Massachusetts' Brownfield Support Team Initiative:
Program Design and Implementation in Somerville and Chicopee, Massachusetts

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MASSACHUSETTS' BROWNFIELD SUPPORT TEAM INITIATIVE: PROGRAM DESIGN AND IMPLEMENTATION IN SOMERVILLE AND CHICOPEE, MASSACHUSETTS

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ABSTRACT

Communities across the country struggle with the challenge of redeveloping vacant or underused, contaminated land, commonly referred to as "brownfields." Brownfields blight their neighborhoods and cause damage relating to poor environmental quality, detriments to public health, and decreased confidence in the surrounding area. Even though redeveloping brownfields offers numerous benefits, the process is an uphill battle for developers and municipalities alike. Given the multiple barriers to brownfield redevelopment, including: the difficulty of determining the level of contamination, unknown cleanup costs, uncertainty surrounding the extent of liability, the challenge of obtaining grants or outside funding to cover cleanup costs, and the unreliable development timeline, it is not surprising that private developers are often reluctant to undertake brownfield redevelopment projects on their own. Therefore, government plays a crucial role in spurring the redevelopment of brownfields to return them to productive reuse.

Massachusetts' Brownfields Support Team (BST) Initiative offers an example of an innovative state program that takes a proactive approach to expediting brownfield redevelopment through the creation of interagency teams that meet monthly to facilitate assessment, cleanup and redevelopment of especially complicated sites. This thesis investigates the effectiveness of the BST through the experiences of two case studies: The Uniroyal and Facemate properties in Chicopee and the Kiley Barrel site in Somerville's Union Square. Through an analysis of these cases, this thesis aims to illustrate how and why the program is effective. Ultimately my research reveals that the BST approach was able to build strong relationships, generate creative solutions, and expedite the brownfield redevelopment process in both cases. This thesis also aims to inform other states' policies surrounding brownfield redevelopment with a discussion of the replication this program in other contexts.

THESIS SUPERVISOR: Judy Layzer, Associate Professor of Environmental Policy

MASSACHUSETTS' BROWNFIELD SUPPORT TEAM INITIATIVE: PROGRAM DESIGN AND IMPLEMENTATION IN SOMERVILLE AND CHICOPEE, MASSACHUSETTS

Communities across the country struggle with the challenge of redeveloping vacant or underused, contaminated land, commonly referred to as "brownfields." Many brownfields exists because factories closed down and left the United States during the deindustrialization of the late 1900s, but even the closing of a small gas station or laundromat can leave significant pollution and thus deter redevelopment. This problem is felt particularly keenly in the Northeast and Midwest, where brownfields of varying size and contamination exist. Brownfields present developers with significant challenges because redeveloping them is a complicated process that is fraught with uncertainty. It is difficult to determine their level of contamination or to predict the cost of cleanup, the extent of liability, the availability of grants or outside funding to cover cleanup costs, and the timeline of cleanup and redevelopment. Given the high levels of risk associated with this process, private developers are often reluctant to undertake brownfield redevelopment projects on their own; therefore, government plays a crucial role in spurring the redevelopment of brownfields to return them to productive reuse.

Part of the reason government intervention to redevelop brownfields is now necessary is a result of federal laws themselves. The federal government has crafted many laws pertaining to the regulation of polluted sites, and some of these laws have unintentionally created barriers to brownfield redevelopment by seeking to hold responsible parties liable and transferring that liability to new purchasers of previously contaminated land. The federal government, however, has also facilitated brownfield redevelopment as well; multiple government agencies offer money and technical

assistance to encourage cleanup. State policies also play a critical role in providing additional funding or creating the right environment to establish confidence that such a project is worthy of federal investment. There is a wide variance between different state policies and programs. Carol Tucker, brownfields section chief EPA Region 1, considers Massachusetts a leader among states in New England because of its progressive laws and policies to encourage redevelopment (Carol Tucker 2013).

The Commonwealth of Massachusetts recently implemented a new program called the Brownfields Support Team (BST) Initiative. This proactive program creates interagency and cross-departmental teams that meet monthly to facilitate brownfield redevelopment. The BST senior team selects five or six complicated brownfield sites in the commonwealth and targets resources, in the form of staff time, to expedite redevelopment over the span of 18 months to two years. At the end of the two-year term, the BST senior team selects a new set of brownfields to support. Created in 2008, the BST is currently in its third round. The BST model is fairly simple and may be of interest to other states. Therefore, it is useful to evaluate the effectiveness of the BST in order to understand how it functions and whether it is worthy of replication in other settings.

Specifically, I ask: How has the BST facilitated the cleanup and redevelopment of brownfield projects in Massachusetts, and to what extent has the BST been effective in meeting its intended purpose? To address this question, I investigated the redevelopment process at the Kiley Barrel brownfield site in Somerville's Union Square and the Uniroyal/Facemate brownfield site in Chicopee in Western Massachusetts. These cases provide the opportunity for an in-depth analysis of the role that the BST has played, and

continues to play in the process of redevelopment. Based on the research I conducted, I argue that the BST has been effective in facilitating and expediting the redevelopment of both sites. I chose cases of different sizes and locations because these characteristics can affect the redevelopment prospects for brownfield properties. The Kiley Barrel site is a relatively small parcel (less than an acre) in the dense, urban community of Somerville. The Uniroyal/Facemate property in Chicopee, Massachusetts is a 38-acre site in rural Western Massachusetts.

Somerville is the most densely populated community in New England. As a result, the Kiley Barrel redevelopment faces complications from being located near residents who have been exposed to contamination over many years. This adds another layer of complexity to the project because it triggers the need for increased monitoring of contamination, which requires increased costs (Joanne Fagan 2013). Despite these challenges, the Kiley Barrel redevelopment presents a big opportunity for Somerville. The parcel is adjacent to the proposed Green Line Extension of the MBTA (T) subway in Union Square, so it is bolstered by the pressure to redevelop as a result of the new T station. The City of Somerville recently updated Union Square's zoning to allow for more dense, intensive development. The Kiley Barrel brownfield site can help us understand the role the BST plays when there is market pressure to redevelop.

The Uniroyal/Facemate property in Chicopee, Massachusetts is a 38-acre site in Western Massachusetts, so it faces an entirely different set of size and location-related constraints and opportunities (City of Chicopee 2013). The site is northeast of downtown Chicopee along the Chicopee River, home to both the Uniroyal and Facemate abandoned

factories. The City of Chicopee aggregated both parcels into one large brownfield, renamed RiverMills at Chicopee Falls, based on future redevelopment plans for the entire property. Its location in a less dense community means there is less market pressure to redevelop the land, and the larger size presents benefits and challenges. A challenge is that cleanup on a larger parcel may be harder to fully fund, but the increased space presents more opportunities for dealing with contamination on site. The Kiley Barrel site and the Uniroyal/Facemate site represent two of the most divergent brownfield properties participating in the BST program, allowing for a fruitful evaluation of how the BST initiative is playing out on the ground in different environments. Both brownfield sites participated in the second round of the BST initiative, however, providing an element of consistency between the two cases.

My investigation relies primarily on first-person interviews with representatives from state agencies involved in the creation and daily operations of the BST program, including Massachusetts Department of Environmental Protection (MassDEP) and MassDevelopment, as well as employees from EPA Region One. I also interviewed municipal planners and other city employees to understand what changes occurred as a result of the BST's involvement in each project. All interviews were semi-structured with a list of primary questions, but the interviews also allowed for the flexibility to discuss other topics as they arose. My questions pertained to the composition of the BST in each site, who participated, what roles they played, what the BST helped to accomplish, and other related issues.

