Montachusett Regional Planning Commission (MRPC) in Conjunction with Montachusett Opportunity Council (MOC) and the City of Fitchburg

Fitchburg

Health Impact Assessment

Guiding the Transformation of Vacant Lots Under 5000 Square Feet

Edition 1

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Executive Summary

The Montachusett Regional Planning Commission was asked to produce a Health Impact Assessment (HIA) in February of 2013. The purpose of the HIA is to study the effects of introducing at least one of three strategies (community/cultural play spaces, urban agriculture and off-street parking) to each of the vacant lots under 5,000 square feet in four neighborhoods of Fitchburg. The four neighborhoods (Elm St., Fitchburg State University/Highland, Lower Cleghorn, and Water St./Green Acres/The Patch), are considered to be low income, minority neighborhoods with high instances of crime. The funding for the project was supplied by the Massachusetts Department of Public Health (MassDPH).

This report was compiled using primary data from walk audits and focus group meetings; secondary data from various sources including both Fitchburg City and Fitchburg State University Police (FSUPD) forces, Environmental Systems Research Institute (ESRI) (a Geographic Information Systems [GIS] developer) and the US Census; and a comprehensive literature review of published, peer-reviewed, white and grey papers. Each of these elements were compiled to give a holistic review of the 4 neighborhoods and the three strategies to be implemented.

The MRPC staff was able to arrive at several conclusions about each strategy:

- Chief among the conclusions is the community must be the prevalent voice in deciding the development of each lot. The success of the development of vacant lots is entirely dependent on the surrounding community, as they will either use the space if chosen properly, or abandon it if the wrong strategy is chosen. If the wrong strategy is chosen, the lot is likely to fall back into vacant lot status.
- Furthermore, each lot needs to be developed on an individual basis rather than as part of a cookie cutter approach, as these neighborhoods have their own unique characteristics.
- Increased police patrol/presence is requested in all neighborhoods and necessary to maintain safe spaces in the converted lots.
- All spaces must be well lit
- Some form of fencing must exist to deter crime, and may include plants such as short hedges as barriers
- To establish community gardens, a set of “How To” sessions would be needed for those with no gardening experience
- Employ raised beds as an alternative to extensive site cleanup of contaminated grounds
- Some play spaces should incorporate natural elements, while others could incorporate the concept of the outdoor gym to promote health
- The use of permeable pavement could improve the safety of residents, as it allows less ice to form, and when plowed, retains less snow melt
- Wherever possible include elements of Low Impact Development (LID is the practice of planning a site to manage stormwater runoff using natural solutions)

The findings of this HIA will be presented to the Vacant Lot Workgroup (VLWG) and MassDPH, as well as various stakeholders and community elements with interest in the HIA process and outcomes. The VLWG will use the findings to guide the development of vacant lots in the future.

It is recommended that this HIA be maintained as a living document, this being the first edition of many. In order to achieve this goal, care must be taken to not only update the statistics, but the literature as well as surveys to maintain the proper direction in accordance with the communities wants and needs. Some of our suggested evaluation factors for continued monitoring and updating of this assessment include:

- How many residents (adults and children) utilize the site?
- Have gardening skills/knowledge changed in the neighborhood?
- Has fruit and vegetable consumption in the neighborhood changed?
- Has the level of physical activity in the neighborhood changed?
- Has the level of neighborhood social interaction changed?
- Has the perception of safety in the neighborhood changed?

Document Guide

This Health Impact Assessment (HIA) report summarizes the process, data and findings that were utilized by MRPC in developing a set of practical recommendations for enhancing health benefits as well as mitigating any potential hazards associated with the three strategies being considered to address the issue of vacant lots and their blighting neighborhood impacts in Fitchburg. In addition, because of the challenging and inequitable conditions often faced by low-income neighborhoods of minority concentration — such as lack of access to community resources and conditions that promote optimal health, safety and quality of life — the HIA process examined how this project can foster greater neighborhood access to these important social determinants of health. The report is organized into five major sections.

Section I

Provides an overview of the project, including decision makers and timeline for this HIA process; outlines the screening and scoping phases of this HIA, with a focus on stakeholder and community engagement; describes the research questions that guided MRPC's examination of the project, including pathway diagrams to show the connections between the site components and potential health impacts and outcomes; and discusses the methodology used to assess the potential health impacts.

Section II

Provides a description of the health behaviors, perceptions and status of the neighborhood, and characterizes how each of the three project strategies may impact the neighborhood's health based on the research.

Section III

Proposes recommendations on how to best maximize the benefits and minimize the hazards associated with the project as a whole, as well as with each of the three strategies.

Section IV

Outlines the plan for the dissemination of the HIA findings; offers suggested approaches for evaluating whether the HIA met its goals; recommends indicators for monitoring the impacts and outcomes over time; and discusses limitations of the HIA.

Section V

Outlines the future of the HIA document and information on the collection of data.

Appendices

Contain detailed findings referred to in the body of the report, as well as further information and resources that will serve to better inform decision makers on executing the recommendations in the last section.

Table of Contents

Section I: Background 1

Decision Making and Stakeholder Engagement

Section II: Assessment 4

Methodology
Socio-Demographic Profile of Impacted Community
Existing Conditions

Section III: Health Impacts 19

Introduction to Health Determinants
Pathways
Literature Review
- Community and Cultural Play spaces
- Urban Agriculture
- Off Street Parking

Section IV: Recommendations 41

Section V: Reporting, Evaluation and Monitoring 45

Application
Tracking the impact of the vacant lots on health determinants and health outcomes
Limitations

Section VI: Appendix 48

Section I: Background

HIA Background

The City of Fitchburg is proposing a series of strategies related to the redevelopment of the City's vacant lots, focusing on lots less than 5,000 square feet located within the Elm Street neighborhood, University/Highland St. neighborhood, the Lower Cleghorn neighborhood, and the Green Acres/ Patch/Water Street neighborhood. The Fitchburg Vacant Lots HIA will examine City proposals for the redevelopment of vacant lots. These proposals include the following strategies:

1. Zoning reform to allow for urban agricultural use of vacant lots. Agricultural use could include community gardens/market gardens, farmers markets, tree farms, livestock 1.
2. Adopting policies to use vacant lots for off-street parking.
3. Zoning reform and other policy options to allow for the development of play and community cultural spaces on vacant lots (to include a possible "adopt a lot" policy).
4. All of the above strategies will include considerations of stormwater management as being impacted by these three (3) strategies, as stormwater can also have impacts on public health in addition to environmental health. As part of adopting policies to use vacant lots, the City will consider stormwater management policies that include options such as rain gardens, bio-retention areas, porous pavement, and vegetative dry swales.

During walk audits within the target neighborhoods conducted by the Fun 'n FITchburg Partnership related to active living, residents consistently identified the vacant lots as barriers to feeling safe to access existing parks within their neighborhoods. Vacant lots, in general, can have a blighting influence on a neighborhood. The "broken windows theory," which can be considered relevant to unkempt vacant lots, is a criminological theory of the norm-setting and signalling effect of urban disorder and vandalism on additional crime and antisocial behavior. The theory states that maintaining and monitoring urban environments in a well-ordered condition may stop further vandalism and escalation into more serious crime 2. Living in neighborhoods with significant physical or social disorder can generate stress and fear which can constrain outdoor activities.3,4 Conversely, safe and clean neighborhoods invite outdoor activity. The HIA will investigate the various strategies for the vacant lots in the identified neighborhoods with two objectives: 1) Inform the policy development process for the vacant lot strategies and 2) help define the health-related metrics that will inform both residents and policy-makers as decisions are made to implement City ordinance and regulatory changes.

HIA Introduction

A Health Impact Assessment (HIA) is commonly defined as "a combination of procedures, methods, and tools by which a policy, program, or project may be judged as to its potential effects on the health of a population, and the distribution of those

effects within the population". 5

An HIA is used to evaluate the potential health effects of a project or policy before it is implemented. An HIA can provide opportunities to identify recommendations to increase positive health outcomes and minimize adverse health outcomes. The HIA framework is used to incorporate public health impacts into the decision-making process for plans, projects, and policies that fall outside of traditional public health arenas.

The major steps in conducting an HIA include:

- Screening (identifying projects or policies for which an HIA would be useful)
- Scoping (identifying which health effects to consider)
- Assessing risks and benefits (identifying which demographics may be affected and making predictions about how they may be affected)
- Developing recommendations (suggesting changes to proposals to promote positive or mitigate adverse health effects)
- Reporting (presenting the results to decision-makers and impacted stakeholders)
- Evaluating (determining the effect of the HIA on the decision).

The HIA process should be utilized on a continuing basis as a tool to document circumstances justifying particular strategies as additional neighborhoods that will benefit from the strategies are identified. The HIA should document needs, obstacles, opportunities and benefits to aid decision makers and community members in embarking on an implementation program in an informed manner.

1 Decision Making and Stakeholder Engagement

A HIA Steering Group was established to provide oversight over the development of the HIA and its application. The Steering Group consists of two representatives from the Montachusett Opportunity Council (MOC), the Fitchburg Board of Health Director, and the Montachusett Regional Planning Commission (MRPC) Director of Comprehensive Planning. The Fun 'n FITchburg's Healthy Zoning/Vacant Lot Working Group, a team of diverse stakeholders, has been designated as the HIA Advisory Committee to provide proactive input throughout the scoping, assessment, recommendations, and dissemination stages.

Fun 'n FITchburg was started in 2009 as a city of Fitchburg initiative to reduce obesity and risk for subsequent chronic conditions (diabetes, heart disease, stroke, asthma, and certain types of cancer) through increased opportunities for youth and families to eat healthy and live active lives. The Fun 'n FITchburg Partnership will be utilized for dissemination and review of key findings and the draft HIA report, enabling public review of the draft and incorporation of comments into the Final HIA. The Zoning/Vacant Lot Working Group represents a wide range of interests and expertise in the community, including residents, safety, community organizing, the Department of Public Works, etc. Ongoing efforts are being made to expand this group to include others who may have a particular interest or expertise to lend. The Working Group is in the process of developing a multi-faceted strategy to turn Fitchburg's vacant lots into positive community assets. Once vacant lots are identified by the Working Group, a strategy is identified. The working group intends to seek funding to implement the strategy.

Other interested parties, such as the Trustees of Reservations, Parks Boards and City Councilors, were also informed about the HIA effort through e-mails announcing Working Group meetings and providing updates on overall progress. An inventory of key stakeholders which have been consulted at one or more points in the study process are shown in Appendix 01.

Scoping

Over 50 stakeholders attended an initial scoping session for this HIA on April 4, 2013. Based on the ideas and concerns identified by stakeholders at the scoping session, a list of factors and pathways was compiled and vetted:

- Follow up with all who attended the scoping session with a Google Form survey so the stakeholders can comment on these factors and the process. Additionally, the survey asked about their interests and level of involvement in the HIA so as to identify additional members to serve on the Project Advisory Committee, assist in the identification of technical experts, and recruit volunteers to review the draft HIA.
- Presentation to the Healthy Zoning/Vacant Lot Working Group, which is acting as the Advisory Committee.

Assessment

During the assessment phase, stakeholders were engaged to provide feedback on the initial approach, preliminary findings, methods, and data sources by:

- Engaging technical experts to provide feedback on the assessment stage
- Sending the preliminary findings to the Advisory Committee

Recommendations

The recommendations stage is an important phase of the project for stakeholder feedback. The Advisory Committee reviewed and prioritized the HIA's recommendations.

Additionally, a draft of the HIA report was provided to people that volunteered to review said draft of the HIA in the survey from the scoping phase as well as technical experts.

Dissemination

The Fitchburg HIA Project Core Team met and discussed themes and messages from different audiences from the findings and recommendations to help inform the HIA's release.

Section II: Assessment

Methodology

This HIA used three research methods, primary data collected in neighborhood group meetings, secondary data analysis and literature reviews.

1. Primary Data: a focus group to assess local resident's behaviors and feelings, as well as walkability studies and neighborhood meetings.
2. Secondary Data Analysis: a summary of statistics available on demographics, health behaviors and health outcomes in each area of interest.
3. Literature Review: review of peer-reviewed and grey literature for each health determinant as related to each strategy.

Primary Data

Primary data was collected in the form of focus groups and brief qualitative surveys taken by key stakeholders in Fitchburg. A focus group was hosted by the Lower Cleghorn Neighborhood Association on July 9, 2013 in order obtain community feedback on the three proposed strategies and identify any barriers that the literature review may have failed to illuminate. This HIA specific focus group supplemented other sources of primary data such as the data from Fun 'n FITchburg walkability studies, focus groups, and stakeholder interviews. This qualitative data is imperative to creating a picture of the neighborhood stigmas, as well as the decision process that chose the strategies that are analyzed in this report. In addition, though the collection of primary data yielded valuable information, the process of it also engaged community members and contributed to buy-in from the affected communities.

Secondary Data Analysis

Secondary data collected provided a holistic picture of existing conditions in Fitchburg. In order to get a baseline assessment of crime, physical activity, nutrition, mental health, social cohesion, neighborhood stigma, and water quality, data on numerous indicators was collected. When possible, data measuring indicators of health determinants was disaggregated by race, gender, and specific neighborhoods. However, much of the data compares Fitchburg to state and national averages. The descriptive statistics were used to assess if the findings of associations in the literature review were likely to apply in Fitchburg. If the measures of health in Fitchburg resembled many of the baseline conditions in the studies from the literature review it strengthened evidence that the health pathways would be likely proceed. Data was collected primarily from the US Census Bureau, ESRI Business Analyst Online (ESRI BAO), the Behavioral Risk Factor Surveillance Survey (BRFSS), Our Healthy Mass, and Fitchburg Police Department. Much of the secondary data is presented in the assessment portion of this report, alongside findings from the literature review.

It is important to note this is the first time MRPC has used ESRI BAO for a document such as this, and it has been an invaluable tool to locate and analyze data in each neighborhood.

