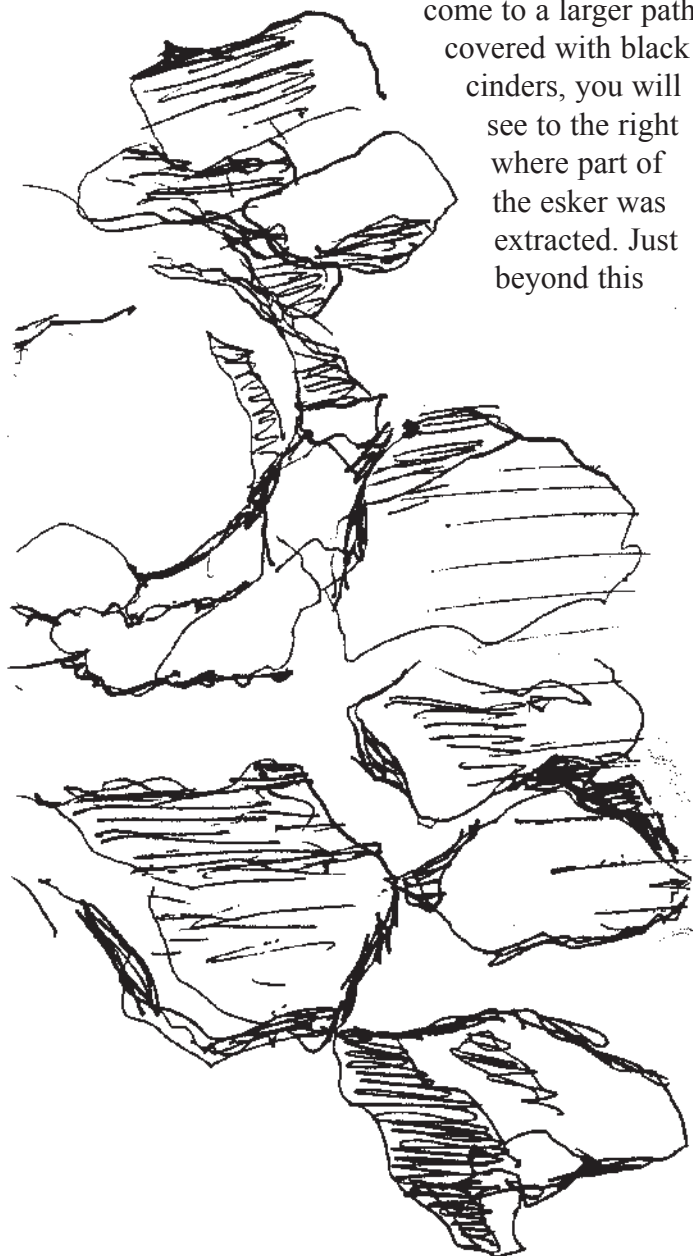
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Geology continued from page 11

formed by melting glaciers. Water flows away from the glacier, but the sand and gravel stay. Sometimes the debris of a large glacier will be funneled down a crack in the ice and be concentrated in one place, forming an esker.

As you continue past the footbridge, watch for a slight rise with many fist-sized stones in the path. From that rise, look to the right for a wandering ridge, about twenty-five feet tall and a few hundred yards long. When I first encountered this esker, the top was so level that I would have thought it was an old road or railroad bed, had it not meandered. If you dig into an esker, you'll find that it is made of sand and gravel. You can see several spots in this esker where people have apparently removed gravel. When you

come to a larger path covered with black cinders, you will see to the right where part of the esker was extracted. Just beyond this



point, a side trail to the right goes to the top of the esker.

The last stop on our tour is a drumlin in the former Metropolitan State Hospital grounds in Waltham. A drumlin is a rounded hill, typically about 100 feet tall, that is produced by a glacier. This drumlin is easy to locate from many spots in Belmont because it has a tower on its top.