BROWNFIELD REDEVELOPMENT IN THE UNITED STATES

Virtually every aspect of the brownfield redevelopment process is susceptible to becoming mired in a web of risk, complexity, and uncertainty. Even the definition of the term "brownfield" is laden with ambiguity. At the federal level, according to the U.S. Environmental Protection Agency (EPA), "Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant"(EPA 2013). This definition is helpful in part for federal funding purposes, but it also suggests that contamination is not a requirement in determining whether a property is a brownfield.

The benefits of brownfield redevelopment are numerous and widely documented. Brownfield redevelopment can lead to the removal of public health hazards, increases in property values, job creation, economic development, increased confidence in the surrounding community, the mitigation of urban sprawl, and more sustainable future development (Sousa 2008). Despite the documented benefits of brownfield redevelopment, many environmental laws, originally crafted to protect the public from contamination and assign cleanup responsibility to responsible parties, have had the unintended consequence of stymying brownfield redevelopment because potential developers would not want to assume responsibility for the contamination by purchasing the site.

The fact that cleanup liability can transfer to the current owner of a site, regardless of who was responsible for the pollution itself, creates a strong disincentive for developers and capital providers to purchase or finance the purchase of brownfields, thereby stifling

potential redevelopment (Kirkwood 2007). As Rosanna Sattler et al. explain, "Environmental liabilities are unintended disincentives to redevelopment of a contaminated urban site . . . [and] a lack of teamwork and coordination among developers, lenders, government agencies, community groups, environmental engineers, landscape architects and attorneys often exacerbates the problem" (Kirkwood 2007). Therefore, given that liability is one of the main hurdles, Sattler et al. allude to the potential utility of a team-based approach to accelerating the pace of brownfield redevelopment.

Due to the fact that federal laws significantly alter the course of redevelopment, an understanding of the federal legal framework is an important starting point for developers and municipal planners alike. Congress crafted the Resource Conservation and Recovery Act (RCRA) in the 1970s to address the nation's growing concern surrounding the increase of waste created by the country's increasingly urban population. RCRA applies to the treatment, storage, transportation or disposal of hazardous waste. RCRA sets standards for closing and cleaning facilities, sealing landfills, monitoring groundwater and landfill gas emissions. Furthermore, the Toxic Substances Control Act (TSCA) of 1976, another important federal regulation, empowers the federal government to monitor and regulate toxic substances that pose environmental and health hazards, including PCBs, lead paint, and asbestos. Finding these substances on sites triggers TSCA, which means brownfields must then comply with an additional layer of regulations. From a brownfield redevelopment perspective, TSCA can add another hurdle or potential delay to the process.

In addition to the regulations pertaining to brownfield sites outlined in RCRA and TSCA, the federal government enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1980 in response to the increased concern about contamination in communities across the country, as highlighted most dramatically by the environmental disaster in Love Canal, New York. CERCLA is referred to as "Superfund" because it created the Superfund Trust Fund to pay for the cleanup of severely contaminated sites. CERCLA created the National Contingency Plan and the National Priorities List (NPL), a list of severely contaminated sites. Superfund liability may discourage the transfer of property because liability is imposed on the site's current owner, regardless of fault (Kirkwood 2007). Additionally, another facet of CERCLA is the ability to put a lien on property after the removal of hazardous waste when no responsible parties are available to pay for the costs of removal. Such liens are inherited with property ownership and prevent property owners from applying for EPA grant funding, which proved to be a stumbling block at the Chicopee site (Eva Tor 2013). Therefore, it is important for practitioners redeveloping brownfield sites to understand the larger federal context within which they are working, as it can have dramatic impacts of funding opportunities.

Even though many federal policies constrain redevelopment, the federal government also plays a supportive role in other respects by providing grants to support brownfield redevelopment projects. Many agencies, such as the Environmental Protection Agency (EPA), the Department of Housing and Urban Development (HUD), the Economic Development Administration (EDA), the National Oceanic Atmospheric Agency (NOAA),

and the Department of Energy (DOE) make grant monies available. All of these agencies have offered grants, low-interest loans and/or direct technical support to brownfields across the country. The EPA has funded more than $100 million in brownfield projects, and this work is widely considered successful (Hollander, Kirkwood, and Gold 2010). While such grant funding is beneficial, it is not adequate to remediate the deluge of contaminated sites across the country. Researchers estimate a range for 25,000 to 400,000 brownfield sites across the United States (Russ 1999). Due to insufficient federal funding and technical support programs, many states have stepped in to bridge the gap.

BROWNFIELD REDEVELOPMENT IN MASSACHUSETTS

Within the Commonwealth of Massachusetts there is no formal definition of the term brownfield. According to the MassDEP, such properties "are typically abandoned or for sale or lease; they typically have been used for commercial or industrial purposes; they may have been reported to MassDEP because contamination has been found or they may not have been assessed due to fear of unknown contamination conditions" (Mass DEP 2012). One implication of this ambiguity is that sites may languish because the perception of pollution is greater than reality. Many sites still face problems of severe contamination, however. MassDEP has tracked 43,315 contaminated sites. Kerry Bowie, director of brownfields and environmental justice at MassDEP, indicated that approximately 900 of those contaminated sites are considered brownfields (Kerry Bowie 2013).

States seeking to assist the redevelopment of brownfields have implemented a variety of approaches ranging from offering tax credit financing, providing additional grant

monies, and easing the burdens of liability if specific conditions are met. The most aggressive brownfield redevelopment programs are typically found in the Northeast and Midwest regions of the country. Massachusetts General Law (MGL) Chapter 21E tasks MassDEP with ensuring the permanent cleanup of contamination. MassDEP implemented this duty with a series of regulations called the Massachusetts Contingency Plan (MCP) (MassDEP 2013a). The MCP process took effect in 1995 to establish state regulations for handling sites with toxic releases, which is especially important for sites that are not already subject to CERCLA, TSCA or RCRA because it establishes requirements and procedures for brownfield redevelopment within the commonwealth. The MCP describes the notification of toxic releases, preliminary response actions, risk reduction measures, deadlines, permits, comprehensive response actions, risk characterization, response action outcomes (RAOs), audits, compliance assistance, public involvement and technical assistance grants, numerical ranking system and scoring instructions, the Massachusetts oil and hazardous material list, and perhaps most importantly the assessment process that all brownfields must go through before cleanup can commence (MassDEP 2012b). The assessment process described in the MCP provides an important road map for the redevelopment process that brownfield redevelopers, city officials, and Licensed Site Professionals (LSPs) must intimately understand.

Given Massachusetts' historical contribution to the American Industrial Revolution, it is not surprising that the commonwealth has an especially high number of brownfields compared to the rest of the country. State policy makers in Massachusetts have responded to the state's historical legacy of polluted sites with proactive brownfields policies and

programs. One broad indicator of effectiveness is that Massachusetts has been especially successful in obtaining brownfield grants compared to the rest of the country. According to Joe Ferrari, Program Officer of EPA New England's Brownfields Program, of the $69.3 million distributed by the EPA in 2011 related to brownfields, Massachusetts received $6.75 million, which was the most of any state in the country (Joe Ferrari 2013).

