

SUSTAINABLE COMMUNITY REDEVELOPMENT: A Plan for Detroit's Lower Eastside

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Abstract

In the city of Detroit, decades of discrimination, unrest, and disinvestment have left scores of vacant and abandoned property and thousands of impoverished residents. This is clearly apparent in Detroit's lower eastside, located just inside the city limits and bordered by affluent suburban Grosse Pointe Park. Here, in the heart of the lower eastside, the Jefferson East Business Association (JEBA) works to restore economic vitality as a means of revitalizing the overall conditions of the neighborhood. To aid JEBA in their strategic planning process, we developed a replicable model of sustainable community redevelopment and delivered a set of tailored suggestions for the lower eastside.

Our research began with a review of national case studies relevant to six core topic areas critical to redevelopment: Economic Prosperity, Human Health & Well-Being, Vibrant Communities, Energy Systems, Material & Resource Flows, and Ecosystem Services. Through the course of our research, common principles emerged and informed the creation of the six-step REPAIR model for sustainable community redevelopment. In this report, we demonstrate the model through application to the lower eastside, provide our resulting assessment of the neighborhood, and suggest detailed next steps for JEBA and the community.

While specific guidance is provided for Detroit, the key findings are universal: First, a data-driven approach is essential in guiding proper resource usage and investment. Second, there is often a plethora of organizations working for the betterment of hard-hit urban areas. It is essential that these disparate stakeholders collaborate on a common plan to avoid redundancy and while accelerating community redevelopment. Stakeholders must rally behind a strong leader to most effectively assemble crucial resources and increase the likelihood of success. Third, a truly sustainable community will need to prepare for future challenges through mitigation and adaptation strategies. These methods must be established to increase resilience and realize true sustainability. We highlight a process of continual improvement in which metrics and indicators are regularly checked for both changes in trends and continued relevancy.

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Introduction

Background & Context

The Rise and Fall of Detroit

Detroit has held a symbolic meaning for America in every decade since World War II. In the 1940s, the automotive industry's ability to rapidly retool earned Detroit the nickname the "arsenal of democracy," and it is often credited as a key reason for the Allied victory. At that time, Detroit was unique in its dominance of the automotive industry. This sector and related industries accounted for nearly one-sixth of the country's employment in 1950, with Detroit at the center of a regional web of vital industry. The pivotal role of Motor City was summed up best in the adage, "When Detroit sneezed, other cities caught pneumonia." At that time, the quickly growing boomtown was home to some of the highest paying blue-collar jobs in the nation.¹

Following World War II, Detroit exemplified the best of postwar American consumerism and productivity. Manufacturing jobs were plentiful in the city. The General Motors' plants and Ford River Rouge complex fabricated parts and supplies for the greater automobile industry, while a myriad of workers at steel mills and chemical plants toiled along the nearby Detroit River. Construction boomed in Detroit's peripheral neighborhoods and nearby suburbs. To the north and west, thousands of new houses were constructed as suburbs sprawled out to become Oak Park, Southfield, Redford, and Livonia.

In the 1950s, the postwar industrial boom spurred major companies to promote efficiencies that led to increased production, reduced workforce size, and overtime shifts. As production grew increasingly automated, manufacturing industries such as textiles, electrical appliances, motor vehicles, and military hardware relocated plants to the suburbs and rural areas to be nearer to lower wage labor markets. Federal highway construction projects also fueled industrial growth away from urban areas. As white populations aged and plants relocated, racial disparities flourished prompting white citizens to flee in droves to the booming suburbs. Detroit's African American community largely lacked the geographic mobility to follow the changing labor market and remained relegated to the city.

By 1970, many neighborhoods were predominantly African American and the older homes were rapidly deteriorating. Many properties had since been converted into rentals; others suffered the ravages as their residents' sunk into poverty unable to afford repair to aging structures. Redlining became a common practice, aggravating the situation. Banks and mortgage firms were notoriously reluctant to invest in older, urban neighborhoods occupied by large minority populations. Historian Thomas Sugrue wrote,

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Detroit continued to hemorrhage jobs, population and tax dollars, and thus city services deteriorated, schools suffered, and neighborhood residents joined in the litany of complaints about inadequate police protection, irregular trash pickup, lack of snowplowing in the winter and infrequent bus service.²

White citizens took their political conservatism to the suburbs, hiding behind governmentally defended municipal boundaries that were impenetrable for African Americans.¹

Racial segregation continued to grow in Detroit. Government policies including Social Security, welfare, and jobs programs reinforced stereotypes and inequalities, while housing programs maintained racial division by keeping public housing in already poor urban areas and bankrolling white suburbanization with discriminatory housing subsidies. Racial division was also perpetuated by labor unions, which, though successful in lobbying for work rules, wages and seniority, remained silent on discriminatory hiring or upgrading and plant relocation that had long-term impacts on Detroit workers. Individual white workers who benefited from these practices promoted discrimination in the workplace, furthering division that extended into homeowner terrain. White neighborhood associations often formed to stem movement of blacks into their communities. Protests, violence, and threats of harassment often were effective deterrents to racial mixing. Detroit's lack of other minorities caused the color line between white and black to remain relatively uncomplicated but highly divisive.³

In late summer of 1967, racial tensions boiled over into five days of riots and violence, which left forty-three dead, and over 7,000 arrested. The property damage was extensive, including looting and burning of 2,500 buildings, the scars of which can still be seen today. The damage resulted in the loss of wages, income, government costs, \$36 million worth of insured property, and millions more of uninsured property value. At the time of the riot, over a third of Detroit residents were African American, many embittered by economic displacement and lack of job opportunity or stability and fueled by growing militancy in the black youth community. Increasingly, young men grew detached from the urban labor market due to discriminatory hiring, decentralized manufacturing, and urban economic decline. This wove a pattern of poverty that left urban poor economically marginalized.

The 1970s ushered in stagflation, oil crises, and the rise of global competition and influx of car and steel imports. The proverbial bottom fell out of the auto industry, causing mass unemployment.⁴ In 1983, the city erupted into flames as houses, abandoned buildings, and unused factories fell victim to a stunning array of arson that lasted seventy-

¹ Michigan is a home rule state, which means that the state has delegated substantial authority, and given

two hours, with over eight hundred fires reported. This occurrence turned into an annual tradition known as Devil's Night, a prelude to Halloween.⁵ Devil's Night was historically an evening of mischief and vandalism but became a cover for arson, a time when property owners unable to sell in the rapidly declining housing market would use this night as an opportunity to burn down their homes, collect the insurance money, and claim that an arsonist was at fault.⁶ Detroit, a city of one and two-story homes, most on narrow lots, now contains blocks with vacancy rates of 70 percent and upward. The visual appearance of damage and lack of strong police force caused rampantly rising crime rates. By the 1970s and 80s, Detroit had earned the title "Murder Capital, USA". After decades of social and political turmoil, it represented the worst of what America had become.⁷

Modern Times

Between 1950 and 2002, Detroit lost nearly half of its population, almost a million people, and thousands of jobs. Devastated by industrial decline, racial conflict, and disinvestment, most factories that had provided stable jobs and union wages and benefits are now demolished or running with greatly decreased workforces. Now, over 10,000 houses are uninhabited; over 60,000 lots are empty. Over a third of the city's residents live beneath the poverty line, and welfare offices, hospitals and jails abound with the effects of unemployment and poverty.⁸ Mayor Bing recently announced plans to tear down 3000 homes per year in an effort to "right-size" the city, with plans to remove 10,000 by the end of his first term.⁹

Today, a city built for 2 million people is home to just over 900,000.¹⁰ Detroit is ravaged by joblessness, concentrated poverty, physical decomposition, and racial isolation. The latest economic crisis has only deepened the impact of white flight, economic decay, and dilapidation. Sub-prime lending practices continue to lead to an increasing amount of foreclosures and abandonment. As a result, a full 40 square miles of the once-thriving city are now vacant land, and an astonishing 30,000 buildings sit empty and abandoned.^{11,12} A recent Urban Environment report ranked Detroit lowest in quality of life among the 72 cities examined, measured by density, transportation, housing, education, cost of living, and safety, making it a unique case study for urban redevelopment.¹³

Redevelopment

Recent years have seen considerable investment and redevelopment in the city. As part of the city's bid for Super Bowl XL, Detroit raced to cleanup streets, upgrade infrastructure, and attract new businesses. Recognizing its long forgotten riverfront asset, the city has seen a number of projects incrementally restoring access and amenity along the water. When completed, the Detroit RiverWalk will span over five miles of shoreline and connect downtown to the edges of the city.¹⁴ Currently, large sections have been completed and funding has been allocated for the remainder. Other notable public

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improvement projects include Campus Martius Park, completed in 2004, and Cadillac Square Park, completed in 2007.

While some urban redevelopment has occurred, grim realities still face most urban neighborhoods. Acres of rundown houses, abandoned factories, vacant lots, and shuttered stores on the margins are left idle while downtowns are revitalized. Trendy urban enclaves of coffee shops make parts of the city appealing for the upper-class, while neighborhood shopping districts in low-income areas are dominated by pawn shops, check cashing agencies, liquor and beer stores, and cheap clothing sellers. Full-service supermarkets are scarce and quality clothes are difficult to come by. Little city, state, or federal dollars are invested into these rundown districts. Community development corporations (CDCs), struggling against formidable odds, have made incremental improvements in urban economies and housing markets. Sugrue noted that, “local non-profits have the will but ultimately not the capacity to stem the larger processes of capital flight that have devastated the city.”¹⁵ Despite this pessimistic statement, a unified collaborative made of local non-profits, governmental organizations, private businesses, and community residents working in concert could affect such large-scale, systemic change and bring prosperity to Detroit once more. Sugrue aptly states:

*What hope remains in the city stems from the continued efforts of city residents to resist the debilitating effects of poverty, racial tensions, and industrial decline. But the rehabilitation of Detroit will require a more vigorous attempt to grapple with the enduring effects of the postwar transformation of the city and creative responses, piece by piece, to the interconnected forces of race, residence, discrimination, and industrial decline, the consequences of a troubled and still unresolved past.*¹⁶

Detroit’s Lower Eastside

Situated just off the Detroit River, five miles east of Detroit’s central Business District and bordering financially affluent Grosse Pointe, our study area within Detroit’s lower eastside is bounded by St. Jean Street to the West, Alter Road to the east, Vernor Highway to the north, and the river to the south. This area encompasses over 170 acres, houses approximately 12,179 residents, and serves as the eastern gateway to Detroit.¹⁷ The neighborhood features riverfront access, several parks, tree-lined streets, and a historic commercial district along Jefferson Avenue. Despite these assets, the neighborhood remains part of a struggling city. Within the lower eastside, vacant or abandoned property accounts for 54 percent of total land area and nearly 50 percent of households have annual incomes below \$25,000.

Known briefly as the Village of Fairview, the lower eastside of Detroit housed a major racetrack in the mid 1800s, called the Detroit Driving Club. Originally a horse racing

track, it was one of the first tracks in the nation to allow African-American jockeys. Isaac Murphy rose to prominence there, winning an astounding 44 percent of his races in eleven years, including three Kentucky Derbies. Later used as an automotive racetrack, the Club took on even more prominence as the historic location where Henry Ford won a significant race in an early prototype of one of his cars. That race attracted investors to his company, ultimately leading to the birth of an American institution, the automotive industry.¹⁸

Jefferson Avenue has a long history of public transportation usage. Streetcars were a strong presence in the area as early as 1863 when horse drawn streetcars made their debut, up through the 1950s when the last of the electric streetcars were decommissioned.¹⁹ Until the discontinuation of the streetcars, the lower eastside was the site of one of the largest rail yards in Detroit, allowing for extensive business development as the city's industrial presence grew.²⁰ Mass transit has evolved into a myriad of bus lines, with a comprehensive schedule that has provided relatively frequent and consistent service to the neighborhood's residents over the years.²¹

Unfortunately, an \$80 million budget deficit and \$300 million debt burden have had an enormous effect on the city's transit system. In November of 2009, Mayor Bing announced across the board cuts in bus service, including the elimination of 24 hour service for most lines, a reduction of weekend service, the elimination of at least two underperforming routes, and likely fare increases to help close the deficit.^{22,23} This reduction in service comes at a time when ridership on DDOT buses is up nearly five percent and single user vehicular traffic, measured in vehicle miles traveled (VMTs), has dropped for the first time in decades.²⁴

The percentage of income spent on housing and transportation costs per capita is disproportionately high for Detroiters, with anywhere from 43 to 103 percent of total income spent on these two expenditures alone.²⁵ A combination of migration due to racial uprisings and layoffs in the auto industry set off an economic slowdown in the lower eastside. This resulted in major business venues closing, leaving 'mom & pop' establishments struggling, and the commercial strip deteriorated faster than rescue attempts. The population dwindled as boarded up windows, empty storefronts, vacant lots, and abandoned houses became the norm.

The Jefferson East Business Association

The Jefferson East Business Association (JEBA) is dedicated to improving the quality of life for both businesses and residents of Detroit's lower eastside. With a history of informal community involvement since the 1970s, JEBA officially organized in 1994 as a Michigan 501(c)(3) non-profit corporation. JEBA provides business district improvement and beautification services, marketing and outreach efforts, and small business consulting programs to improve the business climate within the neighborhood and create employment

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opportunities for area residents. Recently, the association has begun to expand its programming and may soon be viewed as a full-fledged community development organization (CDO). “With the developing riverfront and vibrant neighborhoods surrounding East Jefferson, there is no other corridor better positioned for new investment in all of Detroit,” says Josh Elling, JEBA’s executive director.

JEBA currently commands a staff of four full-time employees, and approximately 350 volunteers, of which 15 are considered core, committed, “supervolunteers”. JEBA’s business and job development goals are to “ameliorate economic disincentives, and create employment opportunities for area residents.”²⁶ JEBA currently offers entrepreneurial training classes and business counseling, working as a satellite center for the Michigan Business Development Center. The East Jefferson Corridor Collaborative (EJCC) project is a partnership between JEBA, the Detroit Downtown Partnership, and Villages CDC to expand and coordinate improvement projects and anti-crime efforts along the East Jefferson Corridor. Lastly, the third of JEBA’s main strategic initiatives is real estate development and physical planning within the district. They are working to initiate façade improvement programs for local property owners, with a larger objective of facilitating development of city-owned properties and planning for future area growth. They also offer summer youth programs, clean sweep activities, flower plantings and other beautification programs, plus a partnership with the Detroit Police Department.

JEBA celebrated many impressive accomplishments in 2009. By mentoring 325 individuals and small business owners, 150 jobs were created or supported. JEBA made progress with redevelopment efforts throughout the neighborhood, including helping secure nearly \$2 million in tax credits and \$225,000 in pre-construction and tenant improvement funds for the renovation and re-use of historic properties along Jefferson. Currently, JEBA’s primary funding comes from grants and contributions, with a smaller share coming from business membership dues. Moving forward, JEBA is investigating additional services and offerings, to reduce reliance on private donations.

Project Goals

Even considering recent accomplishments, a daunting set of interconnected challenges lies ahead of JEBA. Despite its historic years of prosperity, the lower eastside of Detroit has lost most of its vigor to deteriorating economic, social, and environmental conditions. These conditions are not expected to improve without substantial action from leaders within the community, many of whom abound with will and want, but lack in ways and means. In spite of copious pessimism from those outside the situation, those who are faced with the challenges daily are optimistic. In a survey of local residents, 43 percent stated that their favorite aspect of the neighborhood was “the people,” while an additional

11 percent indicated “the neighborhood”.ⁱⁱ There is something keeping the residents from deserting their homes aside from lack of financial means. Clearly, hope is not lost.

JEBA’s strategic planning process favors long-term sustainability over short-term fixes. This approach has the benefit of applying a long-term strategy for success, rather than utilizing limited resources, such as time and money, on strategies that may not have a lasting impact. These short-term fixes tend to alleviate topical conditions, rather than solving the systemic failures that perpetuate them. Sustainability, however, requires mechanisms which not only alleviate stress in the short-term, but provide management strategies to adjust and adapt to a changing environment. This strategy ensures that as Detroit rises again to prosperity, it can be resilient to future economic, social, and environmental crises.

As a collection of six graduate students in the School of Natural Resources and Environment, at the University of Michigan in Ann Arbor, we have a diverse set of backgrounds and skills, but a common interest in the implementation of sustainable strategies for redevelopment in impoverished areas. We have partnered with JEBA to assist them with a review of current trends and conditions in the field of redevelopment, and to help establish a framework for the prioritization of resources, inventory of community assets, and opportunities for partnership to implement change. We seek to build upon existing frameworks and examples of environmentally and socially responsible development with a goal of advising the revitalization of this lower eastside neighborhood.

In summary, our four project goals are:

1. Perform an assessment of leading trends in sustainable community redevelopment.
2. Synthesize the best practices of other areas into a replicable model
3. Perform primary neighborhood research
4. Utilize aforementioned model and research to deliver tailored suggestions for Detroit’s lower eastside community.

We aim to use this opportunity to take the nationwide best practices of urban revitalization and apply them in a way that is highly integrated with the neighborhood’s unique assets. Our research will provide JEBA with new insight and examples which they may use to formulate a holistic plan for a sustainable lower eastside. Our analysis and recommendations will help JEBA target its grant-writing efforts and garner financial backing for program improvement. It will also prove helpful in mobilizing local community groups and residents into a more collaborative effort.

