

# ANALYSIS OF THE ECONOMIC, FISCAL, AND ENVIRONMENTAL IMPACTS OF THE MASSACHUSETTS BROWNFIELDS TAX CREDIT PROGRAM

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NAIOP MASSACHUSETTS, THE COMMERCIAL REAL ESTATE DEVELOPMENT ASSOCIATION

AND

THE MASSACHUSETTS ECONOMIC DEVELOPMENT COUNCIL

PREPARED BY

*Redevelopment Economics*



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**About Redevelopment Economics:**

*Redevelopment Economics, based in Baltimore, has prepared this report. The firm's principal (and the principal author of this report), Evans Paull, AICP, has 35 years of experience in urban redevelopment, with particular expertise in brownfields and sustainable development. Evans has performed economic, fiscal, and environmental impact analysis relative to: the Maryland Historic Tax Credit Program; the Westport Waterfront TOD Project, Baltimore; Powhatan Place, Ranson, West Virginia; Oriole Park at Camden Yards, Baltimore; nine tax increment financing projects, Baltimore; and brownfields investments, generically, for Northeast-Midwest Institute.*

**On the Cover**

*Clockwise from the upper left: Whittin Mill, Whittinsville; Robertson on the River, Taunton; Astro-Logistics, Springfield (solar array); Gateway Park, Worcester.*

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# ANALYSIS OF THE ECONOMIC, FISCAL, AND ENVIRONMENTAL IMPACTS OF THE MASSACHUSETTS BROWNFIELD TAX CREDIT PROGRAM

## EXECUTIVE SUMMARY

### **INTRODUCTION**

This Report has been prepared for presentation to the NAIOP Massachusetts, the Commercial Real Estate Development Association and the Massachusetts Economic Development Council. The purpose is to analyze the economic, fiscal, and environmental returns generated by the Commonwealth's Brownfields Tax Credit (the "BTC").

In Massachusetts, as in other states, there has been a recognition that financial incentives are needed in order to overcome the greater uncertainty, time, and costs associated with assessing, cleaning up, and clearing regulatory hurdles at brownfields sites. Financial incentives have been viewed as creating a "level playing field" with greenfields investments.

### **MASSACHUSETTS BROWNFIELDS TAX CREDIT PROGRAM**

Taxpayers (including non-profits) are allowed a credit against their Massachusetts tax liability for net environmental response and removal costs incurred to rehabilitate contaminated property owned or leased for business purposes and located within an economically distressed area (usually an Economic Target Area). The amount of the credit varies according to the extent of the environmental remedy. The BTC is 25 percent for cleanups that result in activity and use restrictions (such as limiting the remediated property to industrial or commercial use) or 50 percent for cleanups that achieve the higher cleanup standard associated with unrestricted use of the remediated property.

Because the tax credit is not granted until the remediation is complete, the tax credit has a direct relationship to one very substantial benefit to the Commonwealth – protecting the public health through cleanup of contaminated land. Most of this report is devoted to quantifying the array of benefits that also accrue from the redevelopment of the contaminated land; however, the BTC is successful in achieving its statutory purpose even if the land is never redeveloped.

### **REUSE SUMMARY**

There were 56 projects included in the analysis, representing \$53.8 million in BTC credits. These projects represent just over half (51.8%) of all brownfield credits approved in the years 2009 to 2012. Of those projects 44 were completed or under construction, representing \$38.8 million in BTC credits. The BTC completed projects generated:

- In cleanup expenditures — \$113.8 million
- In direct new capital investment - \$1.99 billion

- In total (direct and indirect) impact of capital investment — \$3.9 billion

Half of the projects were residential, producing more than 4,200 dwelling units (DUs); the other half were commercial or mixed use, producing almost 3.2 million square feet of office, technology, industrial, hotel, and retail space, all in the Commonwealth's designated economically distressed areas.

**Table 1 - Re-use Summary, 56 Projects Approved for BTC Program**

Project status	DU's	DU's Affordable	Retail sq ft	Hotel rms	Office + Tech sq ft	Industrial sq ft	Total sq ft
<b>Completed Projects (incl under const'n)</b>	4,237	636	833,456	378	990,000	1,138,000	8,580,845
<b>Planned Projects</b>	1,021	352	146,000	-	547,000	-	2,030,000
<b>Total</b>	<b>5,258</b>	<b>988</b>	<b>979,456</b>	<b>378</b>	<b>1,537,000</b>	<b>1,138,000</b>	<b>10,610,845</b>

The median BTC project is a \$15.9 million capital investment with \$881,000 in remediation expenses. Other median project findings are:

- Remediation costs are a substantial impediment to development, averaging 5.5 percent of total investment;
- In a limited sample of nine properties, the median length of time that properties were vacant/under-utilized was 10 years, indicating that BTC sites were likely to be neglected and blighted prior to redevelopment;
- A total capital investment of \$37 is stimulated for each \$1.00 of BTC outlays.

### **TEMPORARY IMPACTS OF CONSTRUCTION**

- Construction of BTC projects has generated 14,000 direct jobs and almost 26,000 total (direct and indirect) jobs.
- Counting only direct tax revenues, the State recouped 62.5 percent (or \$33.6 million) of its multi-year BTC outlays just in the construction phase.
- Local governments also gained more than \$7 million in direct tax revenue in the construction period.

### **PERMANENT JOBS**

Even though half of the BTC projects were solely residential, the employment-producing office, technology, industry, hotel, retail and mixed use projects leveraged significant direct and indirect employment, all in the Commonwealth's designated Economically Distressed Areas:

- BTC projects led to 7,110 direct permanent jobs (15,900 counting indirect jobs);
- The majority of the jobs (4,200) were in higher paying non-retail sectors;
- The median commercial project involved a leverage ratio of \$3,751/BTC outlays to produce one permanent job. This compares very favorably to economic development benchmarks;

- Two BTC projects (Gateway Park/Worcester, and Watertown Business Park/Watertown) have successfully targeted cutting edge life sciences research and bio-technology businesses, helping advance the Commonwealth's position in advanced technologies.

### **STATE REVENUE IMPACTS**

Business occupants of BTC completed projects generate \$47.8 million, annually in direct state tax revenues (and \$88.3 million in direct and indirect state taxes). Because retail is viewed as a dependent, non-generating sector, one could subtract that portion out, and the industrial-office-tech-hotel sectors would still generate \$35.6 million in direct state revenues annually (\$71.4 million if indirect is included). Under the conservative scenario of counting only direct non-retail impacts, the state is more than recouping its multi-year BTC investment (\$53.8 million) in one full year of occupancy by gaining \$33.6 million in construction-related taxes and \$35 million in revenues derived from non-retail business operations. Projected over ten years, the Commonwealth recoups \$7.74 in direct revenues (or \$13.56 in direct and indirect revenues) for each \$1.00 of BTC credits.

### **ENVIRONMENTAL AND SMART GROWTH BENEFITS**

Direct environmental gains are as follows:

- BTC projects have spent \$127.9 million in remediating properties to the Commonwealth's cleanup standards (this includes projects where remediation is complete but the redevelopment is not complete);
- 70 percent of BTC projects are being cleaned up to an unrestricted use standard, which will reap both environmental and fiscal rewards, the latter due to lowered requirements for State monitoring of institutional and engineering controls.

The following findings also indicate that BTC projects have the smart growth characteristics that are strongly correlated with indirect environmental gains:

- Residential BTC projects had an average density of 15.6 units per acre, about four times average suburban densities of 3-5 units per acre.
- The weighted average Walkscore of all BTC projects was 74.4, which ranks as "very walkable."
- At least four of the larger residential/mixed use BTC projects (838 units) were built with mass transit access in mind and clearly qualify as transit-oriented development.

Following from the above, Redevelopment Economics concluded that BTC projects reviewed, in comparison to alternative sprawl, can be credited with:

- Commercial and residential BTC projects save 25 percent and 45 percent, respectively, of vehicle miles traveled (VMT), with parallel reductions in greenhouse gases (GHG);
- This VMT reduction translates into "saving" 22,100 metric tons of CO<sub>2</sub>, which is the equivalent of taking 4,300 cars off the road each year;
- Over 1,300 acres of farmland and greenfields were preserved by accommodating growth in existing communities;
- Stormwater run-off was lowered by 50 percent in comparison to alternative development; and,
- The need for public infrastructure investment was lowered by 50 to 80 percent, a savings to state and local taxpayers of between \$66 and \$104 million. BTC can be viewed as a worthwhile state investment based solely on these infrastructure savings.



## I - BACKGROUND

### PURPOSE

Brownfields redevelopment represents public gain to the Commonwealth and its cities and towns in several areas. Economic development benefits include increased employment, leveraged investment, and revitalized neighborhoods. Fiscal impacts include the generation of new sources of local revenue derived from previously unproductive land and lowered requirements for investment in infrastructure to accommodate growth. On the environmental side, brownfields redevelopment, when compared to greenfields development, is credited with saving land, reducing air emissions and greenhouse gases, improving water quality through reduced runoff, and generally accommodating growth in an environmentally responsible fashion, eliminating the negative impacts associated with sprawl.

However, as governments at all levels are tightening their belts, brownfields incentives need to be scrutinized for their efficacy in producing these benefits: How many jobs are being generated? How much new revenue is generated for state and local coffers? Are brownfields investments actually lowering greenhouse gases by virtue of more efficient development patterns? Concurrent with this study, the Massachusetts Tax Expenditure Commission has recently completed its work in examining the many tax deductions, tax exclusions, and tax credits in the Commonwealth's tax code. Many concerns have been raised concerning these tax credit expenditures. This report is meant to bridge the data gap for at least one program – the Massachusetts Brownfields Tax Credit Program.

### METHODOLOGY

The following is a summary of the methodology, which is fully described in Appendix B.

First, a note on the organization of the report: for the sake of brevity, considerable information was moved to the appendices. Readers and researchers may want to explore the appendices for much of the analytic data and national context for the study.

**SITE INFORMATION** — Redevelopment Economics started with a list of 56 BTC projects made available by attorneys and professional economic developers that work with prospective BTC applicants. The projects included in this analysis account for \$53.8 million in tax credits representing approximately 52 percent of BTCs (in terms of dollars) approved in 2009 to 2012, according to the records of the Massachusetts Department of Revenue ("DOR"). The study projects represent 26 percent of the total 218 applications approved in the same four years. A full accounting for all BTC projects would likely produce impact numbers that are roughly double those estimated here.

Researchers used information from the tax credit applications submitted to the DOR and the attachments thereto, an on-line survey developed by Redevelopment Economics, site visits and interviews with nine of the developers, internet searches, city and town assessors' records and industry average statistics.

**IMPLAN AND MULTIPLIERS** — Redevelopment Economics used IMPLAN, a Massachusetts-specific input-output model used to estimate: 1) temporary jobs generated by construction; 2) direct and indirect tax revenues; and 3) all indirect job and spending numbers. By capturing the "multiplier effect," the IMPLAN model allows the reader to see the full impact of new expenditures in a given geographic area. The multiplier accounts for "indirect spending," such as supplies required for the original product being measured, and "induced spending," such as money re-circulating in the economy due to employees' spending. The term "indirect" is used here to reflect both of those categories.

**ORDER OF MAGNITUDE ESTIMATES** — Because complete and fully verified information was not available for many of the projects, impact data was, in part, generated by using industry averages rather than site specific data. This approach is consistent with an “order of magnitude” method of estimation, and all of the economic and fiscal impact data should be characterized accordingly.

**CONFIDENTIALITY** — The reader may note that many of the BTC projects are not identified as specific sites. The reason is that, under Massachusetts law, BTC recipients are not currently required to disclose either the tax benefit associated with the BTC or detailed information about the project.

**“GROSS IMPACTS”** — Lastly, the economic impacts outlined in this report should be characterized as “gross impacts,” rather than “net new” economic impacts. Aside from methodological difficulties in differentiating “net new” economic activity, the gross impacts are very legitimate to count in the case brownfields projects, even if the activity is only being relocated within the state. When brownfields projects are accommodating economic activity that is relocated within the state, the impacts are still legitimate to quantify because: 1) the site is cleaned up and public health is therefore protected; 2) the negative externalities associated with alternative locations (usually sprawl) are avoided; 3) jobs are located in economically distressed areas (a statutory requirement) and are generally more accessible to lower income populations than alternative locations; and 4) neighborhood blight is eliminated.

## II. BROWNFIELDS IN MASSACHUSETTS

### MILL TOWNS AND BROWNFIELDS

Where brownfields issues in some states are concentrated in larger urban areas, Massachusetts brownfield sites are geographically dispersed across both cities and small towns, reflecting the prevalence of mostly abandoned mills that now dot urban and rural landscapes. For example, EPA data indicates that there were at one time 1,100 mill sites just in the Central Massachusetts Regional Planning Commission area.<sup>1</sup> Abandoned mills mean more to a community than just a vacant building – they are also symbolic, representing both the community's industrial past and its ambitions for revamping the economy.

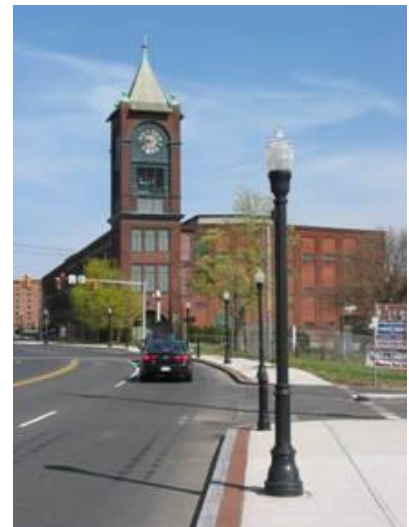
Many of these former mill properties have been returned to productive use, now representing positive (and often picturesque) examples of historic preservation, adaptive reuse, and brownfields redevelopment.

A recent article cited dramatic mill redevelopment success stories in Haverhill, Lowell, and Lawrence.<sup>2</sup> Patrick J. Blanchette, Lawrence, economic development director, cited Lawrence' progress (1 million square feet coming back to life) and was quoted as saying, *"These mills were always the engine of our economy. In Lawrence, they definitely have gone through the oil change because the engines are back and full of life."*

**Massachusetts  
Museum of  
Contemporary Art  
reuse of former  
Arnold Print  
Works Textile Mill,  
North Adams**



**Appleton Mill, Lowell – 130 loft-style affordable apartments and live-work space for artists and artisans.**



**Ludlow Mill, Ludlow - 1.5 million sq ft of space being put to new uses, including a new HealthSouth rehabilitation hospital and an 82-unit senior independent-living facility.**

<sup>1</sup> See [http://cfpub.epa.gov/bf\\_factsheets/gfs/index.cfm?xpg\\_id=6499&display\\_type=HTML](http://cfpub.epa.gov/bf_factsheets/gfs/index.cfm?xpg_id=6499&display_type=HTML)

<sup>2</sup> See: [http://articles.boston.com/2012-01-12/north/30615148\\_1\\_mill-redevelopment-mill-and-factory-buildings-tax-credits/3](http://articles.boston.com/2012-01-12/north/30615148_1_mill-redevelopment-mill-and-factory-buildings-tax-credits/3)

## MASSACHUSETTS BROWNFIELDS PROGRAMS

The definition of a brownfield site is "Real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or the potential presence of a hazardous substance, pollutant, or contaminant."<sup>3</sup> In Massachusetts, as in 23 other states,<sup>4</sup> there has been recognition that financial incentives are needed in order to overcome the greater uncertainty, time, and cost associated with assessing, cleaning up, and clearing regulatory hurdles at these sites. Financial incentives have been viewed as creating a "level playing field" with greenfield investments. Brownfields incentives are in the public interest both to avoid the negative externalities associated with sprawl and to generate the multiple community benefits of re-investment in previously developed sites.

Massachusetts offers three brownfield financial incentives, including environmental insurance, loans grants, and tax credits:

- **Brownfields Tax Credit** – For the tax credit program, see the next section.
- **Brownfields Redevelopment Access to Capital** – According to the Massachusetts Department of Environmental Protection (DEP) website, "The purpose of the Brownfields Redevelopment Access to Capital (BRAC) Program is to encourage private sector lending on contaminated sites throughout the Commonwealth. The program ... designed to address lenders concerns that (1) cost overruns incurred during cleanup might impede the borrower's ability to repay a loan; and (2) contaminated land is "impaired collateral" with a reduced value." The program, which is administered by BDC Capital,<sup>5</sup> subsidizes the premiums of insurance policies up to 50 percent.<sup>6</sup>
- **Brownfields Redevelopment Fund** – provides low-interest loans and grants for site assessment and cleanup in "Economically Distressed Areas" (EDAs). Private businesses are eligible for loans, while public agencies, Community Development Corporations (CDC's), and quasi-public economic development entities are eligible for grants. Maximum loan/grant per project is \$100,000

### LEVEDO BUILDING – Affordable TOD



*The Levedo building was developed as 24 affordable rental units and one commercial space, in the Dorchester neighborhood in Boston. Developed by Codman Square Neighborhood Development Corporation, highlights of the project include:*

- *Transit oriented development, (0.1 miles from MBTA Fairmount line commuter rail station;*
- *Green design and construction that meets LEED standards.*

<sup>3</sup> Small Business Liability Relief and Brownfields Revitalization Act of 2002

<sup>4</sup> US Environmental Protection Agency, "Financing Brownfields, State Program Highlights," September, 2007.

<sup>5</sup> See: <http://www.bdccapitalwebsite.com/brownfields-redevelopment/>, accessed 2/29/2012.

<sup>6</sup> See: <http://www.mass.gov/dep/cleanup/bfhdout2.htm>, accessed 4/49/2012

for site assessments and \$500,000 for cleanups, except that up to \$2 million can be made available for certain "priority projects."

On the regulatory side, the Massachusetts program is privatized, in that private Licensed Site Professionals ("LSPs") oversee most cleanups. An LSP-overseen cleanup leads to liability protections for innocent parties, and the liability protections extend to contribution actions and property damage claims under common law. The LSP program is credited with clearing out an extensive backlog of cases, dramatically reducing cleanup time, and generally accelerating the rate of site cleanups several fold.<sup>7</sup>

This combination of an efficient regulatory program and fairly aggressive financial incentives has meant that Massachusetts' brownfields programs are often cited as good models by other states and by academic researchers.<sup>8</sup>

## MASSACHUSETTS BROWNFIELDS TAX CREDIT PROGRAM

### DESCRIPTION OF THE BTC PROGRAM

The Massachusetts Brownfields Tax Credit program ("BTC") was authorized under the 1998 "Act Relative to Environmental Cleanup and Promoting the Redevelopment of Contaminated Property," Chapter 206 of the Acts of 1998<sup>9</sup> and is now embodied in Massachusetts General Laws Chapter 62, Section 6 (j) and Chapter 63, Section 38Q. The basic purpose of the BTC is to encourage the remediation and redevelopment of a Brownfield site by "eligible persons" thus eliminating a public health hazard.

Taxpayers are allowed a credit against their Massachusetts tax liability for net environmental response and removal costs incurred to rehabilitate contaminated property owned or leased for business purposes and located within an economically distressed area. The amount of the credit varies according to the extent of the environmental remedy. It is 25 percent for cleanups that result in activity and use restrictions (such as, restrictions which limit the property to industrial or commercial use) or 50 percent for cleanups that achieve the higher cleanup standard associated with unrestricted use. The amount of the credit is reduced dollar-for-dollar by the amount of assistance by the MASS BRAC and the Brownfields Redevelopment Fund programs.

**ELIGIBILITY** – In order to be eligible the taxpayer may not have caused or exacerbated the contamination or owned or leased the property at the time of the contamination, and the following criteria must be met:

1. The property must:
  - a. Be owned or leased by the taxpayer for business purposes;

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<sup>7</sup> New Jersey Legislature. Testimony of Massachusetts Department of Environmental Protection Assistant Commissioner Janine Commerford to the NJ Senate Environment Committee Meeting on NJ SB 1897 A Bill to establish a Licensed Site Professionals program, held on May 19, 2008.

<sup>8</sup> For example, see: University of Washington, "Linking Toxic Cleanup and Redevelopment Across the States, Lessons for Washington," 2009; and Northern Kentucky University, "Update: State Brownfield Insurance Programs, 2005, available at: [www.epa.gov/brownfields/insurance/state\\_report\\_2006.pdf](http://www.epa.gov/brownfields/insurance/state_report_2006.pdf)

<sup>9</sup> See: <http://www.malegislature.gov/Laws/SessionLaws/Acts/1998/Chapter206>



## ***Lynn Community Health Center***



*The mission of Lynn Community Health (LCHC) is to "promote the health of all individuals in our community, particularly the frail, chronically ill and economically disadvantaged." In its 55,000 sq ft expansion project, LCHC ran into significant soil contamination and asbestos-contaminated material, costing a total of \$1.7 million.*

*The tax credit amount was \$896,000, and a key hurdle was thus overcome. The BTC was changed in 2006 to make the credit transferable, which allows non-profits to benefit.*

*LCHC added 50 employees (for a current total of 410) and the expansion represented \$18.8 million in new capital investment.*

*See: <http://lchcnet.org/about-us>*

b. Have been reported to the Massachusetts Department of Environmental Protection (DEP);

c. Be located in an economically distressed area;

2. Eligible cleanup costs must exceed 15 percent of pre-development assessed value.

3. The contamination must be remediated and a Response Action Statement or Remedy Operation Status achieved.

**TRANSFERABILITY** – In 2006 the Massachusetts program was amended to establish transferability (transfer to parties with sufficient tax liability to utilize the credit), with a corollary that non-profits could now use the program.<sup>10</sup>

**"CLAWBACK" OR RECAPTURE** – The tax credit may be recaptured by the Massachusetts DOR if the recipient or transferor ceases to maintain the remedy operation status or permanent solution in violation of the Massachusetts Contingency Plan.