An example of a progressive brownfields policy in Massachusetts is a law that modifies the Superfund liability scheme such that a purchaser or developer, under specific circumstances, may be able to seek protection from liability if a permanent solution for dealing with the contamination of an already polluted site is achieved. The new owner or tenant is exempted from liability from cleanup costs and property damage from the state's Superfund statute and from common law doctrines. According to Sattler et al., "this achievement is of monumental importance for the redevelopment of contaminated industrial and commercial sites, because potential purchasers of such sites are encouraged by the statute to become current owners or tenants. Such legislative initiatives are promising, albeit controversial and still relatively unusual" (Kirkwood 2007). Massachusetts state lawmakers are ahead of the curve in seeking creative legal solutions to address the issue of liability, which often inhibits brownfield redevelopment.

In 1998 Governor Cellucci signed the "Brownfields Act" into law, updating Massachusetts' state incentives and encouraging parties to clean and redevelop contaminated property. The act provides financial incentives and liability relief to encourage investment in brownfields while simultaneously maintaining environmental standards. Financial incentives include the Brownfield Redevelopment Access to Capital

(BRAC) Program, which encourages private sector lending to finance the purchase of brownfields and contaminated sites. MassBusiness administers BRAC and the program backs private sector loans with environmental insurance to ensure that cleanup is completed ("Summary of the Brownfields Act | MassDEP" 2012).

The Brownfields Act also created the Brownfield Redevelopment Fund (BRF), which MassDevelopment administers, to provide low-interest loans and grants for site assessment and cleanup in Economically Distressed Areas (EDAs). The BRF appropriation is $30 million, and 30% of all BRF loans and grants must be used to fund site assessments. The maximum loan or grant per project is $100,000 for site assessments, $500,000 for site cleanup, and $2 million for site assessment and cleanup of priority projects. Proposed projects must be located in EDAs and must result in significant economic impacts in terms of new jobs or contribution to the economic or physical revitalization of the areas in which they are located. Furthermore, BRF assistance must be necessary to make the project financially feasible. Applicants cannot be subject to any outstanding environmental enforcement action within the Commonwealth ("Summary of the Brownfields Act | MassDEP" 2012). Many BST sites have enjoyed grants provided by the BRF, and the BST status automatically designates participating BST sites as priority projects. As a result, both Kiley Barrel and the Uniroyal/Facemate sites obtained large sums of money from MassDevelopment.

Another Massachusetts policy innovation is the use of LSPs as a credentialed environmental consultant in lieu of government employees to assess and evaluate brownfield site conditions. Massachusetts and a few other states employ this semi-

privatized method. This approach alleviates the burden of overextended government employees with a system of highly trained professional consultants (Hollander, Kirkwood, and Gold 2010). MassDEP relies on LSPs to oversee the cleanup of most contaminated properties. Therefore, brownfield redevelopment in states with an LSP programs may experience expedited processes by removing a layer of government bureaucracy.

THE BROWNFIELDS SUPPORT TEAM (BST) INITIATIVE

Given the complexity of brownfield redevelopment, often multiple parties and groups are involved. The brownfield "industry" typically includes players ranging from private developers, the federal, state, and municipal government, banks, insurance agencies, law firms, planners, engineers, landscape architects, and in some states such as Massachusetts, and LSPs. As Hollander et al. note about teamwork, "projects that have been successful in collaboration and efficiency have had very specific plans about how to do this" (Hollander, Kirkwood, and Gold 2010). Well-coordinated teams are set up such that everyone on the team understands their responsibilities.

Guided in large part by the belief in the effectiveness of team collaboration, Lieutenant Governor Tim Murray announced the creation of the statewide BST Initiative in 2008. The BST was his idea to assist communities with the cleanup of contaminated land in order to prepare sites for redevelopment by emphasizing communication, active problem solving, and regular meetings of stakeholders and government representatives. This program encourages interagency collaboration for the benefit of targeted brownfield sites in the state. The BST brings together representatives from different agencies such as

MassDEP, MassDevelopment, and the Executive Office of Housing and Economic Development (EOHED) to help municipalities solve the problems that impede the redevelopment of especially complicated, contaminated properties. Participants involved vary based on the needs of each site, but may include the Office of the Attorney General, MassBusiness, and the Department of Revenue. The BST functions by gathering representatives from these entities for monthly meetings to drive progress towards assessment, cleanup, and redevelopment of targeted brownfield sites across Massachusetts.

Lieutenant Governor Tim Murray has prioritized brownfield redevelopment dating back to his time spent as the mayor of Worcester, wherein he established the Mayor's Brownfields Task Force, which was a local model of brownfield redevelopment interagency team that served as a source of inspiration for the statewide BST initiative. He then brought this agenda with him to his role as Lieutenant Governor (Carol Tucker 2013). Worcester was not the only municipality, however, to attempt such an approach. For example, Chicago, Phoenix, and Lawrence, MA have all created interagency teams to support brownfield redevelopment goals. According to an EPA brownfields toolkit highlighting factors to effective programs, "this interagency approach is key to brownfields success, because bureaucracy at the local level can kill brownfields projects . . . An interagency team can promote one-stop-shopping for brownfields parties to help avoid these brownfields barriers" (EPA Region 4 2013).

Although the Lieutenant Governor's office generated the initial idea, MassDEP now leads the BST. The BST requires no additional funding, other than the dedication of

participant staff time. The BST is composed of a senior team with representatives from the Lieutenant Governor's office, MassDEP, MassDevelopment, and more recently the Massachusetts Department of Transportation (MassDOT), and the Department of Energy Resources (DOER). The team coordinator (typically from MassDEP or MassDevelopment) leads monthly meetings and determines the relevant stakeholders to include. As explained by the deputy regional director of MassDEP's western regional office and program leader for the Chicopee site, Eva Tor, "the BST helps not only focus and set timeframes for goals, but also brings all the required players to the table . . . So in terms of my role, I would help organize these meetings, run the meetings, and we would afterwards send out meeting notes clearly defining what the next steps were, what the action items were" (Eva Tor 2013). Encouraging BST participants to agree on next steps on a monthly basis was an important method of building positive momentum and keeping projects moving. The BST's ability to expedite the normal redevelopment process, which is typically laden with sources of potential delay, is one of the core components that sets the BST apart and enables the program's effectiveness.

The senior team selects sites based on a few main criteria: complexity, redevelopment potential, and fit with the theme of the round. Each round has changed and evolved. In 2008 the senior team selected five sites to participate in the inaugural year of the program without a particular theme in mind.[1] In 2010 the team selected six new

[1] The five sites from 2008 include: Indian Orchard Business Park (Springfield), South Worcester Industrial Park (Worcester), Fisherville Mill (Grafton), City Pier (Fall River), and Ted's for Tires (Haverhill)

sites[2] and the theme was sustainable development and transportation. Then in late 2012 the third round of the BST included five new sites based on the theme of renewable energy generation.[3] As one member of the BST summed it up, "If it wasn't complicated, it wouldn't be a BST. That's the whole point. They try to pick complicated sites where there's a big potential return and really good redevelopment opportunity" (Frank Gardner 2013). According to MassDEP's brownfields director Kerry Bowie, "that's the beauty of this process, we do have dedicated resources (staff time) working to push these projects forward on a monthly basis for a period of a year and a half and maybe even two years. The concerted effort drops off after that for our larger team effort but we may continue to work on projects for 3 or 4 years depending on the extent of the contamination and the development cycle or process" (Kerry Bowie 2013).