Drumlins are quite common in New England. Beacon Hill, Bunker Hill, and most of the islands in Boston Harbor are drumlins. Although the shape of drumlins is characteristic, you will have a hard time discerning the shape of this—or any other—drumlin on foot. You need a topographic map. If you do not have a topographic map of this area, go to maptech.com and click on “Online Maps” then on “Maptech MapServer.” Type “Metropolitan State Hospital.” Select the result closest to latitude 42°23'59" N, longitude 71°12'36" W. The map shows the water tank on our drumlin.

Again, recommended access is from Rock Meadow. Walk toward the water tower and look for trails that head up. There are two possible trails. Continue north on the main cinder path near the esker until a marsh appears on your left. Circle around the marsh on trails, keeping the marsh on your left, until you see another marsh on your right. Go right just after this second marsh, then turn left up the drumlin.

As you climb to the top, notice the exposed soil of the trail. It is largely clay and gravel. However, some of the stones on the paths up this drumlin are geologically out of place. A mountain-biking club that repairs trail damage caused by mountain bicycles has repaired one of the trails with foreign crushed stone. The drumlin stones are smooth and rounded.

At one spot on this drumlin, you can find stones covering the surface. From the tower, take the trail that goes northward. The stone patch is on the east side of the path about two-thirds of the way down, perhaps a hundred feet from the trail. These stones are the size of the rocks in stone walls. Gravel, sand, clay, and topsoil have been unable to accumulate on the surface at this spot, so the ground is still locally barren from the glacier. On the geological time scale, the glacier was here yesterday. Realizing that Belmont was recently covered by a mile of ice reminds us that nature bats last.

—*Summer Brown is a board member of the Belmont Citizens Forum.*



A rail-with-trail bike path in Minneapolis, Minnesota. Photo courtesy of Craig Della Penna.

Letter to the Editor: Bike Trails and Railways Can Coexist

I was so pleased to see John Howe's excellent essay on the pathways in Belmont and their progress[in the July, 2005BCF newsletter] . I am writing today to clarify one small part of that overall well-written piece.

On page 8, in the second paragraph he talks about the MBTA opposing the concept of rail-with-trail because of public safety. Then this statement appears: "Several rail-with-trails exist in other parts of the country, but not in areas with frequent or high-speed service." That statement is not quite accurate. There are several places where high-speed commuter rail is directly adjacent to safe and heavily used rail trails.

- New Jersey Transit's line in Morristown, New Jersey has had a bike/walk trail adjacent (12 feet away) for over 15 years. This is an electrified line with scores of trains a day.
- Burlington, Vermont, commuter rail line has a rail-with-trail adjacent.
- Montreal's commuter route to St. Jerome has a rail-with-trail adjacent.
- In Duluth, Minnesota there is a rail trail that coexists with a tourist train, as does a similar one in western Maryland, and even on Cape Cod. Other similar projects are in the works all over the U.S.

- In Newark, Delaware there is a short (1.76 mile) trail that is well used and shares the right-of-way with Amtrak's Northeast Corridor which passes by at 125 mph.

When people at the MBTA say things can't be built, it is only because of one of two reasons. Either they don't know what is happening all around them, or they are hoping you won't find out. That's why it is important when proposing projects in Massachusetts to always make certain that you find where it was done somewhere else first.

For more information about rail-with-trail and a Federal RR Administration commissioned study, see www.altaplanning.com/focus.php?view=0&focus=rail. For more information on the MassCentral Rail Trail (Boston to Northampton and passing through Belmont), go to ww.masscentralrailtrail.org.

Craig Della Penna
Executive Director, Northeast Greenway Solutions
Florence, MA

[Craig Della Penna is the former New England Representative for the Rails-to-Trails Conservancy.]

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government represents local citizens to ensure that they are protected from unnecessary exposure to contaminants.

According to DEP, which maintains an online database of all hazardous-material releases reported in the state, 80 releases have been reported in Belmont at 56 different properties since 1986. Nearly all these spills involve fuel oil or other petroleum products. The spills at Purecoat are a notable exception: they have involved trichloroethylene and chromium, including the carcinogenic hexavalent chromium.