Literature Review

A literature review was conducted to survey the prominent associations between the three identified redevelopment strategies and the seven identified health determinants. Searches for peer-reviewed articles were conducted in journal databases on Pubmed, medlineplus, and JSTOR. Google Scholar was used to collect a wider range of articles such as reports, news articles, or non-peer reviewed articles in various journals. The search terms used were a combination of one of the three development strategies with one of the six health determinants for a total of at least 18 different search term combinations. For example "urban agriculture" and "physical activity" would comprise a single search query. Variations of each of the development strategy phrases were used such as urban agriculture, community gardening, or urban gardening.

The literature reviewed provided a substantial amount of the evidence used to inform the findings in this HIA. The articles included in the literature review write-up were those that provided qualitative or quantitative evidence of associations between the specific redevelopment strategy and the health determinants, whether those associations were positive or negative. The sample sizes of many of these studies provided varying degrees of significance, as did the findings from reports. The most significant findings were cited in the HIA. The evidence from the literature review provided substantial evidence for the proposed pathways and informed the predictions and recommendations when examined in conjunction with the secondary and primary data collected from Fitchburg.

Socio-Demographic Profile of Impacted Community

The following tables provide demographic information for the study area (focus neighborhoods) and the City of Fitchburg as a whole also compared to the Commonwealth where relevant.

Population

This section presents demographic and socioeconomic characteristics for the four Focus Neighborhoods (Elm Street, University/Highland, Lower Cleghorn and Water Street/Patch/Green Acres), Fitchburg and Massachusetts for purposes of comparison. According to the 2010 Census, the total study area population was 13,983 residents, representing about a third of the City of Fitchburg's residents, as shown in Table 01.

Table 01: Population	Total Population	% of City
Elm Street	2,780	6.9%
University/ Highland	5,033	12.5%
Lower Cleghorn	3,044	7.5%
Water/Patch/ Green Acres	3,126	7.8%
Total Study Area	13,983	34.7%
Fitchburg	40,318	

Source: Census Bureau 2010

Age

Table 02 provides population by age. Generally the four areas have greater percentage of Youth population than the City as a whole; the City in turn has higher percentage of youth population than the State. The Study Areas have a slightly smaller percentage of elderly population (65+) than the City of Fitchburg with the exception of the University neighborhood which has the least amount of elderly and has nearly 5% fewer elderly than the State average. This is likely to be explained by the amount of Fitchburg State University students in that area.

Table 02: Population by Age	Elm St.		FSU/Highland		Lower Cleghorn		Water St./ Patch/ Green Acres		City of Fitchburg	
	#	% of Area Pop	#	% of Area Pop	#	% of Area Pop	#	% of Area Pop	#	% of Area Pop
0-9 Years	352	12.6%	498	9.9%	494	16.2%	452	14.5%	5,135	12.7%
10-19 Years	377	13.6%	1017	20.2%	458	15.0%	515	16.5%	5,879	14.6%
20-29 Years	517	18.6%	1332	26.5%	487	16.0%	434	13.9%	6,609	16.4%
30-39 Years	392	14.1%	432	8.6%	367	12.1%	411	13.1%	5,225	13.0%
40-49 Years	407	14.6%	509	10.1%	374	12.3%	419	13.4%	5,392	13.4%
50+ Years	734	26.4%	1,245	24.7%	864	28.4%	895	28.6%	12,078	30.0%
Total	2,779	99.9%	5,033	100%	3,044	100%	3,126	100%	40,318	100.1%

Source: U.S. Census 2010

Racial and Ethnic Distribution

Table 03 displays the racial and ethnic composition of the focus neighborhoods/Study Area, Fitchburg and Massachusetts. The study area is a more diverse community than the City of Fitchburg as a whole or the Commonwealth. All of the study areas have higher percentages of Hispanic persons than the City of Fitchburg and Massachusetts (Fitchburg itself has over double the percentage of Hispanic population Citywide versus the State percentage). All of the study areas have a higher percentage of Black residents than Fitchburg Citywide. Two of the neighborhoods have a higher percentage of Black residents compared to the Statewide percentage. The University neighborhood has a greater percentage of Asian population than Massachusetts while Lower Cleghorn and the Water Street neighborhood also have a higher percentage than Fitchburg as a whole.

http://www.stanislausfamilyjustice.org/home/community-resources/

Table_: Population by Race	Asian Alone	Black Alone	Other Alone	White Alone	Two or More Races	Latino/ Hispanic
Elm Street	57	193	409	1,992	130	835
FSU/ Highland	218	307	494	3,836	179	1,034
Lower Cleghorn	138	178	162	2,084	178	1,075
Water/Patch/ Green Acres	153	191	469	2,136	177	1,079
Fitchburg	1,465	2,049	3,803	31,529	1,472	8,727
Massachusetts	349,768	434,398	326,224	5,265,236	172,003	627,654

Data Note: Hispanic population can be of any race. Census 2010 medians are computed from reported data distributions.
Source: U.S. Census Bureau, Census 2010 Summary File 1. ESRI converted Census 2000 data into 2010 geography.

Households

All of the study area neighborhoods have a greater percentage of female head of household families than either the City of Fitchburg as a whole or the Commonwealth.

Table 03: House-holds by Family and Nonfamily	**Elm St.**		**FSU/ Highland**		**Lower Cleghorn**		**Water/Patch/ Green Acres**		**City of Fitchburg**		**MA**	
	#	**% of house-hold in area**	**#**	**% of house-hold in area**	**#**	**% of house-hold in area**	**#**	**% of house-hold in area**	**#**	**% of house-hold in area**	**#**	**% of house-hold in area**
Total	1,318		1,410		1,212		1,284		15,165		2,547,075	
Family Households	605	45.9%	733	52%	704	58.1%	753	58.6%	9,362	61.7%	1,603,591	63%
Husband-Wife Family	307	23.3%	395	28%	367	30.3%	388	30.2%	5,966	39.3%	1,178,630	46.3%
Other Family	298	22.6%	337	23.9%	338	27.9%	365	28.4%	3,396	22.4%	424,901	16.7%
Nonfamily Households	145	11%	195	13.8%	83	6.8%	88	6.9%	1,280	8.4%	211,221	8.3%

Source: U.S. Census 2010

Housing Units

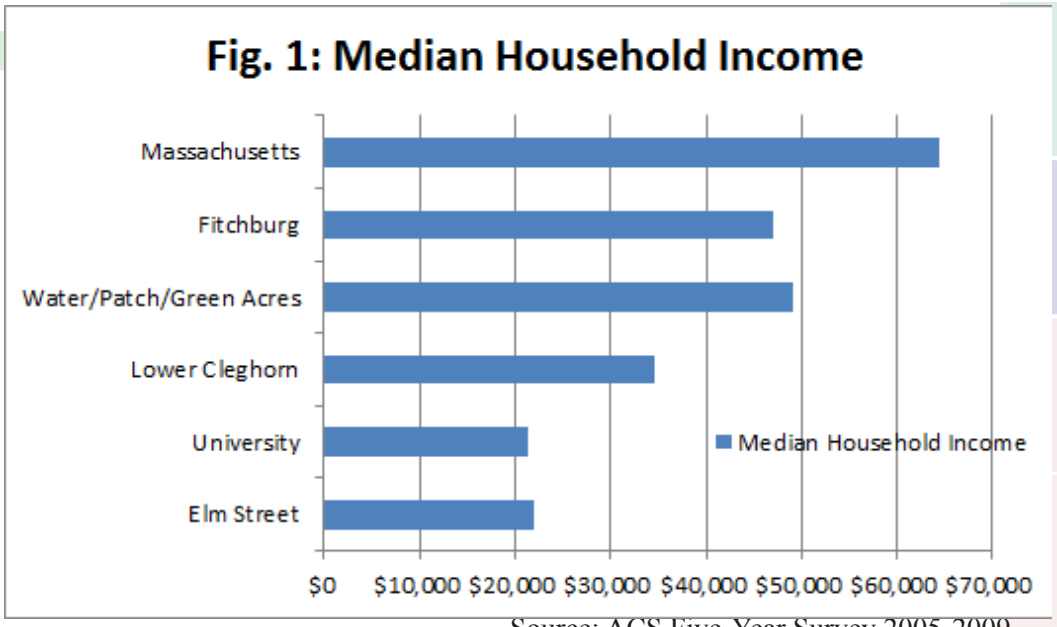
All of the target neighborhoods have a higher percentage of housing units that are renter occupied versus the City of Fitchburg and Massachusetts (The City itself has a higher renter-occupied percentage of its housing units than the Commonwealth). Some of these neighborhoods have significant renter-occupied housing units, especially in Elm Street, University and Lower Cleghorn, with the latter two having almost three-quarters of such housing units being renter occupied. See Table 04.

Table 04: Housing Units	**Elm St.**	**FSU/ Highland**	**Lower Cleghorn**	**Water/ Patch/ Green Acres**	**Fitchburg**	**MA**
Occupied Units	1,318	1,409	1,213	1,284	15,165	2,547,075
Owner-Occupied, with Morgage	283	385	282	360	6,258	1,177,473
Owner-Occupied, free and clear	68	146	87	117	1,933	409,685
Renter	967	878	844	807	6,974	959,917
Percent Owner-Occupied	26.6%	37.7%	30.4%	37.2%	54.0%	62.3%
Percent Renter-Occupied	73.4%	62.3%	69.6%	62.9%	46.0%	37.7%

Source: U.S. Census 2010

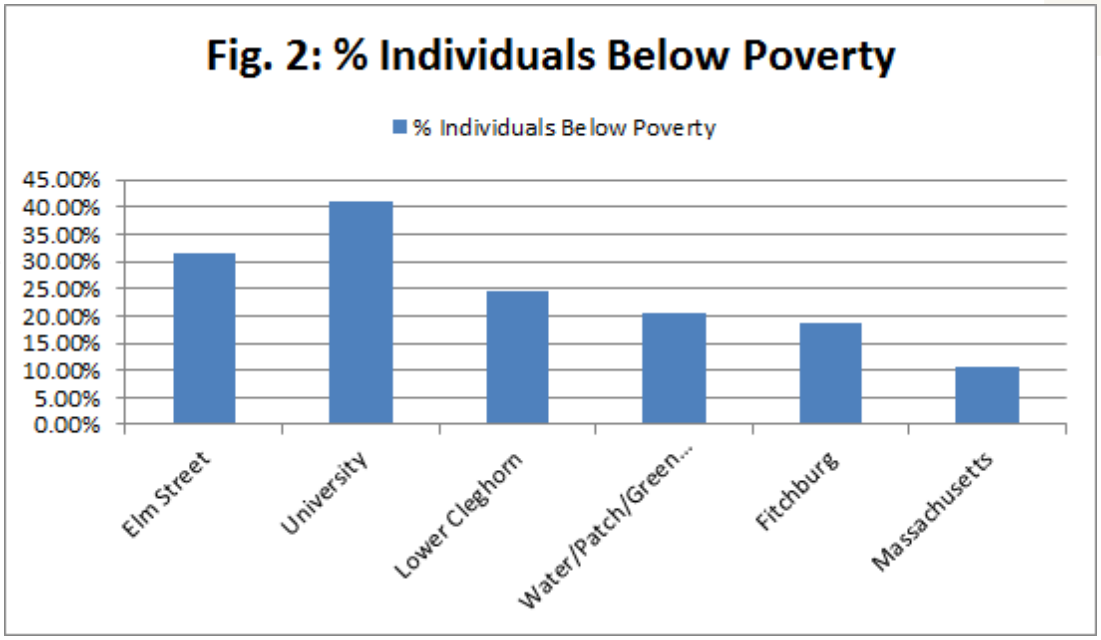
Income and Poverty

The median annual household income in three of the four study areas is lower than the City of Fitchburg and all are lower than the Commonwealth of Massachusetts, see figure 01. Residents that live within the Elm Street and University neighborhoods have approximately one-third the Median Household Income as the Commonwealth as a whole.