Chapter Summary

Chapter 1 provides our definition of the concept of sustainable development and discusses the

ⁱⁱ See Appendix 3 for full listing of survey results.

added complexities that come with an area requiring redevelopment. While we did review many standards and certifications in depth, we chose not to recommend these frameworks as a basis for redevelopment in the lower eastside. Specifically, we studied LEED for Neighborhood Development, LEED for New Construction and Major Renovations, BREEM, the Living Building Challenge, and the Sustainable Sites Initiative. While these tools have been designed to evaluate, rank, and recognize sustainable development, they lack a connection to the key challenges and opportunities associated with many redevelopment situations, particularly the general deficit of funding that is required to attempt certification. While no one certification or standard is highlighted, these standards are vital in gearing development towards sustainable thinking and are mentioned where applicable in Chapter 2, should additional guidance or tools be required.ⁱⁱⁱ

Chapter 2 gives an intensive review of global literature covering six interrelated areas critical in addressing the process of sustainable redevelopment: Economic Prosperity, Human Health & Well-being, Vibrant Communities, Energy Systems, Material & Resource Flows, and Ecological Services, reporting on innovative trends and alternative solutions that may prove effective specifically for communities facing severe decline and blight. Where appropriate, we also indicate how the lower eastside can leverage these breakthroughs.

Chapter 3 discusses the systemic issues preventing progress towards sustainable redevelopment, including the way that land is managed and regulated, and offers strategies that promote improvement.

Chapter 4 introduces the REPAIR model, a framework for sustainable community redevelopment that emerged from our research: a six-step process that provides an organizational approach for implementing the strategies introduced in Chapters 2 and 3, including an initial design scenario for the lower eastside and our suggested next steps for the Jefferson East Business Association.

Chapter 5 summarizes our process and the conclusions drawn from our REPAIR model analysis. From this knowledge we distill our key findings and discuss their applicability for both Detroit's lower eastside and communities in need of sustainable redevelopment.

ⁱⁱⁱ For further in-depth discussion of the Emerging Certifications & Standards, see Appendix 1.

Chapter 1: Sustainable Community Redevelopment

Detroit's lower eastside has seen extensive changes over recent decades. Residents seek stability, security, and opportunity. The city longs to see the stretches of vacant land and abandoned homes converted into an economic tax base. Community members hope to see contaminated sites restored to ecological health and providing social benefit. These goals require a holistic and coordinated approach to redevelopment, one that may lead to a more equitable, environmentally sensitive, and economically feasible solution. Put simply, Detroit's lower eastside presents a rare opportunity to move past currently utilized but outdated development patterns and towards a truly sustainable model of development.

While many books have been written on the concept of sustainable development, there is currently a dearth of information on issues of sustainable redevelopment. We believe that this will become an increasingly important issue as fewer unspoiled tracts of land remain for new growth. Future development will soon need to be solely redevelopment and infill of the existing built environment. Trying to create sustainability in regions needing not only new development but also substantial revitalization will present unique challenges. Detroit, like other aging manufacturing or rustbelt cities, is currently in the process of redefining itself and serves as a unique proving ground for sustainable redevelopment. In the following pages, we will define the concept of sustainable development and discuss the added complexities brought by redevelopment.

Defining Sustainable Development

Never before has the earth's capacity to support human life and activity been so chronically stressed; we are faced with a series of interconnected megaforges. There is growing evidence that population, linked to energy use and greenhouse gas emissions, is a key factor in global climate change.¹ Population is the 'big multiplier', particularly when linked with resource consumption, because it intensifies the rate, scale and scope of both the root causes and effects of climate change in the United States and globally.² We have rapidly increased the anthropogenic capacity to make fundamental changes to the present and future states of the global environment. An increasing scale and scope of environmental problems is recognizable, and the magnitude of challenges and change we face in the coming decades is unprecedented.

The effects of climate change are already being felt both nationally and worldwide. Average annual temperatures are increasing, with the eleven warmest years on record all occurring in the past thirteen years.³ Severe weather events (such as rainstorms, heat

waves, and hurricanes) have increased in frequency. Additionally, major shifts in the growing season have occurred. Climatic change also causes the spread of vector-borne diseases rarely seen in the U.S., such as malaria and dengue fever.⁴ Also alarming, the nation's freshwater resources are increasingly prone to drought, and glaciers are retreating, sea ice is melting, and sea level is rising, all of which are changing the chemistry of oceans around the world.⁵ Freshwater scarcity, biodiversity loss, drastic decreases of valuable ecosystem services, and land use changes (for example the loss of forest land and viable farmland due to conversion and desertification) are likely to, and in some regions already, cause social and political unrest, poverty and declining public health.

Nowhere are these issues more visible than in our cities and communities. Currently, nearly 82 percent of the population of the U.S. lives in urban areas.⁶ The increasing size of cities in terms of both population and land consumption has intensified adverse environmental impacts. Global population continues to grow exponentially; worldwide population will likely reach 9.2 billion people by 2050. Urban areas are expected to absorb this growth, increasing from 3.3 to 6.4 billion people, over 90 percent of the population, by 2050.⁷ Providing for the needs of a larger population requires a greater supply of natural resources, exacerbating already stressed systems. As the technology and affluence of developing countries increase, the growth rate of resource consumption will likely surpass that of population.

The U.S. in particular uses resources at a rapidly growing rate, consuming about 25 percent of the world's energy and generating five times the world average of CO₂ emissions, though it only represents about five percent of the global population. With about 8,000 people added daily and three million added each year there are likely to be one billion high-energy consuming Americans by 2100, all of whom have a bigger 'per-person' influence global climate change than the rest of the world.⁸ America's over-consumptive lifestyle and dependence on finite fossil fuel resources, particularly foreign oil, is wasteful, inefficient and has led to international turmoil. The emissions associated with meeting the energy demands of our lifestyle exacerbate global warming trends, making it inherently unsustainable. Meeting the energy demands of this population and simultaneously reducing GHG emissions is a daunting task.

In its report to the United Nations, the 1987 World Commission on Environment and Development, also known as the Brundtland Commission, defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."⁹ Since then, a growing number of considerations, principles, and guidelines have been established to direct development in a sustainable manner.

There are several key elements specific to community design that form the link between U.S. population trends and climate change: high population numbers and rapid

growth, increasing density in coastal and metropolitan areas, increased energy-consumption in households, a large Baby Boomer population, high per-capita energy use, fossil fuel burning, land use, and vehicle use. There is an opportunity, however, to reduce the impact of the built environment on the natural environment when designing for social and economic community revitalization. Strategies to increase the capacity of urban and rural areas to cope with temperature and precipitation variability run the gamut from improving stormwater management, to increasing social capital, to creating and implementing climate action plans. However, the multitude of social structures, environmental function, and economic foundations on which our society depends are not isolated. Addressing each component in a vacuum will not repair the system. The complex interconnections of the entire system must be contemplated together.

We are at a defining moment in shaping our future. Now is the time to reassess the way we live and interact with the environment. Living in harmony with the global ecosystem will require the discontinuation of the use of polluting sources of energy and a significant reduction in virgin material extraction. A sustainable world would exist within sensitive ecological constraints and aim towards a sufficient use of necessary resources, so that they may continue to exist for future generations. It begins with changes that modify our consumption, energy usage, and behaviors.

The Added Challenges of Redevelopment

As described earlier, the process of developing in a sustainable manner is complex, interrelated, and arduous. Using this model as the basis of a redevelopment schema poses challenges, due to an already an existing population, infrastructure, and a variety of stakeholders. America's former manufacturing centers, or Rust Belt cities, confront a particular set of challenges towards redeveloping sustainably. Often these cities face severe economic decline due to the departure of major corporate employers who have either gone out of business or relocated facilities elsewhere. As jobs were lost, those who could afford to abandon homes and properties fled to the suburbs or other cities. This left the lower socioeconomic class trapped in a downward spiral, often highly segregated by racial and income factors. Existing planning and redevelopment models do not currently offer a holistic approach for addressing the challenges of copious vacant or abandoned properties in America's older industrial cities nor the social inequities created through sprawl and economic decline.

Property abandonment adds further challenges for cities across the United States, increasing crime rates and sinking the vitality of residential and commercial areas.¹⁰ These vacant and blighted areas then pose fiscal challenges of property maintenance and management; the dwindling tax base left by loss of residents and businesses often goes to the welfare support of those who cannot afford to pay taxes rather than addressing social

and service needs of the community.¹¹ Abandoned properties can deter reinvestment, create market malfunction and discourage public and non-profit revitalization efforts.¹² Vacant land oversupply can also depress land prices, property values, and tax revenues.¹³

The severe setbacks of a collapse of local economy can also be strongly related to environmental problems, such as pollution, local resource depletion, or degradation of the local ecosystem. The 1990s were marked by a widespread awareness of the convergence of environmental, economic, and social problems and issues. It is increasingly recognized that residents of low-income communities and communities of color suffer disproportionately from negative environmental factors: poor air quality resulting from overexposure to toxins such as diesel exhaust from highways, siting of toxin-emitting industrial facilities or waste treatment plants, poorly maintained homes with mold, inaccessibility to healthy food options, and the lack of clean, safe open spaces such as parks and playgrounds. Social, economic, and service aspects, such as a lack of access to good jobs, inadequate healthcare and other social services, also prove detrimental.¹⁴

There are significant opportunities for citywide greening strategies, such as converting vacant land to valuable green infrastructure in depopulated areas. These efforts can revitalize urban environments, drawing economic development, empowering community residents, and stabilizing dysfunctional real estate markets.¹⁵ Out of the roots of economic decline and social despair, disparate groups in many local communities have united to devise new ways to live responsibly within their local ecosystem, particularly among challenging socioeconomic conditions. Often these creative methods are characterized by a democratic participatory approach with particular attention to restoration of public health and revitalization of cultural institutions, often called the “human factor” in development, leading to more socially equitable regeneration.¹⁶

While existing literature on successful community redevelopment is somewhat sparse, this paper will draw on lessons learned from successful vacant property, urban greening and sustainable development strategies, including non-profit leadership and neighborhood resident empowerment, land banking, strategic planning, targeted revitalization investments, and collaborative planning. It will point towards an emerging REPAIR model that requires collaborative community design processes and building green infrastructure programs. To address the many challenges faced such as financing, resident displacement, and lack of legal authority, we can postulate that practitioners, the public and private sectors, academics and policymakers need to work in partnership to explore alternative urban designs and green innovations and craft policy agendas to cooperatively solve problems.

In the next chapter, we examine strategies for sustainable community development and redevelopment and case studies from across the United States in an effort to determine successful methods and best practices.

Chapter 2: Issues & Trends

The previous chapter introduced the unique history of Detroit and its lower eastside, as well as the challenges and distinctive opportunities associated with redevelopment. With this understanding of current conditions, we look to the national and international body of literature in order to review the major trends and innovations within the growing movement of sustainability and how they are applicable in areas requiring redevelopment strategy.

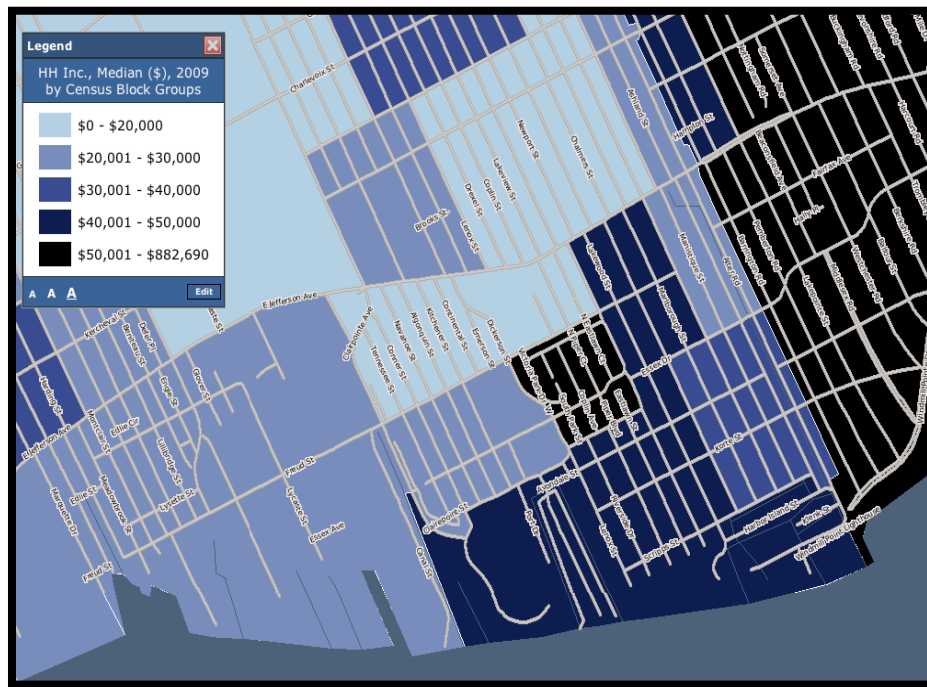
The goal of this chapter is to synthesize multi-national literature covering the six areas we have identified as critical to addressing the process of sustainable redevelopment: economic prosperity, human health and well-being, vibrant communities, energy systems, material and resource flows, and ecological services. These six issues were based on their overall significance to holistic sustainability, which includes economic, social, and environmental drivers. Economically, we must provide a strong investment engine to drive prosperity and afford community members a variety of career options throughout their lifetime. Socially, we are also concerned with providing a healthy living environment, free from pollution and supportive of active lifestyles for all. In connection with this, we also need to design for equitable access to nature, services, and interaction with one another to ensure a long lasting and vibrant community. Environmentally, we look to reduce our overall appetite for energy and try to ensure that all remaining needs are met from clean, renewable sources. We also seek to reduce material waste by rethinking our usage and disposition of finite natural resources. Lastly, we strive to ensure that, throughout the processes, we do not damage or lessen nature's ability to coexist with humans and provide vital ecological services.

A growing multitude of research exists on these topics. In reviewing extensive literature we sought existing examples of prudent principles and techniques specifically applicable to communities facing severe decline and blight. We also identified potential challenges to adopting and implementing these best practices. Where appropriate, we also indicate how the lower eastside can apply these breakthroughs directly.

Chapter 2.1: Economic Prosperity

The creation of even the most well-designed sustainable city requires substantial capital investment to fund development. Therefore, a conscientious and deliberate method must be devised to finance this investment, attract new business, and sustain the characteristics that retain this new growth. Undoubtedly, this new system will require a strong economic engine. Greenfield development of corporate campuses is often driven by an economic anchor, such as a large-scale employer. However, the loss of these economic anchors, due to business failure or relocation, leaves communities scrambling to fill the void. All too often, city leaders lack economic contingency plans and are ill equipped to deal with the exit of a large scale job provider. By the time a necessary leadership change is enacted, the damage, in the form of lost income and tax revenue, is done.

The resulting economic redevelopment challenge involves both attracting outside corporate investment to an urban infill location as well as supporting an entrepreneurial community to create new opportunities from within the city limits. Due to the complex and multi-faceted nature of the challenge, a number of separate organizations must work collaboratively to effectively jumpstart a struggling local or regional economy. These groups serve as the catalyst for improvement by tackling the challenges of attracting outside investment and providing access to both capital and technical expertise for individuals to successfully launch new businesses. The goal of this section is to build on successful economic development theory and highlight the proven emerging trends and best practices in order to apply them to the lower eastside of Detroit.



Map 1 - Median Income in Detroit's lower eastside¹

In Detroit, manufacturers continue to flee the city unchecked by government. Stable blue-collar jobs are scarce, and despite valiant efforts on the part of city officials, initiatives to attract new industry to the city have been unsuccessful. The largest area of job growth since the 1980s has been part-time contingent work, which earns less income and provides few benefits.² Moreover, discrimination persists, with Detroit still segregated by race and class. Even as middle-class African Americans move into suburbs, such as Southfield, white populations continue to flee, creating new segregations. An increasing number of Detroiters live in high-poverty areas; 40 percent or more live below the official U.S. poverty line. Detroit's poor are unable to escape living in neighborhoods with other poor and are increasingly fragmented from the labor force. In Detroit's lower eastside approximately 57 percent of residents live at or below 200 percent of the federal poverty level, which amounts to an annual gross income of \$20,800 for an individual (See Map 1).³ Detroit has gained a reputation coined by journalist Ze'ev Chafets of *The New York Times* as being America's "first major Third World city" with imagery evoking a largely poor black city surrounded by affluent white suburbs, the epicenter of American apartheid.⁴

In the lower eastside, a few small scale neighborhood businesses remain open. As a whole, however, the neighborhood lacks a major job creator. Despite a local Chrysler assembly plant on the neighborhood's border, the majority of union employees live outside the city, limiting local economic gains. Furthermore, inadequate finances, resulting from depopulation and loss of industry, have drained the city of a tax resource base for infrastructure maintenance, drastically slowing efforts to attract new business that would revitalize the city.⁵

Organizing for Action

In the United States, all layers of government have a hand in managing economic development policy. These entities must carefully balance their investments across a large breadth of topical issues and priorities. Through transportation, environmental concerns, human health, and built environment issues, tax dollars are constantly stretched. These multiple layers of economic policy and support add complexity to the redevelopment process and put an unnecessary burden on communities in need as they navigate their way through the system. Individuals often lack the knowledge, time, or support required to compete for government assistance. In underserved communities, especially those with a history of landlord absenteeism, the first step to invigorating the business environment is to establish a local form of control.

In the absence of large businesses with clout and lobbying power, organizations must emerge to drive the local agenda and unite to compete for resources. In some cases, these groups represent formal municipal leadership and regional alliances, while in others they take the shape of non-profits, community organizations, or an assemblage of small

business owners. While the voice of an individual constituent remains important, community groups, non-profits, and local business associations have emerged effectively as the ‘voice of the customer’ when it comes to competing with professional lobbyists.