**"AS OF RIGHT" CREDIT** – The Massachusetts program is an "as of right" credit, meaning that it is automatic if the applicant, the site, and the cleanup expenditures meet the statutory eligibility requirements. There is not a needs test or an application ranking system which might be necessitated if there were an overall program cap. Many economic development professionals are partial to tax credit programs that are fully automatic because developers can "pro forma" the tax credit in their initial evaluation of a site.<sup>11</sup> That means that the program is achieving its purpose to incentivize desirable private investments. Given the extra time and investment required for upfront site work on brownfields, an automatic tax credit is the

<sup>10</sup> An Act Relative to Economic Investments in the Commonwealth to Promote Job Creation, Economic Stability, and Competitiveness in the Massachusetts Economy (St. 2006, c. 123)

<sup>11</sup> For example, see this report on the Historic Tax Credit program: Schwartz, Harry K., State Tax Credit Programs for Historic Preservation, for the National Trust for Historic Preservation, May, 2011.

most effective incentive that a state can offer in order to encourage private investment.

Because the Massachusetts Brownfields Redevelopment Fund does not provide grants to private parties and because BRAC only funds projects with extra liability hurdles, BTC is the primary private development incentive in the Commonwealth for the cleanup of brownfield sites.

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## STATE POLICY CONSIDERATIONS

**KEY DISTINCTION** — All other Massachusetts tax credits start with a neutral playing field and attempt to create an incentive for certain kinds of positive or preferred investments. The BTC, on the other hand, eliminates an environmental negative which is a legal and financial bar to redevelopment. The BTC would be successful if all that was accomplished was protecting the public health through cleanup of contaminated land. Most of this report is devoted to quantifying the array of benefits that also accrue from the redevelopment of the contaminated land; however, the tax credit would achieve its statutory purpose even if the land is never redeveloped.

**COMPLIANCE WITH STATE STANDARDS FOR TAX CREDITS** — During the period in which this Report was prepared, the Massachusetts Tax Expenditure Commission has been reviewing the Massachusetts tax code to study for the first time, the entire universe of the various exemptions, deductions, and credits in the tax code (referred to collectively as "tax expenditures"), as they decrease state tax revenue. The Commission was established in the Fiscal Year 2012 budget as adopted by the Commonwealth. As categorized by the Commission, these tax expenditures have been grouped under five different classifications. The BTC has been listed by the Commission under the designation "Targeted Policy Priorities". As evidenced by this Report it could also be listed under the Commission's label "Economic Incentives".

The Commission has recommended that all tax expenditures meet the following criteria:

1. Clearly meeting an identified public policy and benefits;
2. Periodic data base review;
3. Periodic review by the legislature;
4. Accountability and a "clawback" of benefits if the applicant fails to meet any of its obligations.

The BTC is in compliance with these recommended criteria. First, the public policy aims of the BTC are clear. Secondly, unless extended by the legislature, the BTC will terminate at the end of 2013. Third, there are clawback provisions requiring the applicant to payback all or a portion of the credit if the environmental remediation is not maintained.

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## COMPARISON TO OTHER STATE BROWNFIELDS TAX CREDIT PROGRAMS

Redevelopment Economics tracks state brownfields tax credit programs – see Appendix E. Thirteen states have adopted some form of income tax credit to assist brownfield site remediation and redevelopment.

Some programs are potentially more generous than the Massachusetts program. New York, Connecticut, Iowa, and Missouri each allow a tax credit for redevelopment expenditures beyond just site assessment and cleanup. However, these programs all involve needs testing, overall caps, and/or economic benefit analysis, all of which serve to lessen the effectiveness of the program relative to the objective of inducing desirable private investment. Note also that the Michigan brownfields tax credit program (which offered up to 12.5 percent of *all redevelopment costs*) was recently eliminated because of fiscal concerns. New York's program is also under scrutiny and may be curtailed.

At the other end of the spectrum are state programs that are fully automatic but are limited by per project ceilings (Mississippi, Colorado, Illinois, Florida, and Kentucky) and are therefore unable to offer a substantial inducement for larger more complex cleanups.

Several states (Wisconsin, New York, and New Jersey) do not make their credits transferable, which means that non-profits cannot benefit, and many developers with limited tax liability cannot take advantage of the incentive. That leaves the Massachusetts BTC as the tax credit program that other states are attempting to emulate, because it is the only program with the (arguably) optimal combination of being: 1) fully automatic; 2) fully transferable; and 3) not subject to per project ceilings.

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**Summary:** *Brownfields redevelopment is an economic necessity for many Massachusetts cities and towns, and the Commonwealth has responded with a strong set of regulatory and incentive programs. The Brownfields Tax Credit (BTC) program is the centerpiece of the Commonwealth's efforts to stimulate private investment in brownfields sites. BTC also serves as a national model, as it is the only state tax credit with the (arguably) optimal combination of being: 1) fully automatic; 2) fully transferable; and 3) not subject to per project ceilings.*

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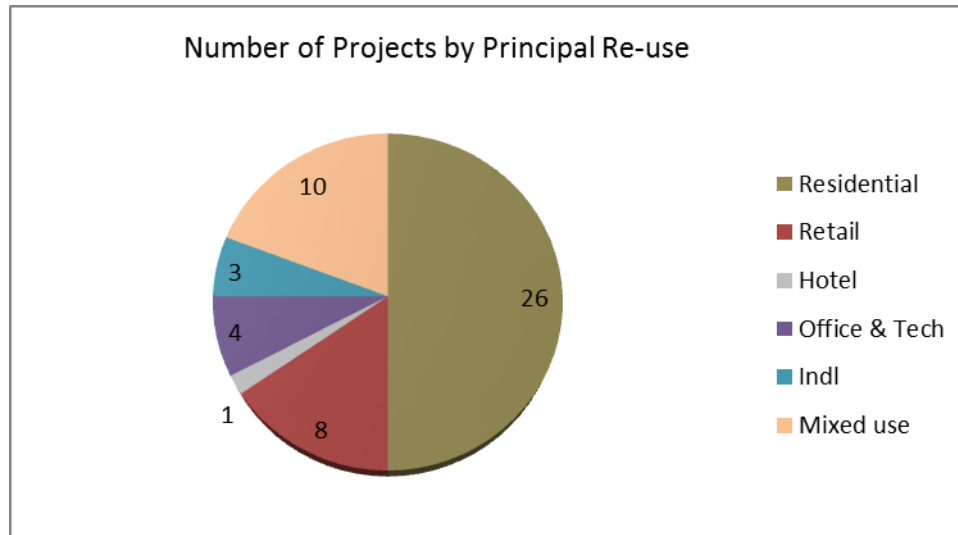
### III. PROFILE OF TAX CREDIT PROJECTS

The BTC projects that were analyzed in this report amount to \$53.8 million in credits granted to 56 existing and planned projects that represent almost \$2.5 billion in capital investment. Of these 56 projects, 44 were complete or under construction, representing \$1.99 billion in new investment. The tax credit amount corresponding to completed and under construction projects was \$38.8 million.

#### RE-USE

Figure 1 generally characterizes the BTC projects by land use and Table 2 breaks out square footage by land use and project status.

**Figure 1 - BTC Projects by Principal Reuse**



Mixed-use projects were (predominant use first):

- Residential-retail — 3
- Residential-office — 3
- Office-industrial — 2
- Office-residential — 1
- Hotel-office — 1

**Table 2 — BTC Project Summary, by Reuse and Project Status**

Project status	No. of Projects	Remediation	Tax Credit	DU's	DU's Affordable	Retail sq ft	Hotel rms	Office + Tech sq ft	industrial sq ft	Total sq ft
Completed Projects (incl under const'n)	44	\$ 113,781,608	\$ 38,827,683	4,237	636	833,456	378	990,000	1,138,000	8,580,845
Planned Projects*	8	\$ 1,423,762	\$ 8,603,625	1,021	352	146,000	-	547,000	-	2,030,000
Redevel't undetermined or no info	4	\$ 12,654,110	\$ 6,327,056							
<b>Total</b>	<b>56</b>	<b>\$ 127,859,480</b>	<b>\$ 53,758,364</b>	<b>5,258</b>	<b>988</b>	<b>979,456</b>	<b>378</b>	<b>1,537,000</b>	<b>1,138,000</b>	<b>10,610,845</b>

\* All but one of the planned projects are future phases of projects listed as complete or under construction.

Some observations are that:

- One-half of the projects are residential, producing 4,237 dwelling units (DU).
- While there were only four industrial projects (including one mixed office-tech-industrial), the square footage created (1.13 million sq ft) was higher than either the retail or the office-technology square footage.
- Planned projects will add another 1,000 DUs and 547,000 sq ft of office and technology space. All but one of the planned projects is a future phase of projects that are partially completed projects.

## TYPICAL PROJECTS

Table 3 represents average or median BTC projects. The reader will notice the discrepancy between the means and the medians. The median is usually regarded as the better indicator because the mean is skewed by, in this case, a few large projects.

**Table 3 — Mean and Median BTC Projects**

Factor	Mean project	Median Project
Remediation	\$ 2,594,577	\$881,203
Tax credit	\$ 882,449	\$ 348,751
Capital investment	\$ 45,256,812	\$ 15,900,000
Building sq ft	195,019	97,000
Acres	10.9	4.1
FAR	0.41	0.54
Number of years vacant or under-utilized (9 sites reporting)	14	10
Remediation as a percentage of capital investment	5.7%	5.5%
Leverage ratio - total capital investment for \$1 BTC outlay	\$ 51.29	\$ 45.59

### *Norwood Crossing*



*A former tannery in Norwood, vacant for 15 years, redeveloped as 105 luxury apartments. The cleanup costs were \$1.45 million, partially offset by the \$365,000 tax credit.*

First, one should note the extent of cleanup required in order to ready the land for development. Cleanups of this magnitude (\$881,000/median or 5.5 percent of development costs) are not incidental to the development process; remediation costs represent a steep financial hurdle to the developer; thus, the rationale for the BTC.

Second, the median number of years that the property was vacant or under-utilized was 10 years. Note that this information was only available for nine sites, and there was likely a reporting bias in that developers were more likely to offer this information when the number was impressively high. Still, it gives an indication that many of the BTC sites involved long-term unproductive use of land and likely represented blighted conditions in the community.

Third, the leverage ratio (\$45.60/other funds to \$1/BTC) is very favorable – see chapter IV and Appendix F for more detail.

Fourth, the mean and median FAR of 0.41 and 0.54, respectively, reflect modest densities but the number is skewed to the low side by several projects that incorporated land preservation and open space in the redevelopment plan.

## BTC RESIDENTIAL AND RESIDENTIAL MIXED-USE PROJECTS

Thirty-two (or 60 percent) of the BTC projects are residential or mixed-use residential. For residential projects the public purpose objectives, aside from eliminating blight and environmental contamination, are presumed to be the social objective of expanding the supply of affordable housing and environmental/smart growth objectives of encouraging walkable neighborhoods and reducing car dependency, thereby improving air quality and lowering greenhouse gases.

**GENERAL CHARACTERISTICS AND AFFORDABLE HOUSING** - The tax credit projects have produced 4,200 dwelling units and 940 more are in planning phases.

**Table 4 – Residential and Mixed Use residential BTC Projects**

Status	Dwelling Units					Mixed uses	
	Market rate	Affordable	Ownership	Rental	Total DU	Office sq ft	Retail Sq ft
Completed and under construction	3,593	633	1,099	3,126	4,225	116,000	398,592
Planned projects	619	322	379	562	941	40,000	-
Total	4,212	955	1,478	3,688	5,166	156,000	398,592
Percent	81.5%	18.5%	28.6%	71.4%			

The majority are rental (71 percent) and market rate (82 percent). Of the completed projects, 633 affordable units have been built (17 percent of all units) and another 320 affordable units are on the drawing boards. If the latter are completed, the share of affordable housing would rise to 18.5 percent.

**SMART GROWTH CHARACTERISTICS** – The residential development characteristic that most strongly correlates with smart growth and reduced Vehicle Miles Traveled (VMT) and Green House Gas (GHG) is density. Residential BTC projects had an average density of 15.6 units per acre, about four times suburban densities of 3-5 units per acre. Four of the projects are also mixed-use in that more than 10 percent of the space is devoted to non-residential use. The weighted average walkscore (see explanation in Chapter VI) for the residential projects was 75.5, which ranks as “very walkable.”

## CDC AND NON-PROFIT USE OF THE CREDIT

As noted above, the Commonwealth adopted changes in 2006 which made the tax credit transferable and made non-profit organizations eligible, thereby also assisting Community Development Corporations (CDC) projects. These changes made the credit even more targeted to lower income and economically distressed areas because CDC’s and non-profits are more active in lower income communities.

Eight of the 44 completed projects represented in this analysis are non-profit or CDC-led projects:

- Gateway Park – Worcester Business Development Corporation and Worcester Polytechnic Institute are developing the 12 acre Gateway Park as a center for education and research in the life sciences. See case study write-up in Chapter VII.
- The Levedo Building – Twenty-four affordable rental units developed in a transit-accessible Dorchester (Boston) neighborhood, developed by Codman Square Neighborhood Development Corporation.
- Whitin Mill – Alternatives Limited transformed the largely vacant mill near downtown Whitinsville into a \$9.6 million center for populations with developmental and psychiatric disabilities, as well as community-serving theatre, artisan, and art gallery space. (See detailed write-up in Chapter VII.)
- Hope House II – Hope House, a Boston-based non-profit, provides residential rehabilitation services for addicted persons. Hope House II created 22 affordable units, linked to programs and services to encourage self-sufficiency and recovery.
- Visiting Nurses Association – two 99-unit affordable assisted living projects in Somerville.
- Olmsted Green – Lena Park Community Development Corporation, known as Lena New Boston, is the developer of the 42-acre former Boston State Hospital in Dorchester. When completed, the development will include up to 287 market rate town homes, 151 affordable rentals, a 123-bed skilled nursing facility and 59 units of affordable senior housing. The redevelopment project has been cited as a model for low-impact development.<sup>12</sup>
- Robertson on the River – Award-winning 64 unit affordable housing redevelopment of the former Robertson Mill in Taunton. Neighborhood Corp (formerly Weir Corporation), a CDC for the Weir neighborhood, was the developer. See case study in Chapter VII.
- Myles Standish Industrial Park – Taunton Development Corporation is the developer of the 809 acre industrial campus with businesses ranging from office users, high tech, and warehousing/distribution centers to manufacturing. The BTC credit was instrumental in the redevelopment of five parcels that now accommodate seven businesses and 962 employees.



**Alternatives Unlimited, the developer of the Whitin Mill in Whitinsville, provides comprehensive services to help developmentally and psychiatrically disabled persons develop a new life mission. See case study chapter VII.**

**BRINGING OTHER FUNDING SOURCES INTO THE MIX** — One of the benefits of making CDCs and non-profits eligible (through transferability) is that CDCs and non-profits are expert in bringing other funding sources into challenging projects. The above projects, representing a total of \$3.9 million in BTC credits, garnered \$24.7 million in federal funds, including New Markets Tax Credits, Low Income Housing Tax Credits, EPA Brownfields, Affordable Health Care Facilities Capital Grants, and Historic Tax Credits. One project (Whitin Mill) also indicated that 21 foundations and 60 corporate and non-profit

<sup>12</sup> See [http://www.mass.gov/envir/smart\\_growth\\_toolkit/pages/CS-lid-olmstead-new.html](http://www.mass.gov/envir/smart_growth_toolkit/pages/CS-lid-olmstead-new.html)

entities had also supported the project. Appendix F gives a more complete accounting of other funding sources that were brought into BTC projects.

**AFFORDABLE HOUSING** — Another benefit is that CDC's usually include affordable housing in their mission. Of the completed BTC projects, 633 affordable units have been built (17 percent of all units) and another 320 are on the drawing boards.



**Robertson on the River, an award-winning preservation project in Taunton, provides 64 loft style affordable units in the former Robertson Mill. Project financing brought in nine other governmental sources (See case study Chapter VII).**

## IV. JOB AND INVESTMENT IMPACTS

### DISTRESSED AREAS

To state the obvious, brownfields projects involve redevelopment of existing developed areas, not new development that stretches the capacity of infrastructure and services. Massachusetts has also established additional geographic targeting — by statute all BTC projects must be located in Economically Distressed Areas.<sup>13</sup> EDAs are “areas that are currently an Economic Target Area (ETA) or that would otherwise qualify to be an ETA.” The criteria for designation of an ETA are that three contiguous census tracts must have: 1) an unemployment rate that exceeds the statewide average by 25 percent; 2) a poverty rate that is 20 percent higher than the state average; or 3) incurred other economic dislocation that meets the statutory guidelines.<sup>14</sup>

This statutory requirement assures that the BTC is being used in ways that contribute to the bigger picture of the state’s strategy of guiding growth to the areas where new investment is most needed. Thus, the entire discussion that follows should be interpreted, not just as “jobs and investment,” but jobs and investment channeled to the Commonwealth’s designated areas of economic distress and targeted growth.

As stated in the methodology section, this targeting of the program to distressed areas renders moot any argument as to whether the induced investments are having a “net new” impact on the state as a whole, because the clear legislative intent is to induce brownfields investments in areas of economic distress, and all such investments are legitimate to count.

The BTC projects impact the Massachusetts economy in three phases: the cleanup phase; the construction (vertical development) phase; and then in the permanent operation of the businesses that locate at the sites. The following discussion provides the detailed analysis of these three phases.

### TEMPORARY IMPACTS DUE TO REMEDIATION AND CONSTRUCTION

**REMEDIATION** — The first economic activity due to BTC investments is remediation, important to document because a few BTC projects are remediation-only, that is, the remediation serves an existing development (helping retain existing businesses) but is not leading to new development activity. For example, one of the BTC projects was a cleanup in an industrial park with a current and continuing count of 170,000 sq ft and 220 employees.<sup>15</sup> The analysis (Table 5) shows that the BTC led to 1,124 direct and indirect temporary jobs, and \$11 million in direct and indirect tax revenues, just in the remediation phase.

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<sup>13</sup> For a list of Massachusetts EDAs, see:

[http://search.yahoo.com/r/?\\_ylt=A0oG7iKQdHdPMnUAD8xXNyoA;\\_ylu=X3oDMTBybnZIZnRIBHNIYwNzcqRwb3MDMQRjb2xvA2FjMgR2dGlkAw--/SIG=11rv9vvr1/EXP=1333257488/\\*\\*http%3a//www.mass.gov/dep/cleanup/eda.htm](http://search.yahoo.com/r/?_ylt=A0oG7iKQdHdPMnUAD8xXNyoA;_ylu=X3oDMTBybnZIZnRIBHNIYwNzcqRwb3MDMQRjb2xvA2FjMgR2dGlkAw--/SIG=11rv9vvr1/EXP=1333257488/**http%3a//www.mass.gov/dep/cleanup/eda.htm)

<sup>14</sup> 2006 Massachusetts Code - Chapter 23A — Section 3D. Economic Target Areas.

<sup>15</sup> These retained jobs were not counted in the permanent job impact numbers.



**CONSTRUCTION/VERTICAL DEVELOPMENT** — The BTC projects in this study led to almost 14,000 direct temporary/construction jobs and 25,500 construction-related direct and indirect jobs. (Note that if one assumed that the BTC projects in this study are representative of all BTC projects, these construction impacts would almost double.)

The construction activity due to vertical development of tax credit projects also generates very substantial tax revenue. The data in Table 5 indicates that state and local governments have recouped \$46 million/direct and \$154 million/direct and indirect state and local taxes due to construction-related activity. For more detail on tax impacts, see the “Tax Generation” section, Chapter V.

**Table 5 — Temporary Impacts of Remediation and Construction**

Project Status	Capital Investment		Temporary construction jobs		State and local tax revenues	
	Direct	Direct and indirect*	Direct*	Direct and indirect*	Direct*	Direct and indirect*
Remediation only	\$ 115,262,032	\$ 211,599,521	512	1,124	\$ 5,455,319	\$ 11,025,877
vertical development:						
> Completed and UC projects	\$ 1,989,804,710	\$ 3,918,802,509	13,952	25,517	\$ 46,446,707	\$ 153,990,053
> Planned projects	\$ 490,690,000	\$ 966,384,889	1,830	3,348	\$ 6,093,671	\$ 20,203,039
<b>Vertical development total</b>	<b>\$ 2,480,494,710</b>	<b>\$ 4,885,187,398</b>	<b>15,782</b>	<b>28,865</b>	<b>\$ 52,540,378</b>	<b>\$ 174,193,092</b>
* IMPLAN						

## ONGOING IMPACTS OF BUSINESSES LOCATING AT BTC PROJECTS

As previously noted, only half of the BTC projects are commercial/job generating projects (including several residential/mixed-use projects). However, as indicated in Table 6, those commercial projects generate substantial economic activity:

- 7,000 direct and 13,300 total (direct and indirect) jobs;
- \$100 million in annual direct state and local tax revenues and \$156 million total (direct and indirect) revenues, annually.
- Total output of \$1 billion direct spending and \$1.9 billion total (direct and indirect) spending.