Source: ACS Five-Year Survey 2005-2009

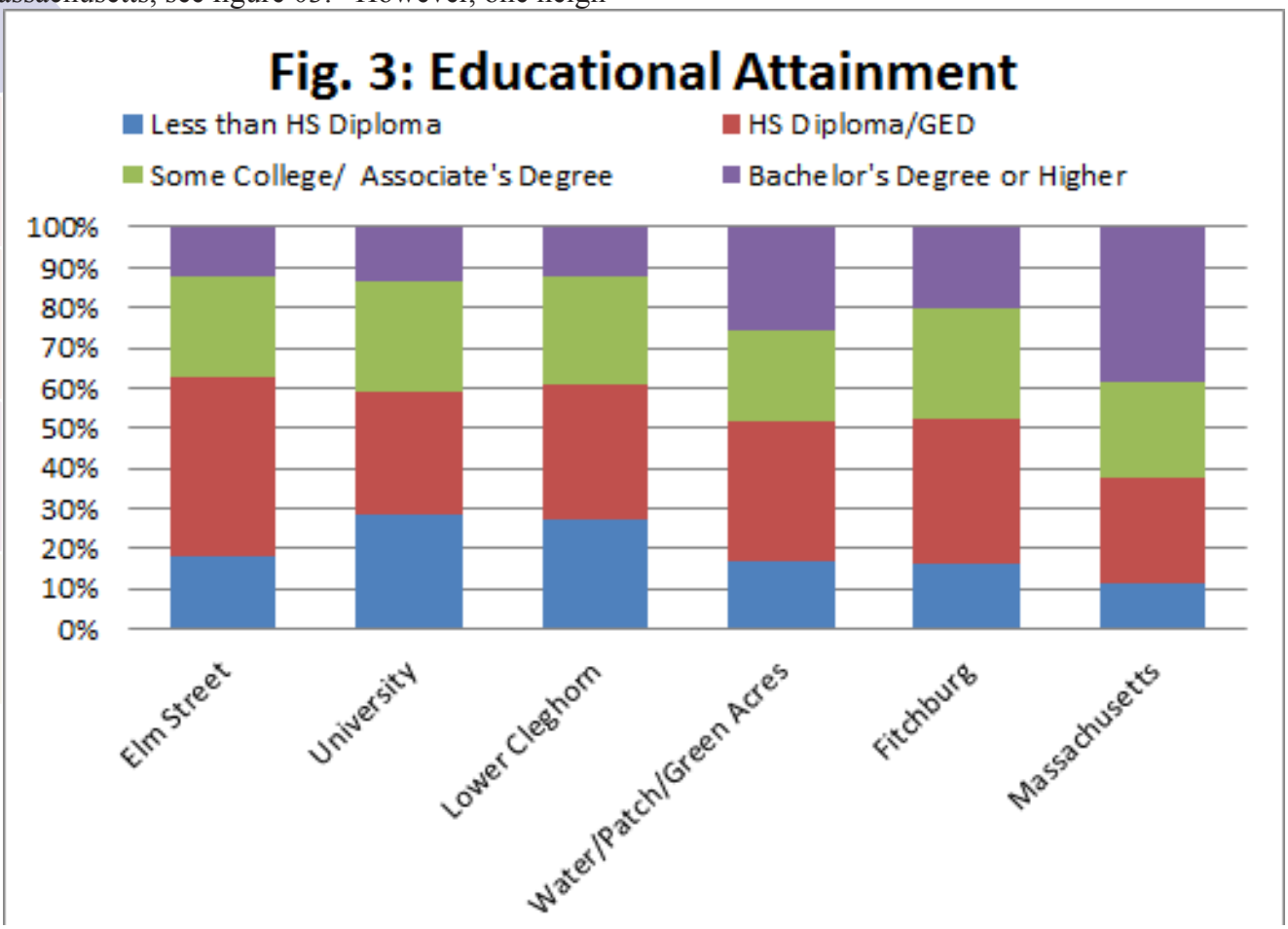
The percent of residents in each study area living below poverty is higher than both the City of Fitchburg and Commonwealth of Massachusetts, see figure 02. The City of Fitchburg as a whole has almost double the population (18.1%) living below poverty compared to Massachusetts, which is at 10.6%. The University and Elm Street neighborhoods have poverty rates at 41.10% and 31.40%, respectively, which are significantly higher than both the City and the Commonwealth.



Source: ACS Five-Year Survey 2005-2009

Education

Residents in all of the Study Area neighborhoods, and the City of Fitchburg as a whole, were less likely to have a Bachelor's degree than residents of Massachusetts, see figure 03. However, one neighborhood, Water/Patch/Green Acres residents were more likely (25.9%) to have a Bachelor's Degree than the City of Fitchburg (20.2%).



Source: ACS Five-Year Survey 2005-2009

Existing Conditions

Currently within the city of Fitchburg, the majority of vacant lots are open spaces. Some are overgrown, others are strewn with trash, many others have become makeshift off street parking. There have been attempts in the past to place community gardens on some of these lots. However, these efforts have failed and fallen back into disrepair. The lots that are being considered in this report are all either city owned or privately owned (under city lien) lots less than 5,000 square feet in high density, low income neighborhoods. These vacant lots pose a health and safety threat to the community as well as a drain on the local economy as they do not produce tax revenue. The need to convert these lots into beneficial and useful locations is paramount to the revival of Fitchburg.

Safety From Crime

Table 05 provides crime statistics divided into categories of Violent Crime, Property Crime, Drug Violations and Vandalism. The statistics are based on Fitchburg Police Department 2012 crime data for the City of Fitchburg as a whole and the Elm Street, Lower Cleghorn and Patch/Water Street/ Green Acres neighborhoods. University neighborhood statistics are Fitchburg State University (FSU) specific. State Police Officers from FSU are designated Special Police giving them jurisdiction in the off campus area. Data for the FSU campus is dated to 2011, as part of a three year report cycle. Although the population of these 4 neighborhoods represents approximately 35% of the City of Fitchburg, the neighborhoods have a disproportionate share of crime in each category. Most alarming is that together the locations represent over half of the Violent Crime occurred within the City of Fitchburg.

Table 05: 2012 Fitchburg Crime Data	**Violent Crime***		**Property Crime****		**Drugs Violations**		**Vandalism**	
Geographic Location	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
City of Fitchburg	620	100%	1,064	100%	295	100%	443	100%
Elm Street	104	16.77	150	14.10	25	8.47	63	14.22
Lower Cleghorn	54	596.15	88	8.27	4	1.36	46	10.38
Patch/Water Street/ Green Acres	81	13.06	123	11.56	5	1.69	62	14.00
Campus and Highland (on Campus as reported to FSU PD in 2011, Off Campus is 2012 data)	109	17.58	119	11.18	202***	68.47	0	0.00
Total of 4 Neighborhoods %	**348**	**84.29%**	**480**	**32.50%**	**236**	**80.00%**	**171**	**36.34%**

Source: City of Fitchburg Police Department, Fitchburg State Campus Police Department.

* - Violent crime includes: murder and non-negligent manslaughter; forcible rape, robbery and aggravated assault

** - Property crime includes: burglary, larceny-theft; motor vehicle theft; and arson

*** - Drug data for Campus is based on referrals to the campus disciplinary system, as arrests are avoided in most cases to protect student's records. In most cases these students were taken into protective custody or sent to the emergency room for medical attention. Alcohol related incidents included for campus data.

Physical Activity

Obesity is often used as a measure of physical activity in a group of people. Keeping in mind that the statistics for obesity are based on Body Mass Index (BMI), it can still be said that the City of Fitchburg has a problem with overweight and obese individuals, indicating a lack of physical activity. There is an incidence of 63.6 percent of the Fitchburg population overweight, compared to the state at 58.85 percent. Further aggravating the issue is that of the people surveyed as part of the Behavioral Risk Factor Surveillance System (BRFSS), only 44.13 percent of the people exchange their leisure time to exercise, compared to a 52.22 percent state average this is a discouraging number. Slightly more encouraging is the fact that Fitchburg is below the state in incidence of heart disease, a major cause of death among those who are obese and sedentary.

Table 06: Indicator	Fitchburg (%)	95% Confidence Interval	Massachusetts (%)	95% Confidence Interval	BRFSS Years used
Obesity (only) Status*	30.03	23.97, 36.86	22.97	21.75, 22.97	2008, 2009, 2010
Overweight and Obesity Status**	63.06	56.45, 69.24	58.85	57.89, 59.81	2009, 2010, 2011
Leisure Time Physical Activity (regpa)***	44.13	38.54, 49.87	52.22	51.6, 52.84	2001, 2003, 2005, 2007, 2009
Heart Disease (only)	5.82	4.51, 7.49	5.85	5.58, 6.13	2008, 2009, 2010

Source: BRFSS

* Obesity Status: Three years average prevalence of obesity among adults in MA (CY2008-2010)
** Overweight and Obesity Status: Three years average prevalence of overweight (including obese) among adults in MA (CY2009 -2011)
*** Leisure Time Physical Activity: Five years average prevalence of regular physical activity among adults in MA (CY2001, 2003, 2005, 2007, 2009)

Nutritional Intake

Related to physical activity, nutritional intake is closely correlated with personal health and ability to stay physically fit. Data for Fitchburg indicates that the City as a whole has a higher rate of diabetes and a lower rate of fruit and vegetable consumption than the State. An imbalance between caloric intake and physical activity can lead to obesity, which causes insulin resistance and is common in people with type 2 diabetes. Access to healthy food is necessary for a healthy diet. While there is a Farmers' Market in Fitchburg, feedback from the Elm Street Parent Focus Group, there is apparently limited knowledge of its existence. The lack of healthy food at nearby stores and the cost of healthy food relative to more inexpensive processed and/or fast food was also cited as a contributor to a less than healthy diet.

Table 07: Dietary Indicators

Indicator	Fitchburg (%)	95% CI	Massachusetts (%)	95% CI	BRFSS Years used
Diabetes rates, Prevalence*	9.7	7.21, 12.89	7.51	7.2, 7.82	2008, 2009, 2010
Fruits and Vegetable Consumption**	23	26.75, 28.1	27.43	26.75, 28.1	2005, 2007, 2009

Source: BRFSS

*Diabetes Rates, Prevalence: Three years average prevalence of diabetes among adults in MA (CY2008-2010)

**Fruits and Vegetable Consumption: Three years average prevalence of consumption of 5 or more fruits and vegetables per day among adults in MA (CY2005, 2007, 2009)

A substantial proportion of total food consumed by residents of the Focus Neighborhoods was purchased away from home see table 08. While there is no data available providing detailed information on specific diets of the Focus Neighborhood residents, the U.S. Department of Agriculture (USDA) has found that food prepared away from home, whether at table-service restaurants, take-out, or fast-food establishments, is lower in nutritional quality than food prepared at home, increases caloric intake, and reduces diet quality among adults and children.6 The USDA also found that food prepared away from home is higher in saturated fat, lower in dietary fiber, and higher in sodium than food prepared at home. Therefore, it may be concluded that efforts to encourage a greater consumption of food prepared at home and reduced consumption of food prepared away from home would have nutritional benefits for the affected community.

Table 08: Food Expenditure by Source

Food Purchase	Water St./ Patch/ Green Acres	Lower Cleghorn	Elm St.	FSU/ Highland	Fitchburg	Massachusetts
Food at Home	$3,601.29	$3,192.40	$3,595.22	$4,083.35	$4,253.67	$5,835.58
Food Away from Home	$2,263.78	$1,981.71	$2,201.60	$2,564.67	$2,678.45	$3,806.36
Alcoholic Beverages	$376.64	$330.85	$379.55	$438.56	$454.59	$658.73
Total	$5,865.07	$5,174.11	$5,796.82	$6,648.02	$6,932.02	$9,641.94

SOURCE: ESRI BUSINESS ANALYST ONLINE: Consumer Spending data are derived from the 2010 and 2011 Consumer Expenditure Surveys, Bureau of Labor Statistics

Stormwater Management and Water Quality

The Massachusetts Department of Environmental Protection (MassDEP) and the Environmental Protection Agency (EPA) have regulations in place to limit the amount of certain contaminants in the water supply. Similarly the Food Drug Administration (FDA) and the Massachusetts Department of Public Health (MADPH) both impose regulations on contaminants in bottled water. The Fitchburg water department is responsible for monitoring the safety of the drinking supply on a timely and regular basis. During the 2011 year, there was a minor violation recorded in 4 of the 68 samples taken during the month of July. Resampling found that there were no contaminants actually present at the sites. Attached in the appendix is a table of the 2011 water sampling report, the product of over 10,000 tests for the year. Because past testing has shown that there is no arsenic or perchlorate in the water supply at any level, annual testing is waived by the DEP and EPA. Currently the City of Fitch-

burg runs two water filtration plants. The Regional Water Filtration Facility is currently processing 12 million gallons per day, with the potential for a future capacity of 15 million gallons per day. The Falulah Water Filtration Facility processes 6 million gallons per day. 7

Mental Health

According to the data, Fitchburg tends to have more incidence of mental health and depression issues as compared to the state average.

Table 9: Mental Health indicators

Indicator	Fitchburg (%)	95% CI	Massachusetts (%)	95% CI	BRFSS Years used
General Mental Health*	13.05	10.27, 16.45	8.86	8.25, 9.21	2007-2011
Depression**	10.6	7, 15.73	7.43	6.71, 8.15	2006, 2008, 2010

Source: BRFSS

*General Mental Health: Five years average prevalence of 15+ days poor mental health among adults in MA (CY2007-2011)
**Depression: Three years average prevalence of symptoms of depression in past two weeks by PHQ-8 among adults in MA (CY2006, 2008, 2010)

One factor potentially contributing to the higher incidence of mental health and depression issues in Fitchburg could be a somewhat higher lack of fluency in English and larger proportion of population that speaks English "not well" or "not at all." This issue is illustrated in the table 13 (part of the appendix), indicating a greater lack of fluency in both the Lower Cleghorn and to a lesser extent, the Water St../Patch/Green Acres neighborhoods.

The apparent linguistic isolation experienced by some residents of these neighborhoods combined with other factors may contribute to mental health issues. These may be potentially mitigated through activities which promote greater social interaction which, in turn, could facilitate improvement of language skills.

Social Cohesion/Social Capital

Social capital refers to the network of associations, relationships, and affiliations that connect individuals and families to communities. Social cohesion refers to the connectedness, trust, bonding and collaboration in a community or neighborhood. Voter participation rates are commonly used as an indicator of social capital (proxy for social cohesion) as voting is a reflection of democracy in action and overall interest in community welfare.

Voter turnout in the study area is lower than the City of Fitchburg, and up to 15% lower compared to the state.

Table_: Average Voter Turnout 2010-2013 Elections						
Election	**Ward 1A**	**Ward 2A**	**Ward 4B**	**Ward 5B**	**Citywide**	**Statewide**
State Primary September 14, 2010 (Governor)	165	113	169	68	2,362	728,886
November 2, 2010 State Election (Governor)	649	528	548	412	10,107	2,319,963
City of Fitchburg Preliminary Election September 27, 2011	244	188	248	139	3,740	_
City of Fitchburg Municipal Election November 8, 2011	472	418	428	282	7,652	_
Presidential Primary Election 2012	117	111	137	74	2,143	529,542
State Primary September 6, 2012 (Senate)	66	45	72	34	938	518,490
State Election November 6, 2012 (Presidential)	1,038	846	948	857	14,553	3,184,196
Special State Primary April 30, 2013 (Senate)	155	95	165	92	2,289	734,114
Average of 8 elections from 2010-2013 (April 30th only) (state does not include City Election data)	**363**	**293**	**339**	**245**	**5,473**	**1,335,865**
# of Registered Voters	1,676	1,403	1,610	1,478	21,018	4,342,841
% of Registered Voters Participating in Voting	**21.7%**	**20.9%**	**21.1%**	**16.6%**	**26.0%**	**30.7%**

Source: Fitchburg City Clerk's Office

Ward 1A = Patch/Water Street/Green Acres neighborhood area
Ward 2A = Lower Cleghorn Neighborhood area
Ward 4B = Elm Street Neighborhood
Ward 5B = Highland Ave. / University Neighborhood

Neighborhood Stigma

Neighborhood stigma is an intangible perception issue. In some cases the sentiments of people outside a neighborhood feel that an area is unsafe, when in reality it actually is safe, or vice-versa. The perception of a neighborhood starts with its residents. Information was compiled from 4 focus groups from the Green Acres and Elm St.. neighborhoods, an adult group and child group each. Unfortunately the data only exists for their own neighborhoods, and does not cover the rest of the areas in this study.