In situations where the central government is unable to provide essential services or proves inadequate at fulfilling an individual neighborhood’s specific needs, non-profit organizations frequently fill the void. Often referred to as Community Development Corporations, or CDCs, these groups reach out to the local residents and business owners and begin formulating a strategic plan. CDCs are often the nation’s first-responders when it comes to improving impoverished neighborhoods. Their relatively small size and depth of local knowledge enables them to be quite effective at responding to the street-level needs of the communities in which they operate. In a recent study of national CDC effectiveness, it was found that CDC investment was responsible for upwards of 69 percent of increased property values.⁶

Once a rallying point has been established and the community’s needs are clearly articulated, these groups are then able to tap into State and Federal programs aimed at job creation and adaptation to changing economic climates. Chattanooga, TN provides a terrific example of this organizational power. In 1984, several dozen citizens and the Lyndhurst Foundation united to form Chattanooga Venture, which crossed class and race boundaries and over the following decade engaged hundreds of citizens to set and conquer community goals.⁷ Simultaneously, another Chattanooga group, The Neighborhood Network, linked dozens of neighborhood associations and encouraged local businesses. This has been instrumental in the revitalization of downtown Chattanooga. Successful initiatives include the installation of electric shuttle buses that now have a ridership of one million passengers per year, the renovation of theaters and historic buildings, and the creation of riverfront walks, urban parks, and greenways, which create pedestrian traffic for local stores and restaurants.⁸ The projects implemented through the Venture created thousands of jobs and brought a billion dollars in public and private investment which was reinvested in projects such as school redesigns, art programs, environmental clean-ups, and innovation for financing affordable housing. This model of organization was so effective that they received the first U.S. Presidential Award for Sustainable Development in 1996.⁹

Detroit’s lower eastside is home to a number of community organizations. The Jefferson-Chalmers CDC is a resident group primarily focused on issues of safety, beautification, and neighborhood services. Creekside CDC was established in 1992 and champions affordable housing, environmental issues, and education. These are but two examples of the more than twenty-five local and regional stakeholder organizations.^{iv} These groups must coordinate efforts to avoid unnecessary and wasteful competition for scarce resources. In addition, these disparate groups must come together under strong leadership.

^{iv} See Appendix 4 for a full listing of Stakeholders & Opportunities for Collaboration

JEBA has a unique role to play in this process as the sole representative of the commercial corridor. By reaching out to the other neighborhood organizations and including them in the strategic planning process, JEBA could act as the central voice for the community.

Attracting New Business

Incentives

The federal government provides a number of economic incentives through which it encourages multinational corporations to locate their headquarters and offices in America. This is primarily driven through national fiscal and monetary policy, ensuring national competitiveness on a global basis. Federal policy levers such as interest rate and inflation all play a role in attracting businesses to the U.S. Once domestic, companies begin the process of state and city selection. For better or worse, our system of government effectively pits local economies against each other, in competition for workers and businesses.¹⁰ Local and regional incentive practices can be leveraged competitively. States must provide incentives to persuade companies with a compelling bill of goods and services to headquarter locally: a skilled workforce, new job creation tax credits, low-cost resources, support services and so on. These can further be complimented by regional and city-specific incentives.

Cleveland, OH, in Cuyahoga County, currently provides more than a dozen programs aimed at attracting corporate investment.¹¹ These programs range from new job creation tax credits to funds encouraging environmental cleanup and re-use. The state also provides numerous avenues to support workforce development and continuing education. Cleveland is home to the corporate headquarters of Forest City, Sherwin-Williams, and KeyCorp, who continue to leverage these benefits and reinvest in the local community. The county of Cuyahoga has expanded its tax exemptions and low-interest loan programs to specific targeted areas that compliment state Enterprise Zones, in which business receive additional tax benefits.¹² This coordinated approach has encouraged existing companies to expand. For instance, the nearby city of Eaton has recently improved its downtown presence in a bid to redefine itself and Cleveland in the process.

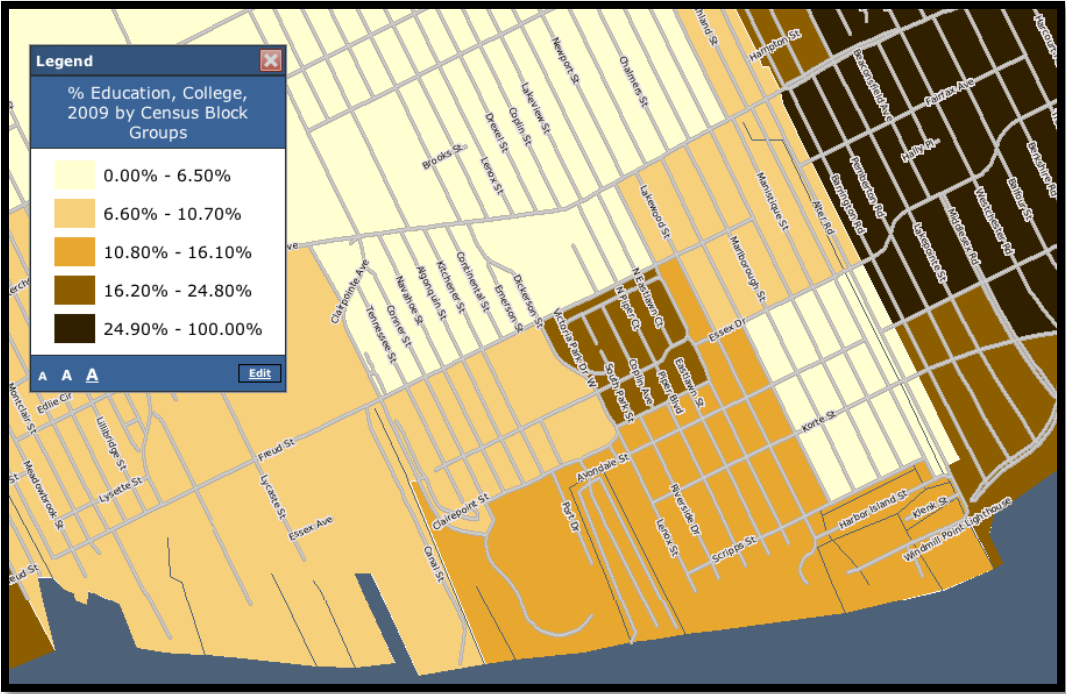
The Michigan Economic Development Corporation (MEDC), a partnership between the state of Michigan and several local communities, seeks to expand new businesses in Michigan and retain top talent. The efforts of MEDC's national and international business development focuses on emerging sectors where Michigan possesses a competitive advantage, for example, the sectors of Alternative Energy, Automotive Engineering, Life Sciences, Homeland Security, Advanced Manufacturing, and Film. These sectors are incentivized through a variety of targeted initiatives like tax credits and funds, and additionally backed by a number of state incentives and tax breaks to attract new firms to the state.¹³ Michigan's Renaissance Zones™ or tax-free zones, in which businesses are

exempt from most state taxes, providing a compelling value proposition. While Detroit features a number of these zones, the lower eastside is not currently included.¹⁴

The addition of a Renaissance Zone™ in the lower eastside would help target investment along Jefferson Avenue. However, to make this case, JEBA will need to focus on specific commercial uses to differentiate the neighborhood. While 2009 saw a number of new businesses open their doors in the lower eastside, a sense of identity and purpose for the neighborhood's commercial district is lacking. To best attract outside investment, Detroit's lower eastside will need to develop a vision for its future and target its efforts at companies who match that vision. Again, JEBA is uniquely qualified to lobby city and state representatives on behalf of the lower eastside, though a combined effort with other local organizations would prove to strengthen their resource base and efforts.

Workforce Development

Workforce development is a key area of concern, especially for de-industrialized cities. The Brookings Institute cites lower educational levels as one of the most profound "legacy costs" of former industrial cities.¹⁵ In fact, the average worker with a high school diploma earns \$23,000 less than a comparable worker with a college degree.¹⁶ Bridging this gap will be crucial as cities vie to attract corporate campuses and the emerging green economy. The recent demands for alternative energy are creating a resurgence of industrialization in the United States. Through a combination of facility re-use and overlapping skills, the "green jobs" sector may provide a stepping-stone for legacy workers. The U.S. Economic Development Agency (EDA) manages several programs that provide capital and assistance in developing a comprehensive strategy for deployment of funds with the intent of accelerating economic growth and job creation, including workforce training programs. In addition to Federal assistance programs for investment in public infrastructure, low-interest loans, and planning support, the American Recovery and Reinvestment Act of 2009 has created additional offerings. This recent expansion is notable in that it specifically supports communities, such as Rust Belt cities, which have experienced job loss or economic hardship in part due to the impact of international trade. The lower eastside of Detroit is plagued by rampant unemployment, which by some measures exceeds 20 percent.¹⁷ As jobs have shifted to new industries, many local residents lack suitable training and education. Over 30 percent of the neighborhood residents lack a high school diploma as compared to the national average of 16 percent. Not surprisingly, a mere seven percent have gone on to obtain a college degree, whereas the national average is 17 percent (Map 2).¹⁸ In an effort to streamline Detroit's school system, Mayor Bing announced a plan to shutter 42 school buildings, three of which is located in Detroit's lower eastside.¹⁹ The goal is to recognize areas of abandonment by redirecting those resources toward select investment neighborhoods. With a little luck, the next generation of Detroit schoolchildren will have a leg up.



Map 2 - Percentage College Educated²⁰



Map 3 - Percentage Unemployment²¹

In the meantime, the city of Detroit offers traditional no-cost workforce development training and support through the Detroit Workforce Development Department (DWDD). Employers and job seekers in the lower eastside can access these benefits at the DWDD's Conner location, which lies on the northwestern edge of the lower eastside. Governor Jennifer

Granholm also instituted the No Worker Left Behind program in 2007, which began a new Green Jobs Initiative in 2008. Six million dollars were invested in training for jobs in alternative energy industries including wind, solar, biofuels, geothermal and other green industries.²²

Defining a vision for Detroit's future workforce will require a concerted effort. Once defined, nearby Wayne State University and the College for Creative Studies can be leveraged to supplement neighborhood training and support. While JEBA has a core competency in professional development and business assistance, there exist opportunities for partnership with other organizations to grow the local workforce in skill and numbers. A variety of target industries may be suitable for the area. Some of these are discussed in the following sections.

Urban Agriculture

Specific areas of future opportunity for workforce development in Detroit's lower eastside may lie in the abundant vacant land. There has been much discussion in the press lately about the role of urban agriculture in rustbelt cities. Transforming vacant lots into useful, productive land is a great alternative to leaving lots vacant.²³ Studies have found that "city revitalization efforts which include urban agriculture have a regenerative effect when vacant lots are transformed from eyesores-weedy, trash-ridden, dangerous gathering places –into bountiful, beautiful, and safe gardens that feed peoples' bodies and souls."²⁴

According to the USDA, urban agriculture accounts for approximately 15 percent of the food produced throughout the world.²⁵ Urban agriculture is the production, processing and marketing of plants within and around cities.²⁶ While agricultural and urban land are often thought of inherently separate, a closer look at food production in urban areas indicates that in reality, these land uses have and do coexist.²⁷ Urban agriculture ranges in scale from backyard or rooftop gardens, to 1-acre plots, to plots of 100 acres or greater. Common cultivation areas include vacant lots, backyards, rooftops, balconies, and roadside open space. Air and soil contamination can be a significant problem in urban areas and are potentially a concern in the lower eastside. Raised beds, soil testing, soil capping, mulch, and sheltered protection such as greenhouses can prevent crop contamination.²⁸

Detroit has many urban agriculture resources. For example the Garden Resource Program Collaborative is a Detroit-based group that provides support, training, and education for those interested in starting an urban farm. In addition, the Detroit Black Community Food Security Network (DBCFSN) is a coalition of organizations and individuals

working together to promote urban agriculture, food sovereignty and justice issues, policy development and co-operative buying.²⁹

One example of a successful urban farm is City Farm in Chicago. This farm produces thirty varieties of tomatoes, beets, carrots, potatoes, lettuce, herbs, and melons.³⁰ The farm is run on city-owned land in a diverse neighborhood. Produce is sold to local residents and to high-end restaurants and hotels at scaled costs.³¹ Another example is the Garden Project of Lansing, MI. They provide tools, seeds, educational resources, and support to residents interested in initiating a community or personal garden. The Garden Project is also involved in operating a food bank that provides food to people in need, as well as reducing wasted food through its Food Movers program.³²

Growing food in backyard gardens, containers, decks, rooftops, or yards supplements food budgets.³³ When a household or community produces more food than needed to meet family or community needs, excess food can be sold to supplement income. If high-end specialty crops are produced, there is often a market for these crops in local restaurants and hotels. Urban farming benefits the local economy and provides employment opportunities. A local food system that includes processing and distribution increases these benefits. With the number of historic buildings along Jefferson that could easily be re-used for food processing and packing, this may be a win-win opportunity for the lower eastside.

The startup costs associated with urban agriculture are often a barrier to implementation. These costs can include labor, management, water, tools and equipment, rent and insurance, processing, packaging, and marketing materials.³⁴ Microcredit and loans from banks or government, donations, resource pooling, utilization of volunteers, insurance for crops and liability, and community block grants can provide assistance to make urban agriculture more economically feasible.³⁵ Last year, the USDA offered up five million dollars in Community Food Project grants. By “sharing the risks and rewards of food production, distribution, and retail” among the local and regional community, “farmers and businesses can explore opportunities to produce new varieties of foods or expand existing ventures to meeting a local or regional need.”³⁶

Branding & Stigma

Rebranding is a unique challenge for cities undergoing redevelopment. The previous industrial history of the city must be repositioned as paving the way for recent investments in infrastructure, workforce training, and in revitalization of core community assets. For example, after the closure of Bethlehem Steel in 1995, the city of Bethlehem, PA entered a period of economic stagnation and job loss. The former manufacturing facilities presented an enormous environmental and social hazard. Nonetheless, the city recognized that this land was located in a unique location proximate to the major population centers of NY and Philadelphia. The city quickly began to seek out a partner for remediation and

redevelopment, to spark the tax base. In 2006, the old steel plant was converted into a new Sands casino, drawing 20,000 visitors on its first day of operation.³⁷ This is an example of a community turning its greatest liability into an asset and reaping the rewards. It also shows the outside-the-box thinking that may be required to repurpose existing assets for modern and sometimes very different uses.

In Detroit, a number of organizations have been working to recast the city in a new light. The Detroit Economic Growth Corporation, a non-profit organization, was founded in 1978 to provide technical, financial, and developmental assistance to the city of Detroit as well as the business community. Over the past ten years, DEGC has worked to market Detroit as the city of the future and to guide investments in infrastructure, building renovations, parks, and streetscapes. With the unique position of Detroit's lower eastside serving as the gateway to Detroit, there seem to be many opportunities for partnership along the Jefferson corridor.

Growing New Business

There are many instances where it is not feasible to attract a corporate "white knight" into a struggling city, regardless of the number of tax breaks. In these cases, the cities are forced to step back and look for growth strategies from within. Several cities successfully adapted to changing times by refocusing on their local community of educational and medical institutions, or 'Eds and Meds'. In addition to employing a large percentage of a city's residents, these core community assets have numerous beneficial spillover effects. Managed properly, a thriving Eds and Meds market segment can be leveraged to spark innovation and foster new business throughout the city.

The revival of Pittsburgh, PA, is an often-cited example of successful economic adaptation. From the ashes of its manufacturing might, the city refocused itself in the 1990s on higher end services and healthcare, retaining manufacturing talent and expertise in select premium areas. Research at the nationally ranked University of Pittsburgh Medical Center, now the single largest employer, regularly spins off new and pioneering startups.³⁸ One by one, these new ventures have increased Pittsburgh's competitiveness in the areas of biotechnology and software. This transformation was only possible through a coordinated approach by public and private interests.

Driven by the Allegheny Conference, a regional collective of politicians, non-profits, and the chamber of commerce, Pittsburgh defined a new economic plan that would leverage the existing workforce skills, rationalize the tax system, and source investment equity. This process involved comprehensive stakeholder engagement from all corners of the community and was not an overnight success. To compliment these efforts, the state contributed grants to upgrade aging infrastructure and R&D facilities, and contributed along with private interests and foundations to install a state of the art LEED rated conference

center. This coordinated effort and planning process provided a clear roadmap for all stakeholders, aligning them with a common vision of the future.³⁹

The Cleveland Clinic, in Ohio, and nearby institutions continue to break ground in new research. Biotech and fuel cell research led by Case Western is currently attracting outside investment and is preparing for a future campus expansion. Not wanting to leave spillover to chance, the city of Cleveland has hired a specific tech czar to oversee technology transfer from academia and ensure that the city has the necessary infrastructure to support this endeavor.⁴⁰ Cleveland University has, in turn, hired a VP of Economic Development specifically tasked with connecting promising researchers with supportive business services and incubator space in the local community.

This work has begun to yield results that will have a trickledown effect on the overall city. A good example is how Case Western recently attracted Intel to invest in its OneCommunity fiber infrastructure project, linking research institutions and blanketing the city in wireless networking.⁴¹ This has already drawn further investment from Cisco and a number of foundations. These private investments in city infrastructure will only serve as a magnet for more businesses.

Another example of leveraging existing assets to create economic revitalization can be seen in Cleveland's Detroit Shoreway neighborhood. They are jumpstarting the local economy by building on local assets, using the arts for economic development and fostering community engagement that will better the quality of life for residents. The local community development organization (CDO) has aggressively pursued holistic redevelopment approach drawing on proximity to the lakefront and downtown Cleveland, architecturally rich housing stock, and the emerging Gordon Square Arts District. Major resources were invested in affordable housing with 700 new housing units built in just the last 2 years. They have now also partnered with the Cleveland Public Theatre on a strategic plan to reinvent the main avenue into a thriving arts district. Leveraging the renovation of the Public Theatre and another future Near West Theatre, the strategy has led to the attraction of 33 new businesses in the past three years and \$750 million of capital investment in the neighborhood.⁴² The Gordon Square Arts District, founded shortly after the creation of the Cleveland Public Theater in 1984, has received \$30 million in revitalization and leveraged over half-billion in economic development.⁴³ There are a variety of similarities in this case to Detroit's lower eastside to be contemplated further later.

In addition to seed capital, it is crucially important that new ventures be given direction and assistance throughout the startup process and on an ongoing basis. In general, between 25 and 30 percent of startups fail in the first year.⁴⁴ The chances for startup success can be vastly improved with guidance from a mentor. Business incubators can provide opportunities for guidance between young and well-established businesses, as

well as offer low-cost space for rent, infrastructure such as telephones and internet access, and many also provide connections with federal, state, and local funding opportunities.