(Again, note that if one assumed that the BTC projects in this study are representative of all BTC projects, these job and investment impacts would almost double.)

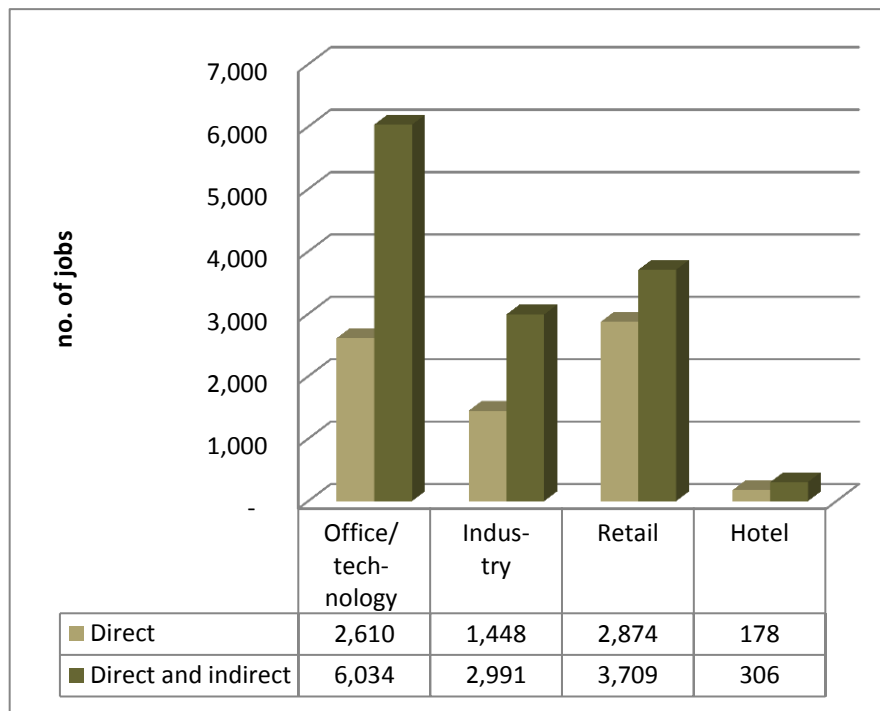


**Perkins, a supplier for restaurants and hotels, located on one of the remediated properties in Taunton's Myles Standish Industrial Park. (see the case study, chapter VII)**

**Table 6 – BTC Commercial Projects by Sector with Job, Spending, and Tax Revenue Impacts (On-going Impacts of Business Occupants)**

Sector	Jobs		Spending output		State and local tax revenues	
	Direct	Direct and indirect*	Direct*	Direct and indirect*	Direct*	Direct and indirect*
Office/research/technology	2,466	6,034	\$ 522,841,312	\$ 1,022,483,732	\$ 22,189,246	\$ 52,440,414
Industry	1,427	2,991	\$ 291,799,584	\$ 526,098,060	\$ 47,551,265	\$ 62,225,319
Hotel	175	306	\$ 22,731,520	\$ 42,611,825.7	\$ 2,072,093	\$ 3,230,689
Total non-retail	4,068	9,331	\$ 837,372,416	\$ 1,591,193,617	\$ 71,812,604	\$ 117,896,422
Retail	2,936	3,985	\$ 171,601,600	\$ 315,153,014	\$ 28,625,845	\$ 37,647,491
<b>Total Impacts</b>	<b>7,004</b>	<b>13,316</b>	<b>\$ 1,008,974,016</b>	<b>\$ 1,906,346,632</b>	<b>\$ 100,438,449</b>	<b>\$ 155,543,913</b>
*Source: IMPLAN						

**Figure 2 — Permanent Jobs Generated in BTC Projects, by Sector (On-going Impacts of Business Occupants)**



Among the employment-producing BTC projects, the retail sector led the other sectors in direct jobs (at 2,900), but the higher multiplier associated with the office/research/technology sector produces a much larger total job number (at 6,000 direct and indirect jobs).

Source: Implan and Redevelopment Economics

## LEVERAGING INVESTMENT

A previous section (“Profile of Tax Credit Projects”) found that \$1 in BTC funding was leveraging \$46 in total capital funding. That calculation represents the median BTC project and counts only completed projects. State budget analysts may have a different point of view – they may want to see the



leverage ratio adjusted to account for all approved tax credits, regardless of whether the project is complete. Even counting the additional tax credits for projects that are either planned or for which a redevelopment plan could not be determined, the leverage ratio drops to \$37.04.

The parallel leveraging ratio for the EPA Brownfields Program is \$18.29/other funds to \$1.00 EPA funds.<sup>16</sup>

There are a number of additional ways to look at leveraging investment. When other public funding sources are taken into account, the data analysis gets more complex (and tedious); therefore the full discussion was moved to Appendix F, but is briefly summarized here.

There are 14 BTC projects where analysts were able to obtain complete project financing information. These 14 projects represent \$753 million in total capital investment, or about 38 percent of the full inventory of completed BTC projects. Note that:

- Of the fourteen projects, six involve no other public funding sources, aside from the BTC.
- 92.3 percent of all funding is private (including philanthropic);
- Public redevelopment funding from all sources represents 5.4 percent of total capital investment, for a leverage ratio of \$18.60/total capital investment to \$1.00 of public redevelopment funding.

## TYPICAL COMMERCIAL PROJECT

Of the 19 projects that were classified as primarily commercial, the median project involves a tax credit of \$350,000, helping generate 94 jobs and \$9.6 million capital investment on 6.0 acres of land redeveloped. (See Table 7)

Remediation constitutes 7.0 percent of capital expenditures, a significant hurdle from the development financing point of view (and a reason for the Commonwealth to continue assisting brownfields cleanups).

### ***Watertown Biotech***



*The former Boston Edison property was remediated and redeveloped as the Watertown Business Park. The Watertown Strategic Framework for Economic Development cites a growing cluster of life sciences and pharmaceutical companies locating here and at an adjacent parcel: Enanta, Envivo Pharmaceutical, Vitruvean, Tetrphase Pharmaceuticals, and Dicerna Pharmaceuticals. The 24 acre Watertown Business Park produces \$633,000 in local property tax revenue, annually.*

<sup>16</sup> This favorable comparison is impressive but not entirely surprising, because the projects that make use of BTC are almost always committed redevelopment projects; whereas, the EPA funds are often the first funds in on sites where redevelopment plans are at an early stage.

The median project leverage ratio is \$27.40/total capital investment to \$1/BTC, lower than the leverage ratio for all BTC projects, but still comparing favorably to benchmarks.

**Table 7 — Commercial Projects, Mean and Median Characteristics (19 projects)**

Measure	Mean project	Median Project
Remediation	\$ 1,605,412	\$ 1,014,462
Tax credit	\$ 539,797	\$ 350,731
Capital investment	\$ 24,581,722	\$ 9,600,000
Building sq ft	153,793	65,000
Acres	10.7	6.0
FAR	0.33	0.25
Jobs	268.1	93.5
Tax credit investment to produce one job	\$ 2,013	\$ 3,751
Remediation as a percentage of capital investment	7%	11%
Leverage ratio - total investment leveraged by \$1 BTC	45.5	27.4

The tax credit to jobs ratio (\$3,751 tax credit to one job) far exceeds national data cited in Appendix A, indicating \$10,000 - \$13,000 in brownfields public investments to create one job; however, the national data counts redevelopment dollars from all sources.

## LOCAL ECONOMIC IMPACTS

Table 8 represents the direct economic impact data for Massachusetts localities. Counting only completed and under construction projects, BTC projects have taken place in twenty-eight localities, all across the Commonwealth. The top seven localities for direct permanent jobs generated, each gaining more than 400 positions, are:

- Boston – 1741
- Taunton – 1034
- Watertown – 668
- Hingham – 980
- New Bedford – 500
- Haverhill – 480
- Worcester – 440

**Table 8 — Direct Economic Impacts to Massachusetts Localities, Completed BTC Projects**

City	No. Proj's	Remediation	BTC Amt.	Direct Capital Investment	Number of DU	Industrial Space (Sq Ft)	Office-Tech Space (Sq Ft)	Retail Space (sq ft)	Hotel rms	Direct Perman't Jobs
Athol	1	\$ 140,251	\$ 70,126	\$ 13,000,000	50	-	-	-	-	-
Boston	11	\$ 31,110,286	\$ 12,756,540	\$ 587,556,680	1,291	-	308,000	139,456	175	1,741
Brockton*	1	\$ 194,738	\$ 97,369	\$ 1,100,000	-	10,000	10,000	-	-	50
Burlington	1	\$ 737,571	\$ 368,786	\$ 132,200,000	425	-	-	-	-	-
Cambridge	1	\$ 10,316,759	\$ 5,151,015	\$ 256,419,000	482	-	-	9,000	-	36
Chelmsford*	1	\$ 1,120,234	\$ 372,697	\$ 1,500,000	-	17,000	12,000	5,000	-	94
Dedham*	1	\$ 832,094	\$ 400,769	\$ 8,400,000	24	-	-	-	-	-
Haverhill	1	\$ 693,539	\$ 346,770	\$ 15,000,000	-	-	-	120,000	-	480
Hingham	1	\$ 6,170,670	\$ 2,118,896	\$ 152,400,000	385	-	-	245,000	-	980
Hudson*	1	\$ 556,024	\$ 278,012	\$ 3,150,000	9	-	-	-	-	-
Lynn	1	\$ 1,771,872	\$ 885,936	\$ 18,800,000	-	-	55,000	-	-	50
Malden	1	\$ 420,965	\$ 210,483	\$ 40,600,000	116	-	-	-	-	-
Medford	4	\$ 9,936,443	\$ 2,015,350	\$ 197,900,000	556	-	-	117,000	-	318
Milford*	1	\$ 172,095	\$ 86,048	\$ 172,095	-	-	-	700	-	3
New Bedford	1	\$ 4,667,964	\$ 1,166,991	\$ 11,640,000	-	-	-	97,000	-	500
Newburyport*	1	\$ 178,349	\$ 89,175	\$ 2,800,000	8	-	-	-	-	-
Northbridge	1	\$ 574,809	\$ 143,702	\$ 9,600,000	3	-	32,000	1,300	-	56
Norwood	1	\$ 1,448,625	\$ 362,156	\$ 18,700,000	106	-	-	-	-	-
Quincy	2	\$ 31,792,316	\$ 8,096,321	\$ 176,000,000	520	-	-	85,000	-	150
Rockport	1	\$ 238,289	\$ 119,145	\$ 12,000,000	-	-	-	4,000	-	16
Somerville	2	\$ 648,736	\$ 324,368	\$ 38,900,000	198	-	-	-	-	99
Southbridge	1	\$ 619,796	\$ 309,898	\$ 93,000,000	-	-	-	-	203	70
Springfield	1	\$ 346,427	\$ 173,214	\$ 3,000,000	-	65,000	-	-	-	65
Stoughton*	1	\$ 287,906	\$ 71,977	\$ 310,030	-	10,000	-	10,000	-	60
Taunton	2	\$ 1,882,037	\$ 841,018	\$ 55,080,000	64	840,000	18,000	-	-	1,034
Watertown	1	\$ 2,033,426	\$ 508,356	\$ 60,160,000	-	96,000	343,000	-	-	668
Woburn*	1	\$ 1,687,396	\$ 828,086	\$ 2,000,000	-	100,000	-	-	-	200
Worcester	1	\$ 1,014,462	\$ 350,731	\$ 80,000,000	-	-	212,000	-	-	440
<b>Totals</b>	<b>44</b>	<b>\$ 111,594,080</b>	<b>\$ 38,543,935</b>	<b>\$ 1,991,387,805</b>	<b>4,237</b>	<b>1,138,000</b>	<b>990,000</b>	<b>833,456</b>	<b>378</b>	<b>7,110</b>
* construction impacts of smaller projects calculated by using average ratios for all projects.										

Taunton, led by the Myles Standish Industrial Park (see the case study, Chapter VII), is far and away the leader in producing industrial space with 840,000 sq ft added in BTC-assisted projects.

Eight localities feature office and technology space in BTC projects, with the three leaders:

- Watertown — 343,000 sq. ft.
- Boston — 308,000 sq. ft.
- Worcester — 212,000 sq. ft.

## INDUSTRIES OF THE FUTURE

The Gateway Park in Worcester, featured as a case study in Chapter VII, is the leading statewide example of creating a new technology business park on redeveloped brownfield sites. Gateway will “advance education and research in the life sciences at Worcester Polytechnic Institute”. As the focal point for the university’s interdisciplinary research programs in biology, biochemistry, bioengineering, biotechnology, and related science and engineering disciplines, the center “is accelerating advances and innovations that will help transform health care and medicine.” The Gateway master plan calls for five life sciences buildings, totaling 550,000 square feet of flexible, adaptable lab space and commercial activities with a 660-space parking garage. Total investment will represent \$175 million in public and private funds. Current investment stands at \$80 million. A \$350,000 BTC credit helped Worcester’s planners overcome a \$1 million cleanup that paved the way for \$80 million in new investment.



**WPI Life Sciences and Bioengineering Center, the centerpiece of Gateway Park in Worcester**

The aforementioned Watertown Business Park is another BTC project that has successfully attracted life sciences and bio-tech businesses.

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**Summary:** Completed BTC projects represent \$1.99 billion in direct new investment in economically distressed communities, with a favorable leverage ratio of \$1.00/BTC to \$46/total investment. Construction of BTC projects has generated 14,000 direct jobs and almost 26,000 total (direct and indirect) jobs. BTC projects led to 7,110 direct permanent jobs (15,900 counting indirect jobs), the majority of which (4,200) were in higher paying non-retail sectors. The median commercial project involved a leverage ratio of \$3,751/BTC outlays to produce one permanent job, which compares very favorably to economic development benchmarks.

Two BTC projects (Gateway Park/Worcester, and Watertown Business Park/Watertown) have successfully targeted cutting edge life sciences research and bio-technology businesses, helping advance the Commonwealth’s position in advanced technologies, while employing an estimated 1,000 persons.

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## V. TAX GENERATION BENEFITS

### STATE TAX GENERATION

The principal question is whether the State is getting a good return on its BTC investment. The BTC projects that are represented in this study account for \$53.8 million in tax credits. Of that amount \$38.8 million was used on projects that are now complete or under construction.

Analysts used IMPLAN to estimate state and local tax generation impacts. Although IMPLAN merges state and local tax proceeds, Redevelopment Economics broke out state from local by analyzing the Massachusetts state and local tax structure.

**TEMPORARY CONSTRUCTION IMPACTS** — The analysis shows that the completed and under construction projects are estimated to generate \$33.6 million in direct state taxes (and \$86.9 million in direct and indirect state taxes), just in the construction period. Thus, counting only direct state revenues, the Commonwealth has recovered 64 percent of its BTC investment just in the construction period.

**Table 9 — Temporary State Tax Revenues Due to Construction of BTC Projects, Existing and Planned**

Status	Capital Investment, Direct	State Tax Revenues	
		Direct	Direct + Indirect
<b>Completed and UC projects</b>	\$ 1,991,299,710	\$ 33,571,649	\$ 86,906,491
<b>planned projects</b>	\$ 490,690,000	\$ 8,272,624	\$ 21,415,231
<b>Total</b>	\$ 2,481,989,710	\$ 41,844,273	\$ 108,321,723
source: IMPLAN and Redevelopment Economics			

**ONGOING OPERATION OF BUSINESSES** – The businesses that occupy BTC projects generate ongoing tax benefits to the state in sales, income, corporate, and other taxes. As indicated in Table 10, BTC completed projects generate \$47.8 million, annually in direct state tax revenues (and \$88.3 million in direct and indirect). Because retail is viewed as a dependent, non-generating sector, one could subtract that portion out, and the industrial-office-tech sectors would still generate \$35.6 million in direct state revenues annually (\$71.4 million in total, direct and indirect, revenues).

**Table 10 — State Tax Receipts due to Ongoing Operations of BTC Project Business Occupants**

Sector	Space (sq ft) Built or Renovated	State tax revenues	
		Direct	Direct + Indirect
Industrial	1,138,000	\$ 20,496,272	\$ 28,186,503
office-tech	990,000	\$ 15,113,023	\$ 43,209,685
Hotel	189,000	\$ 931,562	\$ 1,549,824
<b>Total, Non-retail</b>	<b>2,317,000</b>	<b>\$ 35,609,294</b>	<b>\$ 71,396,188</b>
Retail	833,456	\$ 12,204,028	\$ 16,917,742
<b>Total all sectors</b>	<b>3,150,456</b>	<b>\$ 47,813,322</b>	<b>\$ 88,313,930</b>

**Figure 3 – Annual State Tax Revenues Generated by Business Occupants of BTC Projects, by Use**

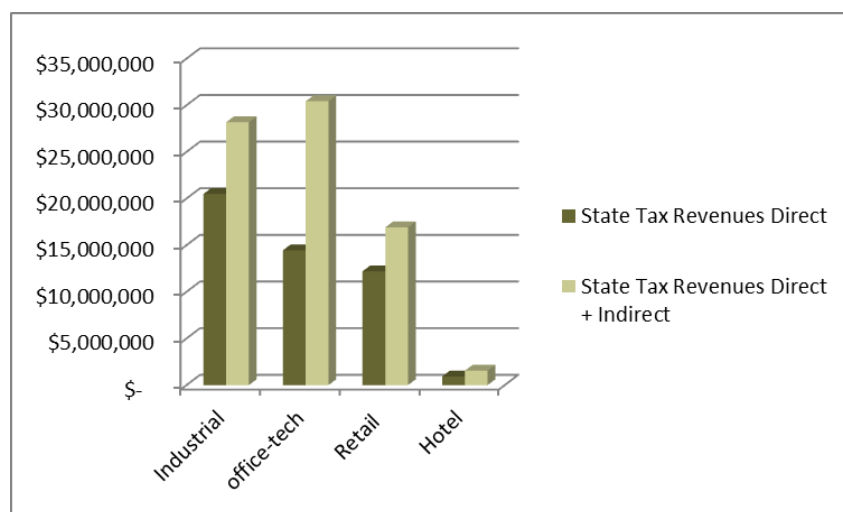


Figure 3 portrays the on-going impact on state revenues generated by the four commercial sector categories for BTC re-use. Of note, the industrial sector, which ranked below the other sectors in job creation (see Table 6 and Figure 3), is the leading generator of direct state tax revenues.

The retail sector is a relatively low tax generator, especially in that the indirect/multiplier impacts add little over and above the direct impacts.

Combining revenues from the construction period and the operational period, the State is recouping \$68.5 million by the end of the first full year of occupancy, outweighing its entire multi-year BTC outlay (\$53.8 million). This estimate conservatively counts only direct state tax revenues and removes the on-going taxes generated by the retail projects. Projecting state tax revenues over a 10-year period (and using the same conservative assumptions), Redevelopment Economics estimates that the Commonwealth is getting a return on investment of \$7.74 for each \$1 of BTC outlay.

## LOCAL TAX GENERATION

The greatest benefit to local government is by taking fiscally unproductive land and returning it to the property tax rolls. Local governments also benefit from both the construction and on-going business operations. Local revenues are primarily from property taxes and personal property taxes. By using IMPLAN modeling analysts were also able to generate local tax revenue impacts that respond to the indirect impacts of supplier networks and employee spending.

**METHODOLOGY** — See Table 11 for a city-by-city summary of the local fiscal impacts of BTC projects. Local annual tax revenues was calculated as follows: 1) for commercial (job-producing) property: IMPLAN generated direct and indirect tax revenue w/ state and local totaled – the analyst assigned IMPLAN estimates to state or local through examining the Massachusetts Tax Code; 2) for residential property the analyst used the estimated direct real property taxes (with no additional indirect impacts); 3) for mixed use the IMPLAN estimates and a portion of the real property taxes (reflecting the residential sq ft as a percentage of total sq ft) were added together. Real property taxes were based partly on direct on-line data and partly on estimates derived by conservatively assuming that the assessment would be 75 percent of capital investment. An on-line calculator was used to generate tax revenue data after the increase in the assessable base was known.<sup>17</sup>

<sup>17</sup> On line property tax calculator: - <http://www.tax-rates.org/propertytax.php?state=massachusetts>

Another conservative assumption was that non-profit projects are counted for their construction impacts, but, if the resulting building is owned by a non-profit, they are not counted for any on-going fiscal benefit to local government. Non-profit advocates would be quick to point out the many indirect fiscal impacts of their spending, but analysts were unable to make that distinction within the limited scope of the study.