The DEP database indicates that no part of Belmont is spill-free. The largest group of releases (29) is associated with gas stations and automotive repair shops. Another 13 releases were at other types of businesses, ranging from the Starbucks on Trapelo Road to the Belmont Savings Bank in Belmont Center to Purecoat North on Hittinger Street behind the high school. Institutional facilities—including McLean Hospital, but also several churches—account for seven releases. Seven more were on publicly-owned properties, such as the Chenery and Winn Brook

schools and the police station on Concord Avenue. Most of the remaining releases occurred on residential properties. Leaky oil tanks, it appears, can be found virtually anywhere.

Of the 48 releases that reported quantity data, estimates ranged from 5 gallons to 2,500 gallons (the 2003 spill at the Burbank School). Where spills were reported in inches (typically the thickness of oil on or below the groundwater table), values ranged from a half inch to approximately 4.5 feet, the latter reported at an automotive service center on Trapelo Road in 2004.

According to DEP, 60 of the listed releases have been fully investigated and all required remediation was completed. This means that a Licensed Site Professional (an individual licensed by DEP to oversee remediation activities) has certified that there is “no significant risk” at the site and that all substantial hazards have been eliminated.

Two sites—the Sunoco station on Pleasant Street and a residence on Ernest Road—have undergone only temporary cleanups. While no substantial hazard is believed to exist at these sites, they have not yet been certified as posing “no significant risk.” As such,



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they must be evaluated every five years to determine whether further risk reduction can be achieved. Two other sites—the Mobil station on Concord Avenue and the Store 24 (formerly an Exxon station) in Belmont Center—are currently undergoing cleanups.

Four of the remaining unresolved sites are classified by DEP as posing significant environmental risks and requiring extensive responses: Tops Cleaners in Cushing Square, the former Gulf station on Brighton Street, Wellington Brook behind the library, and the MBTA property adjacent to Purecoat. With the possible exception of the MBTA property, however, the spills at these sites have largely gone unnoticed by local citizens.

Belmont is not legally required to monitor hazardous-material spills or cleanups. The state, not the town, keeps track of the hazards created and the responses required. But the state's resources are stretched very thin. To protect its citizens from the hazards posed by spills, the town needs a mechanism to influence cleanups. In its report, the Purecoat Planning Committee recommended that Belmont adopt hazardous-material regulations that would:

- promote prompt notification to the Board of Health, police and fire departments of any release of

hazardous materials;

- ensure that town departments receive copies of reports and of correspondence submitted to DEP regarding any hazardous-substance release;
- authorize inspections of premises to look for violations and to enforce the regulations.

The committee also recommended that the town retain an environmental compliance officer. If the officer were a Licensed Site Professional, he or she could monitor all hazardous-substance cleanups in town—including the ongoing environmental response actions on the Purecoat property—and implement the proposed hazardous-waste regulations.

The town government should not be left out of the loop: it should be informed of all spills, participate in responses, monitor remediation, and make sure that the interests of its citizens are advanced. The Town of Homes should not also be the town of mysterious hazardous spills.

- Ray Miyares is a municipal and environmental lawyer, and a member of the Purecoat Planning Committee.

Belmont Citizens Forum
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People Are Asking

Where Are Belmont's Hazardous Spills?

By Ray Miyares

The Purecoat Planning Committee's final report, submitted in June, included the startling observation that "over 75 separate releases of hazardous substances and/or oil in Belmont have been reported to the [Massachusetts] Department of Environmental Protection since 1987 ... 30 of these were within the past five years." That is an average of more than four hazardous-material spills a year. Who is doing all this spilling? And are the spills being cleaned up properly?

A few of the more spectacular spills are well

known. The leak of the Burbank School's heating-oil tank, which contaminated Clay Pit Pond, was front-page news in 2003. Other releases—such as those at the Purecoat North property—have caused ongoing controversy. But most of the releases have garnered little attention and are a mystery to local residents.

When a spill occurs, only the party responsible and the Department of Environmental Protection (DEP) are typically involved in working out the response. Increasingly, DEP is forced to rely on the parties responsible and the contractors they employ for guidance on appropriate cleanup activities. Even if ordinary citizens learn about the spill, they are unlikely to have the resources or the expertise to monitor the cleanup on their own. And no one in town

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