Recognizing its history of entrepreneurship, Youngstown, Ohio, has focused investment on creating more hometown heroes. Birthplace of Good Humor, Arby's, and the now-defunct Phar-Mor chain, innovation is being nurtured in Youngstown. At the Youngstown Business Incubator, fledgling companies gain access to utilities, office space, and business counseling and resources. The investment is already paying off, with one success, Turning Tech, already outgrowing its space.⁴⁵ In response, \$2 million in federal funds has been earmarked for additional incubator space in the city.

Detroit's current debt means that startups must increasingly look towards state and federal grants. Beyond those sources, private foundations and community banks are increasingly becoming mission-driven with their spending. In fact, Bank of America recently announced a commitment of \$25 billion in community development funds for Detroit.⁴⁶ To further reduce startup costs and get training and support, businesses could look toward shared office space. downtown Detroit is home to TechTown, which focuses on research commercialization from Wayne State but also provides business space for the community. However, in the lower eastside, there are currently no formal business incubators in operation. JEBA's business assistance programs are invaluable in setting plans and making connections, however a local facility to provide office amenities would allow budding entrepreneurs room to spread their wings.

Maintaining, Adapting, and Competing

Once a sufficient baseline of business activity has returned, many cities see the formation of Business Improvement Districts, or BIDs, as a means of reinvesting the local profits back into the community. These districts enable each neighborhood to provide for unique services more efficiently than could be delivered by the city.⁴⁷ In fact, a BID's ability to efficiently focus their efforts and separate themselves from the local government has led to nationwide increases in the number of thriving BID-like organizations. Mike Edwards, of the Downtown Spokane Partnership claims that the overall increase in membership and revenues is directly attributable to his organization's ability to "produce results and articulate success very clearly."⁴⁸

Michigan was one of the last states to enact BID-enabling legislation, adopting a formal resolution in 2000. The first BID, Southwest Detroit Business Association, was approved in 2007. Other cities that have seen dramatic turnarounds by leveraging BIDs include Philadelphia, downtown Washington D.C., and San Diego. Structurally speaking, each business within a BID must elect to pay an additional tax, which is collected along with property taxes, and allocated to the non-profit BID entity for usage as directed by its charter. BIDs often start with basic Clean & Safe programs to reduce crime, or the

perception of crime, by employing a local team to perform graffiti abatement, patrol the neighborhood, and provide general cleaning and maintenance. Successfully demonstrated in New York City, the Broken Windows Theory posits that by fixing inexpensive items that imply neglect, a powerful signal is conveyed to the community that vandalism and crime are not tolerated (this will be further discussed in Chapter 2.3). As a result, of their BID programs, which include Clean and Safe programs as well as business development initiatives, the Southwest Detroit Business Association saw a 78 percent increase in the number of businesses and a 16 percent increase in storefront occupancy at a time when the rest of the state was experiencing outmigration.⁴⁹ For the lower eastside of Detroit, JEBA provides basic services but does not currently leverage the Michigan BID legislation. This is partially due to lack of commercial activity currently along the Jefferson corridor.

An example of a highly successful BID is the Capitol Riverfront in Washington D.C., formed in 2007, and bolstered by a waterfront cleanup initiative led by the Mayor, several community organizations, business, and property owners. Like the lower eastside of Detroit, Capitol Riverfront is located on the edge of the city and serves as a gateway. To capitalize on the flow of traffic, the BID focused its efforts on establishing a vision, attracting tenants, and using visible branding to garner interest. Now, the former industrial site is home to the Washington Nationals' stadium, several mixed-use developments, and a number of key anchor commercial tenants, and the Department of Transportation.⁵⁰

As a BID grows as an organization, they may choose to take on a number of additional community responsibilities, such as the development of unique parking solutions, marketing and strategic planning, comprehensive economic development, as well as programming and event production. In addition, they provide local jobs and the opportunity to play a key role in the revitalization efforts.⁵¹ Also in Washington DC, The Downtown DC BID serves over 800 members and commands an annual budget of ten million. It is an impressive example of how influential and effective a BID can become. In addition to a world-class safety and hospitality team, streetscape improvements, and project/event management, the BID has launched a recycling collection system, manages an ongoing clinical-based homeless outreach program, and also provides regular economic development analyses to its many partner organizations citywide.⁵² Even more impressive is the fact that the Downtown DC BID has accomplished all of this in just over ten years.

In other cases, such as Little Italy in San Diego, the assessment extends to residents and property owners as well, enabling a broader community voice to be heard and served.⁵³ In Detroit's lower eastside, JEBA has an opportunity to create the same leverage. From our research, the residents of that area prioritize safety and cleanliness. This dovetails nicely with JEBA's recent plans to expand into residential patrol and security escort service. Increasing the quality of the residential neighborhood will increase home values, attract

Chapter 2.1: Economic Prosperity

more people to the neighborhood, and allow for a stronger pitch to businesses considering locating nearby.

In conclusion, while the issue of capital investment is a vast and pervasive challenge for the redevelopment of blighted areas, opportunities still exist. The lower eastside of Detroit has been devastated by the loss of major economic anchors, but can still create conditions that will bring new prosperity. Outside businesses can be attracted through Federal, State, County, and City incentives, and used in concert with workforce development programs that train local residents in new skills. New local business can also be encouraged, through funding which supports homegrown entrepreneurship. As conditions improve, Business Improvements Districts, or BIDs, have been very successful in other cities in providing long-term resilience to a new business community. With this strong economic foundation, the other highly interrelated goals of sustainability can be addressed and achieved. The Chapters following will address these goals.

Chapter 2.2: Human Health & Well-Being

While long suspected, only relatively recently has the health and well-being of both individuals and communities been included as a significant aspect of sustainable development. As we acknowledge that humans are an integral part of the environment, we recognize that human decisions and behavior are components of a global feedback loop: what people do affects the health and well-being of the rest of the natural world, which in turn affects human health, which encompasses their physical, mental, economic, and social well-being. Many specific design choices can empower individuals to lead healthier, longer, happier lives. This investment is in the best interest of a community as it not only serves the social good, but also reduces the healthcare burden in such conditions as obesity, asthma, and depression.¹

Communities in the United States, especially in urban areas, are often segregated by race and income level. It is increasingly recognized that residents of low-income neighborhoods and communities of color suffer disproportionately from negative environmental factors: poor air quality resulting from overexposure to toxins such as diesel exhaust from highways, poorly maintained homes with indoor air quality issues and toxic substances, inaccessibility to healthy food options, and a dearth of clean, safe streets and open spaces, such as parks and playgrounds, leading to increased obesity rates. Detrimental to social and economic well-being are a lack of access to good jobs, increased crime occurrences, inadequate healthcare and other services.²

The United States is struggling to find answers to its toxic and hazardous waste problems created as a result of an over-consumptive and industrial economy. People earning low incomes and those of color living in blighted areas are experiencing the struggle most deeply. These issues encompass the breadth of the environmental justice movement. The by-products of development, energy system selection, pollution, plus toxic and hazardous waste, are externalized unjustly and have a major impact on creating the very areas that are now in need of redeveloping.³

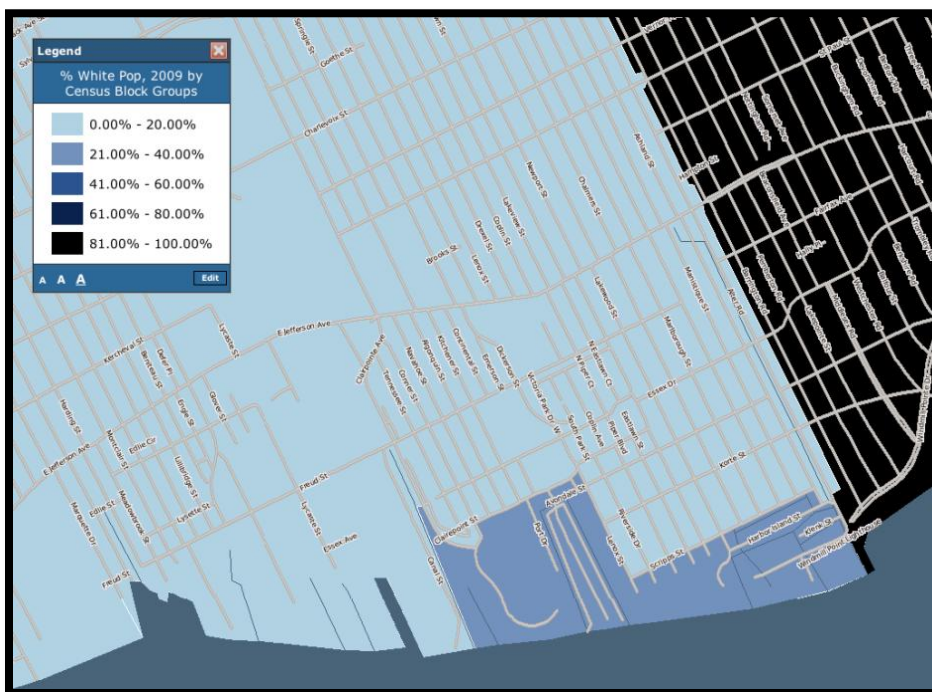
An equitable approach to community redevelopment requires collaboration across a broad range of sectors and groups, incorporating the experience and voices of community members as an integral part of strategic sustainable change. A movement to influence and alter environmental factors so individuals and communities can thrive has arisen. Public health officials, planners, and educators are looking to a neighborhood's physical or built environment, as embodied by the safety of its streets and parks, the condition of housing and schools, the location of business, and patterns or regional growth and change to assess residents' health. If 80 percent of Americans are residing in urban areas, it is crucial to identify elements of site design and development that would provide beneficial impacts to both the physiological and psychological elements of human well-being.⁴

Chapter 2.2: Human Health & Well-Being

Humans have an innate connection with nature. Interactions with nature can have dramatic impacts on mental and physiological health and well-being. Nature has a number of mentally restorative impacts on humans: it may calm, refresh, decrease irritability, and even enhance mental functioning. Both adults and children who encounter everyday nature—a green view from an office window, a lunchtime stroll through a nearby park, well-tended landscapes around schools—restore their ability to concentrate, calm feelings of anxiety, and reduce aggression.⁵ Contact with nature has been associated with improved attention among children with ADD,⁶ improved self-discipline among inner-city girls,⁷ decreased mortality among senior citizens,⁸ longer life spans in elderly Japanese,⁹ and lower blood pressure and decreased anxiety among dental patients.¹⁰

Finding nature in urban areas is almost always challenging; it is even more so in neighborhoods facing economic downfall and blight. As mentioned, minority and impoverished communities faced with adversity have more severe health impacts resulting from built environment externalities, decreased access to nature, worse mental health effects from crowding, poor design, and disenfranchisement of community members due to job loss, drug abuse, and lack of participatory structures. The majority of Detroit's lower eastside population is both African-American (See Map 4) and low-income (See Map 1, Chapter 2.1, page 7), two demographic groups that are more likely to be susceptible to these negative health impacts.¹¹

According to Crain's Detroit Business magazine approximately 57 percent of residents in the area live below the federal poverty level. Chris Allen, CEO of the Detroit Wayne County Health Authority said, "This is one of the poorest parts of Detroit. The top



Map 4 - Racial Demographics¹²

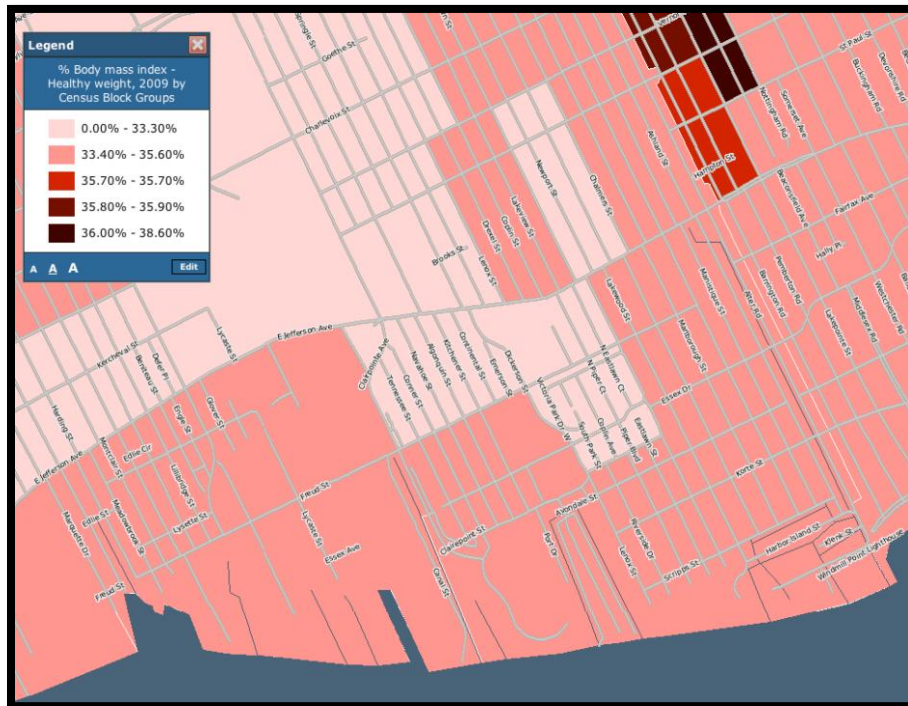
ten things on their list (for spending) are basic acts of daily living — housing, food, utilities — health care might be 11 or 12 on their list.”¹³ In Wayne County, at least 16 percent are without health insurance, twice the statewide average and rising. In 2008 the Authority approved recommendations to improve the underfunded primary care delivery system serving the impoverished lower eastside, as the St. John Detroit Riverview Hospital closed in 2007 due to financial loss. There are currently only four primary safety net providers in the lower eastside, Detroit Community Health Connection, with two clinics; St. John Health's Community Health Center; Health Centers Detroit; and Mercy Primary Care Clinic. The area lacks enough doctors and providers for the amount of people living under the poverty level. Residents who do not have health care or a primary provider are more likely to wait until they get very sick and have to go hospital emergency rooms for an unavoidable visit. This cost is ten to twenty times more than if they went to a primary care facility, which is a waste of resources and leads to a lower quality of care.¹⁴

Obesity & Active Lifestyles

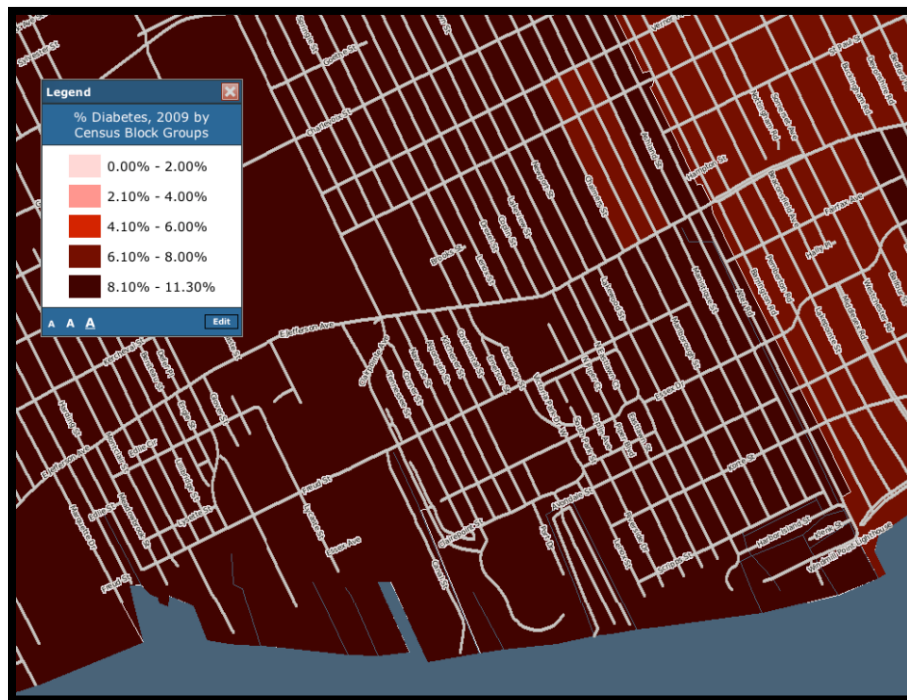
A major key public health concern across America is obesity. Over 60 percent of the U.S. population is overweight and approximately a quarter is obese.^{15,16} This serious and growing issue points to two essential needs: active lifestyles and accessible healthy food options. Many people live sedentary lives; in fact, 40 percent of adults in the United States do not participate in any leisure-time physical activity and less than one-third of adults engage in the recommended amounts of physical activity (at least 30 minutes most days). Physical inactivity, which increases with age and decreases with education and income is one of the six modifiable risk factors for heart disease and stroke identified by the American Heart Association (AHA). It is strongly correlated with increasing cardiovascular risk factors such as obesity, high blood pressure, high triglycerides, high cholesterol, and type 2 diabetes. It is also associated with certain types of cancer, stroke, arthritis, breathing problems, and psychological disorders, such as depression.¹⁷ Approximately 300,000 deaths each year in the United States may be attributable to obesity.

Low-income, African American and Latino populations in the U.S. face an increased risk of overweight and obesity; according to the National Health Interview Survey, the highest obesity rates are correlated with the lowest income and education, with these rates impacting both children and adults.¹⁸ Particularly among women, urban dwellers have higher rates of obesity as well. African American women face an epidemic of overweight and obesity, with nearly half (49.7 percent) obese and over 65 percent overweight. Since U.S. African American women frequently live in poverty with low levels of education,¹⁹ women in inner cities face especially high rates of related health problems.²⁰ These impacts affect African American men as well, in lower proportions, with more than a quarter facing obesity. Obesity is more prevalent in African American children and adolescents than in

Chapter 2.2: Human Health & Well-Being



Map 5 - Percentage Healthy weight, according to Body Mass Index²¹



Map 6 - Percentage Diabetic, 2009²²

Caucasian youth.²³ Diseases related to obesity, including diabetes, hypertension, cardiovascular diseases, and some cancers are higher for African Americans than whites.²⁴

People in areas of poverty are less likely to have or be able to afford health insurance, but are at a higher risk for these health illnesses and often require medical attention. Thus there is substantial cost on the individual for health care and often can impose additional financial costs such as an actual reduction in wages due to discrimination and long term medical expenditures.²⁵ To some extent the cost is also externalized to the community at large and the social cost can be enormous. In the US, the health costs arising from chronic conditions linked to obesity or overweight run into billions of dollars a year. The costs of inactivity in the U.S. were estimated to be \$76 billion annually in 2000. Access to affordable health insurance and health clinics are an essential element of providing a socially equitable community.