**Table 11 — Local Tax Revenues due to Construction and Recurring Property and Business Taxes (for Completed BTC Projects)**

			Local Tax Revenues due to Temporary Impact - Const'n**		Local Tax Revenue, Annual		
City	No. Proj's	BTC Amt.	Direct	Direct and indirect	Direct Local property taxes***	All Revenues, Direct	All Revenues, Direct and indirect
Athol	1	\$ 70,126	\$ 20,120	\$ 48,418	\$ 100,425	\$ 100,425	\$ 100,425
Boston	11	\$ 12,756,540	\$ 1,546,362	\$ 9,151,479	\$ 4,037,064	\$ 9,755,780	\$ 15,924,394
Brockton*	1	\$ 97,369	\$ 4,116	\$ 24,248	\$ 7,920	\$ 32,255	\$ 138,716
Burlington	1	\$ 368,786	\$ 453,995	\$ 3,080,184	\$ 961,755	\$ 961,755	\$ 961,755
Cambridge	1	\$ 5,151,015	\$ 880,580	\$ 5,974,415	\$ 1,865,448	\$ 1,865,448	\$ 1,865,448
Chelmsford*	1	\$ 372,697	\$ 5,613	\$ 33,065	\$ 36	\$ 427,528	\$ 457,187
Dedham*	1	\$ 400,769	\$ 31,435	\$ 185,164	\$ 59,850	\$ 59,850	\$ 59,850
Haverhill	1	\$ 346,770	\$ 89,201	\$ 368,402	\$ 105,750	\$ 2,651,472	\$ 3,227,607
Hingham	1	\$ 1,308,940	\$ 538,705	\$ 4,206,983	\$ 1,097,280	\$ 6,055,565	\$ 7,265,519
Hudson*	1	\$ 278,012	\$ 11,788	\$ 69,437	\$ 22,916	\$ 22,916	\$ 22,916
Lynn	1	\$ 885,936	\$ 97,830	\$ 443,989	non-profit		
Malden	1	\$ 210,483	\$ 139,426	\$ 945,956	\$ 295,365	\$ 295,365	\$ 295,365
Medford	4	\$ 2,015,350	\$ 679,618	\$ 4,610,955	\$ 1,480,331	\$ 2,295,831	\$ 2,638,276
Milford*	1	\$ 86,048	\$ 644	\$ 3,794	\$ 649		
New Bedford	1	\$ 1,166,991	\$ 307,409	\$ 307,409	\$ 73,332	\$ 2,671,274	\$ 3,299,101
Newburyport*	1	\$ 89,175	\$ 10,478	\$ 61,721	\$ 19,740		
Northbridge	1	\$ 143,702	\$ 54,251	\$ 286,792	non-profit		
Norwood	1	\$ 362,156	\$ 65,144	\$ 498,220	\$ 133,238	\$ 133,238	\$ 133,238
Quincy	2	\$ 8,096,321	\$ 613,109	\$ 4,689,131	\$ 1,254,000	\$ 1,813,411	\$ 1,994,873
Rockport	1	\$ 119,145	\$ 71,361	\$ 294,721	\$ 84,600	\$ 84,600	\$ 84,600
Somerville	2	\$ 324,368	\$ 133,588	\$ 906,348	non-profit		
Southbridge	1	\$ 1,403,602	\$ 554,722	\$ 2,273,369	\$ 718,425	\$ 487,503	\$ 639,927
Springfield	1	\$ 173,214	\$ 17,019	\$ 82,896	\$ 29,700	\$ 1,209,940	\$ 1,443,266
Stoughton*	1	\$ 71,977	\$ 1,160	\$ 6,834	\$ 6,834	\$ 36,823	\$ 179,762
Taunton	2	\$ 841,018	\$ 323,275	\$ 1,454,649	\$ 291,060	\$ 714,398	\$ 3,523,606
Watertown	1	\$ 508,356	\$ 334,236	\$ 1,423,740	\$ 437,664	\$ 1,058,483	\$ 3,459,064
Woburn*	1	\$ 828,086	\$ 7,484	\$ 44,087	\$ 14,550	\$ 137,923	\$ 557,846
Worcester	1	\$ 350,731	\$ 477,180	\$ 2,464,026	\$ 618,000	\$ 388,674	\$ 2,464,026
<b>Totals</b>	<b>44</b>	<b>\$ 38,827,683</b>	<b>\$ 7,469,847</b>	<b>\$ 43,940,427</b>	<b>\$ 13,715,932</b>	<b>\$ 33,260,455</b>	<b>\$ 50,736,767</b>
* construction impacts of smaller projects calculated by using average ratios for all projects.							
** Direct and indirect tax revenues attributable to construction - IMPLAN.							
*** Real property taxes which were based partly on direct on-line data and partly through estimates derived by assuming that the assessment would be 75% of capital investment.							

**RESULTS** – As Table 11 indicates, BTC projects, starting with the construction phase, generated \$7.5 million in direct local government revenues and \$43.9 million in total (direct and indirect) revenues.



The on-going impacts, including property tax increases, as well as the primary and secondary impacts of the spending of the business occupants of BTC projects, amounts to \$32.9 million/direct and \$50.4 million/direct and indirect revenues to local government.

The localities that are receiving the largest infusions (direct and indirect) are:

- Boston - \$15.7 million;
- Hingham - \$7.2 million;
- Watertown - \$3.5 million;
- Taunton - \$3.5 million;
- New Bedford - \$3.3 million
- Haverhill - \$3.2 million.

BTC projects have added a total of \$1.46 billion to the assessable base of Commonwealth localities.

## INFRASTRUCTURE SAVINGS

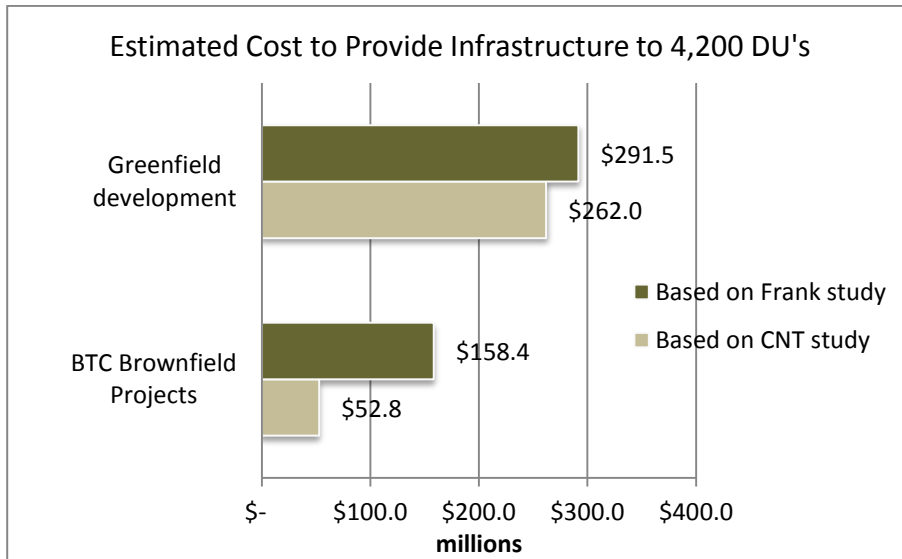
Appendix G provides a literature review and analysis of infrastructure savings attributable to brownfield projects in comparison to alternative greenfield projects. The appendix cites two studies which provide data that can be applied to the BTC projects. One study by the Center for Neighborhood Technology (CNT) pegs the greenfields-grayfields differential at five to one or \$49,000 (in 2012 dollars) per DU. The other study by James Frank estimates a more modest 45 to 50 percent savings for 15-DU per acre infill relative to 3-5 DU per acre greenfields, which translates into a \$31,500 (2012 dollars) per DU savings connected to brownfields.

For the BTC projects, analysts counted eleven on-line survey respondents and the seven case study interviews that answered questions about infrastructure investment. Of these 18 projects only three projects listed any infrastructure funding that was required. This limited sample supports the higher 80-20 differential in the CNT study; however, the following estimates conservatively apply BTC project numbers to both models. Figure 5 depicts the two scenarios, applied to the 4,212 DUs that are existing or under construction in BTC projects.

The result is that residential BTC projects can be credited with saving infrastructure investments of between \$132 and \$208 million. Conservatively assuming that state and local governments pay just one-half of the infrastructure costs, the state and local government cost savings attributable to BTC projects is between \$66 and \$104 million. The total cost of the BTC credit to Commonwealth taxpayers for the projects surveyed was \$53.8 million. This analysis indicates BTC investments may be largely recouped just in foregone infrastructure investments.



**Figure 4 - Cost to Provide Infrastructure to 4,200 DU's, BTC projects vs. Greenfields**



**Summary:** Under the conservative scenario of counting only direct non-retail impacts, the Commonwealth is more than recouping its BTC investment (\$53.8 million) in the first full year of occupancy by gaining \$33.6 million in construction-related taxes and \$35.6 million in revenues derived from non-retail business operations. Over a ten year period, the state is recouping \$7.74 for every \$1 invested in the BTC.

BTC projects have generated \$1.46 billion in increased assessable base for Commonwealth localities, counting only direct impacts. Taxes generated on an annual basis are estimated to be \$34.6 million/direct and \$55.1 million/direct and indirect revenues to local government.

If BTC projects had proven infeasible, State and local governments may have had to spend between \$66 and \$104 million on infrastructure investments to accommodate growth at greenfield sites.

## VI. ENVIRONMENTAL IMPACTS, SMART GROWTH, AND ENERGY-EFFICIENT LOCATIONS

### CLEANUP AND PROTECTION OF PUBLIC HEALTH

All BTC projects have been remediated to the Commonwealth's cleanup standards and the BTC credit can be ranked as a success based on that finding alone. In structuring the tax credit, the Commonwealth gave preference to sites that cleaned up to an unrestricted use, i.e., achieved a high cleanup standard suitable for residential development. The credit is either 25 percent for a restricted use cleanup, or 50 percent for unrestricted use.

Of the 44 completed projects, 31 qualified for the 50 percent credit; 12 qualified for the 25 percent credit, and 1 site was split, with part 25 and part 50 percent. These results, strongly favoring unrestricted cleanups, are in contrast to the experience of many states where use-restricted cleanups are the norm. The benefit, in addition to the obvious environmental gain, is that there is less need for ongoing state involvement in monitoring compliance with the institutional and engineering controls that are required with use-restricted cleanups.



**"Before" picture for the Gateway Park project in Worcester**

Analysts were able to locate records related to the volume of contaminated soil removed for 11 projects. These 11 projects totaled 711,000 cubic yards of soil removed with a mean of 65,000 cubic yards and a median of 10,000 cubic yards per site. Assuming those 11 projects are representative (and using the median as the better indicator), the 44 completed BTC projects can be estimated to have removed 440,000 cubic yards of contaminated soil.

### REDUCING VMTs AND GHGs

As cited the Appendix A "Previous Research..." section, EPA studies have reported that, nationally, brownfields save 32 to 57 percent Vehicle Miles Traveled (VMT) relative to comparable greenfields sites.<sup>18</sup> There are parallel greenhouse gas and other air emission benefits.

Generally the research in this area ranks the following variables as determining the extent to which individual projects can claim similar VMT and GHG reduction (in rank order):<sup>19</sup>

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<sup>18</sup> US EPA, "Air and Water Quality..." op cit.

<sup>19</sup> Urban Land Institute, Smart Growth America, the Center for Clean Air Policy, and the National Center for Smart Growth, "Growing Cooler: Evidence on Urban Development and Climate Change," Washington, D.C. January 2008 <http://www.smartgrowthamerica.org/gcindex.html>

- Density
- Location near the city center or other employment centers
- Mixing of uses (within the project or within the neighborhood)
- Street connectivity and connection to the existing grid
- Access to transit

While a full modeling of the Massachusetts brownfield projects was beyond the scope of this study, the analysts did examine the issue and make an “order of magnitude” estimate. For the BTC projects, there are three indicators:

- Density – As cited above, the residential BTC projects had an average density of 15.6 units per acre, about four times suburban densities of 3-5 units per acre. As indicated by mean floor area ratio, BTC residential projects exhibit higher density (0.48) than BTC commercial projects (0.33).<sup>20</sup>
- Walkscore – Walkscore is a measure of neighborhood walkability which accounts for the proximity of retail services, amenities, and public transportation services and is a good proxy for two factors listed above: mixing uses and access to transit. Rankings are from 1-100, with five gradations from “car-dependent” (0-50) to “Walkers paradise” (90-100). Redevelopment Economics ran Walkscore for all completed BTC projects and then ran a weighted average (against project investment). BTC residential and commercial projects ranked at 75.5 and 70.5, respectively. Walkscore interprets scores between 70 and 90 as “very walkable – most errands can be accomplished on foot.”
- TOD – At least four of the larger residential/mixed-use BTC projects (838 units) were built with mass transit access in mind and clearly qualify as transit-oriented development. One of these, the Clarendon in Boston’s Back Bay area, is written up as a case study in Chapter VII.



**The Clarendon, Boston Back Bay TOD – 3 transit stations within 3 blocks and a walkscore of 94. See the case study chapter VII.**

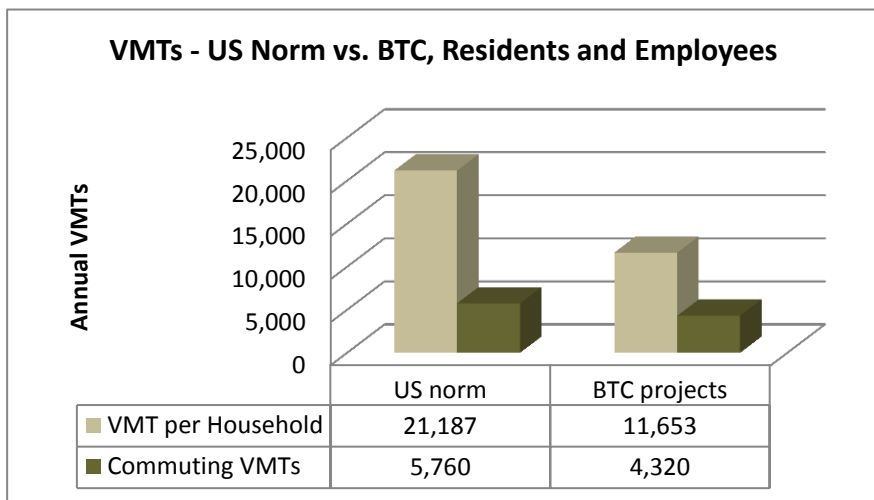
A conservative application of this data would place the residential BTC projects in the middle of the EPA VMT reduction range, at 45 percent lower than sprawl, and BTC commercial projects a little lower than the EPA range, at 25 percent lower than sprawl.

Redevelopment Economics made “order of magnitude” estimates for VMT reduction by applying the above percentage reductions to national data – average VMT per household and average VMT per commute trip. Then, using EPA conversion factors, VMT reduction was translated into CO2 reduction.

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<sup>20</sup> A number of BTC projects included land preservation or open space elements, which had the effect of reducing average FAR’s.

This resulted in the following estimates:



- BTC projects can be credited with reducing VMTs by almost 51 million annually relative to alternative development (assumed to be represented by the US norm);
- This reduction translates into a CO<sub>2</sub> reduction of 22,000 metric tons.
- This CO<sub>2</sub> reduction is the equivalent of taking 4,300 cars off the road.



**GREENING** - Aside from GHG reduction due to smart growth locations, many of the BTC projects advanced energy efficiency through green design and efficient energy production. Of the 15 projects where analysts had access to more detailed project information, seven had particular greening elements.

**Astro Logistics Springfield chemical distribution center features a solar array that provides 40 percent of Astro's energy needs.**

## SAVING LAND

As cited above in the "Previous Research..." (Appendix A), EPA-supported research determined that, on average 1 acre of brownfields redeveloped corresponds to 4.5 acres of greenfields development, i.e. that alternative greenfields development would likely occupy 4 ½ times the acreage of the typical brownfield site. The Massachusetts BTC projects are mostly urban in density, with residential BTC projects averaging 15.6 units per acre. On the commercial side BTC office-technology projects tend to be dense, but industrial and retail are more land intensive. Therefore analysts counted residential and office BTC projects at the 4.5:1 ratio, but the retail and industrial projects were assumed to be 1:1. This results in a calculation of 478 acres redeveloped, "saving" 1,381 acres of farmland and greenfields.

## WATER QUALITY

Also citing previous EPA research, brownfields and similarly dense redevelopment projects have been found to reduce stormwater run-off by 47 to 62 percent relative to sprawl development patterns.<sup>21</sup> Given the density findings cited above the Massachusetts BTC projects should be assumed to reduce run-off by approximately 50 percent.

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**Summary:** *BTC projects embody all of the characteristics that tie brownfields to smart growth and sustainable development. Analysts conclude that BTC projects, in comparison to alternative sprawl, have demonstrated: 1) reducing VMTs by almost 51 million annually; 2) reducing CO2 by 22,000 metric tons (the equivalent of taking 4,300 cars off the road); preservation of 1,381 acres of farmland and greenfields; and lowering stormwater run-off by 50 percent. Further 70 percent of BTC projects are being cleaned up to an unrestricted use standard, which will reap both environmental and fiscal rewards.*

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<sup>21</sup> US EPA, *ibid*

## VII. CASE STUDIES

### THE CLARENDON, BOSTON BACK BAY – TOD AND MIXED USE RESIDENTIAL

**PROJECT SUMMARY** – The Clarendon is a 33 story mixed-use building located at the corner of Clarendon and Stuart Streets, in Boston's Back Bay neighborhood, containing 282 residential apartment units of which 104 are condominiums and 178 are rental units, including 36 affordable units. Two floors (63,000 sq ft) of commercial uses include a US Postal Service office, restaurant, and other retail uses. With three transit stations within three blocks, the site easily qualifies as transit-oriented development.



#### **LOCATION AND ACREAGE:**

- 390 Stuart Street and 400 Stuart Street, Boston
- 45,382 sq ft of land area.
- Building – 415,000 sq ft

**PUBLIC FUNDING SOURCES IN ADDITION TO THE BROWNFIELDS TAX CREDIT** – Favorable debt financing from Massachusetts Development Finance Agency (MDFA) whereby MDFA issued \$40,000,000 of its tax exempt 2006 Series A Bonds and \$40,000,000 of its taxable 2006 Series B Bonds and agreed to loan the proceeds to the project. The bonds were linked to an affordable housing requirement.

**REMEDIATION AND BLIGHT ELIMINATION** – The property had been used for a variety of commercial uses, including a cleaner, and historical records show at least four underground storage tanks. There was also substantial mixed fill material that needed to be removed. The cleanup involved the management and off-site disposal of about 67,000 cubic yards of urban fill materials and soils. Remediation addressed elevated levels of heavy metals, petroleum, and chromium.

#### **The Clarendon By the Numbers:**

- \$6,427,184 – tax credit for remediation
- \$13,468,500 – total remediation.
- \$200 million – Total investment.
- 31.1 – leverage ratio of BTC to total capital investment.
- 1,055 – direct construction jobs
- 2,213 – direct and indirect jobs due to construction.
- 120 – direct jobs, on-going operations of businesses at the site.
- \$1.17 million – estimated real property taxes generated, annually.
- 94 – Walkscore
- 56.4 acres of farms and pristine land “saved.”
- 57% – VMT lower than suburban norms.
- 884 – Metric tons CO<sub>2</sub> “saved” due to lower VMTs.
- 1,383 – metric tons CO<sub>2</sub> “saved” due to green building and lower VMTs



Total remediation costs were \$12.9 million resulting in a tax credit of \$6.4 million. The cleanup was to an unrestricted use.

**ECONOMIC BENEFITS** – The project represents \$200 million invested and is retaining/generating 120 permanent jobs at the post office, restaurant, and a gourmet market operated by American Food Management.

**GREENING/SUSTAINABILITY** – The project is LEED Silver certified.

**SAVING LAND** – Assuming that the alternative would be sprawl at five units per acre, the 282 units can be credited with saving 56.4 acres of land.

**SMART GROWTH AND NON-AUTO MEANS OF TRAVEL** – The site is in a mixed-use urban neighborhood with excellent transit service (three stations within three blocks). Further, the site ranks in the highest category for walkability (94 on Walkscore); and the density is on the high end of “urban.” Therefore, the project encourages non-auto means of travel, both walking and transit.

Brownfields projects, on average, produce 32 to 57 percent lower VMTs and CO<sub>2</sub>, relative to suburban sprawl. This project would rank at the high end of that range or 57 percent lower VMTs and CO<sub>2</sub>, resulting in 884 tons of CO<sub>2</sub> saved. Adding in the CO<sub>2</sub> saved due to the green building (LEED silver) results in a total of 1,383 metric tons of CO<sub>2</sub> saved.

**WEBSITE:**

- General: <http://bealco.com/properties/residential/the-clarendon.htm>; and
- For condominium sales: [www.theclarendon.com](http://www.theclarendon.com)
- For apartment rentals: [www.onebackbay.com](http://www.onebackbay.com)

## MYLES STANDISH INDUSTRIAL PARK, TAUNTON – JOB GENERATOR



**Perkins, a restaurant and hotel supply business located on one of the remediated parcels, employs 620 people**

**PROJECT SUMMARY:** Myles Standish Industrial Park is an 809 acre industrial campus with businesses ranging from office users, high tech, and warehousing/distribution centers to manufacturing. There are currently 100 companies, employing 7,000 people in 5.9 million sq ft of space.

A recent expansion, now underway, involves the Taunton Development Corporation in partnership with MassDevelopment acquiring the former Paul A. Dever State School Campus, which closed in 2003. The 220-acre expansion is expected to accommodate an additional 2,400 jobs. Demolition and remediation have been estimated @ \$10 to \$12 million.