The main idea emphasized by all participants interviewed behind the key to the BST's effectiveness is the relationships that are built based on the camaraderie of working on a team together. As MassDEP's Eva Tor explained, "just like the BST, brownfields work is done by communication and collaboration . . . the simplest thing [the BST] does is bring everyone to the table. And as cliché as that sounds, it really makes a difference because it challenges everyone to say, what have I done? What can I do? How am I going to help this go forward?" Tor explained that the BST was based on the model that the Lieutenant Governor brought from his Worcester roundtable forum, which helped tremendously in

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[2] The six sites from 2010 include: Brownfields Assistance Pilot (Brockton), Downtown Redevelopment Project (Attleboro), Kiley Barrel/Union Square (Somerville), Mill Street Corridor Redevelopment (Gardner), Uniroyal/Facemate Properties (Chicopee), and Katrina Road (Chelmsford).

[3] The sites selected in 2012 include: Lower Millyard (Amesbury), Former Lewis Chemical Site (Hyde Park/Boston), Central Steam Plant (Fitchburg), Ludlow Mills (Ludlow), Payne Cutlery and Former Elco Dress Sites (New Bedford).

Worcester. Additionally, the BST helps the entire team leverage funding opportunities. Tor also emphasized the fact that brownfield redevelopment in general is a team effort, which is why the BST approach, in her estimation, is so effective (Eva Tor 2013).

THE UNIROYAL AND FACEMATE PROPERTIES IN CHICOPEE

The City of Chicopee is located in Western Massachusetts north of Springfield and is part of the Springfield Metropolitan Statistical Area. Chicopee is the second largest city in Western Massachusetts. According to the U.S. Census, the population is 55,333 with a population density of 2,422 people per square mile. Chicopee is located on the Connecticut River in Hampden County, and the city uses the nickname "Crossroads of New England" due to the city's central location in the commonwealth and its proximity to four highways that run through its boundaries. After European settlers first arrived in the 1600s, Chicopee's economy was based on agriculture. By the early 1800s Chicopee experienced rapid industrialization with the appearance of mills for manufacturing and textiles. Northeast of downtown along the Chicopee River was the home of numerous industrial operations over the years, including the Uniroyal and Facemate sites.

Map 1: Chicopee, Massachusetts

Maps courtesy of the City of Chicopee (City of Chicopee 2012)

Boston Associates constructed mills located on the present-day Facemate property to manufacture textiles. The Facemate site covers 20 acres. The Chicopee Manufacturing Company operated there from 1823 through 1915 until Johnson & Johnson purchased the site and continued operations. The Facemate Corporation purchased the property in 1977 and they produced finished cotton and synthetic cloth products (City of Chicopee 2013).

Image 1: Cleanup Underway at the Facemate Site

The Uniroyal property, located just south of Facemate, changed ownership many times over the years. The 18 acres site was a lumberyard in the late 1800s. From 1896 to 1898 the Spaulding and Pepper Company took control of the site and produced bicycle tires. Fisk Rubber Company (whose name later changed to United States Rubber Company

and then to Uniroyal, Inc.) manufactured tires for bicycles, motorcycles, and automobiles on the site from 1898 to 1980. Uniroyal closed in 1980 and sold the property to the Facemate Corporation in 1981. Michelin North America acquired the assets of Uniroyal, Inc. around 1990 and therefore assumed responsibility as the primary responsible party (PRP), which entails dealing with residual contamination of the Uniroyal site ("FY 2013 EPA Brownfields Clean-up Grant Proposal" 2012).

Image 2: Abandoned Buildings at the Uniroyal Site

After Facemate owner Walter Mrozinski went bankrupt in 2003, the entire complex deteriorated. For the last thirty years, most of the two million square feet of industrial space on the Uniroyal and Facemate sites has been unoccupied. In 2010 the City of Chicopee gained ownership of the vacant Uniroyal and Facemate properties (City of

Chicopee 2013). Currently, seventeen vacant buildings, encompassing 1.5 million square feet, remain standing at the Site ("FY 2013 EPA Brownfields Clean-up Grant Proposal" 2012).

The Lieutenant Governor announced Uniroyal/Facemate's designation as a BST project during the second round of the BST Initiative in 2010 ("Patrick-Murray Administration Announces Second Round of the Brownfields Support Team Initiative" 2010). Lieutenant Governor Tim Murray said the Uniroyal/Facemate project was chosen for assistance because "the RiverMills at Chicopee Falls redevelopment opportunity was already in motion and had solid potential for return on investment, but needed a higher level of coordination to move ahead." (Elizabeth Taras 2012). The transportation element of this brownfield site, in keeping with the transit theme of the second round of BST projects, includes the bike path/river walk to connect the site to downtown Chicopee's commercial district. Chicopee Mayor Bissonnette initiated efforts to spur redevelopment of these brownfields when he took office in 2005 (Jeanette DeForge 2012). Mayor Bissonnette has been a staunch supporter of the redevelopment at these properties for years (Karen Betournay 2013).

Given the complicated nature of the property in conjunction with its potential to transform Chicopee, this site was a logical selection for the BST's involvement. The City of Chicopee is working with the BST to redevelop the former Uniroyal and Facemate properties into a mixed-use project, including a senior center located on the Facemate site, along the Chicopee River to be called RiverMills at Chicopee Falls. The senior center will be developed on part of the property after the Facemate buildings have been razed

and the soil has been remediated. The rest of the land will be marketed to private developers (Jeanette DeForge 2012). There will be forty acres of land for housing and retail space (Lt. Gov. Timothy Murray 2012). The older adult community center received funding approval at the Chicopee City Council meeting on February 15, 2011 (MassDevelopment Press Release 2012).

A BST task force made up of representatives from the city and different state agencies met regularly beginning in November 2010 to work collaboratively to fast track the redevelopment of the RiverMills site (Lee Pouliot 2013). These meetings typically included representatives from MassDEP, EPA Region 1, The City of Chicopee, MassDevelopment, MassDOT as well as other agencies as the need arose (Eva Tor 2013).

Image 3: RiverMills at Chicopee Falls Conceptual Redevelopment Plan

Image courtesy of City of Chicopee Brochure (City of Chicopee 2012)

The main contamination at the site includes PCBs, petroleum and asbestos. Former manufacturing operations entailed the use of approximately twenty-two underground

storage tanks (USTs) and five aboveground storage tanks for the storage of various petroleum products and solvents. Twenty-three transformers that were used to distribute electrical power for site operations contained PCB-based dielectric fluids. As the PRP at Uniroyal, Michelin North America, Inc. (MNA) has identified and removed all known USTs on the property and MNA and the City have removed all transformers. MNA has managed transformer fluids and PCB-impacted soils at appropriately licensed off-site waste management facilities. In addition, MNA has consolidated PCB-impacted soils on the site and has initiated construction of a cap under applicable TSCA regulations. Despite these efforts, much contamination remains, including PCBs, heavy metals, EPH, SVOCs & VOCs in soil and EPH & VOCs in groundwater. PCBs have also been identified in accumulated sediment in on-site storm water drainage systems and in the toe drain system for the flood control dikes along the westerly boundary of the Site.