According to residents of the Green Acres community, who were present at the Green Acres Fun 'n FITchburg focus group meeting, the residents of Green Acres have a negative reputation in the City. A recent shooting has scared the residents of the neighborhood, a sentiment that carries to public perception of the Green Acres area. The Green Acres youth focus group, held at the police substation in February of 2009, also feels unsafe in the area because of a recent (at the time) shooting and the fact that their parents don't feel safe.

Since the 2009 focus groups, the area has been reportedly much safer given the presence of a community garden, a participant of which is a local police officer, who will occasionally park his cruiser to show Police support and provide a deterrent. Another factor would be residents being more cooperative and have been working together to create a stronger sense of community.

An Elm Street youth focus group has indicated that the children feel that the area is unsafe due to the presence of homeless people and dangerous traffic conditions. Among parents, there is a worry that the area's drug problems make the neighborhood extremely unsafe, and as a result, parents are reluctant to let their children play at the neighborhood park.

A major consideration with all focus groups has been a lack of lighting at night. It is felt that not only does it make each neighborhood seem unsafe, but the entire city suffers the same reputation. Residents present at both neighborhood focus groups would like to see police presence stepped up in each neighborhood; Green Acres specifically indicating the need for a foot patrol.

Section III: Health Impacts

Introduction to Strategies

In January of 2013, an HIA Kick-Off meeting was held in which stakeholders from MOC, the City of Fitchburg and MRPC met to discuss the goals for the vacant lot HIA. Common resident concerns about vacant lots collected from Fun 'n FITchburg's walk audits and focus groups in targeted neighborhoods included crime and safety issues, illegal dumping as well as community pride issues. Residents mentioned community gardens and safe places for children to play as positive alternatives. Stakeholders at the kick-off meeting also talked about other ideas for vacant lots such as parking, cultural places for community art and other activities and including green infrastructure for stormwater management into the design. The meeting concluded with the scope of the HIA: city owned or privately owned but under city lien vacant lots less than 5,000 square feet in high density, low income neighborhoods. The three strategies for redevelopment of vacant lots would focus on:

1. Urban agriculture to go along with Fun 'n FITchburg's healthy eating tactic.
2. Cultural and natural play spaces to support the active living tactic as well as help with community pride issues.
3. Parking to address residents desire for off-street parking.

Each of these three strategies would include green infrastructure for stormwater management to alleviate Fitchburg's water pollution problem resulting from combined sewer overflows during rain events.

Introduction to Health Determinants

To assess their implications for community health, the Vacant Lot Working Group chose to look at how the three strategies would impact the following seven health-related outcomes:

Crime and Injuries resulting from crime

Crime is a salient issue in the Fitchburg communities selected for vacant lot redevelopment as data from Fitchburg Police department shows that the neighborhoods in which vacant lot redevelopment is proposed account for approximately 30% of the population, but make up approximately 50% of reported violent crimes. The Cleghorn community, where a focus group was held, was vocal about their perception of moderate to high crime in their neighborhood, citing drug use as one of their biggest concerns. The three types of development strategies can have varying effects on the reduction of crime and community perception of crime in the neighborhood.

Nutritional Intake

Nutritional Intake sounds as simple as what people eat, but the effects of the foods that people eat are far reaching, from simple weight control, to medical expenses and mental well-being. It is no secret that you are what you eat, and in many cases in the poorer neighborhoods of the area, the most accessible and affordable foods are canned goods or fast foods. This leads

to issues with obesity, lack of vitamin intake, and various other side effects of being overweight, such as lethargy, diabetes, and depression. Areas that lack in fresh produce can be identified by studying the nutritional intake of residents and can be used to identify means of making fresh produce readily available to the population, thereby reversing the effects of highly processed food that lacks in nutritional value.

Physical Activity

Physical activity is imperative to living a happy, healthy and fulfilling life. Physical activity releases endorphins and other neurochemicals that actually make people feel better and happier. By staying physically active as an adult, humans are able to stave off the effects of aging and are more likely to avoid certain kinds of arthritis and muscle and bone deterioration. Furthermore, it keeps the mind fresh and alert, leading to better decision making and higher cognitive processing. In children, physical activity is in itself a form of play, broadening the imagination, keeping kids healthy, and teaching them competition and fairness. By increasing the physical activity of a population, there are less health issues to burden the healthcare system.

Stormwater Management and Water Quality

Stormwater management is an issue that not only impacts the City of Fitchburg, but impacts the entire region, the Nashua River Watershed and the Merrimack River Watershed. Proper management of stormwater on a basic level keeps the city moving even in extreme weather conditions by preventing road flooding. Furthermore, it is necessary in order to minimize the costs of major storms by preventing flooding of homes and businesses, as well as the transport of mud off of the hills, resulting in street cleaning and sewer drain cleaning. Water blocked from reaching the groundwater supply, can fill the streets and overwhelm the sewer system, resulting in higher filtration costs. With regard to water quality, the runoff of water from the streets often runs into the Nashua River, taking trash and contaminants down river, where communities rely on the river for water. This results in higher costs to communities outside of Fitchburg. Soil contaminants in each site must be identified, and prevented from reaching the drinking water system. Employing elements of low impact development (LID) issues associated with stormwater management and water quality may be avoided.

Mental Health

Studying mental health and wellbeing, can make the city a better place to live. This has direct ties with the social cohesion of the area, as well as the productivity of its workforce. Studies show that there are direct ties between parks, playgrounds, urban agriculture and mental health.

Community Involvement and Social Cohesion

The cohesion and involvement within an neighborhood leads to a safer neighborhood, as well as an overall healthier place to live. When residents in the neighborhood are more interactive, studies show that crime rates tend to be lower, more crimes tend to be solved, and the standard of living tends to be higher. In communities with more social cohesion, people tend to be happier as well. The effects of each strategy will create not just a better neighborhood, but a more tightly knit community.

3

Neighborhood Stigma

Changing the stigma of a neighborhood, how a neighborhood may be perceived from the outside creates opportunities for growth. Right now, Fitchburg has a stigma of being a "tougher" city to live in, and as a result this impedes many new families and individuals from moving in and jump-starting the economy of the area.

By changing the stigma of the area, there is an enhanced opportunity to bring in new families and residents, and to improve the infrastructure to accommodate them.

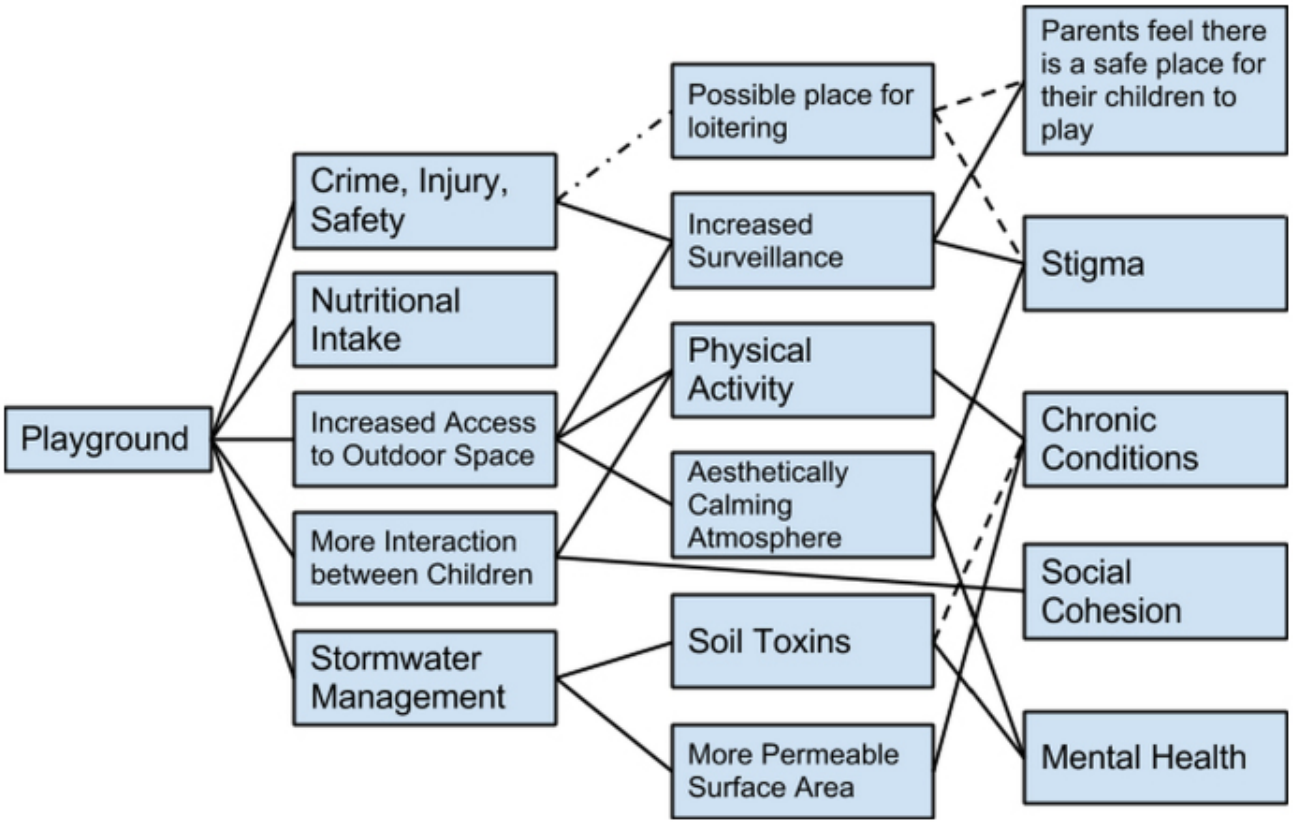
Pathways

Each diagram represents the ripple effects of installing each of the strategies. In some cases, a health determinant will lead to another, in other cases, some determinants have a negative effect on others. A note to keep in mind regarding the pathway of Off Street Parking, because of the lack of literature, the pathway is both sparse and highly uncertain.

Solid Line: Positive effect

Dashed Lines: Negative effect

Dotted and Dashed Lines: Could be positive or negative depending on outside factors



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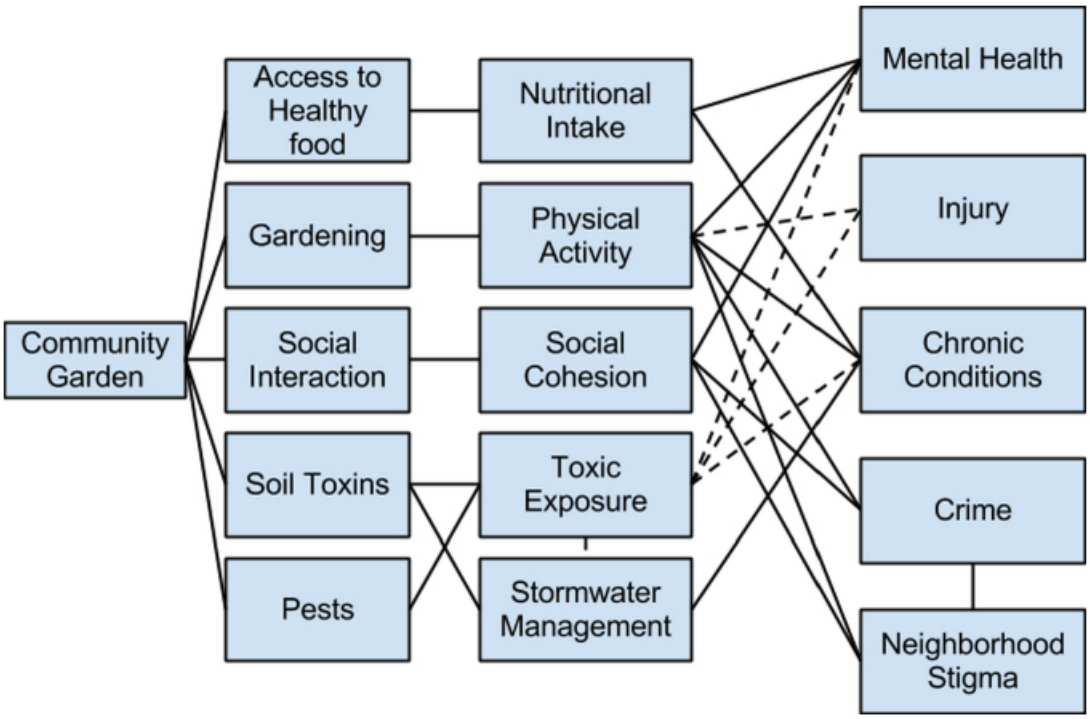
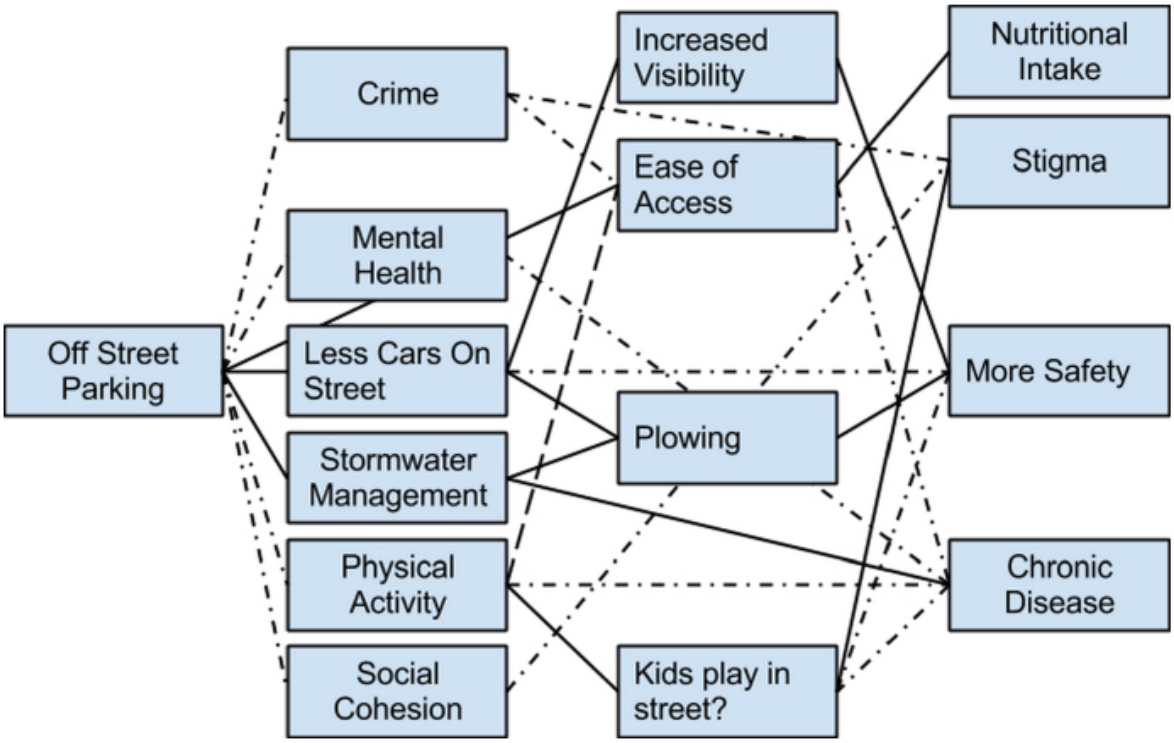