The BTC provided cleanup financing for five specific parcels, with two additional parcels redeveloped as a result of improved access that resulted from one of the brownfield projects. The Taunton Development Corporation is the developer.

**REMEDIATION AND BLIGHT ELIMINATION:** The site was used as an army base until 1946, and was then partially occupied by the Paul A. Dever School, a state run institution for

### **Taunton – Myles Standish Industrial Park**

#### **By the Numbers:**

- \$767,679 – tax credit for remediation
- \$1,535,359 - total remediation.
- 77.2 – acres remediated.
- \$46.2 million - Total capital investment
- 60.2 – BTC to total capital investment leveraging ratio.
- 530 – direct and indirect construction jobs.
- 962 – direct permanent jobs.
- 2,017 - direct plus indirect permanent jobs.
- \$354.7 million – total (direct and indirect) gross output of on-going business operations.
- \$798 – BTC expenditures per direct job.
- \$32.1 million – direct state and local taxes generated by on-going business operations.
- 77 – acres of farms and pristine land “saved.”



the mentally handicapped. Most of the properties were vacant for two decades. Remediation (for PCB's, petroleum, and hazardous substances) costs were \$1,535,359 and the tax credit was \$767,679.

**PUBLIC FUNDING SOURCES IN ADDITION TO THE BROWNFIELDS TAX CREDIT:** No other public funds directly assisted the parcels that were the subject of the tax credit; however, other funds that have assisted the business park more generally include:

- Taunton is a Massachusetts "Gateway City," and a recent \$3.1 million MassWorks infrastructure grant is meant to stimulate new investment, an example of the state's efforts to revitalize old mill cities;
- US Economic Development Administration - \$1.5 million;
- Local capital improvement - \$8 million water system upgrade that also benefits the neighborhood.

**ECONOMIC BENEFITS AND NEW BUSINESSES** – Business investment in the parcels that were remediated under the BTC represent \$46 million in new building investment, generating 962 jobs, as follows:

Address	Business	Sq ft	Acreage	Investment (assume \$55/sq ft)	Employees
225 John Hancock Rd	Agar Supply	290,000	24.53	\$15,950,000	450
275 John Hancock Rd	Multi-Tenant: General Dynamics, Shaw, PETCO	226,000	14.24	\$12,430,000	100
630 John Hancock Rd	Perkins, Inc.	450,000	32.8	\$24,750,000	620
101 Prince Henry Drive	Future Fuel	50,000	13	\$2,750,000	2
455 John Hancock	Versa Cold	147,000	14.31	\$8,085,000	207
305 John Hancock Rd	Graybar Electric	193,000	17.09	\$10,615,000	33
<b>TOTAL</b>		<b>840,000</b>	<b>77.2</b>	<b>\$46,200,000</b>	<b>962</b>

**GREENING AND SAVING PRISTINE LAND** – As a previously developed site, Myles Standish Industrial Park can be credited with saving farms and pristine land on at least a one-to-one ratio, or 809 acres “saved.” The tax credit-assisted parcels would account for 77 acres “saved.”

**SMART GROWTH AND NON-AUTO MEANS OF TRAVEL** – The industrial park is served by the local bus system. Industrial parks, in general, do not have the kind of wide variations in density and form that would lead to significant VMT and GHG reduction, and the Taunton industrial park is estimated to be linked to marginal reductions in VMTs and GHGs.

**COMMUNITY DEVELOPMENT SPINOFF BENEFITS**

– Cleaning up and developing contaminated parcels removed any remaining stigma and aided marketing of the industrial park. The cleanup and redevelopment of 101 Prince Henry Drive was linked to an access improvement that also opened up two other parcels: 90 and 110 Prince Henry Drive, which now house Tribe, Inc (82 employees) and Calico Distributors (90 employees). (Note these additional business investments are not counted in the impact numbers, above.)

**FISCAL BENEFITS:**

\$32.1 million in direct state and local taxes generated annually.

**WEBSITE:**

<http://www.tauntondevelopment.org/msip/index1.htm>



**Tribe, a humus food producer, located their 82-employee operation on a site that was only opened up for redevelopment after the remediation of 101 Prince Henry Drive.**

## WHITIN MILL, WHITINSVILLE – COMMUNITY DEVELOPMENT WITH SOCIAL PURPOSE



**PROJECT SUMMARY:** Alternatives Unlimited, the non-profit owner and developer of a model green redevelopment of the former Whitin Mill in Whitinsville, “transforms real estate capital into social capital.” Alternatives’ mission is to help people with developmental and psychiatric disabilities develop a new life purpose. Alternatives on-site facilities and services include: three apartments housing six people, a day center, a jobs program, and administrative space.

This unique project combines services to their client base with a broader community-serving facility that also functions to integrate their clients with the larger community: a 5,000 sq ft plaza on the banks of the Mumford River; a community theatre (Singh Performance Center) that doubles as a conference center; artisans' shops; and the Aldrich Heritage Art Gallery. As one example of the integration of client services with the larger community-serving facilities, nine people with disabilities were in a recent play at the Singh Center.

This project also combines hydro-electric, solar, and geo-thermal energy sources to create a model for sustainability.

### **LOCATION, ACREAGE, AND SQUARE FOOTAGE:**

20-70 Douglas Road, Whitinsville (Northbridge), MA

1.03 Acres

### **Whitin Mill – Alternatives**

#### **By the Numbers:**

- \$174,000 - tax credit for remediation
- \$575,000 - total remediation
- \$9.6 million - total investment.
- \$2.3 million - total state funds
- 1,000 – persons with psychiatric and developmental disabilities served
- 72 - direct permanent jobs created/retained
- 56 - direct construction jobs
- 110 - direct and indirect construction-related jobs
- 55 - Walkscore

37,000 sq ft, total building space, including:

- Residential - 3,500 sq ft (3 units)
- Studio – 3,000 sq ft
- Restaurant – 1,300 sq ft
- Office, services – 29,000 sq ft

***PUBLIC FUNDING SOURCES IN ADDITION TO THE BROWNFIELDS TAX CREDIT:***

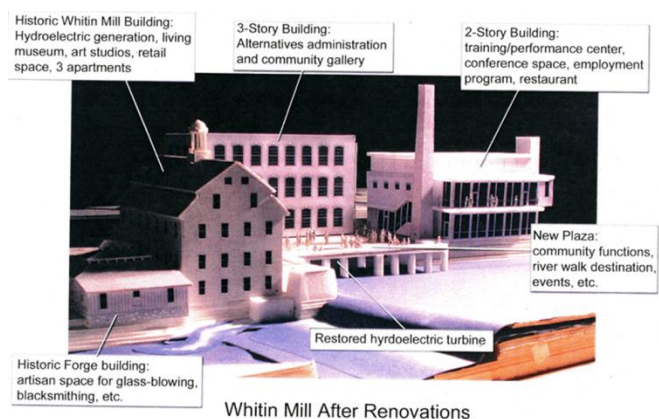
- Massachusetts Historical Commission - \$84,000
- Massachusetts Facilities Consolidation (MA DHCD) - \$1,097,000
- Massachusetts Technology Collaborative/Renewable Energy Trust (for geothermal) - \$344,000
- Total, other state Funds - \$2.1 million

21 foundations and 60 corporate and non-profit entities also supported the project.

***REMEDIATION AND BLIGHT ELIMINATION:*** The property was previously used by the Whitin Spinning Ring Co, which manufactured spinning rings used in the textile industry and closed in the late 1970's. Industrial site operations included turning, paint shop, ring shop, planning, printing, polishing, coal storage, hardening (which used oil), and annealing. Alternatives purchased the property in 1978 and operated a sheltered workshop until it was closed in 1999. Much of the property was vacant from 1999 to 2008 when the current redevelopment plan was launched. The 2008 plan required addressing the cleanup of contaminants, including industrial solvents, arsenic, asbestos, heavy metals, and petroleum. The consultant described one of the contaminants as "oily muck" in the sluiceway that had also contaminated the groundwater. The remediation costs were \$575,000, with \$174,000 credited under the Massachusetts BTC Program.

***SOCIAL BENEFITS:*** Alternatives serves over 1,000 adults with developmental and psychiatric disabilities in 60 residential and day programs throughout Central Massachusetts. The Whitin Mill project provides three apartments housing six people, a day center, a jobs program, and administrative space.

The theatre, conference space, riverfront plaza, and artisan space all serve as a cultural focal point for the larger community, as well as helping to integrate Alternatives' clients with the larger community.



***ECONOMIC BENEFITS AND NEW BUSINESSES*** – The project involves a total investment of \$9.6 million. Seventy-two jobs were created/retained.

**GREENING** — By re-opening the hydro-electric facility that served the mill and by additionally developing solar and geothermal energy sources, the facility's energy needs are 90 percent met through renewable sources with minimal CO<sub>2</sub> impacts. The site qualifies as LEED Gold and has won several sustainability awards, including: Low Impact Hydro Certification; Central Massachusetts Green Award.

**SMART GROWTH AND NON-AUTO MEANS OF TRAVEL** — The redevelopment is close to downtown, has urban density characteristics, and the adjacent neighborhood provides mixed uses that encourage walking.

The project rates as a 55 on Walkscore, meaning that it ranks near the national average for walkability.

Brownfields projects, on average, produce 32 to 57 percent lower VMTs and CO<sub>2</sub>, relative to suburban sprawl. A conservative application to this project would estimate the VMTs and CO<sub>2</sub> reduction based on the lower end of the range (32 percent).

**COMMUNITY DEVELOPMENT SPINOFF BENEFITS** – The project is adjacent to and within an easy walk of downtown, just on the other side of the Mumford River. The project is synergistic with the Whitinsville Downtown Revitalization Project.

Alternatives also serves as a model preservation project, and the project won the 2009 Massachusetts Historical Commission Preservation Award.

**WEBSITE:**

[www.whitinmill.com/](http://www.whitinmill.com/)

<http://www.valleycast.org/>

[http://www.alternativesnet.org/whitin\\_mill.asp](http://www.alternativesnet.org/whitin_mill.asp)



## ROBERTSON ON THE RIVER, TAUNTON – AFFORDABLE HOUSING AND PRESERVATION



**PROJECT SUMMARY:** The Robertson Mill (also known as the Cohannet Mill No. 3) was a textile mill and curtain factory. The mill was rehabilitated, with attention to historical correctness, by the non-profit Weir Corporation (now The Neighborhood Corp) for 64 loft-style affordable residential units and 18,000 square feet of commercial space for businesses on the first floor. The project was a 2006 Massachusetts Historical Preservation award-winner.

### **LOCATION AND ACREAGE:**

120 Ingell Street, Taunton, MA

Total redevelopment area – 6.6 acres

Building renovation – 144,000 sq ft

### **PUBLIC FUNDING SOURCES IN ADDITION TO THE BROWNFIELDS TAX CREDIT:**

Funding:

- EPA \$500,000 grant to the City of Taunton
  - \$52,000 sub-grant to Weir Corporation
- City of Taunton -
  - \$148,000 grant to Weir Corporation

### **Robertson on the River**

#### **By the Numbers:**

- \$73,000 - tax credit for remediation
- \$346,000 - total remediation
- \$8.8 million - total investment in distressed neighborhood
- 64 – affordable rental units created
- 18,000 sq ft commercial space
- 97 - Direct and indirect construction-related jobs
- 45 - Walkscore
- 16.5 - acres of farms and pristine land “saved”
- 248 - metric tons CO2 “saved”

- \$140,000 loan to Weir Corporation
- Low Income and Federal Historic Tax Credits \$8,915,031
- State Historic Tax Credits \$690,000
- HUD Section 108 Loan \$600,000
- Massachusetts Affordable Housing Trust Funds \$900,000
- State Facilities Consolidation Funds \$321,258
- Massachusetts Department of Housing and Community Development – Housing Stabilization Fund \$750,000
- Massachusetts Housing Partnership Loan \$2,700,000
- Mass Development Environmental Assessment Funds \$54,000

**REMEDICATION AND BLIGHT ELIMINATION** — The property had been under-utilized for 15 years, following the closing of the mill in the mid-1980's. The mill building, formerly a cotton mill and curtain factory, was only 25 percent occupied in 2003. A subsurface investigation showed concentrations of PAHs, lead, and "C11-C12 aromatics" that exceeded the Massachusetts' environmental standards. Cleanup included excavation of the top three feet of soil and replacement with clean fill. Asbestos materials, underground storage tanks, and transformers were also removed.

Remediation costs were \$346,678; the BTC was \$73,339 after cleanup funding was deducted from the eligible total.

**ECONOMIC BENEFITS** – \$8.8 million investment in a distressed area - the Weir neighborhood poverty rate is 13.5 percent - higher than the City at 8.3 percent and the State at 8.9 percent.

**GREENING/SUSTAINABILITY** — The site redevelopment included riverfront green space and picnic area, a playground, and a basketball court.

**SAVING LAND** – the density (9.7 units per acre) is appr 2 ½ times suburban sprawl densities; so the project can be credited with "saving" 16.5 acres of farmland and greenfields.

**SMART GROWTH AND NON-AUTO MEANS OF TRAVEL** — Brownfields projects, on average, produce 32 to 57 percent lower VMTs and CO<sub>2</sub>, relative to suburban sprawl. Robertson on the River's density (9.7 DU/ac) and setting is urban, although walkscore is below average @ 45. A conservative application to this project would estimate the VMTs and CO<sub>2</sub> reduction based on the lower end of the range (32 percent), resulting in 248 metric tons of CO<sub>2</sub> "saved."



**Open space along the river enhances the project and the community**



**COMMUNITY DEVELOPMENT SPINOFF BENEFITS** – The project was part of the Weir Village neighborhood riverfront revival, as community plans came to fruition and residential, park, and other uses replaced abandoned industrial property.

**WEBSITE:**

<http://www.neighborhoodcorp.org/;>

[http://www.epa.gov/region1/brownfields/success/06/rotr taunton ma rlf cg.html](http://www.epa.gov/region1/brownfields/success/06/rotr_taunton_ma_rlf_cg.html)

## GATEWAY PARK, WORCESTER – RESEARCH IN LIFE SCIENCES SPURS TRANSFORMATIVE ECONOMIC REDEVELOPMENT PROJECT



**PROJECT SUMMARY** - A joint development of the Worcester Business Development Corporation and Worcester Polytechnic Institute, the purpose of the 12-acre Gateway Park redevelopment project is to “advance education and research in the life sciences at Worcester Polytechnic Institute. As the focal point for the university’s interdisciplinary research programs in biology, biochemistry, bioengineering, biotechnology, and related science and engineering disciplines, the center is accelerating advances and innovations that will help transform health care and medicine.”

Gateway Park is also part of a larger 82-acre “Innovation Square Growth District,” a state designation designed to spur investment in mixed-use districts.

The Gateway master plan calls for five life sciences buildings, totaling 550,000 square feet of flexible, adaptable lab space and commercial activities with a 660-space parking garage. Total investment will represent \$175 million in public and private funds.

The project, which is a joint venture of Worcester Polytechnic Institute and the Worcester Business Development Corp, won the prestigious Phoenix Award for brownfields redevelopment in 2007. The for-profit Gateway Park, LLC owns and operates the buildings after they have been built.

### **LOCATION AND ACREAGE:**

- 10 Salisbury St, 75 Grove St, and 10, 30, 32, 42, and 50 Prescott Streets, Worcester, MA

### **Gateway Park/Worcester Polytechnic Institute by the Numbers:**

- \$350,731 - tax credit for remediation
- \$1,014,462 - total remediation
- \$175 million - total investment at build-out
- \$84 million - investment to date;
- 871 – direct and indirect construction-related jobs
- 440 - direct permanent jobs
- 997 - direct plus indirect permanent jobs
- \$1.3 million – direct state taxes generated, annually
- \$617,000 – direct local taxes generated, annually
- 92 - Walkscore
- 81 acres of farms and pristine land “saved”
- 45 percent – VMT reduction relative to alternative development
- 400 - metric tons of CO2 “saved” due to lower VMTs

- 11 acres

**REMEDICATION AND BLIGHT ELIMINATION** - The previous industrial uses were: New England Metal Plating; Parker Metals; Ziff Paper; storage and repair shop for laundry operations; a sheet metal shop, machine manufacturing; a gas station, and an auto body shop. The land was vacant or underutilized for about ten years as the previous industries down-sized, moved away, or closed.



Remediation included cleaning up petroleum, USTs, asbestos, cyanide, and industrial solvents. The remediation included: removal of 11 tons of contaminated soil; and treatment of three feet of petroleum-contaminated groundwater. Total remediation costs were \$1,014,462. The tax credit amount was \$350,731 (50 percent of \$701,462 eligible remediation expenditures). Other cleanup funding sources were a \$200,000 EPA Brownfields grant to the City of Worcester of \$200,000, and \$113,000 in city CDBG funds.

Quoting from the developer, "The Brownfield's Tax Credits through the Commonwealth's Department of Revenue were critical to the ongoing success of the project." At the onset, the tax credit made it easier to justify the cost of the cleanup. At the closing of the RAO, "the tax credits allowed the project to recoup enough costs to continue with the economic development of the park."

**ECONOMIC BENEFITS AND NEW BUSINESSES** - The remediation of the site has laid the groundwork for \$84.7 million in new investment, including \$66.8 million/private and \$17.9 million/public, and creating 440 direct jobs, as follows:

- \$42 million investment in the 120,000 sq ft WPI Life Sciences and Bioengineering Center. Current research specializes in, for example, bionanotechnology, cell and tissue engineering, neurotrophic factors for treating Alzheimer's disease and stroke; and developmental cell biology and animal somatic cell cloning. Aside from the Life Sciences and Bioengineering Center, WPI accommodates Massachusetts Biomedical Initiatives and an incubator which includes RXI Pharmaceuticals, and Blue Sky Biotech.
- \$6.4 million to renovate 85 Prescott, now used for New England Regional Headache Center, the Massachusetts Academy of Math and Science, ECI Biotech Inc, and other WPI facilities.
- An \$11 million parking garage.
- \$30 million for Gateway II - now under construction, a 92,000 sq ft building at Gateway will include space for the Biomanufacturing Education and Training Center, the WPI Fire Research Institute and for the graduates of the WPI incubator.

At build-out the project will generate up to 1,500 jobs and \$175 million in public and private investment. The project also advances Massachusetts' position vis-à-vis bio-technology innovation.

**OTHER PUBLIC FUNDING SOURCES** (this corresponds to the WPI Life Sciences and Bioengineering Center and Gateway II):

- State - \$9,425,000

- Mass Development – \$750,000 loan
- BRAC Insurance Subsidy - \$12,800
- State Match to HPP Funds - \$425,000
- PWED Grant - \$2,350,000
- Massachusetts Life Sciences Center - \$5,150,000 (fit-out for Gateway II)
- Federal – total \$4.5 million<sup>22</sup>
  - HPP TEA-21 Infrastructure Funds - \$1,800,000
  - EDA Grant - \$2,500,000
  - EPA Grant (City of Worcester Brownfields Revolving Loan Fund) - \$200,000
- City of Worcester Investment – total \$625,000
  - Right of Way Acquisition (Purinton Lock) - \$425,000
  - Design for HPP TEA-21 Improvements - \$200,000
- Total public sources – \$17,900,000

**GREENING AND SAVING PRISTINE LAND** – all buildings planned for LEED certification.

The project has urban density characteristics that would support using national data to calculate “greenfields saved.” Nationally brownfields projects save 4.5 acres of farm and pristine land for every 1 acre redeveloped. Applying this ratio to Gateway Park results in crediting Gateway with saving 81 acres of farms and pristine land.

**Smart growth and non-auto means of travel** - The redevelopment is close to downtown, has urban density characteristics (.81 FAR), includes structured parking, and the adjacent neighborhood provides mixed uses that encourage walking.

The project rates as a 92 on Walkscore, meaning that it ranks in the highest category for walkability.

Brownfields projects, on average, produce 32 to 57 percent lower VMTs and CO<sub>2</sub>, relative to suburban sprawl. The gateway project has characteristics – density, mixing uses, and walkability – that would put it at least in the middle of the national range (45 percent), resulting in 400 metric tons of CO<sub>2</sub> saved.

**COMMUNITY DEVELOPMENT SPINOFF BENEFITS** – Gateway has breathed new life into a blighted derelict district and adjacent redevelopment projects attest to the transformative nature of the

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<sup>22</sup> Research operations are also supported by \$8.5 million in DOD and NIH Funding for WPI’s Bioengineering Institute

Gateway investment. The following are examples of adjacent development redevelopment projects that were unlikely to occur absent Gateway Park:

- Northworks Mill (an 80,000 sq ft multi-tenant industrial loft/incubator);
- Massachusetts College of Pharmaceuticals building; and,
- WBDC redevelopment of the Telegram Gazette building.

**FISCAL BENEFITS** — At build-out Gateway is projected to generate \$6 million annually in local tax revenues. Currently the project is estimated to produce:

- \$1.3 million in direct state taxes generated, annually;
- \$617,000 in direct local taxes generated, annually.