The city is working in cooperation with MNA to prioritize site cleanup activities, but "unknown subsurface conditions" remain under existing buildings and related structures. As additional buildings are demolished at the site, MNA indicated they would be implementing supplemental subsurface investigations. MNA's obligation for response actions will not fully achieve redevelopment requirements; additional environmental cleanup will likely be necessary. MNA's responsibilities as a PRP at the Uniroyal property are largely related to the assessment and remediation of existing environmental contamination under Chapter 21E, the MCP and TSCA regulations. The assessment and abatement of hazardous substances within the on-site buildings, along with actual demolition of most of the buildings, are the city's responsibility and are funded separately

from MNA's efforts. As of November 2012, the City has demolished six buildings; 17 structures remain to be abated and demolished ("FY 2013 EPA Brownfields Clean-up Grant Proposal" 2012). Environmental assessments have been required for cleanup proposals. Various consultants have completed environmental studies on the Uniroyal property beginning in the early 1980's.[4] Numerous activities related to assessment and cleanup have been completed or are already under way.[5] Overall, the city has made more progress with the Facemate site, in part because there was no PRP present, so the city

[4] In March 1991 ECS completed a Phase I Limited Site Investigation, and in August 1997 they completed a Phase II Comprehensive Site Assessment (CSA). In February 1998 ECS completed additional Phase II Investigations. Gannett Fleming completed a Supplemental Phase II CSA in June 2005. Gannet Fleming also completed a Phase III Remedial Alternatives Analysis in June 2005 as well as various Phase IV Remedy Implementation Plans from March, 20006 through April 2010. GZA GeoEnvironmental, Inc. completed additional work since that date, and that includes a Supplemental Phase II CSA in January 2011. On May 10, 2010, Tighe & Bond completed an Existing Conditions Report on some of the remaining Uniroyal buildings. Smith & Wessel Associates, Inc. completed a Pre-Demolition Inspection Report for Hazardous Building Materials in Uniroyal Building #26 in November of 2012. These assessments detail the structural condition of the Building 26 and confirm the presence of asbestos, lead and other hazardous materials ("FY 2013 EPA Brownfields Clean-up Grant Proposal" 2012).

[5] The following list showcases the completed and on-going activities on the Uniroyal/Facemate Site: Demolition of Uniroyal Buildings 1-6 completed in August 2010; Phase II Building Assessment of Facemate Buildings 1, 3 & 5 and Uniroyal Building 25 completed in September 2010; Hazardous Building Materials Study of Facemate Buildings 1 & 5 completed in September 2010; Phase II Environmental Review on the Facemate Property, which is on-going; EPA Brownfields Clean-up Grant Proposal on Facemate Buildings 1, 5 & 12. Proposal submitted to the U.S. Environmental Protection Agency and waiting approval for grant funds targeted for use in abating hazardous building materials prior to demolition activities; Rails to Trails Project which includes a rail line from Grape Street to the Uniroyal/Facemate Site & Rail on Uniroyal/Facemate. Iron Horse Preservation Society removed all rails and ties from the area leaving behind a prepared trail base; Hazardous Building Materials Study of Facemate Buildings 1, 3, 5, 8, 12; The UST Removal Project wherein the Facemate underground storage tank removal project removed three large underground storage tanks from the site; the Transformer Removal, which is the he final phase of the Uniroyal transformer removal project was completed in March 2010 with the removal of the final transformer from building 29; Approval for Section 108 Loan program application. An application submitted and approved for $5 million HUD section 108 loan for site preparation and construction of an Older Adult Community Center on the Facemate site; and lastly Facemate Demolition Services; the city has commenced demolition of buildings on the Facemate site. Site clearance will allow for the development of an Older Adult Community Center and other private investments on the site (MassDevelopment Press Release 2012).

stepped up to fill the void and begin taking action more immediately without seeking input, approval or coordination with another entity (Karen Betournay 2013).

In evaluating the effectivenss of the BST in Chicopee, interviews with multiple members of the Chicopee BST revealed that the participants felt that relationship building component of the monthly meetings was integral to the success of the project. The ability to meet people in person and "put a face to the name" created strong bonds that enabled greater cooperation and camaraderie, so that teammates worked together for the benefit of the success of the RiverMills project (Betournay 2013). As MassDEP deputy regional director Eva Tor put it, "I think the relationship building is a very powerful aspect of this because we're not all just working on this one site. When you're doing brownfields redevelopment work you're working on a lot of sites, and the city development folks are working on a lot of sites, and so that increased coordination and communication I think is an unmeasured benefit, but a very important one" (Eva Tor 2013). This indicates that the BST offers lasting benefits that extend beyond the life the specific BST project.

Another widely touted benefit of the BST in Chicopee that many participants mentioned was rapid pace of the project redevelopment. Participants viewed this as evidence of the BST's effectiveness. After its inclusion in the BST, RiverMills began redeveloping more quickly than it had before and also more rapidly than the average brownfield site (Pouliot 2013). Multiple municipal employees emphasized the importance of the BST, including Chicopee's Director of Community Development who affirmed that the BST "far exceeded any thought of how valuable it could ever be" (Carl Dietz 2013). Most compelling, the LSP overseeing the site mentioned multiple instances in which

potential delays were avoided as a result of the increased access to key decision-makers at multiple agencies in the commonwealth. The site's LSP, Al Hanscom, described how this not only rapidly sped up the process by avoiding delays, but this also saved the city considerable sums of money by not paying the contractor for lost time. In Hanscom's estimation, based off of his many years overseeing multiple brownfield redevelopment projects, the BST saved the city hundreds of thousands of dollars by avoiding delays (Alan Hanscom, LSP 2013).

Chris Nolan, City of Chicopee Project Manager affirmed that the BST expedited the process in several instances. He explained that at first the City of Chicopee was making progress on its own while the BST was educating itself on the project. Nolan went on to state that "as time went on, when certain things came up, we asked [the BST] to help us on this piece or that piece, and it became apparent that when we ask them for help on something, [...] they didn't delay and they took action. It wasn't always perfect, and it didn't always come out the way we wanted it to, but for our purposes, the worst thing that can happen is no answer. Whatever the answer is, we'll live with . . . We just need an answer so that we can continue to move forward; that's the most important thing . . . I think that again is an invaluable piece of [the BST]" (Chris Nolan 2013).

BST meetings also resulted in a creative EPA funding solution. Frank Gardner, a BST participant representing EPA Region 1, suggested the idea to split the larger RiverMills parcel into two separate parcels (Uniroyal and Facemate), so that the City of Chicopee could apply for two separate EPA grants and thereby receive a total of $400,000 instead of

$200,000 from the EPA. Gardner generated this idea during a BST meeting and thereby doubled the city's EPA funding (Lee Pouliot 2013).

Another major benefit of the BST is that in May 2012, MassDevelopment officially designated the City of Chicopee as priority site as a result of its BST status, which enabled the city to apply for larger loans or grants up to $2 million from the BRF for continued environmental testing and cleanup. MassDevelopment approved an additional $1.1 million in grant funds for testing and cleanup at the Uniroyal and Facemate sites (MassDevelopment Press Release 2012). The city received the first $2 million MassDevelopment grant for cleanup in 2009. As explained in the newspaper article from The Republican, "Typically, MassDevelopment allows a $2 million grant for any project, but Chicopee . . . successfully argued the project is really two properties and deserved a second grant. Mayor Michael D. Bissonnette said . . . The idea of splitting the site into two projects came from the [BST] and was approved by the [MassDevelopment] Board of Directors this month"(Jeanette DeForge 2012). In the fall of 2011, Lt. Gov. Murray and Chicopee Mayor Bissonnette announced $1 million in state funding to support ongoing environmental assessment and cleanup at the site. This complemented a $5 million loan from the U.S. Department of Housing and Urban Development for further assessment and demolition obtained by Congressman Richard Neal (Lt. Gov. Timothy Murray 2012).