Michigan in general has the ninth highest rate of adult obesity in America at 28.8 percent and also the 26th highest rate of overweight youth (aged 10-17) at 30.6 percent.²⁶ The Michigan Department of Community Health indicates that 70 percent of Detroiters are obese or overweight.²⁷ As illustrated by Map 5 in Detroit's lower eastside, no more than 38.6 percent of residents have a healthy body weight.²⁸ Physical inactivity costs the state of Michigan almost \$9 billion annually, through higher health insurance premiums, lost productivity and increased state-funded Medicaid payments.²⁹

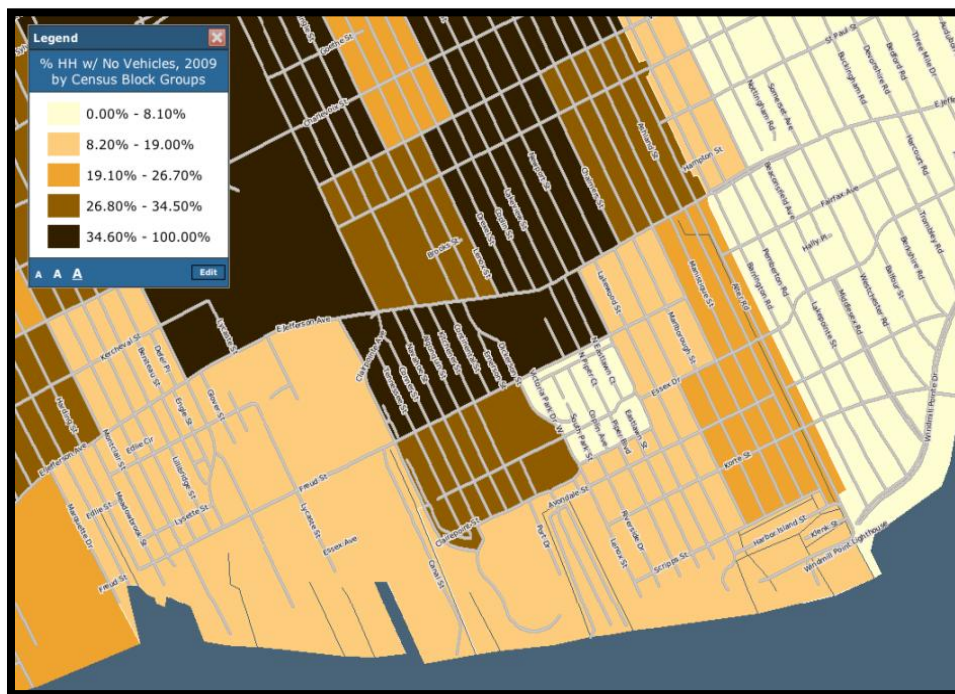
Designing for Active Living

Urban planning and design to promote physical activity is known as active living and has emerged as a strategy to combat growing obesity in the U.S. The goal of active living is to integrate physical activity into daily routines in ways that accumulate at least 30 minutes of activity each day. This may be achieved by walking or biking for transportation, exercising for pleasure, playing in the park, working in one's yard, taking the stairs, and using recreation facilities.³⁰ An active living community is one that makes this integration of physical activity feasible, where bicyclists and pedestrians are respected, roads are built for all forms of transportation, and recreation opportunities are accessible; parks, playgrounds and sports facilities are located near homes and are open to all residents. According to Active Living Research (2004), "Rather than addressing obesity as an individual health problem, this new, transdisciplinary field of active living is focusing on how the built environment – including neighborhoods, transport systems, buildings, parks, and open spaces – can promote more active lives."³¹ Initially the active living movement focused mainly on the shortcomings of the built environment in middle-class suburban communities. However, as low-income, African American, and Latino populations, often found in areas in need of sustainable regeneration, also usually face the greatest risk of these health problems, promotion of active living should particularly target these communities.³²

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While all active communities are different, they have some common principles. One, mixed-use and compact design need to be embraced. Homes and businesses are built close to existing retail shops, restaurants and community services which bring people closer to the places they frequently travel. Shortening distances to these destinations makes it more likely that residents will walk or bike there. Two, streets, bike lanes, sidewalks, shared-use paths and trails should be used to form a non-motorized transportation network. Three, these sidewalks should provide continuous paths that are wide enough for people to walk together and pass those going the other way, with multiple routes to different places, and safe, convenient crossings. Bike routes should also be clearly marked, safe, and connected. In order to promote physical activity through walking or biking to public transit stops, transportation needs to be efficient and convenient enough to be utilized.

Active living community design also provides economic, environmental, equitable, safe and social benefits as well. Walkability can decrease insurance premiums by improving health, increase property values, decrease transportation expenses that can be up to 19 percent of a family's budget for auto expenses and gasoline, and be a perk for businesses in attracting employees. Since motorized transport accounts for 32 percent of greenhouse gas emissions, 28 percent of common air pollution, 51 percent of toxic air pollution, and 23 percent of toxic water pollution, walking two miles a day per family can prevent 730 pounds of carbon dioxide from entering the atmosphere per year.³³ Nearly one-third of Michigan residents do not drive because they are too young, too old, and physically unable, choose



Map 7 - Percentage of Households with No Vehicles³⁴

not to, or cannot afford a vehicle (See Map 7).³⁵ Thus, a community must be designed for all modes of transportation to provide social equity in helping these residents move around safely and easily. Rails-to-trails (walking/biking paths along abandoned railroad corridors), and free or low-cost parks and recreation centers located throughout a community can help to provide opportunities for more healthy physical activity.

Over 5,000 people die in the U.S. annually from vehicle collision with over 70,000 injured. Non-drivers are most at risk, 21 percent are seniors and 16 percent children; pedestrian injury is the third leading cause of unintentional injury-related death among children aged 5-14.³⁶ Reducing traffic speeds and/or volume increases safety. Public transportation also provides additional opportunities for community interaction. Spontaneous social interaction can create stronger community ties, such as bumping into neighbors when walking to work or around the block.

The Promoting Active Communities (PAC) Program is a Michigan state initiative on physical activity to help make changes to community policies, promotion strategies, and the physical design to increase activity. PAC offers web-based self-assessment checklists to help scrutinize policies, programs and environments. It requires teamwork amongst community leaders, professionals, and citizens to generate community improvement ideas. Awards are given out based on scores. There are seven other ongoing initiatives from the Michigan Department of Community Health including Healthy Community Checklist, Promoting Healthy Eating, Healthy Work Environments, Healthy Schools—Healthy Students, Walk by Faith, Public Health Steps Up Challenge, and the Legislative HealthChallenge.

Walkability

Unsafe walking pathways and lack of connectivity are additional barriers that exist to incorporating walking into daily activities. Walkability is a critical part of a sustainable development design; it is a universal form of physical activity that is low-cost and easily incorporated into daily life. Some planners suggest that walkable communities should have destinations within roughly one quarter to one half mile of the point of origin. Bicycle destinations can be located slightly farther- two to three miles from point of origin, even though individuals may be willing to walk/bike further. Walking will increase if the activities of daily living are within walking distance and linked to where people live and work by an interconnected network of streets, sidewalks, and paths. These goals can be achieved by straightening streets to improve connectivity, ‘calming’ traffic, compact land uses with diverse destinations, and environments with amenities such as street furniture and plantings. Transit use should also increase with more compact land use and clustering of shopping and housing near rail or bus nodes. Studies show that walking to and from public transportation can also help physically inactive populations, especially low-income and minority groups, attain the recommended level of daily physical activity.

As active living will take unique forms across communities, planners and health practitioners should try to understand the perspectives of the communities and their unique challenges, rather than striving for a hypothetical 'norm'.³⁷ Walking, for example, may be a solitary recreational activity, or it may be obligatory errands in areas deemed unsafe. Solutions should be focused accordingly, targeted towards improving visual interest and safe sidewalks, allowing for grocery carts, and providing benches for resting and restroom facilities along the route. Another limiting factor can be beliefs about exercise and social norms. For example, one focus group with African American adolescent girls described exercise as "unfeminine".³⁸ However, African American families often show strong family ties with respect for elders and church clergy. An active living strategy might then focus on the families or church leaders advocating for walking groups, perhaps led by peers and group leaders. Identifying these particular relevant values and preferences within the community will prove beneficial in targeting strategies.

Since Detroit's lower eastside population falls into demographics that are more likely to be susceptible to obesity and overweight issues it would be beneficial to implement an active living strategy. Most who are employed drive to their workplace. Thirty percent of our survey respondents claimed walking as their favorite outdoor activity but many do not feel their neighborhood is amenable to recreational walking, perhaps as a result of both safety and aesthetic issues. Seventy percent indicated it was not safe to walk along in the evening in their area. Sixty-eight percent indicated that it is necessary to drive to retail or grocery shopping amenities.^v This indicates that for many individuals walking is not being incorporated. A re-design strategy needs to include elements that make paths or trails, greenways, parks, and access to the nearby waterways more easily available, so that people will feel both safe and excited to walk there for recreation. Also, there is the need to create walkability to both public transit stops and the retail amenities of the area so that people will be willing to incorporate the necessary 30 minutes of walking or biking physical activity built into their daily activities, which could increase health overall.

In accordance with the demographics of our neighborhood and their potential perceptions of walking, neighborhood groups or churches (there are approximately 25 in the area) could be advised to promote these active living programs or encouraging community walking groups. A unified effort between these groups could also look into procuring funding for PAC programs. Another form of program that could prove beneficial is the organization of walk or bike-to-school buddy programs, as the perception is currently that walking to school is not an option. The organization of a non-motorized transportation advisory group, with support from a local governing unit if available, could advocate for non-motorized transport facilities and then also advocate for funding for promotional or

^v See Appendix 3 for full listing of Survey Results

educational programs that encourage alternative modes of transportation. JEBA could at as a crux part of this group or its formation.

Another international active living movement is known as Safe Routes to School (SR2S), dedicated to creating safe, convenient and fun walking and biking routes to educational facilities for children. Michigan schools can obtain funding for this program through the National Transportation Bill (SAFETEA-LU) established by Congress in 1991. This is another activity that could be taken on by an advisory group.

Furthermore, in the search for potential business opportunities to attract to the neighborhood, a physical fitness facility, gym or YMCA could be a potential revenue generator and job creation mechanism, while providing health benefits to residents. The barrier to be considerate is that it should not be exclusionary or too expensive for the residents of the neighborhood to have accessibility; that would not be aligned with the socially equitable principles of sustainability.

Provision of Parks & Green Spaces

Although parks do not guarantee physical activity among nearby residents, they can offer an opportunity. Restricted access to parks and recreational facilities is often a limiting factor in physical activity in low-income neighborhoods.³⁹ One experimental study found that for children who reduced their sedentary time, physical activity increased as park proximity increased.⁴⁰ The same research team has provided evidence that as the percentage of park area within a neighborhood increases, so does the physical activity among children four to seven years of age⁴¹ and non-overweight children eight to twelve years of age.⁴²

Children in low-income or minority neighborhoods may have less access to parks and other recreational facilities. A national sample found a correlation between access to a physical activity or recreational facility (including parks) and adolescents living in areas with higher percentages of the population having a college education. In areas where less than 25 percent of the population had a college education, higher proportions of minority population were associated with a lower likelihood of having access to a recreational facility.⁴³ Teens from lower socioeconomic status are more likely than their affluent peers to report that a nearby recreation facility is important for their degree of physical activity;⁴⁴ this is possibly because they have limited access to more remote (or more expensive) opportunities for physical activity or poorer quality of sports programs in lower income school systems. Poor upkeep of parks and playgrounds in urban neighborhoods needing redevelopment may also lead to lower participation in physical activity by poor residents.⁴⁵

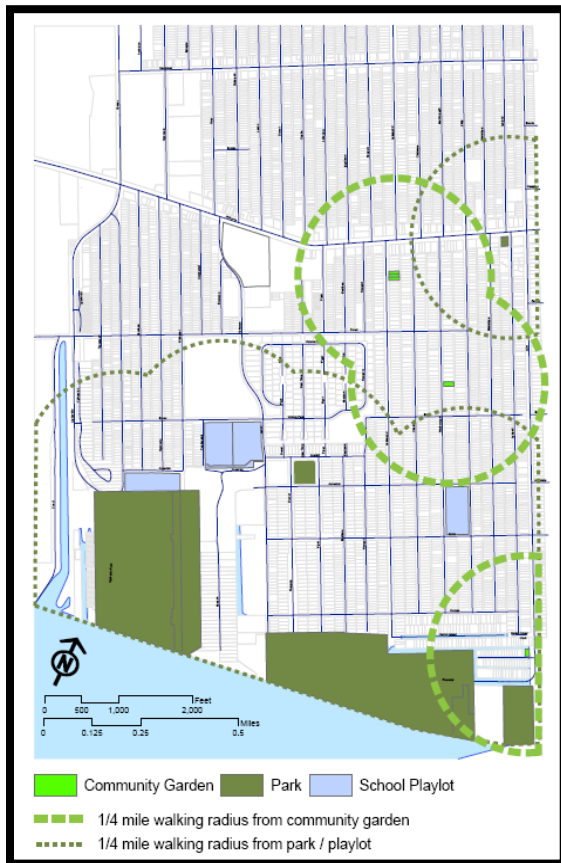
Communities that suffer from blight usually have the some of the least acreage of park space; often it is fenced off to discourage gang territorialism. The park space that is left is often vandalized and strewn with graffiti or left to be overrun by growth when funds are not available to maintain them. What little park space there was to begin with is considered

unsafe or unusable for recreation. Obviously, this pertains not just to the physiological health of individuals but the overall well-being of the community.

One organization that tries to tackle lack of and unsafe park space is Community Greens, an initiative of the international non-profit Ashoka. Community Greens is restoring community to neighborhoods across the country, by enhancing the environment and empowering citizens through the creation and integration of citizen-managed shared greenspaces where people live and work. In initiatives such as Alley Gating and Alley Greening in Baltimore they helped residents, government leaders, and non-profit or citizen sector organizations to unite and develop incentives and policies that create green urban commons. Citizens have since merged their backyards and transformed alleys from blighted space to shared green community places and playgrounds, giving life to vacant lots in a sustainable manner.⁴⁶

Another organization that is geared towards green infrastructure management is Sustainable South Bronx. One of the goals is to start to manage and restore urban areas that have experienced disinvestment. In rejuvenating the NYC's South Bronx, part of their work involves planting, cultivating, pruning, watering trees and working on restoring the

Bronx River (removing invasive species, planting native species, etc). They also partner with the city's parks department to do maintenance on specific parks, simultaneously integrating training programs. They teach green-collar job skills to students and unemployed members of the community.⁴⁷ Following a similar model could not only give the potential health benefits of increased equitable access to parks for exercise, but also provide potential job training and skill enhancement while also concurrently taking better care of the environment. JEBA's position as a professional development agency could help bring such a program to the neighborhood.



Map 8 - Parks, Playgrounds, and Community Gardens in Detroit's lower eastside

Detroit's lower eastside does contain four riverfront parks and two inland parks, which are great community assets (see Map 8). There are 135 acres of park within the boundaries of the neighborhood. However, only 20 percent of the area is within one

quarter of a mile or walking distance to these parks, meaning that there is not equitable access to their usage. Eighty-six percent of our survey respondents indicated that they enjoy the parks in their neighborhood, and would like it if they were closer in proximity.^{vi} More conveniently accessible parks would lead to greater use. With the abundance of vacant land in the area, the potential for the creation of new parks could both increase recreational opportunities and consequently, overall health from increased activity. Adding park space often has the supplementary benefit of increasing property values as well, not to mention creating additional space for public engagement and interaction.