**WEBSITE:**

[www.gatewaypark.com](http://www.gatewaypark.com); [www.worcesterbdc.com](http://www.worcesterbdc.com); and <http://www.wpi.edu/Admin/LSBC/>



**Spin-off development - Northworks Mill operates as a private small business incubator.**

## SOUTHBRIDGE BUSINESS CENTER, SOUTHBRIDGE – MANUFACTURING PLANT RETOOLED AS CONFERENCE CENTER AND INDUSTRIAL PARK



**PROJECT SUMMARY:** The establishment of the Southbridge Business Center required the redevelopment of the former American Optical 1.0 million sq ft manufacturing facility in Southbridge, MA. The business center features a 315,000 sq ft conference center that is primarily leased to the Department of Defense as a training facility. The industrial space consists of 643,000 sq ft of space in 11 principal buildings on a campus setting of 135 acres. The remediation that was subject to the BTC was for the conference center parcel. There are 360 people employed in the business center, including 70 in the conference center.

### **LOCATION AND ACREAGE:**

- 14 and 100 Mechanic Street, Southbridge, MA;
- The remediated property, now conference center – 10.4 acres;
- 325,000 sq ft conference center and 643,000 sq ft of industrial space;
- Total redevelopment area – 150 acres.

### **Southbridge Business Center**

#### **By the Numbers:**

- \$1,403,662 - tax credit for remediation
- \$2,807,325 - total remediation
- \$93 million - total investment
- 1,113 – direct and indirect construction-related jobs
- 70 direct permanent jobs
- \$541,000 – direct and indirect state taxes generated
- \$640,000 – direct and indirect local taxes generated
- 74 – Walkscore
- 32% - VMTs lowered relative to alternative development
- 61 tons of CO2 “saved”



**PUBLIC FUNDING SOURCES IN ADDITION TO THE BROWNFIELDS TAX CREDIT** - \$1.5 million Mass Development Loan financed improvements to accommodate a specific industrial user.

**REMEDICATION AND BLIGHT ELIMINATION** — The former use was the American Optical manufacturing operation. The contamination was petroleum and hazardous substances. The remediation costs were \$2,807,324, with \$1,403,662 credited under the Massachusetts BTC Program.

**ECONOMIC BENEFITS AND NEW BUSINESSES** –

	Total Sq ft	Sq ft used	Employment
Conference ctr.	315,000	315,000	70
Industrial buildings	643,000	247,000	290
<b>Total</b>	<b>1,018,000</b>	<b>562,000</b>	<b>362</b>

The on-site 203 room hotel/conference center, employing 70 full time workers and additional part-time workers, is leased to the US Department of Defense (DOD) for \$9.6 million, annually. This \$9.6 million can be counted as net new economic growth to the community and to the state because virtually all conference attendees are coming from out-of state. DOD reserves about 20,000

or one-half of the available room nights; the remainder are available for other conferences and local events. DOD actually uses about one-half of the reserved room nights. The local community uses the health club, ballroom, and bar when DOD is not running a conference. Although the occupancy rate for the facility averages about 50 percent, it still attracts about 10,000 conference attendees annually, at least 90 percent would be out-of-state visitors to the community, annually.

The industrial/business park's largest current tenant, [Aearo Company](#), is a world leader in the manufacturing of safety devices for the eyes, ears, nose and face. Other tenants include: Stonebridge Press, which publishes the Tri-Community Newspapers, SemiCon, a national firm providing refurbishing services to the semi-conductor industry and A&D Data Corp., a provider of data storage and disaster recovery support to the financial services industry.

Note that, for the purposes of the BTC economic and fiscal benefit calculation, only activities generated by the conference center are counted because the tax credit was only applied to the conference center site. Nevertheless, the full benefit of the project includes the employment generated by the business park.

**GREENING ENERGY** – An on-site 10 Megawatt co-generation power system provides highly reliable, uninterruptible power – electricity and low pressure steam – to business park industrial users, as well as electricity to the grid. Southbridge Power and Thermal operates the co-generation plant, offering power solutions at below market rates. The steam option is ideal for industrial firms requiring large



**Combined heat and power plant (on right) provides efficient energy to area businesses.**



amounts of steam for manufacturing. Co-generation provides roughly double the energy efficiency and half the CO<sub>2</sub> emissions of conventional centralized power plants.

**SMART GROWTH AND NON-AUTO MEANS OF TRAVEL** — Brownfields projects, on average, produce 32 to 57 percent lower VMTs and CO<sub>2</sub>, relative to suburban sprawl. The project has urban density characteristics (FAR .72) and rates as a 74 on Walkscore, meaning that it ranks above the national average for walkability. A conservative application to this project would use the lower end of the EPA range (32 percent), as it applies to conference center employees; however, there would likely be no VMT reduction for conference attendees. Following these assumptions results in an estimate of 61 tons of CO<sub>2</sub> saved.

**COMMUNITY DEVELOPMENT SPINOFF BENEFITS** – The project is located in a designated Economic Target Area. The Conference Center project involved renovation of the historic façade, which is now an icon for the community.

**FISCAL BENEFITS:**

- \$541,000 – direct and indirect state taxes generated
- \$640,000 – direct and indirect local taxes generated

**WEBSITE:**

[http://www.massdevelopment.com/press-room/press/releases/southbridge-business-center-renovates-building-for-schott-north-america-creates-70-jobs-using-1-5-million-massdevelopment-loan/;](http://www.massdevelopment.com/press-room/press/releases/southbridge-business-center-renovates-building-for-schott-north-america-creates-70-jobs-using-1-5-million-massdevelopment-loan/)  
<http://www.thefreelibrary.com/Unkept+promise%3b+Defending+the+expense+of+Southbridge+hotel+deal.-a0188992750>

## 303 THIRD STREET, CAMBRIDGE – WALKABLE, TRANSIT-SERVED RESIDENTIAL



**PROJECT SUMMARY** — 303 Third Street in Cambridge was developed into 482 apartments in two towers totaling 621,000 sq ft and 9,000 sq ft of retail space. The developer was 303 Third Street, LLC, wholly owned by Equity Residential. The site was previously used as tank storage for manufactured gas.

### **LOCATION AND ACREAGE:**

- 303 third St, Cambridge, MA 01550
- Total redevelopment area – 3.21 acres

### **PUBLIC FUNDING SOURCES IN ADDITION TO THE BROWNFIELDS TAX CREDIT:**

No other public sources

**REMEDIATION AND BLIGHT ELIMINATION:** The Property was adjacent to the former site of a manufactured gas plant and was used as a maintenance facility for Boston Gas, now NSTAR. Storage tanks for the manufactured gas were located on the site. The subject property was impacted by coal tar, petroleum, arsenic and other contaminants found in fill material.

Total remediation costs were \$10,316,759, resulting in a tax credit of \$5,151,015. A total of approximately 132,007 tons (approximately 82,506 cubic yards) of soil impacted by the contaminants

## **303 Third Street, Cambridge**

### **By the Numbers:**

- \$5,151,000 - tax credit for remediation
- 10,317,000 - total remediation.
- \$256 million - Total investment
- 1,283 - construction jobs
- 40 - direct permanent jobs
- \$50.20 – private investment leveraged for \$1 BTC
- \$1.7 million – estimated new property taxes generated
- 94 - Walkscore
- 93 - acres of farms and greenfields “saved”
- 1,917 - tons of CO2 “saved” relative to alternative development

of concern was transported off-site and treated. The cleanup costs significantly exceeded the amount budgeted for cleanup and the tax credit helped offset those additional costs.

**ECONOMIC BENEFITS** – \$256 million invested. The project expanded the supply of quality residential units in Cambridge, expanding options for young urban professionals working in nearby office, research, and MIT-related facilities. Additionally the project provided 9,000 sq ft of retail space, accommodating approximately 40 jobs.

**GREENING/SUSTAINABILITY** – The site is 3 blocks from Kendall/MIT T station. Many tenants chose the building because they could walk or take transit to work.

**SAVING LAND** - Assuming that the alternative would be 5 units per acre sprawl, the 482 units can be credited with saving 93 acres of land.

**SMART GROWTH AND NON-AUTO MEANS OF TRAVEL** — The site is three blocks from Kendall/MIT T station, ranks in the highest category for walkability (94 on walkscore), and the density is on the high end of “urban.”

Brownfields projects, on average, produce 32 to 57 percent lower VMTs and CO<sub>2</sub>, relative to suburban sprawl. This project would rank at the high end of that range or 57 percent lower VMTs and CO<sub>2</sub>, resulting in 1,917 tons of CO<sub>2</sub> “saved.”

**COMMUNITY DEVELOPMENT SPINOFF BENEFITS** – Retail occupancy in adjacent blocks improved noticeably.

**FISCAL BENEFITS** - The Commonwealth and the City of Cambridge have benefited from the taxes generated by the expenditure of \$256,419,000 in new construction and ongoing taxes derived from the rental property. Local property tax revenues are estimated to be \$1.7 million, annually.

## ASTRO-LOGISTICS, SPRINGFIELD - GREEN INDUSTRIAL REVIVAL OF HAZARDOUS WASTE DUMP



**PROJECT SUMMARY** - Astro-Logistics, LLC, cleaned up an abandoned and heavily contaminated former hazardous waste Treatment, Storage, and Disposal Facility and then established a new chemical distribution operation. The project allowed Astro Chemicals to consolidate and expand in the Springfield area. The new 65,000 sq ft facility employs 60 people (10 more than the previous locations) and represents an investment of \$3.0 million in a site that once was widely viewed as both a visual blight and a significant threat to public health. The Astro Chemicals provides raw materials for the manufacturing of pharmaceuticals, food, electronics, plating, waste treatment, and other industrial processes. A solar installation provides about 45 percent of Astro Chemical's energy needs.

### **SITE LOCATION AND ACREAGE -**

- 126 Memorial Drive, Springfield, MA 01104
- 8 acres

**REMEDIATION AND BLIGHT ELIMINATION** — The previous use was the Hampden Color and Chemical Company, which distributed chemical products. Starting in 1983 the site also became a designated Treatment, Storage and Disposal (TSDF) for hazardous waste. The site was abandoned in 1998 and, after several unsuccessful attempts to locate a buyer, the City gained title to the property in a tax foreclosure action in 2002. The site contamination included: two releases of TCE into storm drains; more than 500 containers of chemicals, totaling 7,500 gallons; and a toluene release from several USTs. EPA grants totaling \$270,000 funded removal and disposal of the

### **Astro-Logistics**

#### **By the Numbers:**

- \$173,000 - tax credit for remediation
- \$346,000 - total remediation.
- \$3.0 million - total investment
- 60 - direct permanent jobs retained (10 new jobs)
- 122 - direct and indirect permanent jobs generated
- \$17.34 - private investment leveraged for \$1 BTC
- \$2.6 million - direct and indirect state and local taxes generated
- 108,000 - kWh generated by Greenskies solar installation
- 88 - metric tons of CO2 saved due to solar

containers and started a bio-remediation of the Toluene release. As a condition of a Mass DEP Covenant-Not-To-Sue, Astro-logistics completed remaining remediation, costing \$346,000, with a resulting tax credit of \$173,000.

***PUBLIC FUNDING SOURCES IN ADDITION TO THE BROWNFIELDS TAX CREDIT:***

- EPA grants totaling \$270,000, while the site was owned by the City.

***ECONOMIC BENEFITS AND NEW BUSINESS INVESTMENT*** – Astro-Chemicals invested \$3,000,000 in building and site improvements and employs 60 people, ten more than their previous location. The site is in a Massachusetts Economic Target Area.

***GREENING AND SAVING PRISTINE LAND*** – Part of property is leased to a solar farm which provides 40 percent of Astro Chemicals energy needs. Greenskies ([www.greenskies.com](http://www.greenskies.com)) financed and installed the 98 KW system using federal tax incentives and renewable energy credits. About 20 percent of the energy produced is sold to the grid. The system generates approximately 108,000 kWh annually, which saves 195,000 lbs. or 88 metric tons of CO<sub>2</sub>, annually.

As a previously developed site, Astro-Logistics can be credited with saving farms and pristine land on at least a one-to-one ratio, or 8 acres “saved.”



***COMMUNITY DEVELOPMENT SPINOFF BENEFITS*** – cleaning up and developing contaminated parcels removed a major blighting influence and therefore aided marketing of the industrial park, helping attract new businesses, as well as the capping and beautification of an adjacent landfill. The successful cleanup and redevelopment of the Astro site also served as a model for cleanup in the adjacent Smith and Wesson Industrial Park and indirectly led to the recent investment by Performance Food Group, a 200-employee food service business.<sup>23</sup>

***FISCAL BENEFITS:***

No infrastructure investment required.

State and local taxes generated estimated @ \$2.6 million, annually, including direct and indirect tax revenues.

***WEBSITE:***

***[HTTP://WWW.TAUNTONDEVELOPMENT.ORG/MSIP/INDEX1.HTM](http://www.tauntondevelopment.org/msip/index1.htm)***

Astro Chemicals: [http://www.chemdisnet.com/astro\\_chemicals.htm](http://www.chemdisnet.com/astro_chemicals.htm)

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<sup>23</sup> Source for this section: telephone interview with Kathy Brown, President, East Springfield Neighborhood Council, 2/22/2012.

Greenskies: <http://www.greenskies.com/projects/case-studies/astro-chemical/>

Measuring the solar project: [http://live.deckmonitoring.com/?id=astro\\_chemicals](http://live.deckmonitoring.com/?id=astro_chemicals)

Massachusetts brownfields success story: <http%3a//www.mass.gov/dep/cleanup/bfstory.doc>

## APPENDICES

### APPENDIX A – PREVIOUS RESEARCH, THE ECONOMIC AND ENVIRONMENTAL IMPACTS OF BROWNFIELDS REDEVELOPMENT

In this section, the analysts summarize the literature – the findings of impact studies that have been carried out across the country, highlighting any previous studies of Massachusetts projects.

#### ***ECONOMIC AND COMMUNITY DEVELOPMENT IMPACTS***

Studies of brownfields redevelopment indicate that the majority (between 55 and 80 percent) of brownfields projects involve public subsidy. The following discussion relates only to those projects that require this public investment.

**Employment Impacts** – The Massachusetts Department of Environmental Protection’s (MASS DEP) 2009 report listed the following job and investment impacts of the MASS BRAC and MASS Brownfields Redevelopment Fund:<sup>24</sup>

	Sites assisted	State funds expended	Potential new jobs	Redevelopment expenditures
MASS BRAC	330	\$6.6 million	27,000	\$4.1 billion
Brownfields Redevelopment Fund	418	\$41.9 million	5,800	

Although there is no comprehensive national data that represents the full breadth of brownfields redevelopment activity, three sources give an indication of the impacts:

- EPA Brownfields investments have helped create 75,290 new jobs nationwide at a ratio of 7.3 jobs per \$100,000 in EPA funding;<sup>25</sup>
- According to the 2010 U.S. Conference of Mayor’s (USCM) brownfields survey, fifty-four cities said that 161,880 jobs have already been created through the redevelopment of 2,118 sites, with 64,730 jobs in the pre-development/remediation stage and 97,150 permanent jobs. The

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<sup>24</sup> Massachusetts Department of Environmental Protection, “Massachusetts Brownfields Program, A Decade of Progress in Economic Development,” 2009, available at: <http://www.mass.gov/dep/cleanup/progbf.doc>.

<sup>25</sup> US EPA, monitored results of the ACRES brownfields reporting system, posted at: <http://www.epa.gov/brownfields/overview/bf-monthly-report.html>



survey indicates that 230,223 additional new jobs could be created just on the brownfields sites in 106 respondent cities.<sup>26</sup>

- Interpreting results from six studies with widely varying results, the Northeast-Midwest Institute (NEMW) concluded that it takes between \$10,000 and \$13,000 in public investment (from all sources) to leverage one permanent job on redeveloped brownfield sites. Isolating public costs for brownfields-related site preparation, NEMW concludes that an average \$5,700 in public costs leverage one job. For reference, the standard for judging investments by the U.S. Department of Housing and Urban Development and the U.S. Small Business Administration is \$35,000 per job.<sup>27</sup>

**Leveraging Investment** – Although public funding is a necessary part of most brownfields projects, the ratio of public to private funding indicates a favorable return on public investment:

- A 2009 MASS DEP report found that the 330 sites assisted through MASS BRAC represented \$4.1 billion in new investment.<sup>28</sup>
- The EPA Brownfields Program has leveraged \$18.29 of funding from other sources for every \$1.00 of EPA funding.<sup>29</sup>
- Interpreting the results of eight studies with widely varying results, NEMW concluded that public investments in brownfields leverage total investments at a ratio of approximately \$1/public investment to \$8/total investment. Brownfields-related subsidies for site assessment, cleanup, and site preparation leverage total investment at a higher ratio of 1 to 20. The 1 to 20 ratio is the average public cost to make the land “development ready.” However, the study concluded that brownfield sites in severely distressed areas require higher subsidy levels, as much as double or triple the ratios indicated here.<sup>30</sup>

**Neighborhood Revitalization as Measured by Property Value Increase.** Cleanup and redevelopment can lead to property value increases in the surrounding area. EPA studies conclude these increases average two to three percent,<sup>31</sup> but other studies have found higher five to 15 percent increases for properties that are up to 3/4 mile from the site. Then there exceptional “impact” projects, usually involving change in use from industrial to parks or mixed-use, have had much higher impacts, even exceeding 100 percent.<sup>32</sup>

## **ENVIRONMENTAL BENEFITS OF BROWNFIELDS REDEVELOPMENT**

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<sup>26</sup> US Conference of Mayors, Recycling America’s Land, A national Report on Brownfields Redevelopment, 1999 – 2010, available at: <http://www.usmayors.org/brownfields/>

<sup>27</sup> Evans Paull, Northeast-Midwest Institute, “The Environmental and Economic Impacts of Brownfields Redevelopment, a Working Draft,” July, 2008, available at: <http://www.nemw.org/images/stories/documents/EnvironEconImpactsBFRedev.pdf>

<sup>28</sup> Massachusetts Department of Environmental Protection, op cit.

<sup>29</sup> US EPA, ACRES, op cit.

<sup>30</sup> Evans Paull, op cit.

<sup>31</sup> US EPA, “Air and Water Quality Impacts of Brownfields Redevelopment,” October 2011, available at <http://www.epa.gov/brownfields/BFEnvironImpacts042811.pdf>

<sup>32</sup> Evans Paull, op cit.

**Cleanup/Reduced Threat to Public Health** – In 2009 Mass DEP reported that they had processed 30,000 sites through cleanup programs since the adoption of the Licensed Site Professional approach in 1998. Active caseloads average about 5,000 sites and 75 percent of sites are resolved within one year.<sup>33</sup> (Note that these are not all real estate projects, as MASS DEP includes spills at active industrial sites in their count.) A separate 2009 progress report listed 723 brownfield sites that received direct DEP assistance, 360 of which have led to completed cleanups.<sup>34</sup>

**Responsible Growth and Saving Land from Destructive Sprawl Development** – An EPA-supported study concluded that one acre of redeveloped brownfields has been estimated to conserve 4.5 acres of greenfields sprawl development.<sup>35</sup> In 2009 MASS DEP reported that 19,333 acres of brownfields had been cleaned up under the LSP program. If 50 percent of those properties have been successfully redeveloped consistent with the findings of the EPA supported analysis, that would mean that 43,500 acres of land have been conserved by the redevelopment of brownfields in Massachusetts.

According to the U.S. Conference of Mayors 2007 report, 82 responding cities estimated that redeveloping brownfields could generate housing for 2.8 million households.<sup>36</sup>

**Air Quality Improvements** – EPA studies have concluded that brownfields redevelopment saves 32 to 57 percent Vehicle Miles Traveled (VMT) relative to comparable greenfields sites.<sup>37</sup> There are parallel greenhouse gas and other air pollution reductions.

**Contribution to Water Quality Objectives** – EPA data also indicate that brownfield redevelopment produces an estimated 47 to 62 percent reduction in stormwater runoff relative to greenfields development.<sup>38</sup>

## **FISCAL IMPACTS**

**Direct Generation of Local Tax Revenue** – From the micro/project-specific perspective, NEMW found that public investments in brownfields are generally recouped from local taxes generated by the project within about five years, although tax credits may extend this period. From the macro perspective, the U.S. Conference of Mayors survey found that redeveloped brownfields in 62 surveyed cities could lead to \$408 million in annual local tax revenue. Further, the survey found that redeveloping remaining brownfields could generate between \$1.3 and \$3.8 billion in local taxes.

For an analysis of the lower investment in infrastructure required for brownfields projects, see Appendix G.

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<sup>33</sup> New Jersey Legislature, Testimony of Massachusetts Department of Environmental Protection Assistant Commissioner Janine Commerford to the NJ Senate Environment Committee Meeting on NJ SB 1897 A Bill to establish a Licensed Site Professionals program, held on May 19, 2008.

<sup>34</sup> Massachusetts Department of Environmental Protection, op cit.

<sup>35</sup> George Washington University, "Public Policies and Private Decisions Affecting the Redevelopment of Brownfields: An Analysis of Critical Factors, Relative Weights and Areal Differentials," 2001, <http://www.gwu.edu/~eem/Brownfields/>

<sup>36</sup> US Conference of Mayors, op cit.

<sup>37</sup> US EPA, "Air and Water Quality..." op cit.

<sup>38</sup> Ibid.