Working with MassDevelopment in particular proved to be an especially fruitful relationship for the City of Chicopee. Mayor Bissonnette stated, "Our partnership with MassDevelopment has enabled the project to be transformed from a derelict mill site into an important redevelopment opportunity for Chicopee. Collaboration with

MassDevelopment shows the results that can be achieved when a team approach is taken to resolve local problems" (MassDevelopment Press Release 2012). The future focus on the Chicopee BST will be to continue to provide assistance to the City of Chicopee in the form of technical, financial, and legal expertise to assist the cleanup and redevelopment of the River Mill Project sites. The BST will continue to work proactively to address issues relating to building demolition and assessment/remediation concerns at the Uniroyal and Facemate sites in 2013 ("Massachusetts Brownfields Support Team (BST) Initiative November 2012 Report").

Another instance of benefiting from the BST in the form of increased access to funding comes from collaboration with MassDEP. The City of Chicopee needed additional background data in order to prepare strong grant applications for EPA funding. As a result of a monthly BST meeting in Chicopee, MassDEP learned of the city's need for funds to cover the costs of this assessment. Due in part to MassDEP's commitment to helping the project succeed, MassDEP secured $50,000 in Brownfield Assessment Funding to hire a state contractor to perform a pre-demolition hazardous-material assessments of Uniroyal building ("Massachusetts Brownfields Support Team (BST) Initiative November 2012 Report"). The data obtained from the assessment enabled the city to successfully apply for three EPA grants. Therefore, as Chicopee City Planner Lee Pouliot explains, MassDEP's funding of the assessment was a lynchpin for ultimately receiving substantially more grant money from the EPA. And the genesis of MassDEP's interest in helping provide this funding was a direct result of a BST meeting with the city (Lee Pouliot 2013).

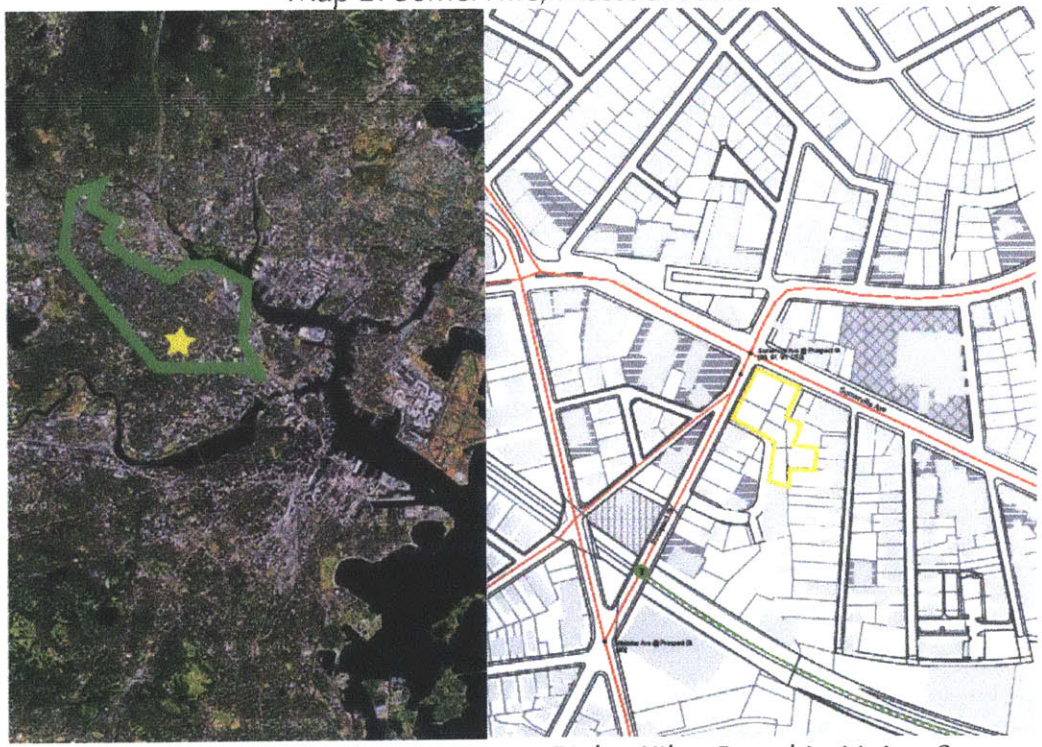
The BST Initiative was designed so that each program would receive formal support from the team for a period of eighteen months to two years (Conway 2013). The Chicopee BST has now surpassed the original two-year time frame, but instead of wrapping up the project, MassDEP made the decision to prolong the team meetings, but reduce the frequency from monthly to quarterly meetings. Eva Tor, Deputy Regional Director of the Bureau of Waste Site Cleanup from MassDEP, was the chair of the Chicopee BST, and she felt the need to continue meeting. After confirmation that all participants agreed with this decision, the Chicopee BST has officially extended beyond its initially predetermined end date (Tor 2013). City staff from Chicopee did not know that the term of the BST program was limited, but they were pleased to learn that the BST meetings had been extended. However, they also felt that now that connections to department and agency representatives had been made, they would be able to continue building on those relationships even after the BST formally ends, so they were not concerned about the program's eventual termination in Chicopee (Chris Nolan 2013).

THE KILEY BARREL BROWNFIELD SITE IN SOMERVILLE

Somerville is a city in Middlesex County, Massachusetts located just north of Boston on the other side of the Charles River, with a current population of 76,519 and a population density of 18,404 people per square mile, approximately 7.5 times denser than Chicopee. This high concentration of people in built up community like Somerville means residents are almost always affected by or at risk of contamination from nearby brownfields. Within Somerville, Union Square is the oldest commercial district, situated directly north of

Cambridge in East Somerville. After rail lines and other routes connected Union Square to Boston, Union Square developed rapidly. Originally known for slaughterhouses, brickyards and glass shops, the rail yards of Union Square transitioned into an industrial area. In the early 1900's, Union Square enjoyed excellent public transit with electric streetcars making 88 stops per day, connecting the area directly to Boston and bringing commuters to the industrial jobs and factories of Union Square. As transportation modes changed and Bostonians moved farther out to the suburbs, manufacturing also began its descent. Interstate I-93 and the McGrath Highway both bypassed Union Square to serve the needs of outlying suburbs. The local economy collapsed after the removal of the light rail system and Union Square experienced disinvestment and decline (City of Somerville 2012).

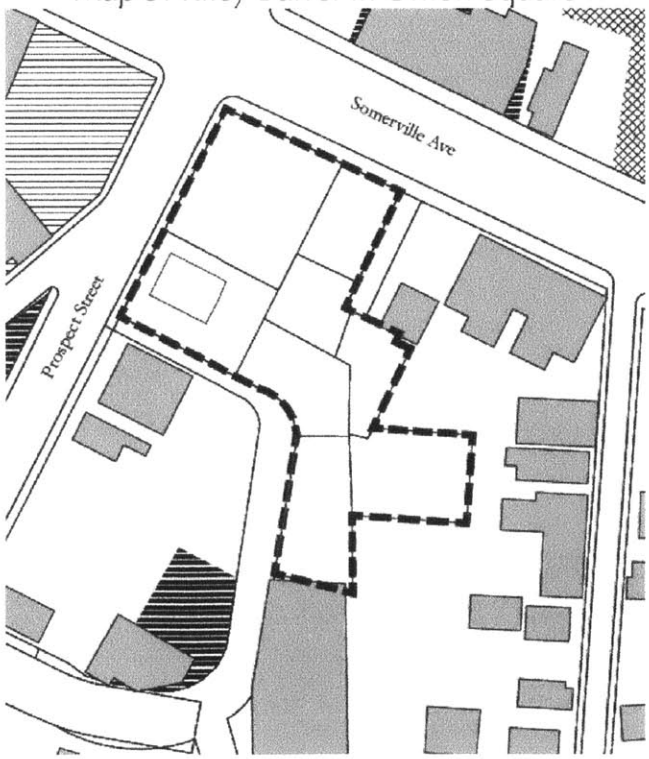
Map 2: Somerville, Massachusetts



Left, Union Square in Greater Boston. Right, Kiley Barrel in Union Square
Maps Courtesy of Micah Davison, 2012

The Kiley Barrel Company operated from 1951 until 1989, situated just east of the heart of Union Square. The company cleaned, refurbished and distributed drums storing chemical products. The residual products and used cleaning solutions were disposed into a drain located near the property causing contamination of the land. The wastes were by-products of paint, solvents, and oil constituents, including PCBs, which were used to clean the barrels as well as for storing baking and chemical products on the site. The former Kiley Barrel property contains eight contiguous parcels bounded by Prospect Street, Allen Street, Somerville Avenue, Milk Place and Bennett Street. The Site is approximately 32,000 square feet in size and is located at the southeast corner of the intersection of Prospect Street and Somerville Avenue (City of Somerville 2013).