Community Garden
Access to Healthy food
Gardening
Social Interaction
Soil Toxins
Pests
Nutritional Intake
Physical Activity
Social Cohesion
Toxic Exposure
Stormwater Management
Mental Health
Injury
Chronic Conditions
Crime
Neighborhood Stigma


Off Street Parking
Crime
Mental Health
Less Cars On Street
Stormwater Management
Physical Activity
Social Cohesion
Increased Visibility
Ease of Access
Plowing
Kids play in street?
Nutritional Intake
Stigma
More Safety
Chronic Disease

Literature Review

Community and Cultural Play spaces

The concept of community and cultural play spaces can take a variety of forms. Playground or Cultural Space use can be oriented to young children who might otherwise not have recreational facilities in their immediate neighborhood. Play facilities can also be designed that are more oriented to adult exercise activities such as fitness trails or circuit training. In either case this could include the provision of play equipment, landscaped paths, and seating area or simply a managed surface that could be used for games. Such facilities provide a means of physical activity and social interaction for children and adults. A different approach might be to use the space for performances or community gatherings that reflect the culture of the surrounding neighborhood. This could involve the construction of a stage or performance venue. This might also be a place where food vendors could establish neighborhood-oriented food stands (consistent with local public health regulations). In both cases, the use of vacant lots as play spaces provides enhanced opportunity for social interaction and a level of activity that could increase public perception of the parcel and reduce opportunities for illicit activities.

Specific considerations for a community or cultural space needs to reflect a variety of forms which the space may take and the extent of its utilization. At a minimum, consideration must be given to maintenance of the lot and any structures or equipment, security, lighting, and possibly supervision. Consideration also must be given to hours of operation to avoid creating a nuisance to abutters.

Crime, Injury Resulting from Crime, and Safety

The literature on the effect of natural play spaces for children and community development show that natural play spaces in general increase people's perceptions of safety and order in the neighborhood. Some articles also highlight the possibility that a poorly maintained park can have a negative effect and serve as a place of delinquency and crime.

Many of the studies on urban agriculture also serve as evidence that maintained green space in general, whether it is a formal garden or play space, has benefits on reducing crime. For instance, the Chicago study in urban neighborhoods shows that green space is associated with less crime and disorder. 8

The literature suggests both positive and negative association of a public play space with the perception of crime. Wilcox and Crewe suggested that urban playgrounds increase the perceived risk of crime, that they have a tendency of "encouraging lurkers and attracting drug dealers".9,10 A contrasting opinion is found in Kuo's 2001 study in Chicago, that found that green space in low-income project housing as associated with a reduction in aggressive and violent behavior. 11

A focus group held in the Cleghorn neighborhood showed that a natural play space might galvanize community interaction and surveillance as it was viewed as more communal than a community garden. A natural play space had more utility and its uses and users would be more diverse than a single use garden. Resident input from that focus group also demonstrated that they are cognizant that a natural play space

will confer benefits to the degree that it is properly maintained. Studies show that some public spaces can be prone to disorder. The concept of 'defensible space' is a principle that can be incorporated into public spaces to deter crime or inappropriate use of public spaces. Outside spaces become more defensible if they are clearly demarcated (by fences, shrubbery, and so forth) and if they are easily observable by residents, neighbors, and passers-by. Defensibility is also helped by good lighting around an entrance, and removal of visual barriers such as a high solid fences and shrubs that create hiding spaces. 12 The residents of Cleghorn addressed many of these issues by stating that they wanted signage with agreed upon rules for the park, lighting, and timed lighting to discourage use of the park after hours.

With regard to placing adult exercise capacity, safety is a major concern, especially for older adults themselves. Some have voiced concerns about whether a playground is dangerous, if it's safe to go there, will be there be someone around if they fall, whether someone would see and help them. Some ways to minimize these concerns is to provide adequate signage to distinguish hazards from risks. "A risk is a challenge—something the visitor can identify, assess and then choose to do or not do. A hazard, by contrast, is something like a sharp edge or some other flaw in the equipment itself." To make it easier for someone to rise to a challenge, each piece of equipment should have adequate signage, guidance and graphics on how it should be used. Regular equipment inspections should help ensure that hazards are avoided 13. 14

When provided with a natural landscape in which to play, children showed a statistically significant increase in motor fitness.

Nutritional Intake

Substantive literature on Natural Play spaces and their effects on Nutritional Intake could not be found. It can be hypothesized that a connection would exist showing that parents who take their children to parks are more likely to feed their children healthier foods, further study is required.

Physical Activity

A 2007 study on the provision of safe play spaces to promote physical activity in children in low income communities in New Orleans shows that when a safe play space was made available within a low-income residential neighborhood, it was highly utilized by children for physical activity. There was a substantial, 84 percent, increase in the total number of children outdoors in the community compared to a community that did not have a safe play space provided.15 This study also suggested that provision of a safe outdoor play space reduces the time children spend in sedentary activities.16

Another 2004 study investigated the impacts of playing in a natural environment on motor development in children. When provided with a natural landscape in which to play, children showed a statistically significant increase in motor fitness. There were also significant differences between the two groups in balance and coordination in favor of the experimental group. The findings indicate that landscape features influence physical activity play and motor de-

velopment in children. 17

Another 2010 study examines the association between objectively measured access to green space, frequency of green space use, physical activity, and the probability of being overweight or obese in the city of Bristol, England. Results showed that the reported frequency of green space use declined with increasing distance. The study also found that respondents living closest to the type of green space classified as a formal park were more likely to achieve the physical activity recommendation and less likely to be overweight or obese. The findings suggest that the provision of good access to green spaces in urban areas may help promote population physical activity. Outdoor gyms in public parks provide an alternative to costly indoor gym memberships for low-income populations.

"...reported frequency of green space use declined with increasing distance. The study also found that respondents living closest to the type of green space classified as a formal park were more likely to achieve the physical activity recommendation and less likely to be overweight or obese. The findings suggest that the provision of good access to green spaces in urban areas may help promote population physical activity." 18

Research has shown that children who live closer to play spaces are more likely to be active than children who do not. Most physical activity obtained by children takes place on a playground. 42% of children get most of their exercise on a playground, either during school recess or in their neighborhood. 19

Another national study by the RAND Corporation found that girls who live closer to parks participate in more physical activity than those who live farther away.20 This association with girls' physical activity may be due to parents' perception of safety and their readiness to encourage children's physical activity outside. Comments from the July 9th focus group brought up issues of safety and whether or not parents felt comfortable allowing their kids to play outside without close supervision. Adults in neighborhoods with more physical order, in the form of manicured greenery and playgrounds, were twice as likely to allow children to use local playgrounds.21

International Council on Active Aging (ICAA) CEO Colin Milner says "Research shows that time spent outdoors contributes to health and wellbeing for older adults in the community and in care settings.22 The value of play for wellness is increasingly recognized as well. By bringing together the outdoors and a supportive environment for play, these new playgrounds can maximize the benefits—and experience—for users and their organizations. 23

Stuart Brown, MD, founder of the National Institute for Play and author of the book Play: How It Shapes the Brain, Opens the Imagination and Invigorates the Soul says that "For older age groups, play has a role in fertilizing the brain and in producing increased brain-derived neurotropic factor [a protein that encourages growth and new connections between nerve cells], particularly when there is social play that's physically active, such as dance." Brown continues, "For virtually every age group, there is evidence that play has very positive effects

on mood, on the immune system, and for personal well-being and health." People who don't have opportunities to play or can't bring themselves to play may suffer from "play deprivation," according to Brown. "They may endure a smoldering depression and lack of optimism—a feeling that they're not really engaging in the world," he explains.

3

Stormwater Management

Natural play spaces are generally comprised of nature friendly materials that either use and filter water (plants) or allow water to seep into the ground instead of entering storm drains (porous surfaces and wood chips). Projects have been completed in Philadelphia and New York City that successfully design parks to be passive forms of watershed management. Both are larger cities and their projects were on large scales however the processes used can be applied to Fitchburg with minor adjustments to meet the needs of the community and the local environment. 24

In New York City green infrastructure was applied to small plots of land, including traffic islands, and the outcome lowered the urban heat island effect, reduced carbon dioxide and other pollutants, and provided clean oxygen. Green infrastructure is design and building techniques that protect and improve natural landscape and the New York State Department of Environmental conservation defines it as "a variety of site design techniques and structural practices used by communities, businesses, homeowners and others for managing stormwater". A medium sized tree can absorb 2,500 gallons of rainwater a year and provide plenty of fun for children and adults to run around, play hide and seek, and climb.25

Mental Health

Several mediating processes have been discussed with respect to children's psychological distress. These include parent–child interaction, child and adolescent monitoring and supervision, restricted play opportunities for younger children, lack of contact with the natural environment, and safety concerns.

A few studies reveal that women staying at home with young children may be especially vulnerable because of social isolation caused in part by their inability to let their children play outside. 26

A study by Burdett in 2005 uncovered qualitative evidence that inaccessibility to outdoor play was an important contributor to a preschool child's distress.27 Furthermore, in an intensive analysis of 20 urban families, Huttenmoser documented that 4-year-olds who could not play independently outdoors, primarily because of traffic-related safety, had more strained relations with their parents, had fewer playmates, and manifested poorer socio-emotional development.28 Inability to spend time in natural areas may also be associated with poor cognitive functioning or psychological well-being.29

Playgrounds for older adults are a new concept. They generally are outdoors, until recently they consisted mainly of walking trails and equipment that enabled participants to do various types of exercises. Adult playground may also include other equipment not necessarily for burning calories, but for social aspects like having chess tables. Adults may just want to be outside, and reap the benefits associated with fresh air and sunshine.

Social Cohesion

Perceptions of neighborhood physical activity opportunity were significantly related to neighborhood social cohesion and neighborhood problems.30 Perceived neighborhood physical activity opportunity and neighborhood social cohesion were also significantly and positively related to residential members' reports of their physical activity levels.31 Researchers suggested that improving actual physical activity facilities or environments in neighborhoods, enhancing perceptions through increasing awareness of facilities, identifying and educating residents on existing opportunities for physical activity, and dealing with issues regarding safety and crime32 may contribute to increasing self reports of neighborhood social cohesion.

http://pinterest.com/pin/116601077823787631/

Play spaces can encompass a number of physical structures and uses. Play spaces that include natural elements rather than traditional fixed structures connect children more to nature. In addition play spaces can also include cultural elements and meeting spaces like a stage that increases the uses to adults as well.

Literature suggests that the social interaction youth engage in increases in playground settings. A report by The Trust for Public Land reported that outdoor play "teaches children how to interact and cooperate with others, laying foundations for success in school and the working world."33 Another 2012 study by Knowles on the effect of recess on children's physical activity showed that recess was important for the development of conflict management and social skills and contributed to physical activity engagement.34

Stigma of the neighborhood

A 2013 study in urban areas of Seattle and San Diego examined the associations between parent reports of their neighborhood environment and children's activity within the neighborhood and in parks. Parent's reports of the neighborhood environment were a salient measure as children are not entirely autonomous in choosing their methods and modes of play and physical activity. A parent's perceptions play a large role in how children utilize outdoor space for physical activity. Findings from this observational study showed that as with adults' recreational physical activity, aesthetics were related to more child neighborhood physical activity. Favorable aesthetics may improve the enjoyment of being active in neighborhoods. Attractive buildings and gardens may have provided a sense of order for parents, making them more comfortable to let their children play and be active outside35.