## Appendix B - METHODOLOGY

**PROJECT SAMPLE** – Researchers started with a list of 51 tax credit projects made available by a group of attorneys and professional economic developers that work with prospective BTC applicants. These projects account for \$53.8 million in tax credits, all in the calendar years 2009-2012. DOR's September 2012 report to the General Assembly indicates that there were 218 projects representing \$103.9 million in approved brownfields credits in the fiscal years 2009 – 2012.<sup>39</sup> Thus, the BTC projects in this report constitute just over half (51.8 percent) of the credits granted in the four-year period. Note that there is a minor discrepancy in that the study projects are reporting on a calendar year and DOR is reporting on a fiscal year.

All impacts quantified and described in this study are for the projects represented in the analysis, i.e. the 51.8 percent of all brownfield credits. A full accounting for all BTC projects would likely produce impact numbers that are roughly double those estimated here.

For more information about tax credits authorized by the Commonwealth, see the proceedings of the Massachusetts Tax Expenditure Commission, recorded here: <http://www.mass.gov/dor/tax-professionals/news-and-reports/tax-expenditure-commission-materials> and in the Commission's report, available here: <http://www.mass.gov/dor/docs/dor/stats/tax-expenditure-commission-materials/final-report/tec-report-with-appendices-new.pdf>.

**INFORMATION SOURCES** – Researchers used information from the following sources:

1. **Tax credit applications**– as referenced above, the consultants used information from tax credit applications (and associated attachments). Generally, this provided basic information about location of the project, the amount of the remediation and tax credit, pre-development assessed value, and a general description of the reuse.
2. **An on-line survey developed for the project** – Fifteen respondents filled out the survey, providing more detail on: completed and planned re-use, other governmental funding sources, permanent jobs, total investment/project costs; and any sustainability elements. See Appendix C.
3. **Site visits and interviews with developers** – Seven projects were chosen for more in-depth case study treatment, utilizing on-site or telephone interviews conducted with developers. Information gained included the same items as listed, above, for the on-line survey, as well as more subjective information about obstacles encountered and overcome.
4. **Online research** – project websites provided supplementary information, particularly for project narratives; however researchers were careful to distinguish between plans, phased projects, and completed projects, as websites often reflect a build-out objective that has not yet been achieved.
5. **Assessment records** – some cities and towns have assessment records that are easily accessed on-line, therefore allowing post development accounting for local tax revenues;

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<sup>39</sup> Massachusetts Department of Revenue, letter the Massachusetts General Assembly, September, 2012, available at: <http://www.mass.gov/dor/docs/dor/stats/tax-expenditure-commission-materials/selected-dor-reports/fy2012-report-environmental-response-action-brownfields-tax-credit-program.pdf>

however, good on-line assessment resources turned out to be the exception rather than the rule.

Quantitative data was supplemented, as follows:

1. **Industry averages** – in many cases the information about projects was partial – for example square footage and use was known but employment and investment were not. In these cases analysts used industry averages and rule of thumb ratios to generate the complete picture. For example, a 10,000 sq ft industrial building was assumed to cost \$55.00 per square foot and employ 1 person per 1,000 sq ft. A full listing of the industry averages employed in the project is included in Appendix B.
2. **IMPLAN** – IMPLAN, using a Massachusetts-specific input-output model, was used to estimate: 1) temporary jobs generated by construction; and 2) all indirect job, tax, and spending numbers.
3. **Post Development Assessments** – When post development assessment data was not available, it was estimated by conservatively assuming that assessment values would be 75 percent of total capital investment.

This resulted in the following breakdown of projects and the relative quantity and quality of the information.

- a. Seven projects were chosen for in-depth case studies – these are written up in chapter VII.
- b. 44 projects were deemed sufficiently well documented to allow basic quantitative analysis of job, investment, and tax impacts;
- c. 15 projects (a subset of “b”) were deemed sufficiently well documented in all aspects to allow detailed quantitative analysis of funding sources, sustainability elements, affordable housing and other aspects, in addition to basic job, investment, and tax impacts.
- d. Two projects were dismissed from the analysis because of inadequate data, and four projects were included in the tax credit totals, but no redevelopment was counted because: 1) information about the redevelopment could not be obtained; 2) the cleanup was of an existing/ongoing industrial use and was not linked to any new development or redevelopment; and 3) the planned use of the property was still in doubt.

Direct and indirect impact numbers were then generated from all of the above sources.

**ORDER OF MAGNITUDE ESTIMATES** – From the above, analysts had access to primary and reliable data (through the on-line survey and interviews) for 15 of the projects included in the analysis; the remainder were assessed using industry averages and rule of thumb ratios, supplemented by the other information sources cited above. However, analysts did attempt to correct any data that could be potentially be misleading. For example, the Watertown Business Park included a 200,000 sq ft AT&T facility that was described as a “web-hosting facility.” Analysts consulted with Watertown officials and corrected the employment data to reflect essentially no jobs located at the facility.

The implication of reliance on this method of estimation is that the resulting impact analysis is not precise – it is more consistent with an “order of magnitude” approach. Because of this lack of precision, analysts did not take the extra step of converting all the impact numbers into “net present value.”

**SOME NOTES ON IMPLAN** – IMPLAN is an input output model that is designed to measure the ripple effect of different kinds of expenditures in the economy. The model is based on economic data that

captures industry inter-relationships within defined geographic regions. By capturing “the multiplier effect” (the impact of secondary or induced spending) the model allows the reader to see the full impact of new expenditures in a given geographic area. IMPLAN makes a distinction between “indirect spending,” such as supplies required for the original product being measured, and “induced spending,” such as money re-circulating in the economy due to employees’ spending. In this study the authors refer to “direct and indirect spending” as representing the full multiplier effect, including both indirect and induced spending.

In this report IMPLAN is used to:

- Estimate the temporary direct and indirect impacts (jobs and taxes) of the construction activities in BTC projects;
- Estimate the direct and indirect impacts (jobs, output, and taxes) of business operations locating at tax credit projects. The input was normally the number of jobs, the sector, and location and the output was the indirect jobs and the direct and indirect output and tax revenues;

A point of clarification is that job numbers projected by IMPLAN are not full-time equivalent –they are just “jobs.”

Additionally, on the tax generation side, IMPLAN aggregates state and local taxes as one number. Analysts reviewed the Commonwealth tax structure and broke out state and local by assigning the IMPLAN tax generation data accordingly.

**CONFIDENTIALITY** – Under Massachusetts law BTC recipients are not currently required to disclose the either the tax benefit associated with the BTC or detailed information about the project. Therefore, the analysts do not name many of the applicants or projects cited in the report. Projects may be characterized more generally (an “industrial park in Bristol County,” for example). More detailed description is limited to the case study projects in chapter VII, and a number of projects that filled out an on-line survey or otherwise gave permission for use of project identifying information.

**GROSS VS. “NET NEW” ECONOMIC ACTIVITY** – Generally, the data resulting from this impact analysis should be characterized as “gross impacts” to the economy rather than “net new impacts” to the economy. A calculation of “net new” activity would be a significantly more complex task, involving accounting for the “substitution effect” and attempting to distinguish and appropriately discount businesses or business activity that relocated from one place to another within the locality or within the state of Massachusetts.

Aside from the difficult methodological issues involved in calculating “net new” economic activity, there is also a strong rationale to use the gross impacts in the case of brownfields redevelopment. The reason is that, in brownfields redevelopment, the Commonwealth and municipalities are getting a significant benefit from the resulting economic activity, even if the activity is only being relocated within the community. The benefit is that: 1) the site is cleaned up and public health is therefore protected; 2) the negative externalities associated with alternative locations (usually sprawl) are avoided; 3) jobs are located in economically distressed communities (a statutory requirement) and are more accessible to lower income populations than alternative locations; and 4) neighborhood blight is eliminated. Further, all of this activity is being generated by the investment of an innocent purchaser/developer who is taking on considerable risk, somewhat mitigated by the tax credit, and it simply makes sense to

measure the full reward attributable to the Commonwealth's sharing some of the developers' risk. If the analysis focused solely on "net new" activity, much of the benefit of the tax credit projects would be lost.

The analysts, however, do recognize that the retail sector is generally a dependent, non-generating sector and several of the tax impact calculations remove the retail sector.

## APPENDIX C – INDUSTRY AVERAGES USED IN GENERATION OF ECONOMIC IMPACT DATA

As explained in the methodology section, analysts used industry averages to generate impact data for projects where researchers were unable to find primary source information. The following table represents the industry averages and rule of thumb ratios employed to generate the full picture. These were derived, in part, from examining those BTC projects for which there was more complete information.

**Table 12 - Industry Averages Used to Generate Project Data**

	cost per sq ft	cost per unit	sq ft per unit	jobs per 1,000 sq ft*	jobs per unit
Industrial rehab	\$ 30			1	
Industrial new	\$ 55			1	
New low rise office or retail	\$ 120			4	
Research/hi tech and mid-rise office or retail	\$ 160			4	
Rehab for office or retail	\$ 100			4	
Hi rise office or retail mixed use	\$ 250			4	
Residential hi rise condo		\$ 350,000	1,400		
Apartments		\$ 300,000	1,200		
Townhomes and non-urban condos		\$ 350,000	1,600		
Hotel			500		0.6
Assisted living					0.5

\* By using a conservative ratio of jobs per 1,000 sq ft, the projected job numbers allow for a reasonable level of vacancy.

Typically, the available information might indicate X square feet of space developed. The industry averages were used to estimate capital costs and jobs.

As indicated in the report text, this technique is consistent with an “order of magnitude” estimate and there may be errors.



## APPENDIX D – ON-LINE SURVEY

1. Name of the project
  2. What is the Massachusetts Release Transaction Number for the project?
  3. Your name
  4. Your organization
  5. Your telephone number and email address
  6. Relationship of your organization to the project
    - ☒ Developer
    - ☐ Environmental consultant
    - ☐ Attorney
    - ☐ Other
    - Other (please specify
  7. Address of the project
  8. Project summary - narrative. Identify the previous use of the property and describe the redevelopment. Please add any other information, such as, beneficial community impacts, length of time the property was vacant, LEED or other green certification, etc.
  9. Status of the project (choose one category that best describes the project)
    - ☐ Complete
    - ☐ Under Construction
    - ☐ Final design with financing in place
    - ☐ Project is phased - part is complete or under construction and part is planned (See instructions in intro section)
    - ☐ Planned
- Explain phasing or other clarifications

10. Re-Use of the property (check all sectors that apply)

	Primary use of property	Secondary use of property
Residential	<input type="checkbox"/>	<input type="checkbox"/>
Office/technology/institutional	<input type="checkbox"/>	<input type="checkbox"/>
Retail	<input type="checkbox"/>	<input type="checkbox"/>
Industrial	<input type="checkbox"/>	<input type="checkbox"/>
Hotel	<input type="checkbox"/>	<input type="checkbox"/>
Mixed use	<input type="checkbox"/>	<input type="checkbox"/>

Clarify, if necessary

11. Total investment (enter dollar figure without commas, decimals, or dollar signs)

Remediation

Other site prep

Infrastructure

Total including  
vertical  
development

12. General project scope (enter numbers without commas or decimals)

Land area in acres

Sq. ft. rehabbed

Sq. Ft, New  
Construction

Total sq ft

13. Indicate the amount of space for each use (numerical answers, no commas or decimals)

Sq Ft Office/  
technology/institutional

Sq Ft Retail

Sq Ft Industrial

TOTAL DU's

>> DU's Affordable

>> DU's Market rate

>> DU's Rental

>> DU's Ownership

Number hotel rooms

14. How many permanent full-time equivalent jobs were (or will be) created by the project? Indicate "0" if the project is 100 percent residential. Do not use commas or decimals.

Jobs current

Jobs planned (over  
and above current)

Jobs total

15. Amount of Brownfields Tax Credit (enter dollar amount with no commas or decimals)

16. Website and/or news links where we can find out more about this project

17. Thank you for completing PART ONE, basic project information.

Feel free to skip to the last page and submit.

If you are able, please continue by answering these more detailed PART 2 questions.

☐ yes I want to skip to the end but you can call me for more info

☐ yes I want to skip the end

☐ No, I'll keep going

18. Funding sources other than the Mass Brownfields Tax Credit - indicate appr dollar amount (with no commas or dollar signs)

Private

Federal - EPA  
Brownfields

Federal - New  
Markets Tax Credits

Federal - Low  
Income Housing Tax  
Credits

Other federal	<input type="text"/>
Mass/Federal Historic Rehabilitation Tax Credit	<input type="text"/>
Mass State Brownfields Access to Capital	<input type="text"/>
Mass Development Brownfields Redevelopment Fund (BRF)	<input type="text"/>
Mass Economic Opportunity Area Credits	<input type="text"/>
Mass DEP - Assessment/Cleanup Grant of Service	<input type="text"/>
Mass other	<input type="text"/>
Local Community Development Block Grants	<input type="text"/>
Local Tax Increment Financing (or Special Assessment District)	<input type="text"/>
Other local government	<input type="text"/>

Other philanthropic

19. Clarify financing - From question 18,

>> Specify response in the "other" categories;

>> Indicate if any of the above were loans, loan guarantees, or equity positions.

>> Add any additional clarifications

20. Is the project in an area that has been designated for revitalization, preservation or economic revival? (Note all brownfields tax credit projects are in "Economically Distressed Areas;" so that is a given)

	yes	no	unsure
Economic Target Area		<input checked="" type="radio"/>	<input type="radio"/>
Local Urban Renewal Area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Preservation Area	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Clarify or explain "Other"

21. Please name any employers with 25 or more employees, their number of employees, and identify their type of business

22. How long was the property vacant/under-utilized before the new use was established?

- ☐ less than 6 months
- ☐ 6 months to one year
- ☐ one year to three years



- ☐ three years to five years
- ☐ more than five years
- ☐ Don't know

add any clarification

23. Did the redevelopment project stimulate investment in other nearby properties?

- ☐ yes
- ☐ No
- ☐ not sure

24. Please describe any notable sustainability and/or preservation features

Transit served

Bike paths

Preservation

Green/energy  
efficient buildings

>> LEED certification

>> Other certification  
or designation

Park/land  
conservation/greening

Extensive use of recycled materials

Other recognition or awards

25. Additional information or clarification of answers

## APPENDIX E. STATE BROWNFIELDS TAX CREDIT PROGRAMS

State Brownfields Income Tax Credit Programs							
State	Credit amount (% of cleanup costs)	Eligible expenditures	Eligible sites	Transf- erable	Automatic vs. needs test or statewide cap	Variations in the amount of the credit	Website
	(cross column descriptions are cleanup AND redevelopment credits)						
Co.	50% - first \$100,000, 30% - 2nd \$100,000;  20% - 3 <sup>rd</sup> \$100,000	Site assessment and cleanup	In-state VCP	-	Automatic	Tax credit not applicable to expenses in excess of \$300,000	<a href="#">Co Brownfields Tax Credit</a>
Conn	Up to 100% of investment costs with a \$100 million ceiling. Credit scheduled over 10 years.		<div>1. Industrial site subject to contamination;</div> <div>2. Community meets size and distress criteria, and</div> <div>3. Minimum investment of \$5 million</div>	yes	<div>Statewide cap of \$500 million</div> <div>Credit amount depends on needs test and impact analysis.</div>	Lower minimum investment requirements (\$2 million) for historic preservation and mixed residential-commercial projects.	<a href="#">Industrial Site Investment Tax Credit</a>

<b>Del.</b>	\$650 credit for each \$100,000 of new investment, and \$650 for each new job, 15-year credit on gross receipts taxes		Located in a distressed area and creating at least 5 jobs	Yes	Automatic	Job credits are increased by \$250 per job for brownfields sites	<a href="#">Del. Qualified Investment in Targeted Areas</a>
<b>Fla.</b>	50% of total eligible solid waste removal costs, not to exceed \$500,000.	Site assessment and cleanup	Either sites with executed Brownfield or Voluntary Rehabilitation Agreements	Yes	Statewide Cap of \$2 million	<ul style="list-style-type: none"> <li>An additional 25% of eligible expenditures if the site used exclusively for affordable housing or for health care facilities;</li> <li>Bonus tax refund of \$2,500 for each new job</li> </ul>	<a href="#">Fl. Voluntary Cleanup Tax Credit Program</a>
<b>Ill.</b>	25% of remediation costs over \$100,000. Limit - up to \$40K/yr, \$150k per site.	Site assessment and remediation	Meets the state definition of a brownfields site	Yes	Automatic	The threshold of \$100,000 in column 1 is not applicable in enterprise zones.	<a href="#">Illinois Environmental Remediation Tax Credit</a>
<b>Iowa</b>	12% to 15% of total investment costs for a greyfields site: 24% – 30% of total investment costs for a brownfields site			yes	Needs test and Statewide cap of \$3 million	The higher percentages are for sites that meet green building standards	<a href="#">House Bill 2687</a>
<b>Ky.</b>	Up to \$150,000	Site assessment and remediation	In-state VCP		Automatic	Also linked to property tax reduction	<a href="#">Ky. Brownfields</a>

							<a href="#">Program</a>
<b>Mass</b>	25-50%	Site assessment and cleanup	Economically distressed area; response costs exceed 15% of assessed value	Yes	Automatic	The higher 50% credit is for "full" cleanups only – no use restrictions.	<a href="#">Tax credit provisions of the Brownfields Act (5/11)</a>
<b>Miss</b>	25% up to \$150,000 (\$40,000 annual ceiling)	Site assessment and remediation	Cleanup agreement w/ MDEQ	No	Automatic		<a href="#">Mississippi Brownfields Tax Credit</a>
<b>Mo.</b>	Up to 100% - need must be demonstrated	Site assessment, remediation, and demolition	Abandoned for 3 years and project creates 10 new or 25 retained jobs	Yes	Needs test and benefit analysis test	Note there is a separate program for job creation credits.	<a href="#">Mo. Brownfield Redevelopment Program and Remediation Tax Credit</a>
<b>New York</b>	<ul style="list-style-type: none"> <li>• <a href="#">Redevelopment Credits</a> - 10% - 12% of total development costs up to \$35 million or three times site prep costs, whichever is less</li> <li>▪ <a href="#">Site prep credits</a> – 22% to 50% of cleanup and site preparation costs depending on the extent</li> </ul>		Eligibility depends on completing a "Brownfields Cleanup Agreement" with the regulatory side of BCP.	Transferable to new owner only (the credit is fully refundable)	Automatic based on admission to the State Brownfields Cleanup Program, which has a set of criteria	<a href="#">Redevelopment credits:</a> <ul style="list-style-type: none"> <li>▪ manufacturing projects – up to \$45 million in credits or 6 times cleanup costs, whichever is less</li> <li>▪ Additional 8% credit if located in</li> </ul>	<a href="#">New York's Re-structured Brownfields Tax Credit</a>

	of the cleanup					distressed area	
	<ul style="list-style-type: none"> <li>▪ <u>Environmental Insurance</u> - One-time credit of 50% (up to \$30,000) of environmental insurance costs</li> </ul>					<ul style="list-style-type: none"> <li>▪ Additional 2% credit if cleanup to an unrestricted use</li> </ul> <p><u>Site prep credits:</u></p> <ul style="list-style-type: none"> <li>▪ Higher percentages are for unrestricted use cleanups with residential re-use.</li> </ul>	
<b>NJ</b>	Reimbursement of up to 75% of eligible costs	Site assessment and remediation	Depends on state revenues from the site	No	Needs test	Reimbursement for up to 75% of the remediation costs	<a href="#">NJ Brownfield Contaminated Site Remediation Act</a>
<b>Wisc.</b>	50%	Site assessment and remediation	In Community Development Zones (distressed areas)	No	Automatic		<a href="#">Wisc. Community Development Zones</a>

Source Redevelopment Economics





## APPENDIX F - ALL FUNDING SOURCES FOR BTC PROJECTS

Redevelopment projects that have brownfields-related obstacles have greater upfront costs, longer and more complex pre-development activity, and often involve extra costs related to outmoded and dilapidated structures; therefore it should not be surprising that public funds, often from a variety of sources, are needed to make the projects feasible.

Redevelopment Economics was able to gain reliable funding information, including all public sources, for fourteen of the completed BTC tax credit projects, representing approximately one-third of all BTC projects. Given the relatively small sample of sites with reliable funding information, the findings should be interpreted as only indicating an order of magnitude. In accounting for other funding sources, analysts differentiated “end use” funding from redevelopment funding, i.e. end use funding provided use-specific subsidies such as low income housing, health care facility funding, and high technology funding. “Redevelopment funding” included historic preservation, infrastructure, and community development funding, as well as other sources for brownfields assistance.

**Table 13 - Redevelopment Funding Sources for BTC Projects (subset of 14 projects)**

Public Redevelopment Funding		Sites Reporting	Total Amount	% of Redevelopment Funds
Mass Brownfields Tax Credit		14	\$ 17,500,337	42.0%
Other sources:				
Federal sources:				
	EPA Brownfields	3	\$ 970,000	2.3%
	New Markets Tax Credits	1	\$ 2,600,000	6.2%
	CDBG	2	\$ 713,000	1.7%
	Federal Historic Tax Credit	1	\$ 4,450,000	10.7%
	Other federal	2	\$ 4,300,000	10.3%
	<i>Federal total</i>		\$ 13,033,000	31.3%
State sources:				
	MASS BRAC	2	\$ 1,408,000	3.4%
	Mass Developmt BRF	5	\$ 2,413,256	5.8%
	Other state	3	\$ 6,375,000	15.3%
<i>State total w. BTC and other</i>			\$ 27,696,593	66.5%
Local		2	\$ 913,000	2.2%
<b>Total, public redevelopment funding sources*</b>		<b>14</b>	<b>\$ 41,642,593</b>	<b>100%</b>

Table 13 and Figure 5 portray the results. Six of the fourteen sites used the BTC credit but used no other public funding. Overall BTC provided 42 percent of public redevelopment funding, indicating that BTC was a key gap closer for these projects. State commitments outweighed federal dollars by more than two-to-one. This is consistent with national findings – that state investments tend to outweigh

federal and local commitments.<sup>40</sup> The most frequently used incentive, other than BTC, was the Mass Development Brownfields Redevelopment Fund, used by five projects.