Map 3: Kiley Barrel in Union Square



Map courtesy of Micah Davison, 2012

Mr. Kiley, the owner of the Kiley Barrel Company, left the property to Massachusetts General Hospital (MGH) in his will. In 1999 MGH sold the inherited property to a private developer, Somerville Avenue LLC. However, Somerville Avenue LLC's intended use for the property did not conform with the Union Square Master Plan. After years of negotiation with the private developer, the Somerville Redevelopment Authority (SRA) purchased the former Kiley Barrel site in February 2002. At this time the city hired GeoInsight, Inc. to conduct a preliminary assessment of the site as part of the due diligence process. The results indicated that an additional site assessment was necessary to better understand the full extent of the contamination. (City of Somerville 2013).

Image 4: Kiley Barrel in Union Square

Image Courtesy of Micah Davison 2012

Further assessments revealed the existence of metals in the soil, including lead and arsenic in concentrations above MassDEP limits. The site also contains Polychlorinated biphenyls (PCBs), Perchloroethane (PCE), and Volatile Organic Compounds (VOC) detected in the soil above MassDEP's limits. Additionally, vinyl chloride (VC) and 1,2-dichloroethane (1,2-DCA) was found in the ground water. All hazardous substances were deposited prior to the SRA taking ownership of the Site. It is believed that the contamination was caused by a combination of the historical uses of the Kiley Barrel Company on the site and illegal dumping. There has been no business activity at the site since the SRA took ownership (City of Somerville 2013).

In 2003 the City of Somerville hired the Clayton Group Services to perform additional assessments and reports. In December 2006, the city hired TRC, Inc. to conduct assessments at numerous sites across Somerville, including the former Kiley Barrel property, under the Brownfields Program. On April 13, 2007, the EPA approved Somerville's Quality Assurance Project Plan (QAPP) that described activities to be conducted at the Site. Assessment activities conducted at the former Kiley Barrel property include assessment of contamination in groundwater at nearby residential properties and public right-of ways to evaluate the extent of the plume and potential impacts to indoor air in adjacent residences (City of Somerville 2013).

TRC Environmental Corporation (TRC) completed a Comprehensive Site Assessment (CSA) and found oil and hazardous materials (OHM) in the site and four adjacent residential properties that pose health risks to humans through soil, groundwater and indoor air impacts. In the soil and groundwater, OHM are present such as

polychlorinated biphenyls (PCBs), metals, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and petroleum hydrocarbons. These substances are linked to past activities on-site that included releases from cleaning or draining of barrels, incidental releases from handling and storage, and OHM material used to fill the Miller's River and wetlands. These VOCs and PCBs are present in the sandy aquifer, and consequently are affecting the groundwater. The OHMs are constrained vertically by a thick underlying clay layer 22 feet below the surface. Horizontally, contaminant plume migration has been minimal, but there is a possibility that gasified VOCs may intrude into the indoor air of adjacent residential basements (City of Somerville 2013).

Prior to Kiley Barrel's BST designation the City of Somerville struggled with the redevelopment of the site for over a decade. One of the largest impediments was the inability to amass sufficient funding to pay for the assessments mandated by MassDEP's MCP process. In 2010, the Lieutenant Governor's office designated the Kiley Barrel Brownfield site as part of its Brownfields Support Team (BST) program during the program's second round. Kiley Barrel was a logical site to participate in the BST because the high levels of contamination made the project more complicated than the average brownfield site, the prime location of the brownfield indicated that it had great redevelopment potential, and its proximity to the extension of the green line of the T made it fit well with the sustainable development and transportation theme of the second round. The city has not yet decided the redevelopment plans for the site, but given the recent upzoning, it is highly likely that mixed use, high density commercial and residential developments will be considered (City of Somerville 2012).

Somerville municipal employees, MassDEP and EPA members of the Kiley Barrel BST all considered the BST's involvement in Kiley Barrel a resounding success. According to BST participants, establishing positive working relationships with members of the BST enabled the city to make more rapid progress with the Kiley Barrel site during the two years of participation on the team than they had made in the previous decade. Somerville's senior economic development planner Steven Azar claimed that without the BST it would have taken the city another ten years to accomplish what they had done with two years with the BST (Steven Azar 2013). Since participating in the BST, one of the largest accomplishments has been the city's ability to obtain substantial grants – enough to pay for all the assessment and cleanup costs for the site. In total, the City of Somerville has raised over $3,542,400 for assessment and cleanup, cobbled together from numerous sources (see Appendix 2) (City of Somerville 2013).

Steven Azar attributes the success of his grant applications in large part due to the BST's assistance. BST participants also provided Azar with access to critical information new resources, and connections other key decision makers in the commonwealth. Most importantly, the monthly meetings generated positive momentum that created buy-in and garnered support for the project across multiple state and federal agencies, including those with the ability to offer funding, such as MassDevelopment, the EPA, and MassDEP. Funders often want to feel certain that they are making a good investment, so when multiple funders are represented on the BST and they know first-hand that other agencies are also funding the project, that in turn makes them more likely to offer grant funding as well. Therefore, Kiley Barrel experienced grant-funding increase rapidly in a snowball-like

effect (Steven Azar 2013). This indicates that the BST had a dramatic effect on the city's ability to gather sufficient funds, which is one of the main obstacles to brownfield redevelopment.

The BST also offered the city access to state employees who were able to offer concrete and helpful advice in structuring redevelopment plans. For example, BST members connected Somerville planners to people in the attorney general's office to discuss plans for limiting liability to both the city and future developers of the Kiley Barrel site. This is particularly relevant because the city likely may not have had access to these high level decision-makers without the help of the BST. But, as a result of these meetings, the attorney general's office and the city of Somerville were able to create plans for a covenant not to sue, which will protect both the city and future developers from taking on undue liability in the redevelopment process. Therefore, this aspect of relationship-building directly enabled the city to overcome one of the largest hurdles, which is the uncertainty surrounding liability.

Another major accomplishment of the BST was its ability to address the environmental concerns of the residents adjacent to the Kiley Barrel site on Allen Street. Groundwater contaminated by VOCs and TCE had migrated under the Allen Street properties, causing concerns for indoor air quality of the houses. This necessitated additional monitoring and the associated funding to cover the costs. Furthermore, the houses' surface soil was contaminated by arsenic and PCBs, so the EPA removed the top three feet of soil and replaced it with clean soil in its place. Joanne Fagan, Brownfields Section Chief of MassDEP Northeast Regional Office and leader of the Kiley Barrel BST,

attributed the ability to gather sufficient funds as a result of the BST meetings because funders were more readily willing to invest in the project after seeing how much momentum it had been gaining. As Fagan explained, the main goal of the Somerville BST was to make significant progress within the allotted two year time period. And given the city's ability to get substantial amounts of funding, monitor and remediate contaminated soil on adjacent properties, and deal with issues of liability in a productive way, it seems clear that the BST was effective in meeting out its stated goal in the Kiley Barrel case study.