The "access or proximity to recreation areas was related to all physical activity outcomes"36. The finding that proximity is the greatest common denominator for physical activity in children "suggests that proximal play areas could be a powerful influence on child physical activity, and that this may be a useful focal point for cities that are developing more active-friendly neighborhoods. Recreational physical activity is the dominant domain of activity for children, and children typically have low levels of physical activity while indoors, so it is reasonable that having places to play near the home would emerge as an important corre-

late of physical activity. Conversely, lack of accessible places to play could be a strong barrier to children's activity."[37]

Another study using 9 years of Early Childhood Longitudinal Study data reported that children whose parents perceived their neighborhoods as unsafe watched more television and participated in less physical activity. Children living in neighborhoods perceived as unsafe by their parents had significantly lower physical activity and significantly higher television-watching, Body Mass Index (BMI) percentile, and obesity relative to those in neighborhoods perceived to be safe

3

Urban Agriculture

Urban agriculture is essentially the practice of cultivating, processing, and distributing food in or around a developed community or urban area. It can be used to produce income and food while also providing a source of recreation or relaxation for the participants. The benefits of food production can be particularly important in communities with limited access to fresh and healthy produce. In Fitchburg, the concept of urban agriculture could apply to the reuse of vacant lots as garden areas to cultivate vegetables and/or flowers, thereby productively utilizing the otherwise vacant lots, improving neighborhood aesthetics, providing a source of healthy food and physical activity, and also providing a means of community interaction and involvement. Typically, urban gardens are maintained by individuals or families who have responsibility for a designated garden plot. Alternatively, a group or organization might collectively take responsibility and share the effort among a group of individuals for individual plots or an entire lot.

Issues to be considered in relation to this use would be the extent of knowledge and skills that potential participants might have relevant to gardening; sources and funding for tools, seeds, and gardening supplies such as fertilizer and compost; storage of equipment; and ability of participants to maintain interest in their plots through a typical growing season. Soil contaminants such as lead which may be a residue from paint on nearby structures and security, particularly in regard to the ownership of produce, should also be considered.

Crime, Injury Resulting from Crime, and Safety

Literature indicates that the presence of community gardens can facilitate a reduction in the perception of crime and crime itself. Urban agriculture in the form of community gardens provides individuals as well as communities with benefits such as a reduction in crime through processes of informal surveillance as well as facilitating positive interactions between neighbors. An urban agriculture report by the department of public health of Waterloo, Canada shows that community gardens established on previously vacant lots are associated with a reduction in crime. This report suggests having people simply participate and work in the garden can deter crime through increased degree

of surveillance through the presence of people outdoors, and mitigate some of the psychological precursors to violence.38 After a community garden was established on a vacant lot on the center of Victoria Hills Neighborhood, Canada, police incidents decreased by 30% first summer, and almost 56% by the end of the third summer. People indicated they felt safer in their community after establishment of garden due to "the physical presence of people in the garden late into the evening" and they fact that they "knew more people in their neighborhood" and the feeling that "neighbors were also watching out for them, their children, and their property". Contrary to the findings of the Victoria Hills Neighborhood study, a study of the impact of community gardens on the number of property crimes in Urban Houston found no statistically significant differences between the mean number of crime occurrences in community garden areas and the mean number of crimes in randomly selected areas.39

A study on a large public housing development in Chicago showed that residents living in "greener" surroundings report lower levels of fear, fewer incivilities, and less aggressive and violent behavior. Based on police crime reports for an area of 98 apartments buildings with varying levels of nearby vegetation, the greener a building's surroundings were, the fewer crimes reported.40 Furthermore, this pattern held for both property crimes and violent crimes. The relationship of vegetation to crime held after the number of apartments per building, building height, vacancy rate, and number of occupied units per building were accounted for.41

The primary findings in the literature on community gardening and crime are that the presence of people outdoors in neighborhoods, combined with the social connections facilitated by gardening are associated with improved perceptions of crime by providing informal social surveillance and predictability in the neighborhood. Comments from Fun 'N FITchburg focus group showed that the unknown, unpredictability of outside space is what contributed to fear of crime, rather than witnessing of actual crimes.

However, based on comments gathered from a focus group comprised of Cleghorn neighborhood residents, a community garden may not yield these benefits to a significant magnitude. They reported that based on prior experience, a community garden is difficult to coordinate and sustain. They also reported disagreements based on allocation of lots, mistrust of others taking from their gardens, and general disorder. Though community gardens provide benefits in other settings, they will not likely succeed without community buy-in and support.

Nutritional Intake

Growing food in urban areas plays a role in local food security by providing much needed space to grow produce. The food produced in community gardens or rooftop gardens are local sources of food that require minimal travel distance to reach consumers. This may reduce barriers to consuming fruits and vegetables reported by residents of Fitchburg such as distance and convenience to grocery stores. Zick, among others, documents that community gardeners consume more fruits and vegetables than non-gardeners.42 A diet high in fruits and vegetables has been linked to numerous health benefits. If residents choose grow food in their gardens, then the food produced could benefit citizens who cannot otherwise afford fresh fruits and produce.43

The major findings from a study on urban agriculture in Philadelphia were that gardening is related to an increased frequency of vegetable consumption. This study provided evidence that gardening access in the inner city is an empowering nutrition strategy that overcomes many of the barriers to increasing vegetable consumption.44

3

Physical Activity

Studies suggest that the establishment of community gardens may benefit residents by increasing physical activity, or improve nutrition, depending on what is grown.

A study by Zick that compared the BMI of community members that had a plot in their community gardens, to that of their neighbors that did not garden, reported that the BMI of women gardeners was 1.48 lower and 34% less likely to obese or overweight than their non-gardening neighbor. And the BMI of men gardeners was 2.52 lower and 36% percent less likely to be obese or overweight.45 Study participants benefitted from both the increased physical activity as well as improved nutrition as they grew produce for consumption. The link between increased physical activity and community gardens has been well documented in the literature.46

"Properly designed rain gardens can effectively trap and retain up to 99 percent of common pollutants in urban storm runoff".48

Stormwater Management (and Rain Gardens) 47

Rain gardens have been found to lower the concentration of nitrates, ammonia, phosphorus, and other pollutants that commonly enter storm drains. Rain gardens are areas of land with vegetation planted for the specific purpose of filtering water runoff and rain. They replicate the natural water cycle that would occur if there were no roads, which are impervious and inhibit efficient storm water management. Studies have found that plants that are tolerant of long dry spells and short bursts of wet spells, like summer rains, do better and are more aesthetically pleasing because they do not die or become dormant during dry periods. These types of rain gardens are known as dry rain gardens and deep rooted meadow species that are drought tolerant are usually planted. There are also species of plants that thrive with certain pollutants such as nitrates and phosphorus including certain vegetables which creates the possibility of planting community gardens as a way to filter stormwater runoff. The importance of this type of rain garden is that during periods of drought the garden does not look unkempt and unmanaged and is still visibly a used and cared for area which inhibits dumping and vandalism.

According to the Environmental Protection Agency (EPA), more than half of all rainwater that falls on a city block leaves as runoff. On its way to storm drains the water becomes contaminated with pollutants such as metals, oils, and fertilizers. "Properly designed rain gardens can effectively trap and retain up to 99 percent of common pollutants in urban storm runoff".

Mental Health

Psychological studies have shown that the restorative effect of a natural view holds the viewers' attention, diverts their awareness away from themselves and from worrisome thoughts,

thereby improving health.[49] Kuo and Sullivan, in their study of violence and aggression in the inner city of Chicago, found a direct correlation between mental fatigue and the absence of green space in residential areas. They cite empirical evidence of the attentionally restorative effects of natural settings. Their study demonstrates a link between nature and reduced aggression in an experimental design and provides support for the proposed mechanism of attentional restoration resulting from natural spaces in residential areas.[50]

Participation in gardening in a community garden may also reduce feelings of isolation as gardening facilitates interactions with neighbors and others who may live nearby or have similar interests in gardening and food.[51]

Social Cohesion

Growing food, whether on a rooftop or in a community or backyard garden, provides benefits to people from diverse backgrounds, languages, and cultures. "Food growing can be a way for ethnic minorities, the elderly, and people with disabilities to regain pride in their identity and to promote that positive self-image to others"[52]. People from diverse ethnic backgrounds can grow food from their own culture as a way to maintain cultural traditions or reclaim and revalue their culture. Community gardens are also considered spaces in which people from different backgrounds can successfully come together. Gardening is an international activity that crosses cultural gaps. Food growing can serve to break down barriers between people through a focus a common interest of food.[53]

Another study in Philadelphia with participants of urban agriculture found that gardeners were more active than non-gardeners in community projects such as food distribution at churches, social events, and neighborhood clean ups. This finding was especially significant among the Korean and African American study participants.[54]

Finally, a comparison of gardeners and non-gardeners indicated that gardeners were more likely than non-gardeners to participate in their community and to have higher life satisfaction. This study also showed that community gardens were considered to be social centers and sources of pride; they provided social cohesion for gardeners.[55]

Stigma of the neighborhood

The perception of a neighborhood can have a significant influence on the sense of pride and commitment that neighborhood residents feel toward their community. The act of building and maintaining a community garden can become a tool to empower neighborhood residents against urban blight and crime. Furthermore, in some communities, urban lots that were once trash-strewn eyesores and magnets for criminal activity have become "havens of safety that provide valuable interaction among neighbors. This, in turn, can contribute toward a perceived reduction in crime."[56] This can further mitigate the negative stigma that is associated with a particular neighborhood.

Off Street Parking

Off street parking refers to any vehicle parking that is not curbside on a public or private roadway. It can be in the form of a surface lot or structured parking, although, in regard to vacant lots in Fitchburg, it is assumed that the strategy would involve the establishment of surface parking lots. Use of vacant lots for surface parking would enable dormant property to serve a constructive use and provide a level of activity that would otherwise not occur on the lot. It is assumed that such lots would be utilized by nearby residences and/or businesses and be maintained to manage litter and growth of vegetation that impact neighborhood aesthetics and ambiance.

While there would be potential benefits from the productive utilization of the vacant property, consideration needs to be given to the secondary impacts of increased parking availability. In general, there is agreement in the literature that increased parking supply changes the cost structure associated with mode choice decisions, resulting in greater reliance on automobiles, reduced pedestrian activity and public transit use, and an increase in vehicle miles of travel (VMT)[57,58] This, in turn, may have negative public health impacts. Other issues which need to be considered with regard to the development of off street parking are costs of paving and striping (if the lot is to be paved), access and circulation, maintenance and snow removal (if uncovered), lighting, and overall security.

Crime, Injury Resulting from Crime, and Safety

Off street parking has been a concern raised by many residents and stakeholders involved in the HIA. Opinions for and against additional parking in the neighborhood exist. Similar to resident opinions, the literature is also conflicting on the impact of off-street parking on crime and safety.

On street parking increases the visual complexity of roadways and may cause increased crash risk.[59] High densities of curb parking are also associated with increased numbers of pedestrian-automobile collisions.[60] These findings may indirectly support the idea that increasing off street parking may reduce the number of cars parked on roads and reduce risk of crashes.

However, some people argue the very opposite, on-street parking creates a buffer between cars and pedestrians and therefore increases the safety and walkability of streets. An increase in off-street parking would likely reduce the buffer between pedestrians walking on sidewalks and reduce pedestrian safety.[61,62]

The literature reviewed is lacking in information on what the health impacts of off-street parking will have in a community similar to Fitchburg. The conflicting views on whether or not off-street parking reduces pedestrian safety may be resolved with further community input. Based on the July 9th Focus Group, residents agreed that there was a need for parking to improve convenience and safety. But they were also cognizant of challenges to keeping a parking lot safe and productive to the community. Residents identified barriers including ownership of spaces, responsibility of maintenance, and the possible creation of a space prone to crime if the parking lot was not adequately observed and/patrolled.

Storm-water management and water quality[63]

Off street parking may have either positive or negative effects on stormwater management depending on the construction of the parking lot. Traditional non-permeable parking lots require drainage systems that route runoff into storm drains and eventually lead to treatment facilities or storm drain outfalls depending on location. This relies on municipal resources to filter the water before it goes back into the water cycle. Permeable or otherwise porous pavement allows the water to drain into the ground below instead of routing it into storm drains. Permeable pavement also has a longer lifespan, even in harsh New England winters, because the water drains down to the earth below and is not stored in the pavement; the water doesn't freeze and expand which causes potholes and frost heaves. Permeable pavement has an average lifespan of thirty years while non-permeable pavement has an average of fifteen. Permeable pavement also has higher traction because of the materials used and water does not pool on top of the pavement. As a result, less ice accumulates meaning that less deicing is needed in the winter. Other alternatives to permeable pavement that still improve runoff management include planting buffers between the pavement and the storm drains which filter and soak up water. Retention basins also allow water to collect while giving time for the water to sink into the ground instead of entering the storm drains. All of these methods help prevent toxins from entering storm drains and thus the waste water treatment system and storm drain outfalls.

Monitored Pollutant Removals of Permeable Pavement[64] (EPA National Pollutant Discharge Elimination System)				
Application	**Location**	**Total Suspended Solids**	**Metals**	**Nutrients**
Porous Asphalt				
Parking lot	Durham, NH	99%	Zn: 97%	TP: 42%
Permeable Interlocking Concrete Pavers				
Parking lot	Goldsboro, NC	71%	Zn: 88%	TP: 65% TN: 35%
Parking lot	Renton, WA	---	Cu: 79% Zn: 83%	
Parking lot	King University, ON	81%	Cu: 13% Zn: 72%	TP: 53% TKN: 53%
Previous Concrete				
Parking lot	Tampa, FL	91%	75-92%	--

Permeable pavement water quantity and pollutant reduction characteristics such as 80 percent total suspended solids reductions can qualify it to earn credits under green or sustainable building evaluation systems such as Leadership in Energy and Environmental Design (LEED®) and Green Globes. Credits also can be earned for water conservation and conservation of materials by utilizing some recycled materials and regional manufacturing and resource use.