**Figure 5 - Public Redevelopment Funding – All Sources (subset of 14 BTC Projects)**

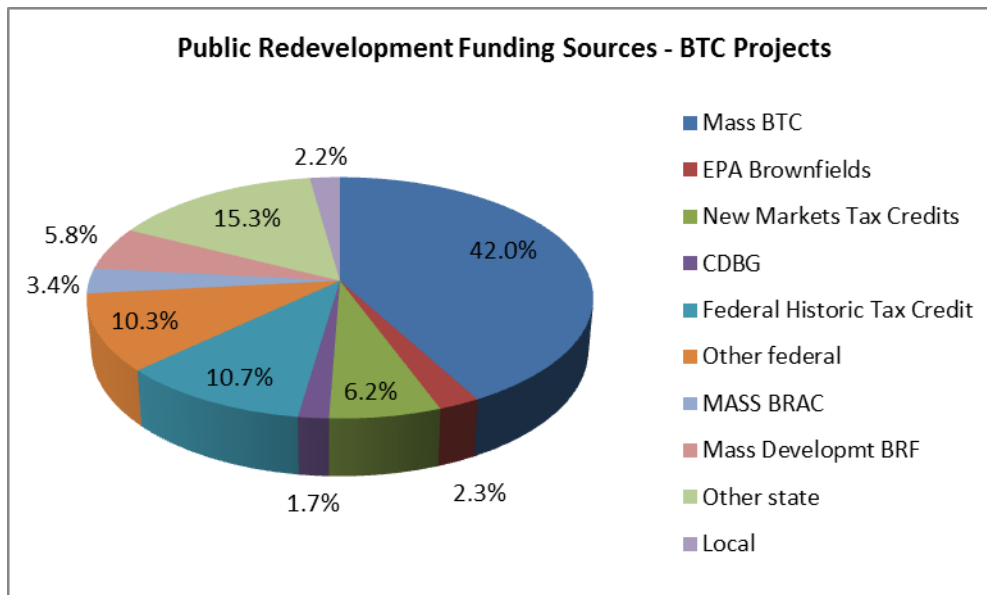
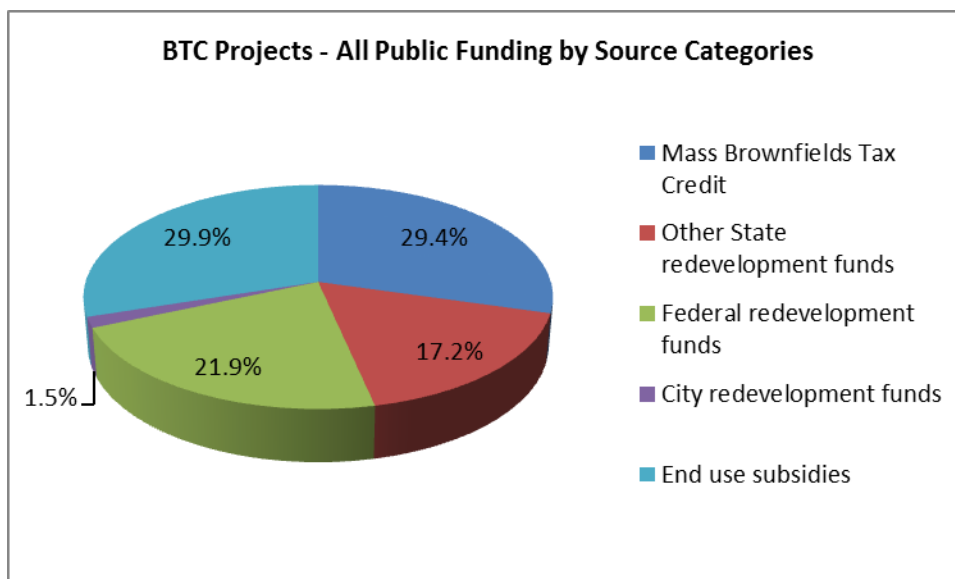


Figure 6 shows the bigger picture of all public funding sources, including \$17.8 million categorized as “end use” funding. The BTC provides 29 percent of all public funds.

**Figure 6 - Funding Sources by Level of Government**



<sup>40</sup> Op cit, Northeast-Midwest Institute

Table 14 broadens the perspective to also include private funding. Note that private and philanthropic funds comprise 92.3% of total capital investment for the 14 BTC projects. Table 15 calculates leverage ratios using several variables. One key finding is that \$1.00 of BTC credits leverages almost \$41.00 in private (including philanthropic) funds.

**Table 14 - Capital Funding by Source (subset of 14 BTC Projects)**

Capital Investment by Source:		\$\$ amount	percentage of all capital investment
Public redevelopment funding			
	Mass Brownfields Tax Credit	\$ 17,500,337	2.3%
	Other redevelopment funding	\$ 41,642,593	5.4%
Total public redevelopment funding		\$ 59,142,930	7.7%
Public end use funding		\$ 17,800,000	2.3%
Total public funding		\$ 76,942,930	10.0%
Foundations		\$ 7,000,000	0.9%
Total private investment		\$ 702,964,437	91.4%
Total private and philanthropic		\$ 709,964,437	92.3%
Total capital investment		\$ 769,407,030	100.0%

**Table 15 - Capital Investment Leverage Ratios (subset of 14 BTC Projects)**

Leverage ratios (14 site subset)		
	Capital investment (all sources) leveraged by \$1.0 Mass Brownfields Tax Credit*	\$ 43.97
	Total private funds (including philanthropic) leveraged by \$1.0 BTC	\$ 40.57
	Capital investment (all sources) leveraged by \$1.0 public redevelopment funds	\$ 13.01
	Capital investment (all sources) leveraged by \$1.0 public funds (including end use subsidies)	\$ 12.94
	Total private funds (including philanthropic) leveraged by \$1.0 public funds (including end use subsidies)	\$ 11.94
* Note the corresponding leverage ratio for ALL BTC projects is \$45.59		
Source: IMPLAN and Redevelopment Economics		

## APPENDIX G - BROWNFIELDS VS. GREENFIELDS INFRASTRUCTURE COSTS

### BROWNFIELDS AND INFRASTRUCTURE

Brownfields redevelopment is generally assumed to save infrastructure costs relative to alternative greenfields development; however, there is little previous brownfields-specific research that attempts to quantify the cost savings. EPA summarizes the brownfields infrastructure advantages in narrative terms, as follows:

Infrastructure, such as roads and utilities, to support brownfield redevelopment generally requires less land per capita and results in less stormwater runoff than infrastructure needed to support a similar amount and type of conventional development. Generally, the lower the population density, the more roads and highways are called for to connect trip origin and destination points. On the other hand, residents and employees in more efficiently located, compact communities typically drive less and have opportunities to use other transportation modes. The resulting lower demand for highways implies fewer lane-miles and less road surface and, consequently, lower stormwater runoff, energy consumption, and cost for construction, maintenance, snow removal, and highway safety programs. Studies have shown that infrastructure costs for conventional development are significantly higher than that of infill areas.<sup>41</sup>

The following analysis examines previous research, compares that to the information for the Massachusetts Brownfields Tax Credit (BTC) projects, and then develops a quantitative “order of magnitude” estimate of the infrastructure savings attributable to the BTC projects.

### NATIONAL RESEARCH

There have been a series of studies that compare infrastructure costs for compact development vs. sprawl development. These studies have quantified the infrastructure savings due to compact development at between 10<sup>42</sup> and 65 percent,<sup>43 44</sup> with most

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<sup>41</sup> US Environmental Protection Agency, “Air and Water Quality Impacts of Brownfields Redevelopment,” October 2011, available at <http://www.epa.gov/brownfields/BFEnvironImpacts042811.pdf>

<sup>42</sup> Robert Burchell, David Listokin, Anthony Downs, et. Al, “**Costs of Sprawl Revisited.**” National Academy of Sciences/ National Research Council. Transportation Research Board TCRP H-10. 1998.

<sup>43</sup>.Center for Energy and Environment. (1999). *Two Roads Diverge: Analyzing Growth Scenarios for the Twin Cities Region*. [www.me3.org/sprawl](http://www.me3.org/sprawl). Hammer, Siler, George Associates and Gould Evans Goodman Associates. (2001). *Smart Choices: Understanding the Cost of Development*. Mid-America Regional Council.

<sup>44</sup> Mix, Troy D. “Exploring the Benefits of Compact Development,” for Delaware’s Office of State Planning Coordination, 2003

studies estimating the differential at 20 – 30 percent.<sup>45</sup> However, these studies understate the brownfields vs. sprawl differential because:

- The studies are generally looking at two options for NEW development: compact vs. sprawl. It can be assumed that any NEW development, even if it is compact, will require infrastructure investments. Brownfields projects, on the other hand, are almost always infill/REdevelopment and many are comfortably served by existing infrastructure. Thus, the difference between “new/compact” and “infill/redevelopment” (including brownfields) can be quite significant, i.e. the cost of building new infrastructure, even for efficient land uses, is bound to be significantly greater than repairing and hooking up a redevelopment project to the existing system.
- The density differential used in most of these studies (2-5 DU/ac for sprawl and 5-10 DU/ac for compact) understates the density of brownfields projects. For example, the Massachusetts BTC residential projects average 16 units per acre, consistent with national data.<sup>46</sup>

The authors have been able to find only two studies that make an appropriate distinction between compact development and brownfields/infill, as opposed to new compact development.

**JAMES FRANK STUDY.** First, a widely cited 1989 analysis by James Frank examined the results from eight previous studies and created a graph of the per dwelling unit costs of providing infrastructure. This analysis differentiated projects by infill, contiguous, and leapfrog patterns, as well as by a range of densities and distance from the center.<sup>47</sup>

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<sup>45</sup> Ken Snyder and Lori Bird, “Paying the Costs of Sprawl: Using Fair-Share Costing to Control Sprawl,” December, 1998.

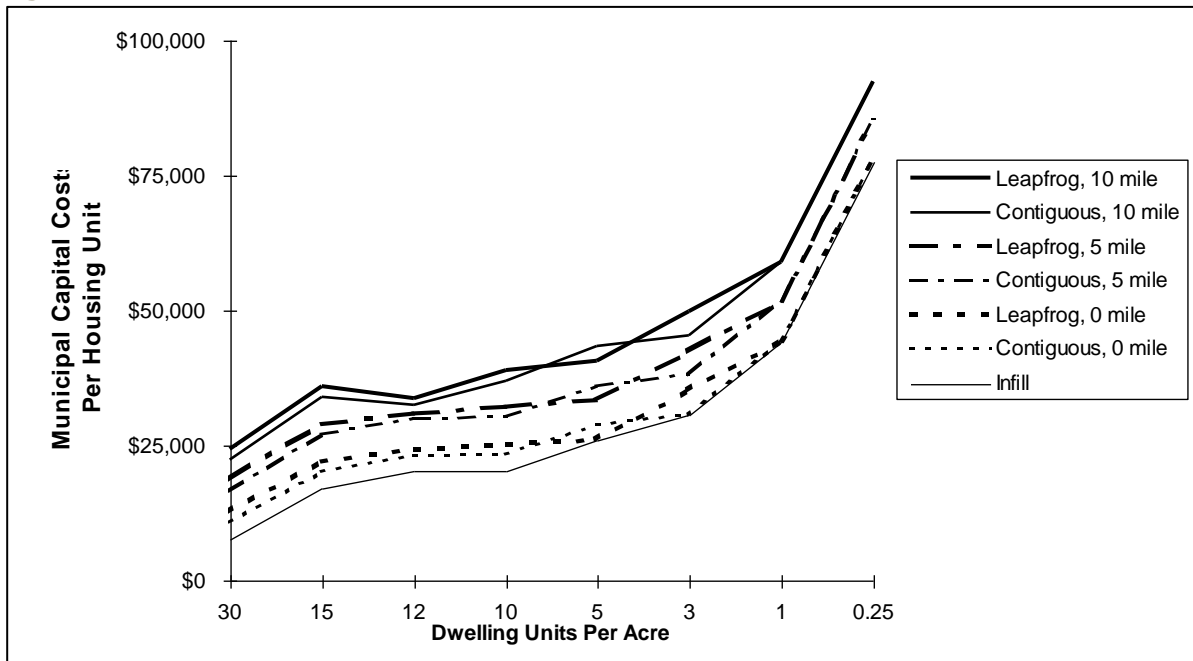
<sup>46</sup> Evans Paull, Northeast-Midwest Institute, “The Environmental and Economic Impacts of Brownfields Redevelopment, a Working Draft,” July, 2008, available at:

<http://www.nemw.org/images/stories/documents/EnvironEconImpactsBFRedev.pdf>

<sup>47</sup> James Frank, “**The Costs of Alternative Development Patterns: A Review of Literature.**” Washington, DC. Urban Land Institute. 1989.



**Figure 1 - Residential Service Costs of Infrastructure - James Frank**



Massachusetts BTC projects would all fall within the definition of infill and BTC residential densities are 15.6 DU per acre, which corresponds to infrastructure costs on the order of \$20,000 per unit in 1989 dollars (\$37,000 in 2012 dollars). Spread development, assuming contiguous @ 3-5 units per acre and 5 miles from the center, costs \$35,000 to \$40,000 per unit in 1989 dollars (or \$65,000 to \$74,000 in 2012 dollars). By these calculations the infrastructure savings attributable to BTC projects is a little below 50 percent or between \$28,000 and \$34,000 per DU.

**CENTER FOR NEIGHBORHOOD TECHNOLOGIES** - A 2003 Center for Neighborhood Technologies (CNT) study suggests it takes at least five times more infrastructure investment for a greenfields site (at \$50,000 per unit) relative to an infill/grayfields site (at less than \$10,000 per unit).<sup>48</sup> Updating the 2003 data to 2012 dollars results in a differential of \$62,000 per unit/greenfields vs. \$12,500 per unit/brownfields. The CNT conclusion does not appear to represent quantitative analysis of specific sites; rather it reflects the observation that infill development often fits into the existing street grid and minimal infrastructure is needed.

The Capital Area Regional Planning Commission in Wisconsin has produced comparative infrastructure cost data focused on the influence of density. Service costs for recently permitted projects, counting road, water, sewage and stormwater services, were estimated based on actual costs incurred, and indexed to a per-capita basis for occupancy. At the lowest densities, the cost to service was \$25,000 and at the highest

<sup>48</sup> Scott Bernstein, "Using the Hidden Assets of America's Communities and Regions to Ensure Sustainable Communities." Center for Neighborhood Technology, 2003, <http://www.cnt.org/hidden-assets/pt1f.html>

\$10,000 per capita, respectively, a 60% differential.<sup>49</sup> The high density category included both new/compact and infill/redevelopment. The author of the Massachusetts study speculates that, had the study focused on infill/redevelopment in the high density category, the differential may have risen to 80-20 split predicted by CNT.

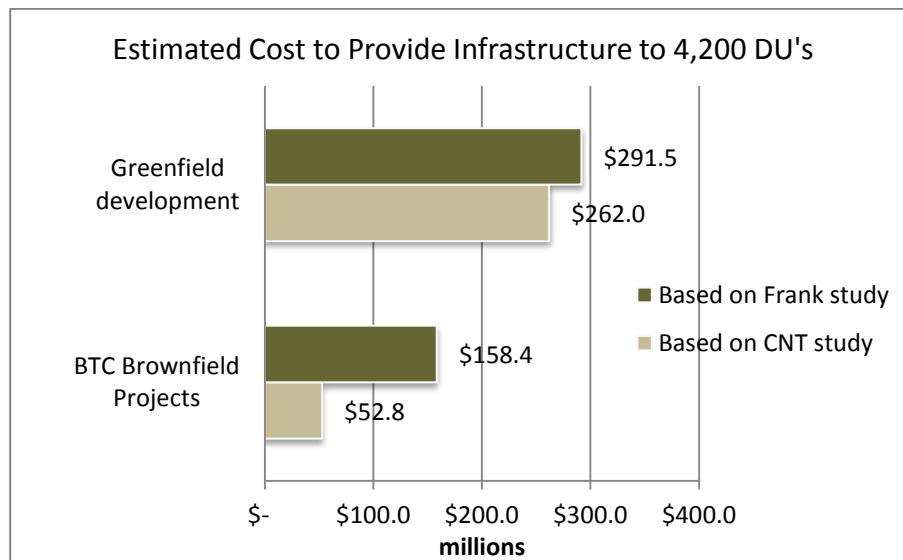
## MASSACHUSETTS BTC PROJECTS/INFRASTRUCTURE SAVINGS

For the Massachusetts BTC projects, analysts counted 18 projects where the information was sufficient to determine whether there were significant infrastructure investments (eleven of the on-line survey responses and seven case studies projects that were covered through interviews). Of these 18 projects only three (17 percent of all projects) listed any infrastructure funding that was required, and all three projects were industrial-commercial, not residential. This limited sample supports the higher 80-20 differential in the CNT study.

Nevertheless, the following estimates conservatively apply BTC project numbers to both models (the Frank study and the CNT study). Figure 5 depicts the two scenarios, applied to the 4,212 DUs that are existing or under construction in BTC projects.

The result is that residential BTC projects can be credited with saving infrastructure investments of between \$132 and \$208 million.

**Figure 2 - Infrastructure Investments "Saved," BTC vs. Greenfields**



It should be pointed out that, in many jurisdictions, developers are paying at least some of the bill for infrastructure through impact fees, water and sewer hook-up fees, special assessment districts, and other mechanisms. A 2011 national survey of impact fees

<sup>49</sup> Personal communication, Center for Neighborhood Technology, July 25, 2012.

(including water and sewer hook-up fees) found that impact fees average \$11,908 per unit, which is approximately 20 percent of the true costs of suburban infrastructure.<sup>50</sup>

However, because other mechanisms, such as special assessment districts, were not included in the survey, the Massachusetts analysts have conservatively assumed that state and local governments pay at least one-half of the infrastructure costs. This leads to the conclusion that the state and local government cost savings attributable to BTC projects is between \$66 and \$104 million (See Table 1).

Note this counts only the direct cost of providing infrastructure. Many researchers have argued that the true cost of greenfields/suburban infrastructure should include numerous indirect costs, such as: blight and abandonment of urban centers; health costs associated with less walking in car-dependent environments; and greater energy (and other natural resource) consumption.<sup>51</sup> The latter point (natural resource consumption) was the subject of a separate CNT study.<sup>52</sup> Further, the current analysis only represents that capital side of the equation, and a full accounting would also include the presumably greater operation and maintenance costs of sprawl-related infrastructure.

Table 1 - Infrastructure Costs BTC projects vs. Greenfields

	BTC projects	Greenfields (theoretical)	Difference
<b>DU</b>	4,203	4,203	
cost per DU, CNT study	\$ 12,500	\$ 62,000	\$ 49,500
cost per DU, Frank study	\$ 37,500	\$ 69,000	\$ 31,500
<b>Total cost to build infrastructure</b>			
> CNT study	\$ 52,537,500	\$ 260,586,000	\$ 208,048,500
> Frank Study	\$ 157,612,500	\$ 290,007,000	\$ 132,394,500
<b>Assume state-local government funds 50% of infrastructure</b>			
> Public infrastructure cost savings using CNT study differential	\$ 26,268,750	\$ 130,293,000	\$ 104,024,250
> Public infrastructure cost savings using Frank study differential	\$ 78,806,250	\$ 145,003,500	\$ 66,197,250

## CONCLUSION

<sup>50</sup> Duncan Associates, 2011 Impact Fee Survey, see: <http://impactfees.com/>

<sup>51</sup> Ken Snyder and Lori Bird, "Paying the Costs of Sprawl: Using Fair-Share Costing to Control Sprawl," December, 1998. .

<sup>52</sup> "Analysis of Infrastructure Capital Stock Accounts Including Depreciation, 2006-2007," Center for Neighborhood Technology 2009.

The conclusion is that Massachusetts BTC projects save infrastructure costs, relative to alternative greenfields development, by 50 to 80 percent, the former consistent with the James Frank study; the latter consistent with the Center for Neighborhood Technology analysis and the limited sample of BTC projects. It is acknowledged that the 80 percent part of the range is less well documented and follow-up analysis is recommended.

The result is that residential BTC projects can be credited with saving infrastructure investments of between \$132 and \$208 million.

As a very conservative “order of magnitude” estimate, researchers assumed that state and local governments pay at least one-half of the infrastructure costs, which translates into a state-local-government cost savings attributable to BTC projects of between \$66 and \$104 million. The total cost of the BTC credit to Commonwealth taxpayers for the projects surveyed was \$53.8 million. This analysis indicates BTC investments may be largely recouped just in foregone infrastructure investments.

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