CONCLUSIONS AND RECOMMENDATIONS

Despite the vast differences in size and location of the brownfield sites in Somerville and Chicopee, both experienced very similar results with the BST, with respect to relationship building, access to resources and decision-makers, expediting the process, obtaining more funding, and accumulating momentum for the projects' successes across not only stakeholders from the city, but also state and federal representatives as well. To the extent that the goal of the BST is to facilitate the redevelopment of complicated brownfield sites, the BST has effectively met these goals.

With respect to the BST's ability to expedite the redevelopment process of complicated brownfield sites, both cases illustrated an ability to do this by forming very effective working relationships with other participants of the BST. This enables the municipalities to easily contact any other members of the BST to get fast resolutions to any potential problems as well as quick answers to questions that require timely responses.

The relationship-building aspect of the BST helps not only facilitate redevelopment of the sites directly involved, but also other brownfields in the same municipality benefit as a result of improved relationships. Furthermore, the ability to work quickly and effectively with BST partners expedites the normal process of assessment, cleanup and redevelopment. Therefore, for all these reasons, positive relationships allow the BST to meet its goal of accomplishing a substantial amount progress in a short amount of time.

Additionally, when it comes to accomplishing a lot of this work, time is literally money. When delays in the process arise, the city can be held responsible for thousands of wasted dollars that must be paid to contractors while awaiting feedback or input from state decision makers. Instead, with the BST, decisions are made quickly and hundreds of thousands of dollars are saved in avoided costs. This money can then be reinvested directly back into more brownfield redevelopment. Therefore, for many reasons, the relationship building aspect of the BST enables the program to quickly and effectively meet its desired goals, and having committed members on both teams was integral to the BST's ability to effectively meet its goals in both case studies.

In terms of the implications for other states, many aspects of the BST can be easily transported. The fact that the only dedicated resource is staff time, indicates that even in the face of tight budgets, which are increasingly the norm across the country, such a program would be affordable. The largest consideration is the ability to dedicate staff time to such a project. But, given the high returns experienced in both the Kiley Barrel and the Uniroyal/Facemate case studies, justifying such a program should not be too challenging.

One factor that is highly subject to variation is the actual composition of the teams. The participants themselves matter a great deal. In both cases, all interviewees emphasized that a major contributor to the success was the fact that the people involved were highly motivated, collegial, engaged and effective. Any program that is subject to this human element of the participants involved will inevitably face uncertainty. However, that is certainly no reason to avoid implementing such a program.

Another consideration for other states is the fact that Massachusetts' LSP system enables more rapid results than other states without this semi-privatized system. All the same, a BST program should still expedite progress experienced despite the existence of constraining factors.

A final consideration for other states is MassDEP's structure of being divided into five regions. This was beneficial in allowing each region to take on only one project per round (with the exception of two projects in the Boston region). This means the geographic distribution of resources allowed for most state agency employees to focus on only one BST project at a time. States without such a clean division may have a greater challenge figuring out how to apportion staff time effectively, and this is something that other states should consider heavily.

In conclusion, the case studies involved indicate that the BST was effective in achieving many of its stated goals, and it is a relatively simple program that should be easily replicated elsewhere, yet at the same time it is capable of making rapid progress and expediting brownfield redevelopment. One potential source of bias in this research is the possibility that interviewees experienced the "halo effect", which caused them to

reflect back on their experiences in a rosy light. This could have been better accounted for with interviews conducted with bystanders not involved in the project, as well as more objective measures of evaluation. For those interested in future research into this topic, I would suggest using this as a starting point because it is likely worthy of future investigation.

APPENDICES

Appendix 1:

Abbreviations

AUL – activity use limitation
BRAC – Brownfield Redevelopment Access to Capital
BRF – Brownfield Redevelopment Fund
BST – Brownfields Support Team
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act
CSA – comprehensive site assessment
DCA – dichloroethane
EDAs – Economically Distressed Areas
EOHED – Executive Office of Housing and Economic Development
EPA – Environmental Protection Agency
EPH – extractable petroleum hydrocarbon
LSP – licensed site professional
MassDEP – Massachusetts Department of Environmental Protection
MassDOT – Massachusetts Department of Transportation
MCP – Massachusetts contingency plan
MGH – Mass General Hospital
MGL – Massachusetts General Law
MNA – Michelin North America
OHM – oil and hazardous materials
PAHs – polycyclic aromatic hydrocarbons
PCBs – polychlorinated biphenyls
PCE – perchloroethane
PRP – potentially responsible party
QAPP – quality assurance project plan
RAO – response action outcome
RCRA – Resource Conservation and Recovery Act
SRA – Somerville Redevelopment Authority
SVOCs – semivolatile organic compounds
TCE – trichloroethylene
TRC – TRC Environmental Corporation (consultants to the City of Somerville)
TSCA – Toxic Substances Control Act
UST – underground storage tank
VC – vinyl chloride
VCP – voluntary cleanup program
VOCs – volatile organic compounds

Appendix 2:

State and Federal Awards – Assessment and Cleanup Aggregate for Kiley Barrel

Grant	Sources	Awarded/Allocated	Use
1	**USEPA** Brownfields Assessment Grant '06	$ 200,000	Assessment of Kiley Barrel
2	**State's Interagency Permitting Board (IPB)** Chapter 43D Technical Assistance Grant '09	$ 100,000	Permit streamlining for Kiley Barrel (PDS)
3	**MassDevelopment** - Brownfield Redevelopment Fund '10	$ 95,000	Assessment of Kiley Barrel
4	**MassDevelopment** - Brownfield Redevelopment Fund '11	$ 297,400	Assessment of Kiley Barrel
5	**MassDEP** Brownfield Coalition Grant '11	$ 50,000	Assessment of Kiley Barrel
6	**MassDevelopment** - Brownfield Redevelopment Fund '12	$ 950,000	Cleanup of Kiley Barrel
7	**USEPA** Brownfields Cleanup Grant '11	$ 200,000	Cleanup of Kiley Barrel
8	**USEPA** Brownfields Cleanup Grant '11	$ 200,000	Cleanup of Kiley Barrel
9	**USEPA** Brownfields Cleanup Grant '11	$ 200,000	Cleanup of Kiley Barrel
10	**USEPA** Brownfields Cleanup Grant '12	$ 200,000	Cleanup of Kiley Barrel
11	**USEPA** Brownfields Cleanup Grant '12	$ 200,000	Cleanup of Kiley Barrel
12	**USEPA** Brownfields Cleanup Grant '12	$ 200,000	Cleanup of Kiley Barrel
13	**USEPA** Brownfields Assessment Grant '10	$ 200,000	Targeted for the rest of the North Prospect Block
14	**USEPA** Brownfield Cleanup Revolving Loan Fund '12	$ 450,000	Targeted for the rest of the North Prospect Block
15	**USEPA** Emergency Planning and Response Branch '12	N/A	Cleans several abutting residential properties along Allen Street to healthy conditions
	Total:	**$ 3,542,400+**	

Source: (City of Somerville 2013)

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