Volume Retention of permeable Pavements65 (EPA National Pollutant Discharge Elimination System)				
Application	**Location**	**Soil Type**	**Underdrain**	**Volume Retention**
Parking lot				
Parking Lot66	State University, PA	--	--	Retained the 25 yr-24 hr storm
Permeable Interlocking Concrete Pavers	Durham, NH	Clay	Underdrain	25%
Parking lot				
Parking lot	Swansboro, NC	Sandy Soil	No	100%
Parking lot	United Kingdom	Impermeable Liner installed	Yes	34%-45%
Parking lot	Renton, WA	---	No	55%
Parking lot	Kinston, NC	Clay	No	55%
Pervious Concrete				
Parking lot	Kingston, NC	Clay	No	99.9%

Community involvement and social cohesion

In a cross sectional study surveying youth in the UK, those who reported the road outside or nearest their home to be full of parked cars were less likely to consider the local area a good place in which to grow up or an area where they could ask for help from their neighbors. Furthermore, it was seen as an unsafe place for children to play outside or have good parks, playgrounds and play spaces.67 This may indicate that the availability of off-street parking could reduce the number of cars parked in the road and could impact how youth view the local area and their perception of the area around their house a safe place. In depth qualitative exploration of young people's views of their neighborhoods by Morrow (2001) concluded that perceptions of the local area are likely to have an important effect on sense of community identity and, ultimately on personal wellbeing.68

Stigma of the neighborhood

It has been found that incorporating landscaping in parking lots betters the visual perception of the parking lot and its surrounding area. Colorful flowers and plants create a vibrancy that exudes positivity and creates a sense of togetherness in the sense that the area is cared for by a community. Having greenscapes near a parking lot also promotes social gathering as people use the area to store their cars. It was also noted that improper vegetation can inhibit views on safety. Thick vegetation that blocks peoples' views of their surroundings gives the sense that danger may be lurking nearby. Shorter shrubs and bushes or a well trimmed hedge that is short but wide would greatly prevent entry while still improving the appearance without putting up too imposing of a security system. Aesthetics play an important role on how safe people view and area based upon the thought that increased

security means that there has been a prevalence of danger in order for such security measures to be needed. High fences, gates, cameras, and patrols can signify that there is danger about while at the same time give a sense of protection. There are mixed findings on how aesthetics affect stigma of a neighborhood in regards to safety and perception of safety. 69

Determinants Lacking Literature: Nutritional Intake, Physical Activity and Mental Health

Having discovered an absence of literature on Nutritional Intake, it is hypothesized that off street parking will make people more inclined to do food shopping in a way that increases frequent food shopping for vegetables. It can be hypothesized that, having the security of knowing that parking is readily available may induce people to buy produce, something that is bulky, instead of packaged or processed foods. It may be that people may shop for food more frequently because parking and distance to house is more convenient. The July 9th Focus Group identified Fitchburg as a food desert (an urban area in which it is difficult to buy affordable or good-quality fresh food), and as such easier access to their vehicle may incentivize driving further to the supermarket. It is thought that perhaps shopping for food more frequently may promote shopping for fresh food. There is great potential for future study in this regard.

Data could not be found connecting Off-Street parking to physical activity but it can be hypothesized that an increased access to vehicle transportation may decrease levels of walking or other forms of human powered transportation (biking, skateboarding, etc.). Conversely, it can be hypothesized that in instances where on street parking is restricted, the street is safer for children to play in the street in instances where they do not have a yard to play in, similar to the lifestyle of larger cities.

After an extensive literature review that included combinations of search terms such as parking, mental health, stress, built environment, livability, and parking lots, no substantial associations were found between the presence or absence of off-street parking and mental health. The lack of research that exists for this relationship may indicate that there is in fact no association, or that parking is an insignificant factor on mental health. Further primary research is recommended with the assistance of FSU Regional Economic Development Institute (REDI)

Comments gathered from focus group as well as stakeholder meetings reveal conflicting attitudes on the benefits of the creation of additional off-street parking. The July 9th focus group with the Cleghorn neighborhood had positive views on additional off-street parking, saying that they thought they were “excellent idea, especially for the winter months.”70 However, they were also cognizant of some challenges that additional off-street parking may create such as creation of a permit system to designate spots, snow plowing and maintenance, and lighting and surveillance to ensure that lots would not be used for illicit activity. Other stakeholders were against the creation of more parking.

The combination of a weak literature base as well as conflicting views from stakeholders, makes it difficult to predict off-street parking effect on mental health, nutritional intake and physical activity, as well as many of the other health determinants. Therefore this HIA is unable to provide strong evidence or recommendations on off-street parking until additional primary and secondary data can be collected or a detailed study is authorized.

Summary

The following tables are intended to summarize and synthesize the finding of the preceding literature review. The information is presented for each of the three strategies in terms of their expected impacts on the key health determinants also discussed in this section. In many cases there is a great deal of information and research to support the findings. In other cases, there may be limited or a lack of research, and as a result, the conclusions may be less definite.

Community and Cultural Play spaces

Health Determinant (pathway, indicator, outcome, etc)	Direction of Impact	Likelihood of Impact	Intensity of Impact	Distribution of impact	Strength of Evidence	Uncertainties
Physical Activity	+	Likely	High	Children & Caregivers	High	
Social Interaction	+ (children) ?(adults)	Likely	High	Users & Neighbors	High	Adults benefit from social interaction depending on neighborhood
Perception of Safety	+/-	Likely	High	Users & Neighbors	High	Depending on Maintenance and lighting, structures and police patrol
Crime	+/-	Uncertain	High	Users & Neighbors	High	Based on Police presence and lighting
Sense of Wellbeing	+	Uncertain	High	Children & Caregivers	Medium	Depends on Police Presence, Caregiver supervision, and Lighting
Social Cohesion	+	Likely	High	Users & Neighbors	Medium	Depending on level of utilisation
Exposure to Toxins	?	?	?	?	?	Dependant on toxins present, site specific, toxin specific
Mental Health	+	Likely	Medium	Everyone	High	
Nutritional Intake	~	Neutral	Neutral	Children & Caregivers	Neutral	Data neither proves of disproves a link
Stormwater Management	+/-	Likely	High	City	?	Depends on if designed as LID
Neighborhood Stigma	+	Likely	High	Everyone	High	

Urban Agriculture

Health Determinant (pathway, indicator, outcome, etc)	Direction of Impact	Likelihood of Impact	Severity of Impact	Distribution	Strength of Evidence	Uncertainties
Physical Activity	+	Likely	High	Participants	High	
Social Interaction	+	Likely	High	Participants	High	
Perception of Safety	+/-	Likely	Medium	Participants & Community	High	Crime potentially increases if lot sits unused and deteriorates
Crime	+/-	Likely	Medium	Participants & Community	High	Crime potentially increases if lot sits unused and deteriorates
Sense of Wellbeing	+	Likely	Low to Medium	Participants & Community	Medium	
Social Cohesion	+	Possible	Low to Medium	Participants & Community	Medium	Depending on level of utilisation
Exposure to Toxins	+	Possible	Dependant on toxins	All Participants	High	Toxins are site specific in most cases, intake in plants, hand washing stations, etc
Mental Health	+	Uncertain	High	Participants & Neighbors	High	
Nutritional Intake	+/~	Likely	High	Participants & Wider Community	High	Dependant on what participants choose to grow, fruits and vegetables vs. flowers
Stormwater Management	+	Likely	High	Community & City	?	
Neighborhood Stigma	+/-	Uncertain	High	Community	?	Dependant on ability of participants to maintain their plantings

Off Street Parking

Health Determinant (pathway, indicator, outcome, etc)	Direction of Impact	Likelihood of Impact	Severity of Impact	Distribution	Strength of Evidence	Uncertainties
Physical Activity	+/-	Possible	Medium	Community	Low	If on-street parking is restricted, allows for play space for those without yards
Social Interaction	+ /-	Uncertain	Uncertain	Community	Low	In Cleghorn, seen as a positive, but may fail in other areas
Perception of Safety	+/-	Likely	Medium	Community	Low	Depends if defensible stance, well lit, if police pass by
Crime	+/-	Likely	High	Community	Low	Depends if defensible stance, well lit, if police pass by
Sense of Wellbeing	+	Likely	High	Users & Neighbors	Low	Neighborhood Dependant
Social Cohesion	?	Uncertain	Uncertain	Users, Neighbors & Community	Low	Neighborhood Dependant
Exposure to Toxins	?	Uncertain	Uncertain	Community & City	Low	Depending on construction, site specific toxins
Mental Health	?	Uncertain	Uncertain	Neighbors	Low	Lack of literature support
Nutritional Intake	?	Uncertain	Uncertain	Neighbors	Low	Lack of literature support
Stormwater Management	+/-	Likely	High	Community & City	Low	Depends on LID construction, how many lots converted
Neighborhood Stigma	+	Likely	High	Community	Low to Medium	

Evidence Quality/Key Findings Legend

Direction: This is a chance to provide the most general summary finding that the reader will likely key into

+ (Increase)

- (Decrease)

? (Unable to assess)

~ (Neutral impact)

/ (It will either increase or decrease based on noted uncertainty)

Likelihood:

- Likely (likely the impact will occur as a result of the project)
- Possible (possible that the impact will occur as a result of the project)
- Unlikely (unlikely that the impact will occur as a result of the project)
- Uncertain (unclear if the impact will occur as a result of the project)

Severity: This is an indicator of the strength of the effect.

- Low
- Medium
- High

Distribution: The population most likely to be affected by the changes

Strength of Evidence: the key point here is to pick a method to use for determining strength of evidence and stick with it.

- High (Primary Survey Data, Secondary Data, and Strong Literature Base)
- Medium (Strong Literature Base and Primary Survey Data OR Secondary Data)
- Low (Weak Literature Base OR Secondary Data)

Section IV: Recommendations

http://pinterest.com/pin/116601077824113700/

Community and Cultural Play spaces

Health Determinant	Promote/ Mitigate	Recommendation
Physical Activity	Promote	• Encourage "Active Design" playground with multiple activity spaces, such as painting a world map and hopscotch lines on the ground, opportunities to strengthen both upper and lower body as well as promote balance and aerobics. See NYC Active Design Guidelines *Appendix G + For design ideas visit www.playcore.com & other playgrounds in Boston. • Design using natural materials where possible • promote connection with nature • Exercise equipment for outdoor gym
Social Interaction	Promote	• Plant shade trees alongside the playground, fruit trees where possible. Contact Grow Boston Greener for grants. *Appendix H • Vandalism-proof benches and tables • Play equipment that encourages two or more users simultaneously • Meet American Society for Testing and Materials standards for accessibility • Site in population dense areas
Soil Exposure	Mitigate	• Cover ground with one way permeable, safe, shock-absorbing material such as poured in place rubber, recycled rubber tile, or wood products. • Create hand-washing station next to playground • Signage on site about washing hands after playing
Injuries	Mitigate	• Cover ground with safe, shock-absorbing material such as poured in place rubber, recycled rubber tile, or wood shavings. • Age-appropriate play equipment • Signage that children must be accompanied by an adult • Place where kids play in streets • Keep up with maintenance
Crime	Mitigate	• Well lit spaces, proper lighting that includes extended hours and mesh over lights to prevent damage and vandalism • Signage about ages of use for playground • Signage about hours of operation for playground (dawn –dusk) • Visible, front placement of playground

Community Gardens

Health Determinant	Promote/ Mitigate	Recommendation
Healthy Food Access	Promote	• Survey neighborhood residents about fruit & vegetable preferences to plant in gardens • Develop a distribution network among local food retailers. • Contact BNAN, TFP, and ReVision Farms *Appendices J and K • Contact BPHC regarding corner stores and the use of SNAP/ EBT & Bounty Bucks; pursue grants to supply local, small food retailers (such as corner stores) with technical assistance and refrigeration units for stocking garden produce *Appendices H and K • Suggest to bus company to improve route times and access to supermarkets.
Social Interaction	Promote	• Contact local schools, youth groups, ABCD centers, and senior centers to engage participants *Appendix L • Build garden for maximum accessibility — including for those of different heights, with compromised balance, or in need of wheelchairs. Contact BNAN and TFP regarding ADA accessibility requirements and suggestions *Appendix K • Open Garden day for neighborhood non gardeners to pick.
Soil Contamination	Mitigate	• Use standard techniques for mitigation of soil contamination • Raised beds using chemical-free bed planks/dividers — see TFP Raised Bed Manual *Appendix M + Contact ReVision Farm and BNAN *Appendix K • See BNAN Tips to Protect Against Soil Exposure *Appendices N and O • Water spouts for garden should also be also available for washing hands • Shed for compost/fertilizers • Plants which filter soil/groundwater

Community Gardens Cont'd.

Health Determinant	Promote/ Mitigate	Recommendation
Injuries	Mitigate	• Signage and teaching regarding safe gardening techniques, as described by the American Physical Therapy Association *Appendix P • Shock-absorbing material for garden paths *Appendix K • Build gardening beds at multiple levels/heights, and include paths, that meet ADA requirements. Contact BNAN *Appendix K

Crime	Mitigate	• Lighting and fencing
		• Possible Police Gardening Program
		  • "how to garden" training for community led by officers
		  • one track per lot
		• Perimeter plants for the community to pick at
		• Hunting trap cameras for night time observation

Health Determinant	Promote/ Mitigate	Recommendation
Pests	Mitigate	• Pest control options- see TFP Urban Agriculture Manual and BNAN Pest Control Tips *Appendix Q + Rotation, barrier, row cover, and organic techniques • Organic/safer pesticides — see Resource Guide for Organic Insect and Disease Management *Appendix K • Insect traps • Crop selection • Biological controls, such as predatory insects and beneficial microorganisms • Fencing for animals • Scarecrow or other anti-bird device • Trap Camera to identify pests to choose best method of deterrent

Off Street Parking

Health Determinant	Promote/ Mitigate	Recommendation
All	Promote	• Create Parking Passes
Physical Activity	Promote	• Basketball hoops • Hopscotch • Foursquare • Park area
Social Interaction	Promote	• Park area, benches near plants
Crime	Mitigate	• Vandal-proof lighting • Perimeter plants • Perimeter Fence • Defensible Stance • Police Patrol
Stormwater Management	Promote	• Permeable pavement surface • Low Impact Development

Overall Site

Health Determinant	Promote/ Mitigate	Recommendation
All	Promote	• Hire a local resident as site manager to perform ongoing maintenance and to ensure proper usage of the site
Physical Activity	Promote	• Signage around the neighborhood directing people to the site • Signage on site about calories burned while engaging in different activities
Social Interaction	Promote	• Host community and cultural events on site
Chronic Disease	Promote	• Place at least one water fountain on site • Use “green”, low toxic building materials to prevent air quality problems
Crime	Mitigate	• Proper vandal proof lighting, including mesh over lights to prevent breakage • Graffiti resistant materials *Appendix S • Proper maintenance and oversight by site/garden manager • Neighborhood watch
Traffic	Promote	• Traffic-calming measures, such as a lined crosswalk,signs to slow down (10–15 mph) — see HRiA’s Community Traffic Calming Policy and Practice Brief (Due out in Spring 2013) and NYC Active Design Guidelines *Appendix G

Section V: Reporting, Evaluation and Monitoring

Application

The information from this report will be used to design a system for siting and implementing strategies. This is intended to be the first edition of many to come, which will evolve with the City and the vacant lots that are filled. It is intended not only to guide the siting, but also to encourage the continued evaluation of sites that have been remediated.