The local government in lower eastside Detroit clearly lacks funding for site maintenance thus imposing a barrier to implementation. Ownership could be placed in the hands of a local community group, through an initiative such as Community Greens, a model like Sustainable South Bronx, or a homeowners association. Putting creating and management of parks in their hands could potentially create jobs, instill a feeling of ownership and pride over the beautification of their neighborhood, get people outdoors and active, and create stronger community ties. In February, the Greening of Detroit was awarded a grant of \$147,000 from the Community Foundation for Southeast Michigan to employ a crew of four seasonal workers to perform greenway maintenance. Additionally, the grant will be used to plan and execute community outreach events.⁴⁸

Nutrition & Food Access

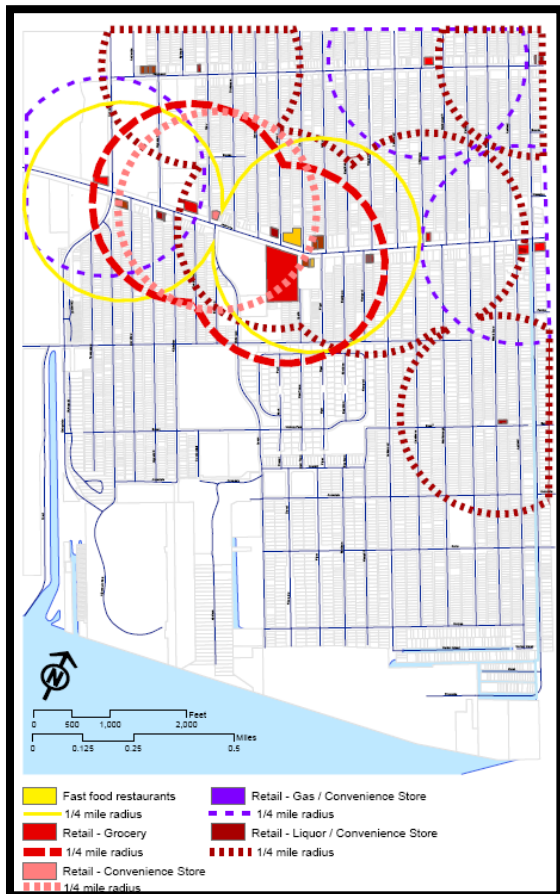
In addition to the negative impacts of physical inactivity, poor diet is a leading cause of death in the United States.⁴⁹ At a national level, alarming trends are emerging within our food system such as food insecurity, increasing environmental degradation and energy inputs associated with crop production, processing, distribution, and decreasing farmland. In the U.S., the number of working poor who suffer from food insecurity is increasing.⁵⁰ Food insecurity can be related to insufficient supply of food, lack of nutritional quality, or fear of future lack of food,⁵¹ and the effects are considerable, ranging from hunger to developmental complications, to difficulty with concentration, and increased anxiety and stress.⁵² The large-scale farming that dominates the U.S. food system has harmful environmental impacts: air pollution, water contamination, soil erosion, and biodiversity loss are consequences of industrial farming.⁵³ Due to the fossil fuels required to harvest, process, and transport food the footprint of food, or the amount of energy, resources, and waste associated with food production to consumption, is significant.⁵⁴

The availability of fruits and vegetables per capita in the U.S. has declined in recent years. In 1996, the total availability of fruits and vegetables was a historical high of 711.4 pounds per person; by 2007, total fruit and vegetable availability had decreased to 680 pounds per person.⁵⁵ Yet Americans continue to consume more and more calories,

^{vi} See Appendix 3 for full listing of Survey Results.

replacing fruits and vegetables with starches and sugars. This is concerning on many levels as a report from USDA’s Economic Research found that we need to increase our fruit and vegetable production by approximately 13 million acres (using 2005 population) to produce sufficient quantities that would allow for full adoption of the Dietary Guidelines for Americans by the population in its entirety. Our current agricultural production is incapable of providing levels of fruits and vegetables sufficient for healthy diets. Public health relies on a healthy food supply; thus it is crucial that we develop a sustainable food system that links preservation of natural resources and land use with human skill. As Michael Hamm said in the Journal of Hunger and Environmental Nutrition, “The economy, the earth’s environment, and the food supply are all part of the biological and social environment which Americans exist.”⁵⁶

Food access is a major issue in America, particularly in urban areas and inner cities that have suffered from de-industrialization, and one that leads to racial health inequalities. One study documented relationships between racial and socioeconomic inequalities and the density of fast food in New York City. Results found that “predominantly Black” areas had higher densities of fast food than “predominantly White” areas, regardless of income,



Map 9 - Grocery Stores and Fast Food Restaurants in Detroit’s lower eastside

which highlights the need to develop policy-level interventions to address racial disparities.⁵⁷ A second source performed a comprehensive review of 54 studies evaluating neighborhood access to food outlets, types of available food in stores and restaurants and dietary info and weight status. It was found that individuals who have better access to supermarkets and limited access to fast-food restaurants tend to have healthier diets and lower rates of obesity. Those living in low-income, minority and rural neighborhoods are most often affected by poor access to supermarkets and healthful food (aptly named “food deserts”), while fast food restaurants and high-fast, unhealthy foods are readily available.⁵⁸

Over half of Detroit has been declared a food desert, with 800,000 people and 40 grocery stores. A study of food availability and accessibility in Detroit found that there are few venues that sell healthy food: 92

percent of the recorded food stamp retailers in Detroit are fringe retailers such as liquor stores, dollar stores, bakeries, convenience stores, and gas stations, etc., and only eight percent are mainstream, small, medium, and large grocery stores and supermarkets.⁵⁹ In order to reach a mainstream grocer, over half of the population of the City of Detroit has to travel at least two times further than the distance required to access a fringe food store.⁶⁰ It can be interpreted that a significant portion of the population meets their caloric needs via fringe retailers, which do not offer the quality, variety, or produce a mainstream grocery store does. Lack of access to mainstream grocery stores increases premature death associated with food imbalance, or lack of adequate nutrition.⁶¹

While Detroit's lower eastside is not technically a food desert, it lacks access to fresh produce and healthy options. There are four fast food chains within one quarter mile walking distance and no farmers markets. There is one true grocery store, a Parkway Foods, and one Family Dollar store that claims grocery store status. Only 15 percent of area residents are within walking distance of these stores. There are nine liquor, gas station or convenience stores, 46 percent of the area is within walking distance to at least one of these. There is one CVS/pharmacy store. It is likely that those without vehicular access or in need of a quick trip will choose one of the more conveniently proximate locations. Many survey^{vii} respondents mentioned that they leave the community and drive to obtain groceries, rather than walking to the local store. Fifty-four percent of our respondents said that they wanted easier access to a better grocery store. See Map 9 for an illustration.

One interesting organization in downtown Detroit that is already trying to address this need is Peaches and Greens, a healthy spin on the ice cream truck model run by the Detroit Christian Community Development Corporation, who also have 60 vacant lots' worth of urban vegetable gardens. Peaches and Greens stocks trucks with fresh fruits and vegetables from community gardens, plays R&B music and peddles produce through the inner city five days a week. Their goal is to educate, particularly children, on the benefits of eating healthy to stave off later health problems. A potential partnership could help extend their routes into the lower eastside where they do not currently serve, or the business could be modeled as a potential opportunity for entrepreneurs in the area.

As more fully discussed in Chapter 2.1, urban agriculture is a rising movement in Detroit. Reintegrating food systems within a community addresses a range of issues from public health, to unemployment, to fossil fuel dependency.⁶² When implementing urban agriculture programs, there is opportunity to incorporate the undervalued or underdeveloped local expertise and social capital within a community.⁶³ Farming in a backyard, down the street, or at a school inherently increases access to nutritional food. Urban farming supplements rural agriculture and increases the availability of fresh produce, which can have as much as twice the nutrients as store-purchased produce.⁶⁴ In urban

^{vii} See Appendix 3 for full listing of Survey Results

neighborhoods that often lack adequate grocery stores, access to locally grown fruits and vegetables can significantly improve the quality of residents' lives.

One model of successful urban agriculture that is addressing the issues of food insecurity and equitable access can be seen in The Detroit Black Community Food Security Network (DBFCFSN) 'D-town' farm, a three-acre parcel on the west edge of Rouge Park in Northwestern Detroit.⁶⁵ The non-profit, who is dedicated to providing healthy food and encouraging local participation in food production and food politics, is working with the city of Detroit to secure the land for long-term agricultural use.⁶⁶ The two-acre farm produces a wide variety of crops, including medicinal herbs, vegetables, honey, and mushrooms, using sustainable, chemical free practices.⁶⁷ A hoop house extends the growing season, enabling the farm to sell produce at the D-Town farm, Eastern Market, and urban growers markets in Detroit year round.⁶⁸ The farm is one action DBCFSN is taking to promote the creation of a Detroit Food Policy Council to address hunger, justice, and access to healthy food.⁶⁹

Food & Education

Schools are a crucial setting for addressing childhood obesity. More than 54 million U.S. children attend school and 6.5 million youth are in after-school programs. A substantive portion of school-aged kids' daily food and caloric intake happens while at school or in an after-school environment.⁷⁰ Most often school districts fail to take advantage of healthier foods offered by the federal child nutritional quality of foods offered to schools by USDA. A California study found that 82 percent of funding was spent on commodity foods, over 50 percent of which were processed before arriving at schools, which leads to unregulated nutritional quality.⁷¹ Another 2005 study found that regardless of income, 97 percent of high schools and 82 percent of middle schools sell food and beverages a la carte, most of which are unhealthy options such as vending machines. About 55 percent of schools in the study had an exclusive agreement with a beverage company that allowed them to be the sole distributor of sodas. Lower-income schools were significantly less likely to offer fruits or raw vegetables each day.⁷²

One strategy gaining credibility and credence across the country is working with K-12 school meal programs to develop farm to school linkages. Farm-to-school is thought of as any program that promotes and encourages the utilization of locally produced foods in school cafeterias while providing farmers with market opportunities. The concept is to forge closer linkages with schools and farms and between our nation's youth and our nation's farmers. Studies have shown that 300 of 684 school food service directors are interested in purchasing food from local producers if the price is right. This has the simultaneous capacity to help increase the economic vitality of both rural and urban communities while providing economic and public health incentives for preserving productive capacity for future generations.⁷³

Similarly, school garden programs provide curricula built on models of hands-on, problem-based environmental and science education and also introduce healthy eating habits to children at an early age. School gardens are a form of community garden, which provide a new setting for interactions among members of the school community and potentially promote the social networks, sense of connectedness, and skills of the community.⁷⁴ Organizations concerned with sustainable agriculture and food systems have provided support for school gardens and farm-to-school programs as approaches for teaching children about ecological systems, linking food consumption to sustainable agriculture, and promoting land stewardship.⁷⁵ For example, Go! Gardening, a branch of Ann Arbor's Project Grow, is a dynamic, experiential school gardening program that gives students in 1st-5th grade in area elementary schools a chance to dig in and get dirty while learning about organic gardening, nature, and healthy food. Results so far have shown improved test scores demonstrating that students who participate in Go! Garden are learning important concepts in accordance with Michigan Education Assessment Program standards.⁷⁶

Another study was done in Detroit in 2004 with a youth gardening program, reporting that after gardening, students retained an increased appreciation for working with neighborhood adults and had an increased interest in the improvement of neighborhood appearance. In addition, the students made new friends, and showed increased knowledge about nutrition, plant ecology, and gardening.⁷⁷ As this model is occurring in a neighborhood so close to Detroit, it is possible that it could be lobbied to be extended into the lower eastside. There are two schools in the lower eastside and no such program exists in either. There is a burgeoning movement of urban agriculture and community gardens as productive landscapes that effectively use vacant land in the city, perhaps even in the lower eastside. The proximity of these farms and gardens bring a wonderful opportunity to create farm-to-school linkages and better educate the children and adults of the community on healthy food and nutrition.

Air Quality

Air quality and pollution, both indoors and out, has a significant impact on human health and resulting well-being. Outdoor air quality is obviously of potential risk to human health, particularly if found to be containing pollutants. Urban areas, due to more intense concentration, industrial factories, and more concentration of vehicles, tend to have elevated levels of pollutants. Children are more susceptible to air pollution because their lungs are still developing and because they spend more time outdoors where they have exposure to it. Pollution can cause short-term and long-term decreased lung function rates, and decreased lung function levels throughout ones whole life (due primarily to exposure to particle and traffic-related pollution), worsening of asthma and increased prevalence of

asthma, cough, bronchitis, and risk of upper and lower respiratory infections, all mainly as a result of particle and ozone pollution.⁷⁸ Studies show that children living near heavily traveled highways appear to be particularly harmed by traffic-related pollution. The American Academy of Pediatrics highlighted concern over diesel school buses. Air pollution is also one of the more under-appreciated contributors to asthma aggravation.⁷⁹ Year round exposure to ozone has also shown a possible association with asthma. A recent study indicated an increased onset of asthma cases in children engaging in three or more outdoor activities in area with elevated levels of ozone.⁸⁰

One major source of air pollution and public contention is the Detroit incinerator. The Greater Detroit Resource Recovery Facility is a refuse-derived fuel (RDF) plant that opened in 1991. The much-debated incinerator is located on Russell Street, occupying 17.8 acres at the intersection of I-75 and I-94, approximately seven miles from the center of our site. While the plant burns 4,000 tons of municipal solid waste per day and produces 720,000 pounds of steam per hour⁸¹ which is then sold by the Detroit Edison Corporation. From an environmental justice perspective the argument is made that residents of the Detroit area suffer disproportionately from the negative externalities of the toxins given off through the process of burning. In 2005, the Incinerator was the 5th largest stationary source of nitrogen oxides in Wayne County, a critical component of smog (ground-level ozone). Wayne County is in violation of U.S. EPA health standards for smog and soot (particulate matter). Additional hazardous air pollutants from the facility include mercury, lead and dioxins.⁸²

Asthma hospitalization rates in Detroit in 2008 were three to four times the average rate of the rest of the state of Michigan. Soot, smog and these additional pollutants from both indoor and outdoor air quality are all contributors and aggravators of asthmatic symptoms and other upper respiratory diseases. The American Lung Association gives Wayne County a failing grade for both high ozone and particle pollution, having approximately 35 days of unhealthy for sensitive populations on the EPA's Air Quality Index per year.⁸³ The Center for Managing Chronic Disease found rates of asthma to be high among preschool children in Detroit; whereas nationally they are about seven percent, rates as high as 27 percent have been found in children in Detroit.⁸⁴

As will be discussed further in Chapter 2.6, design recommendations should include adding tree canopy cover to help purify air quality and creating a more walkable environment so decreased auto usage can occur.

Indoor air quality constitutes another environmental issue that can have harmful impacts on physiological health. Children in urban areas, especially poor and minority children, represent a sensitive subpopulation because they spend a significant portion of their time indoors where irritating and allergenic substances are prevalent. This indoor exposure to allergens, VOCs, toxic adhesives, poorly maintained HVAC systems, and

cigarette smoke may increase a child's susceptibility to allergic sensitization, respiratory symptoms, and ultimately the development of asthma. Disadvantaged asthmatic children in urban areas appear to be at increased risk for higher residential allergen levels, elevated air-pollution exposure, and higher levels of asthma triggers in the home,⁸⁵ particularly if they tend to spend more time living and playing indoors because of lack of access to nature and perceptions of danger.

In addition to the chronic conditions caused by indoor air quality, Sick Building Syndrome (SBS) encompasses a variety of building conditions that may cause temporary illness in occupants.⁸⁶ Symptoms include headaches, nausea, dizziness and fatigue which disappear when the occupant leaves the building.⁸⁷ Thirty percent of Americans suffer from this condition yearly.⁸⁸ The EPA cites inadequate ventilation as one cause of SBS, for example, systems that harbor mold and chemical contaminants, like volatile organic compounds (VOCs) from materials like paint, carpet, and furniture, from both indoor and outdoor sources.^{89,90,91} Additionally, viruses are more likely to spread through forced air circulation, increasing incidents of influenza and other airborne illnesses.⁹² The U.S. EPA states that the indoor air quality of buildings can be two to five times worse than the outdoor air quality.⁹³ Thankfully, indoor air quality can be improved by restricting the introduction of toxins that pollute indoor air.

Restricting the Introduction of Toxic Materials

Volatile organic compounds (VOCs) are emitted as gasses from liquids and solids over time. This process is called "off-gassing." These compounds are used extensively as ingredients in many consumer products, for example, paints and lacquers, paint strippers, fuels, aerosols, cosmetics, and pesticides.

Many VOCs can adversely affect human health and the environment. They have been linked with respiratory conditions, skin and eye irritation, headaches, nausea, muscle weakness, and even serious ailments like liver disease and lung cancer. Twenty-five VOCs such as benzene, carbon tetrachloride, and chloroform are known or suspected carcinogens, which is a substance directly linked to the promotion of cancer. Concentration of these compounds in public water supplies is regulated by the EPA and various state regulatory agencies.

Additionally, volatile organic compounds have been shown to react in the presence of sunlight to form ozone. Ozone is an important part of the atmosphere, but at ground level, high concentrations of ozone can cause respiratory irritation in people and damage plants. Ozone build-up is the primary components of smog, and since the enactment of the Clean Air Act, the EPA has the power to regulate it as one of six "criteria air pollutants".⁹⁴

Studies have found that air levels of some compounds average two to five times higher indoors than outdoors. During and for several hours immediately after certain activities, such as paint stripping and drying, levels may be 1,000 times greater than average

outdoor levels. There are increasing concerns about the long-term health effects in homes, offices, and public buildings, such as hospitals and schools. Children, seniors, and those with compromised immune systems are particularly vulnerable to the vapors released by paint and other chemical products.

To meet the tightening regulations, many manufactures are taking steps to reduce VOC use in products. By using products that do not off-gas VOCs, the indoor air quality of a building can be greatly improved. The paint industry, for one, has been quick to develop and market low- to no-VOC brands. The carpet industry, too, has introduced new floor treatments with low-VOC adhesives.

Though lead paint, high levels of VOCs, was banned in 1978, approximately 56 percent of all housing stock in Detroit was built prior to 1950⁹⁵, meaning that lead poisoning is still a prevalent health risk for children. Since it is easily found inside and outside of houses, apartments, and public housing in the city, young children are at greater risk to swallow paint chips and inhale lead dust, particularly young children who crawl and play on floors. Lead dust used on the exterior of houses can also wash off to the soil surrounding a home and poison a child during outdoor play. As of 2004, six percent of all children, age six and younger, in the City of Detroit were identified as having lead poisoning.⁹⁶ The demolition of buildings with lead paint and asbestos insulation may increase the possibility of human exposure.⁹⁷ Proper management and disposal of these materials prior to demolition can reduce this risk.

Detroit also has a high incidence of former smelter sites in certain residential areas; at least sixteen potentially harmful former smelters, foundries, and alloy makers have been identified⁹⁸. At these sites both adults and children can be exposed to long-term emissions of lead dust that has settled into the soil around industrial sites and outside its boundaries. At least 2 of these sites are within a half mile of the lower eastside neighborhood. All future development in design plans should be made with the goal of restricting or remediating lead and other volatile organic compounds.

Education

Human health and well-being is not just related to the physical. Though somewhat outside the scope of our paper, education is also a vital part of one's quality of life. As mentioned earlier, over 30% of Detroit's lower eastside lacks a high school diploma and only 7% have acquired a college degree. The area is currently served by only one primary school as the others have been shuttered due to low enrollment and the Golightly Technical and Career Center for vocational skills and secondary learning.

To bring about the cultural and economic changes necessary to foster informed and active participation in political processes pertaining to sustainable community development, environmental science and education will have to be significantly expanded.