Reporting

This report will be presented to the MA DPH Division of Prevention and Wellness to guide the future development of vacant lots in the Fitchburg areas of Elm St., Cleghorn, Green Acres and the area surrounding FSU. Hopefully this HIA will inform future decisions on how to develop the many sites to support the health of the city. This report was also provided to the City of Fitchburg and the MOC as part of the grant requirements for this project.

Other intended forms of dissemination include the Cleghorn Neighborhood Center, as well as local Neighborhood associations. A presentation at the annual MRPC and MEC meeting, a presentation to the VLWG, and possibly other stakeholders. Additional avenues for disseminating this HIA will be discussed among MDPH, MRPC, MOC and VLWG.

Evaluation

The Massachusetts Department of Public Health will consider the following evaluation questions for this HIA:

- What resources were used by MRPC and MOC to complete this HIA?
- To what extent was the community involved and engaged in this HIA process?
- What were the successes and challenges of this HIA process?
- Did MOC, MRPC, and the Vacant Lot Workgroup find the HIA process valuable?
- How did this HIA influence the decision making of the Vacant Lot Workgroup?
- What aspects of the recommendations were included in Vacant Lot Workgroup's proposals to the City of Fitchburg for the procurement of land and development of each vacant lot?

*The process evaluation will be completed within the month of the submission of this HIA report, and will be made available on the MRPC website.

Tracking the impact of the vacant lots on health determinants and health outcomes

One way that the health determinants and outcomes of this HIA could be monitored is through proposed regular surveying of local residents by Vacant Lot Workgroup using a Resident Survey to be developed by (MOC? MRPC? VLWG?).

The current version of the survey (found in

Appendix XX [from the focus group]) contains primarily qualitative health behavior and health status questions, as well as questions regarding resident values and perceptions of the neighborhood. The future survey can be adapted to address future needs and concerns of the VLWG as progress is made on the development and implementation of vacant lots and community programming, producing both qualitative and quantitative data. Over time, the survey can indicate whether predicted improvements on the social determinants of health, relative each site or neighborhood, were achieved. In addition, complementary data can be compiled from sources that already collect several monitoring indicators of interest. For example, actual crime data is collected by Fitchburg and University Police Departments. Similarly, traffic data is collected by MRPC.

We recommend that the VLWG monitor the following indicators over time — questions in italics denote those indicators that are contained in the resident survey:

- How many residents (adults and children) utilize the site?
- Have gardening skills/knowledge changed in the neighborhood?
- Has fruit and vegetable (healthy food) access changed in the neighborhood?

» Where do you get most of your fruits and vegetables?

- Has fruit and vegetable consumption in the neighborhood changed?

» How many servings of fruit did you eat or drink yesterday?
» How many servings of vegetables did you eat or drink yesterday?

- Has physical activity in the neighborhood changed?

» During a usual week in the past month, how many days did you do vigorous physical activity? For how many minutes each day?
» During a usual week in the past month, how many days did you do moderate physical activity? For how many minutes each day?

- Has the level of neighborhood social interaction changed?
- Has the perception of safety in the neighborhood changed?

» Overall, how safe do you consider your neighborhood to be?

- Has the incidence of crime in the neighborhood changed?
- Do neighbors believe that the <<improved lot location>> affects their sense of well-being?
- Has traffic volume in the neighborhood changed?

Limitations

As with all research efforts, there are several limitations related to the data collection that should be acknowledged. A number of secondary data sources were drawn upon for quantitative data in creating this report. It should be noted that for several indicators, current neighborhood level data were not available. Instead, larger geographic statistics (e.g. Fitchburg or Massachusetts) were used. Further, due to the collection of data from multiple sources, data presented in this report cover a variety of time periods. Therefore, figures and tables may not be directly comparable with each other. Congruently, because of small sample sizes or because geographic information was not noted, many of the secondary sources are not able to provide data that are specific by neighborhood. When this is the case, Fitchburg citywide data are presented in the report.

Additionally, self-reported survey data (e.g.,

BRFSS and YRBS) should be interpreted with caution as respondents may over- or under report behaviors and illnesses based on fear of social stigma or misunderstanding the question being asked. Respondents may also be prone to recall bias — that is, they may attempt to answer accurately but remember incorrectly. Despite these limitations, these self-report surveys benefit from large sample sizes and repeated administrations, enabling comparison over time.

Specifically in relation to the BRFSS: "The SAE prevalence for Fitchburg meets one but not both DPH Reporting Rules. (Fitchburg estimates have adequate sample size, however, the precision of 95% CI is larger than the allowable requirements). The SAE and 95% CI may be reported at the discretion of the program but the following language must accompany the report: In order to provide data for more Massachusetts communities, we include town level estimates that may be based on relatively few respondents or have standard errors that are larger than average. The confidence interval for this community is wider than the normal limits set by MDPH. Therefore, the estimate for this town should be interpreted with caution."

There are several limitations related to this resident survey that should be acknowledged. First, this was a convenience sample, not a scientific sampling of the neighborhood; therefore findings are not representative of all residents. Additionally, the data from the survey is self-reported and should be interpreted with caution as respondents may over or under report behaviors based on fear of social stigma or misunderstanding the question being asked. Finally, respondents may also be prone to recall bias — that is, they may attempt to answer accurately but remember incorrectly.

Finally, it should be noted that a limitation of the literature review was that some of the search terminology was different from the exact site components of each strategy. For example, search terms for the research on the Cultural and Natural Playspace included playground, outdoor gym, adult playground, which is somewhat different from a Natural or Cultural Playspace and may have resulted in literature that was not entirely applicable to the type of playspace in each vacant lot's application. This limitation applied to the literature searches related to all three components. "Community garden" was used for searches related to the Urban Agriculture, in order to supplement the information found on Urban Agriculture. However, it is believed that much of the evidence provided in the literature was still relevant to this HIA, and thus was included in the assessment. A major limitation was realized upon the first search for literature regarding Off Street Parking. As it turns out, and where noted above, there is little research done into the health effects of siting off street parking. Search terms included "Pavement", "Non porous pavement", "Permeable Pavement", and "Parking lots". We were able to make some intuitive hypothesis and hope that this report will pave the way for research into the effects of off street parking and the surrounding populations. It is noted where there are deficiencies. Furthermore, "Stigma" tended to bring up racial issues rather than general perception issues that we were looking for, and in order to supplement the limited research the terms "judgment," "Perception," and "Impression" were used.

Section VI: Appendix

Street Light Location map
http://www.ci.fitchburg.ma.us/government/departments/DPW/STREET%20LIGHT%20STATUS%20FEB%202013.pdf

National Asphalt Paving Association
http://www.asphaltpavement.org/index.php?option=com_content&view=article&id=558&Itemid=1148

BMI Information:
http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html
Fitchburg Water Supply tables

Stakeholder Group	Key Contact & Info	Area of Expertise	Interest in the HIA or related decision
City of Fitchburg Board of Health	Steve Curry, Director	Health-related information about the City	Fitchburg Stakeholder
City of Fitchburg DPW	Lenny Laakso, P.E., Commissioner of Public Works	Information about Fitchburg's streets, water and wastewater-related infrastructure systems	Fitchburg Stakeholder
City of Fitchburg Police Department	Robert A. DeMoura, Chief	Crime statistics	Fitchburg Stakeholder
Montachusett Opportunity Council, Inc.	Mary Giannetti, Director Nutrition and Wellness Service	Previous walkability audits that identified vacant lots as an important issue, other health-related data including obesity	Co-Fun 'n FITchburg facilitator with the City
Cleghorn Neighborhood Center	Joana Dos Santos, Executive Director	Localized knowledge of Lower Cleghorn, including vacant lots	Neighborhood Stakeholder

Stakeholder Group	Key Contact & Info	Area of Expertise	Interest in the HIA or related decision
Twin Cities Community Development Corporation	David Thibault-Munoz	Localized knowledge of Elm Street neighborhood including vacant lots	Neighborhood Stakeholder
Growing Places	Joanne Foster, Executive Director	Location of existing community gardens in Fitchburg they have assisted in creating	Yes, opportunity to assist in development of additional community gardens
Mass. Dept. of Public Health	Ben Wood	Information about Public Health, potentially related to some of the Indicators	Public Health Stakeholder
Residents		Local/Lot level knowledge of each neighborhood	Residents of each neighborhood
Montachusett Regional Planning Commission (MRPC)	Eric R. Smith, Regional Planner	Demographics	Regional Planning Agency; involved in HIA Report Development
City of Fitchburg Mayor's Office Lisa Wong- Mayor	Mayor Lisa Wong	Overall information about the City	Interested and Policy Leader
City of Fitchburg City Council	President Jody M. Joseph	Overall information about the City	Interested and Policy Leader
City of Fitchburg Parks Board	Mary Whitney, Chair	Information about Fitchburg's Park and Recreation resources	Fitchburg Stakeholder related to Park and Recreation Opportunities
Fitchburg Public Schools	Jill Lucius, General Manager School Services	Obesity and Nutrition info of Fitchburg children enrolled in Fitchburg Public Schools	Fitchburg Stakeholder
YMCA - Montachusett Community Branch	Pamela-Christian-Ridings	Residents currently served by YMCA Programs	Interested in HIA process Community based organization
Fitchburg State University	Mary Beth McKenzie	**Faculty/staff have expertise in many areas**	**Community institution in the University Neighborhood**
Residents		**Detailed community information**	**Affects their neighborhoods**

Stakeholder Group	Key Contact & Info	Area of Expertise	Interest in the HIA or related decision
Spanish-American Center	Mickey Guzman, Family Advocate	Latino Organization, based in Leominster but serves Fitchburg Hispanic population	Interested in HIA process
The Trustees of Reservations (TTOR)	David Outman, Community Conservation Specialist	**Open space, Conservation**, Community Garden involvement at Gateway Park	Interested in HIA process
Children's Aid & Family Service	Noreen Alves, Grant Coordinator, Strengthening Families		Interested in HIA process
North County Land Trust	Laurie Nehring	**Open space, Conservation**	Interested in HIA process
Sen. Jen Flanagan	Amanda Early, Legislative Aid	Information related to current and potential legislation at the State level	Interested in HIA process
Mass. Public Health Assn.	Andrea Freeman	Information about Public Health, potentially related to some of the Indicators	Public Health Stakeholder
Health Resources In Action (HRiA)	Brittany Chen	Information on Health Impact Assessments	Facilitator of Scoping Session; Technical Assistance

Crime Data:

Elm St. data

Streets

"MARSHALL" Or "ELM" Or "MECHANIC" Or "ACADEMY" Or "HIGH" Or "PRICHARD" Or "NUTTING" Or "SIMONDS" Or "MT GLOBE" Or "MOUNT GLOBE" Or "WALLACE" Or "HARTWELL" Or "FOX" Or "OLIVER" Or "OMENA" Or "SPRING" Or "TAFT" Or "GARNET" Or "PLEASANT" Or "BEVERLY" Or "KNOWLTON" Or "NORCROSS" Or "JAY" Or "DAVIS" Or "GROVE" Or "BROOK" Or "MERRIAM" Or "SAARI" Or "LOWE" Or "NORTHMEN" Or "ADAMS" Or "JOHNSON" Or "OXFORD" Or "COOLIDGE" Or "VILLA" Or "HARDING" Or "VICTOR" Or "ESSEX" Or "MURKLAND" Or "GOODWIN" Or "MATTSON" Or "TAPIO" Or "BAILEY" Or "CRESCENT" Or "GAGE" Or "CENTRAL"

Main St.—320 Main St. to 923 Main St.
Mt Vernon—0-156 Mt Vernon St.
Blossom St.—0 to 208 Blossom St.

Lower Cleghorn

5

"FEDERAL" Or "ALLEN" Or "CLEGHORN" Or "ROCKLAND" Or "LITCHFIELD" Or "KING" Or "AMIOTT" Or "WALL" Or "PRATT" Or "LAFLAMME" Or "MARTEL" Or "DUMAIS" Or "HURON" Or "DANIELS" Or "FAIRMOUNT" Or "OAK HILL" Or "BLAIS" Or "ORCHARD" Or "PLYMOUTH" Or "COLUMBUS" Or "WILDWOOD" Or "BOXWOOD" Or "FOCH" Or "CLEARVIEW" Or "NEWTONVILLE" Or "PERSHING" Or "HOME"

0-58 Leroy St.
176-270 Reingold Ave
0-50 Shea St.
0-130 St. Joseph Ave
0-158 Madison St.
0-62 Edwards St.
0-98 Chester St
0-184 Clarendon St.
0-156 Woodland St.
100-320 Beech St.
>194 Pratt Rd
>320 River St.

Footnotes

1. Right to Farm Chapter 92-3
2. The broken windows theory was first introduced by social scientists James Q. Wilson and George L. Kelling, in an article titled "Broken Windows" and which appeared in the March 1982 edition of The Atlantic Monthly. The title comes from the following example: "Consider a building with a few broken windows. If the windows are not repaired, the tendency is for vandals to break a few more windows. Eventually, they may even break into the building, and if it's unoccupied, perhaps become squatters or light fires inside. Or consider a pavement. Some litter accumulates. Soon, more litter accumulates. Eventually, people even start leaving bags of refuse from take-out restaurants there or even break into cars."
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