Popular education and consciousness raising (critical thinking and skills) should be a foundational component of a communities sustainability planning.⁹⁹ Since developing sustainably is a social change methodology with much emphasis on the human factors, the educational components need to incorporate social science perspectives as well. Education is necessary to involve and engage the community, to give them understanding and ownership over the stewardship of their neighborhood.

Practical skills, such as planning, development, and community organization skills, in addition to group facilitation and conflict resolution skills are necessary for groups as they come together to initiate new directions for their communities. These skills are also pertinent in creating adaptability and flexibility in the face of future challenges. Communities will need expertise but some of it will be acquired as they proceed. To begin, however, some scientific knowledge, technical skills, material and technological resources, legal sanction, and financial support and management are essential. Sustainable redevelopment is a process that arises out of new vision of a society based in humanistic values, democratic politics, respect for the natural world, and aligning economic goals with human equality and welfare.¹⁰⁰ Without awareness this vision cannot come to fruition.

Educating users and visitors can help spread stewardship practices. Creating opportunities to observe first-hand the physical design elements that contribute to sustainability is necessary. Studies of environmentally responsible behaviors at the individual level demonstrate that education and awareness-building is an essential step in changing behavior,¹⁰¹ however it is important to take it a step further. Behavior is motivated by many variables. No one particular program or behavioral intervention will be successful in all cases, and if used alone rarely is any one intervention effective at promoting long term change. When designing programs to educate it is important to take into account a wide variety of variables that may be affecting your particular situation and also use a variety of strategies to target these variables. For example, using incentives, whether monetary or inspirational, competition or commitment, providing procedural knowledge in addition to knowledge of issues and consequences call can help to promote behavior change.

The Sustainable Sites Initiative includes in their criteria options to provide educational or interpretive elements that will draw attention to and explain sustainable elements of site design, construction, operations, and maintenance, including sustainable features and processes. It is also recommended to help users and visitors, through interactive and interpretive elements, understand how on-site sustainability features can be applied to off-site situations (such as homes, schools, and workplaces) and demonstrate and promote the connection to environmentally responsible behavior. Another option offered is to provide programming that welcomes, encourages, and expands sustainability learning and understanding on the site. However, this is contingent on activities and programs

Chapter 2.2: Human Health & Well-Being

welcoming diverse participants, recognizing and being mindful of cultural context, and supporting local organizations.¹⁰²

One new movement in educating for stewardship is that of place-based education (PBE):

*PBE immerses students in local heritage, cultures, landscapes, opportunities and experiences, using these as a foundation for the study of language arts, mathematics, social studies, science and other subjects across the curriculum. PBE emphasizes learning through participation in service projects for the local school and/or community.*¹⁰³

PBE practices can address the integrated goals of student achievement, and community social and economic vitality. Ecological integrity is also learned as students forge ties to local social and environmental organizations and make contributions to solving local issues and conserving environmental quality. This simultaneously creates a sense of stewardship and academic engagement outside of the classroom. Often, it is energizing to teachers as well.

One Detroit-based organization that is already trying to implement this form of education is the East Michigan Environmental Action Council (EMEAC). One of their newly developed programs is called Community Monitoring: Hands-on Science & Math. This initiative is a youth air quality project that focuses on schools with high instance of asthma due to their proximity to polluting facilities. Three of the involved schools are close to the Detroit incinerator. A 'bucket brigade' method of teachers and students will take samples. This initiative will be a model for schools across the state and will eventually be expanded to include water and soil quality monitoring.

In science classes student will learn about air quality issues and also undergo press and media training. The data will be analyzed during math class and policy implications discussed during social studies. Another aspect of the program in development is installing ozone-monitoring gardens to educate students and the community about ozone impacts on plants. EMEAC will create gardens with indigenous Michigan plants such as milkweed and Black-eyed Susans that are indicative of ozone and the monitoring will connect to the Green Schools programs.¹⁰⁴

While it is observed that students often take home lessons learned and transfer knowledge in a bottom-up manner to their parents, it is also vital that education, awareness building, and participation engagement occur at the adult level as well. An excellent example of broader community education is that of non-profit Sustain Dane in Madison, Wisconsin. Sustain Dane is committed to creating a community that deeply enjoys, cares for and is sustained by its unique environment.¹⁰⁵ It was established voluntarily as a result of a half-day workshop with Torbjorn Lahti, who founded the Swedish eco-municipality

movement called The Natural Step. Through an initial experiment in open participation, drawing on leadership, interest and collaboration from community members, Sustain Dane has now established itself as a 501(c)3 non-profit developing several impacting programs and initiatives. Their activities involve thousands of local citizens in a variety of manners including volunteerism, event attendance, discussion courses, rain barrel customers, listserv subscribers, neighbornation.net participants and more. They cosponsor events and collaborate with over 50 local, national, and international organizations. Using The Natural Step framework for sustainability as a guide and a democratic, highly participative development process they aspire to create an “eco-municipality”, an ecologically, economically, and socially healthy community for the long term.

One example of an initiative that both generates some financial support and creates a volunteer learning process is the Rain Barrel Project , which sells and installs barrels to keep waterways clean (over 2,000 have been distributed in less than three years). They also run discussion courses that open sustainable topics up for discussion and mobilize discussion on how community groups can make choices for sustainable living. Neighbornation.net is an originally designed website that allows neighborhood residents to connect, share resources (gardening tools, magazines), offer expertise or services to one another like cooking lessons, and organize groups for carpooling or social activities. Sustain Dane also supports Madison’s Mpowered program, which uses a commitment strategy to empower citizens to help made the city greener by reducing CO₂ emissions. The organization also has developed a collection of sustainability resources that have been available at public libraries in their area and a green visitor’s guide.¹⁰⁶ All of these programs have been developed based on the initiative of the citizens who are working together, proactively, to educate themselves and each other on how to improve the sustainability of their own community.

Chapter 2.3: Vibrant Communities

The health and well-being of individuals is inseparable from the creation of vibrant communities. Humans are social creatures and wither in the absence of regular interaction with each other. Whereas in suburban communities physical fragmentation results in isolation and leads to social polarization and a dwindling sense of civic engagement, in an urban environment, social integration and community involvement are an integral part of life.¹ Again, these benefits are not isolated to the individuals themselves, but also extend to the entire community's ability to withstand change. For example, a recent study by Natural Resource Defense Council shows that dense, walkable communities with access to public transit tend to have lower rates of foreclosure.² In the section that follows, we will review several design paradigms that have proven effective in supporting strong local communities as far as creating social equity, access to mobility, forums for engagement and interaction, and issues of crime and safety.

Psychologists are increasingly warning that the encroaching of technology and the built environment on the natural environment may emerge as one of the central psychological problems of our time.³ Humans living in landscapes devoid of trees or other natural features can undergo patterns of social and physical breakdown that are similar to those observed in animals taken out of their natural habitat, such as increases in aggression, disrupted parenting patterns, and broken social hierarchies. Findings indicate that violence and aggression are highest in urban settings lacking trees and grass. A study of public housing facilities in Chicago, done by environmental psychologist Frances Kuo and landscape architect William Sullivan, showed that a greater number of aggressive, and often violent, conflicts occurred in units with no immediate view or access to nature than those who lived near trees and grass. Similarly, crime rates were highest for residences with little or no nature in proximity. When living in barren landscapes humans suffer a variety of negative social effects including decreased civility, decreased supervision of children outdoors, more illegal activity, more aggression, more property crime, more loitering, more graffiti and more litter. "In our studies, people with less access to nature show relatively poor attention or cognitive function, poor management of major life issues, poor impulse control," says Kuo.⁴ Other research has found that access to nature can positively influence a community's moods, life, and work satisfaction.⁵ Ways of incorporating green spaces such as greenways, urban tree farms and parks will be further discussed in Chapter 2.6 on ecosystem services.

Social Equity

Any valid concept of dignity and equality includes a number of nonmaterial 'goods' – responsibility, security, and participation, the free exchange of

thought and experience, a degree of human respect that is independent of monetary rewards or bureaucratic hierarchies... All these goods... belong to the sphere of life where growth is truly exponential – in knowledge, in beauty, in neighborliness and human concern.

- Barbara Ward, founder of the International Institute for Environment and Development and inventor of the term “Sustainable Development”⁶

The American economy has typically been dedicated to consumerism and the private accumulation of wealth and material goods. The idea that achieving a sustainable pattern of development will require changes in certain dominant social values is often seen as threatening to highly industrialized societies. However, in order to create a socially equitable development, particularly in the face of despair and economic degradation, there needs to be a new emphasis on values of sufficiency, adequate but modest satisfaction of basic needs for all and the cultivation of non-material goods in life, such as leisure and community interaction, family and friendships, growth of arts, personal skills and education.⁷ Sustainable initiatives must address how their economic enterprises contribute to basic needs (housing, food, energy, health, education, and transit) and how they are balanced with policies to promote local quality of life for all while simultaneously sustaining the ecological base. Achieving sustainability will require values of cooperation and democratically developed community consensus for action. Fundamental human and civil rights must always be respected first.

Sustainable redevelopment is about creating equitable structures that enable the lower socioeconomic, unrepresented and marginalized to not only participate in transformative change, but to partner in the process. The much-referenced and debated concept of sustainability is about creating interdependent relationships on equitable community-based structures rather than inequitable configurations. While creating vibrant, walkable, mixed-use villages connected by multiple transportation options is highly desirable, the social and economic equity issues need to be addressed. As too often occurs, redevelopment of an urban core should not create gentrification that pushes disenfranchised groups to new areas of marginalization. Reinvestment in the inner city requires increased integration and improved opportunities for all citizens.⁸

Access to a safe and healthy shelter or home is essential to a person’s physical, psychological, social, and economic well-being as part of their basic livelihood. To this same effect any new housing development needs to provide a range of equitably affordable opportunities. A new sustainable or redeveloped type of housing should not be deemed to be for low-income families, as the effect of status can be detrimental to a person’s self worth. Low-income housing projects also tend to suffer from vandalism when not properly

designed to accommodate its residents' needs.⁹ Also, specifically energy efficient housing and alternative reusable material options can improve affordability while simultaneously providing benefit to the local ecosystem.

Social equity principles must be considered maintained in all decision-making and design planning for creating a sustainable redevelopment. Residents in these degraded or rustbelt neighborhoods have often faced a lifetime of social inequality.

Access & Mobility

As will be discussed in Chapter 3, the pace and extent of suburban growth and sprawl has had severe environmental impacts, but there has also been an impact on livability. Shopping, recreation and schools are located further away from one another and are often separated from residential homes by wide, fast traffic lanes and parking lots. Travel distances increased while safety of pedestrians has steadily declined, making life without automobiles less attractive. Most suburban development patterns include poorly connected street networks, which thus influence people's travel decisions and behavior. It is not uncommon for only one long route to exist between destinations and for it to be sized and scaled for small moving vehicles rather than the start and stop of mass transit. Pedestrian and bicycle avenues are viewed as dangerous and second to cars. Sidewalks are most often adjacent to traffic lanes with no planting between, exposing walkers to vehicles and emitted pollutants. Many residential streets do not have sidewalks; the ones that do are dominated by cars, driveways, and garages. As a result of these conditions suburban dwellers spend more and more time in their cars to get where they want to go; distances, congestion and commuter time increase.¹⁰

In neighborhoods facing more extreme conditions of hardship, sprawl to the suburbs may be a problem, but additional challenges may be faced. Social amenities and stores may have left the area making desirable grocery and retail centers even further away. If a public transit system exists it may not have the funding to run on a constant and convenient schedule, thereby decreasing its net usage and benefit. If a neighborhood is sprawled out, accessibility and convenience of transit stops may be limited or the trip to them from homes may be poorly lit or unsafe. Scheduling and getting people to go the 'extra mile' between home and the transit stop or the stop and destination is one of the greatest challenges to encouraging public transit usage as opposed to the ease of individual cars.

Public Transit

A contemporary challenge for planners is to create more compact, pedestrian-friendly development patterns that consume less land and encourage transportation choices to be made besides the automobile, such as public transit, bicycling and walking. While mass transit is at the heart of any plan to reduce automotive dependency, it will not succeed without also overcoming the "first and last mile" challenge. Transporting people via

buses, light rail and trains is desirable but it is not truly accomplishing the goal if people still have to drive to the transit station, park in huge, expensive lots and then take a cab or other vehicle to their place of work. Viable choices need to be produced to create a seamless end-to-end infrastructure that helps people to move easily, efficiently, safely and economically.¹¹

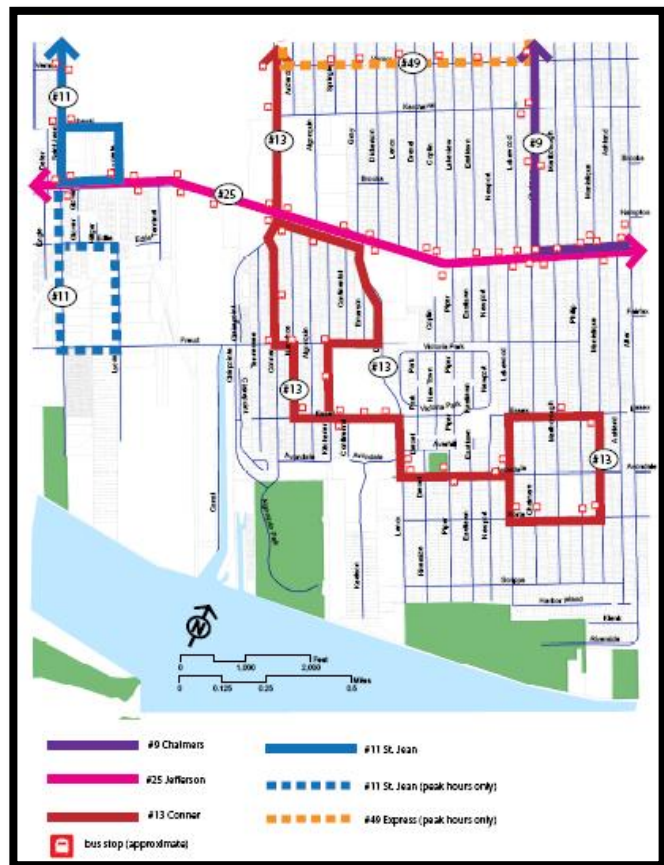
One example is that of Portland, Oregon. According to their transportation planning, new development must be concentrated at town centers located at transportation nodes, mostly along light rail lines. Orenco Station is a transit-oriented neighborhood on the western perimeter of the city, almost 20 miles from downtown. Located at a rapid transit station, and containing 1,835 dwellings and a mixed commercial center on a 156-acre site, its initial sales have exceeded projections. Almost three quarters of the residents have reported increasing their mass transit use over their prior dwellings.¹²

Another example is the Village Homes near Davis, California. Often considered to be a prototype green neighborhood, their development demonstrates a pedestrian first, automobiles-second circulation network. Eighteen percent of the development is reserved for public streets. Small common areas between groups of houses connect to larger greenways that accommodate stormwater drainage. A connected network of pedestrian and bicycle routes is well integrated into the open space and street network; it is most often easier to walk or bike from one area to another than to drive. Travel distances are less than five minutes, most of which can be negotiated without crossing a street, while automobile transport is less direct. A small commercial area includes a restaurant and offices; however most shopping and other service districts are within bike-able, not walkable distance. Residents must drive to commercial centers further away for more significant shopping which is somewhat of a liability.¹³

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Transit Options

The creation of multi-modal transit facilities at transit stops is an important step in overcoming the first and last mile barriers. Bicycling is a



Map 10 - Existing Bus Routes

greatly underutilized resource in America, particularly for the one-three mile trip to and from a transit station. Studies have shown the primary reason most bikes sit unused in garages is fear of bicycle theft.¹⁴ Locks break easily and racks are open and vulnerable. Convenience is another source of concern- where to change, freshen up and store clothes. Personal safety is another roadblock. If transit planners could build multi-modal transit facilities, which involves the incorporation of many stakeholders and policy makers, many of these objections would be overcome, giving Americans a realistic choice of transit options.

A multimodal transit site will include bike locker modules or secure spaces operated by access control systems. Transit centers are generally staffed and offer a variety of services from restrooms and lockers to bike repairs and rentals. They often include parking and rental for electric vehicles, bike and ride-sharing facilities. The sites make alternative transport methods available and easy to all users. While a fully staffed site might not always be a cost-effective option, it can be combined with non-staffed modules to create a full-scale access network throughout a city.

While an idealized vision would offer a multimodal facility at every transit stop, metro center, shopping and entertainment area, corporate and college campuses included, several site and location factors must be taken into consideration. They must be convenient and at any existing or planned transit station. Necessary requirements include: access to transit, demand, land ownership issues, and zoning. Recommendations on choosing a location vary from access, employment, connectivity, demand, visibility, to proximity to residences and educational facilities. Criteria for site selection consist of: infrastructure, timeframe constraints, safety and security concerns, and realistic development potential.¹⁵ Obviously, demand assessment and seasonal considerations must be strongly taken into account in doing a cost-benefit analysis for these stations. However, when asked, sixty-four percent of users of a Seattle bike-transit facility said they would have used their cars if the facility was not available, so having a convenient and safe option available facilitated a change in their behavior.¹⁶

There are four bus lines currently serving Detroit's lower eastside. While the frequency of operation is adequate for some lines, the perception is that they are not a convenient form of transportation. In order to increase ridership, they could run with higher frequency to match people's schedules and have higher visibility of their convenience. The transit stops are also not perceived to be safe nor well lit for nighttime usage. As determined by our survey, they do not provide direct or easy access to employment opportunities or the jobs the residents do occupy.^{viii} The public rail line Amtrak stations are also approximately 6.5 miles from the center of the neighborhood, which does not address the first and last mile challenge in making it an effective option for decreasing auto usage. The stations do not include multimodal resources such as bike racks or lockers. The

^{viii} See Appendix 3 for full listing of Survey Results

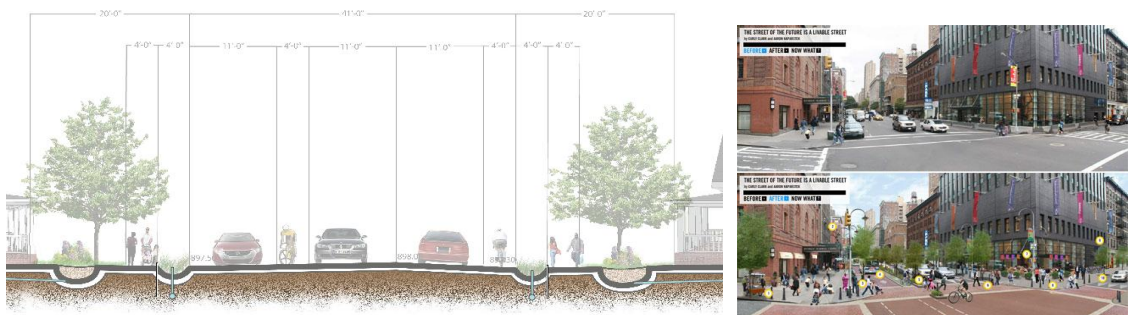
neighborhood is also 5.5 miles from Woodward, where a proposed light rail station would be located.

Complete Streets

'Complete streets' is a movement that emphasizes the need for a holistic approach to transportation options; they are designed and operated in order to enable safe access for all users. These socially equitable designs try to make it safe for pedestrians, bicyclists, motorists, and public transportation users of all ages and abilities to move along and across the street. The movement includes a set of policies that try to inform and direct transportation planners and engineers to consistently design with all users in mind. It argues that the current auto-centric model has led to the decline of the urban fabric and a number of societal ills. Thoughtful transportation design can improve a sense of community, encourage more physical activity, and reduce energy usage by creating transportation options for pedestrians, bicyclists, and public transit, rather than automobiles alone. While there is no one correct design there are common elements that can be included: sidewalks, bike lanes (or wide waved shoulders), specified bus lanes, comfortable and accessible public transit stops, frequent and safe crossing opportunities, median islands, pedestrian signals, etc.¹⁷ The main ingredient is safety and accessibility for all.

The complete street movement has been embraced by a number of different organizations, including the American Society of Landscape Architects, Journal of the American Medical Association, the American Academy of Pediatrics, Centers for Disease Control and Prevention, Urban Land Institute, and others.¹⁸ For one reason, programs that encourage walking and/or biking to school via greenspaces, pedestrian islands, and improved sidewalks are considered critical in helping fight childhood obesity.¹⁹

A number of cities and states have enacted complete streets legislations in recent years in response to this movement. New York City's new design manual emphasizes its



Left to right:

Figure 1 - Typical Complete Street Configuration

Figure 2 - Before and After, "Good's Complete Street Interactive Graphic"²⁰

“cityness”, with smaller streets, wider sidewalks, more greenscaping, and innovative hardscape^{ix} design. Chicago, San Francisco, Washington DC, and Portland, Oregon have implemented similar initiatives.²¹ Some cities have begun touting the health benefits gained by walking to and from the train/bus to the workplace: Los Angeles’ “Metro Fit”, Arlington, Virginia’s “Car-Free Diet”, and Wilsonville, Oregon’s “Walk SMART” programs all offer riders fitness tips, pedometers, and other ridership incentives.²² Cleveland, another Rustbelt city, has made a commitment to promote sustainable transportation and is working to implement a Complete Street set of guidelines in the course of their redevelopment.²³ Recently, U.S. Ohio Senator Sherrod Brown urged Cleveland Governor Ted Strickland to get involved in the redevelopment of the Inner Belt Bridge project and ensure that ODOT includes a multipurpose route across the bridge, despite concerns of safety and cost. Brown said it was imperative to include a bike and pedestrian path. In order to remain aligned with his political promises of Ohio's emergence into a green economy, the Governor is now coming out as strongly supportive of bicycling and alternate transport modes. Obviously a vocal pressure from political constituents can affect change.²⁴

There is obvious potential to also reduce carbon emissions by shifting automobile trips to lower-carbon modes of transport. A National Household Transportation Survey in 2001 found that 50 percent of all trips in urban areas are three miles or less and 28 percent of all trips are one mile or less. While these are easy distances to walk, bike or take public transit, 65 percent of trips are made by automobile partly due to incomplete streets that make it dangerous or unpleasant. Increasing bicycle usage from one percent to 1.5 percent of all trips in the U.S. would save 462 million gallons of fuel each year.²⁵ The American Public Transportation Association estimated that switching from automobile use to partaking in mass transit can reduce CO₂ emissions by 4,800 pounds per person per year²⁶; this a reduction fuel emissions would also reduce particulate levels in the immediate atmosphere. Any increase in greenhouse gas emissions (GHG) that result from increased mass transit ridership is offset by a total reduction of GHGs from the decrease in automobile traffic.²⁷ Auto usage can be further reduced by encouraging bicycling or walking to the transit center.

The complete street method can also help to offset the heat island effect. An increase in the tree canopy, a potential component of any complete street design, helps to shade the street, allows for cooling by transpiration, and can perform carbon sequestration. The trees may also contribute to the ecological health of the region by acting as a corridor and potential habitat for birds and small mammals. In implementing complete street

^{ix} Hardscape refers in landscaping to the paved elements of streets and sidewalks or other areas where the upper level of soil is no longer exposed. This is particularly applicable in urban areas where there is limited bare soil.

designs communities can try to maximize pavement albedo (or reflectivity) which will decrease the heat island effect as well.²⁸

Implementation of transit-oriented developments and the complete street model requires undeniably higher initial costs than construction of a traditional automobile corridor. Evidence suggests, however, that the long-term benefits of utilizing a complete street approach to planning can have enormous financial benefits. Studies have shown an increase in residential value of about \$160 for every 100 additional feet of transit station proximity,²⁹ while commercial property values rose by \$2.30 per square foot.³⁰ According to a poll of real estate developers and agents, residences located next to a trail or within a walkable neighborhood sell much quicker than traditional developments.³¹

While funding is of course limited for implementation of a complete streets design, the lower eastside could benefit greatly from such design as it is currently inhospitable to non-motorized transport along the main corridor. Jefferson Avenue, the main corridor, is a 7 lane major roadway divided by a median with two lanes for parking on either side. There are few pedestrian crossings and no bike lanes. However, there are sidewalks, along which the Greening of Detroit planted 3,034 trees in fall of 2009 in an attempt to restore the aesthetic impact the area contained in the past. Perhaps lobbying for complete streets policy would bring in funding dollars for implementation.

The United States Department of Transportation released a policy statement in March 2010 in support of fully integrated active transportation networks, recognizing that well-connected walking and bicycling networks are important to livable communities and that their design should be included in Federal-aid project developments. The statement encouraged States, local governments, professional associations, community organizations, public transportation agencies, and other government agencies, to adopt similar policy statements, integrating bicycle and pedestrian accommodation into the transportation system.³² Perhaps this recent announcement will result in grant availability for continual development of complete street design in neighborhoods that would benefit from implementation.

Greenway Access

Greenways are another way of enhancing community connectivity and mobility. Greenways, corridors of land that foster interaction and recreation, function as areas for alternative transportation, ecological activity and often encourage utilization of underused space,³³ provide shading, evaporative cooling, and stormwater storage and infiltration.³⁴ A combination of “greenbelt” and “parkway”, they imply a recreational or pedestrian use with an emphasis on introducing or maintaining vegetation, sometimes including community gardens or typical trees and shrubs landscaping. Many in urban centers are linear parks, contiguous pathways for urban commuting. Municipalities often define them as having vegetation and being both linear and multi-purpose. Greenway networks provide a number

of social, environmental, and economic benefits including conserving natural ecosystem values and functions,³⁵ adding aesthetic beauty while also stimulating economic development.³⁶ As urbanization increases, the services that greenways provide become more and more important.

Greenways can directly and indirectly improve the overall health of the community. Provision of a pathway separated from automobile traffic encourages bicycle usage and pedestrian activities and can lead to an overall increase in physical fitness in the community. Careful tree planting along the greenway can reduce the presence of air pollutants that cause health problems mentioned earlier. Evidence suggests that access to a greenway system and open space can also lead to reductions in stress levels among residents, with lower instances of hypertension and other stress-related disorders a common result.³⁷ Finally, a marked increase in property value is typically reported for homes and businesses adjacent to greenway space.³⁸

These corridors can also be significant engines for private financing. Every public dollar spent on protecting open space and maintaining trails can lead to more in private support and city taxes. They generate economic activity for cities seeking revitalization because users will generate local spending on food and equipment for transit or recreational usage. They can also generate jobs in construction and maintenance in addition to elevating the perceived quality of life, which in turn will attract new business, residents and tourists.³⁹

The City of Boston, MA, in partnership with Grow Boston Greener, the city's urban tree canopy initiative, created fifteen acres of new public greenway when the City moved a previously elevated highway underground. In addition to providing open space for recreation, and habitat for wildlife, the one-mile long park promotes non-motorized transportation and connects people to four parks and districts.⁴⁰ The central location demonstrates the City's dedication to increasing green space in the city. The park aims to model sustainability; it is accessible by public transportation, encourages active public use, reflects local culture, uses sustainable landscape management practices, and hosts the Environmental Stewardship Initiative, among other activities and events.⁴¹ One and a half to two million people have visited the Greenway annually since the park's opening in 2007.⁴²

In 2009 the Detroit Greenways Coalition received a \$3.5 million grant to help grow momentum for greenway and alternative transport development. The Conner Green Greenway is currently being planned and developed in pieces, in the adjacent neighborhood. Two miles near the city airport have been completed with more segments to come, including bike lanes along St. Jean between Mack and Jefferson. Greenway development in Detroit's lower eastside neighborhood could integrate with and branch off the work already being implemented.

Community Cohesion

Community cohesion involves the quantity and quality of interactions between people in a neighborhood, as evidenced by the degree residents know and care about each other and participate in community activities. It reflects the value of having nearby friends and acquaintances with whom a person can run into regularly and provide mutual support if need be.⁴³ Further, meaningful interaction between people from different backgrounds can potentially reduce stereotypes and prejudices, because positive contact can encourage empathy and perspective taking, often not just of the individual but of the group as a whole.⁴⁴ This can mitigate perceived threats, and promote the development of relationships, and the sharing of resources.⁴⁵ A Citizenship Survey recognized that having friends from different ethnic backgrounds positively predicted community cohesion. Meaningful interactions have been found to have the following benefits for individuals: “helping people to develop and grow, giving people a sense of purpose, helping with integration improving overall life outcomes, helping people change their lives, as people talking about their plans helps make them real, especially when the other person can make a useful suggestion or give a useful contact, helping younger people to develop their social skills, understanding of other people and citizenship, helping older people by reducing fear that exists between generations; helping keep them active and involved, with the health and welfare benefits that will bring; and replenishing their diminishing network of friends.”⁴⁶ Individual benefits can lead to societal improvement because they encourage: “more integrated resilient and sustainable communities where issues can be resolved and diversity celebrated; communities that are more interesting and vibrant; and large bodies of people to cooperate and achieve things together.”⁴⁷

As sprawling cities fragment their communities, opportunities for neighborhood interaction decrease. Where neighborhood social ties are weak, people feel isolated and unsupported with fewer resources to rely on. When neighborhood ties are strong, residents help and protect each other. For example, research indicates that strong ties create a source of social support, a sense of community and also make neighbors more capable of defending against crime.⁴⁸

A “sense of place” is crucial to the health of communities and their sustainability as far as creating loyalty and retention to a hometown. Sense of place can be defined as a sentiment that humans attribute to their natural and physical surroundings; it is a feeling of being an integral part of a local system, or in short, the feeling that one belongs to a place. Civic participation and strong social support systems create a feeling of belonging, ownership, and sense of safety.⁴⁹ It is important to install this sense in a neighborhood because members of a community will ultimately feel attached and committed to the sustainable survival and development of the area. It is crucial to both the psychological sense of belonging of the individual and the cohesion of the community at large. This aspect

is especially critical in neighborhoods that have faced particular hardships or devastation as a result of economic decline or natural disaster.

Nationally, groups are working together to create place-based solutions to improve the protective factors of their neighborhoods and impact community well-being. A report on “Why Place Matters” and the movement for healthy communities published by a California-based national research institute called PolicyLink identified multiple case studies in which residents are taking action with place-based strategies to organize and advocate for policy change to tackle the tough issues of inequality they see in their communities with actions ranging from the city block to the entire metropolitan region. Los Angeles residents are creating parks in underserved neighborhoods. The Harlem Children’s Zone in NYC recently began a charter school including a free health clinic and nutrition-conscious cafeteria. A Washington state local community coalition convinced county commissioners to create walking paths and bike trails. Asthma sufferers in San Diego lobbied local legislators to stop a housing development in an industrial area next to a major highway from coming to fruition. Focusing on their local community and commitment to a place, these efforts are targeting improvement of individual well-being and addressing health disparities at the neighborhood level.⁵⁰

Designing for Social Interaction

There are certain and numerous design elements that have proven to affect social behavior and interactions. Objective features – architectural design, crowding, noise, and pollution – as well as subjective features like sense of safety – all affect human behavior and thought, environmental stressors linking to less productive social interactions.⁵¹ Good design is essential in enabling the functioning of a community, as community ultimately forms as a result of interaction.

In 1957 Dr. Humphrey Osmond began observing the effects of environmental change on the interactions of patients in a mental hospital in Saskatchewan. From that research, he identified two major systems for patterning space: sociofugal space (gridlike) tends to keep people apart and suppress communication while sociopetal space (radial) does just the opposite. It brings people together and stimulates interaction as routes merge and overlap.⁵² Examples of sociofugal space can be seen in airport lounges, libraries and classical classrooms. Sociopetal design examples are seen in a shaded plaza with benches at right angles, or a typical street café, as they would seemingly attract people and encourage social encounters.⁵³ Similarly to the design features and destructive zoning that decentralize uses and activities, poor design elements promote isolation of people and families, creating fragmented places that make it difficult for people to lead meaningful public lives.

In 1954 the Pruitt-Igoe project was built in St. Louis, relocating 12,000 people into 43 eleven-story buildings, covering 57 acres. The project was a classic example of what happens when a poor community with no social cohesion is subjected to architectural

design that does not acknowledge their pro-social inclinations. The low-income buildings had narrow hallways with no semi-private areas for congregation, institutional wall tile (for easy graffiti removal), unattractive (but indestructible) light fixtures, and vandal-resistant radiators and elevators. Praised for having no wasted space, a few years after development it was in shambles: broken glass, tin cans, and abandoned cars littered the playgrounds. Soon, the windows were broken and boarded up, and the complex was populated by gangs. Incidents of rape, vandalism, and robbery were common particularly in the elevators and stairwells, which led to abandonment of the upper floors. Everywhere smelled like trash, urine, and garbage. The entire development was demolished in the early 1970s. Theorists argued that the design did not facilitate interaction. It put children beyond their parents' sight and control and gave many hidden areas to cause trouble, also providing a lack of defensible space (for further discussion see page 57), but rather, sanctuaries for illicit activities. It was also isolated from the surrounding community, which reduced the sense of community cohesion.⁵⁴ Another explanation offered for the complex's failure was that the environment itself might have conveyed self-threatening or negative messages to the residents, through the vandal-proof fixtures and institutional design elements. Residents of the complex felt threatened and rebellious or demoralized and disconsolate.

Public Spaces, Town Squares and Third Places

The creation, management and use of public urban space are oft-overlooked aspects of community development. Public urban space is mainly left unattended, thought of as neutral territory that is left over between the built environment elements. However, though buildings may make up the urban fabric, formulating a city's identity and character, the public life of the city takes place beyond their walls, in the street or the square, in the public realm. Ray Oldenburg, author of *The Great Good Places:...and How They Get You Through the Day*, said, "The environment in which we live our lives is not a cafeteria containing an endless variety of passively arrayed settings and experiences. It is an active, dictatorial force that adds experience or subtracts them according to the way it has been shaped."⁵⁵

One form of an outdoor public space is that of a town square, which is by no means a new innovation, but rather one that has perhaps been forgotten with the spread of the suburb and the rise of strip and indoor malls. The town square is an open area found at the heart of what are now called 'traditional' towns used for community gatherings. Known by many other pseudonyms such as civic center, city square, urban square, market square, public square, plaza, piazza, or Platz, they are often hardscapes readily used for open markets, concerts, rallies, or other events and are often surrounded by small shops. The center sometimes will contain statues, works of art, or fountains. As these center points, the epitome of sociopetal design, generally serve as a place for social interaction or a historic district it is a core amenity that can attract people back onto the streets and also become a center for business reinvestment.

An example of a public space that contains many key attributes of a successful design is Washington Square Park in New York City. The park has a history of spontaneity, a music scene, longstanding use as a performance and protest space. Its role as a gathering space and activity center in addition to its unique and special bohemian “vibe” make it special to its nearby residents, performers and visitors. The park is accessible to people engaged in a variety of activities, a diversity of ages, races, and genders, people alone or in groups, and is well used at different times of day and the week. It is well cared for and peacefully shared by many even when tightly packed. At the center of the square can be found a large fountain and the Washington arch.⁵⁶

The square was not always this hub of activity. In the 1980s it had become a drug dealing center and was particularly dangerous. However, in 2007 the NYC Parks department undertook an extensive renovation that resulted in repaved paths, new benches and lighting and the relocation of the fountain to the center of the square, which also enabled the creation of more green space.⁵⁷

The idea of a ‘third place’ is defined as “a generic designation of the great variety of public places that host the regular, voluntary, informal and happily anticipated gatherings of individuals beyond the realms of home and work.”⁵⁸ These places include cafes, coffee shops, community centers, beauty parlors, general stores, bars, taverns, the traditional Main Street; they can all be generators of community, allowing the fulfillment of social needs. These spaces are often lost as residents retreat into their homes or isolated automobiles or as neighborhoods take on the perception of lack of safety.

The lower eastside lacks many of these public forums for interaction. Aside from the main drag of Jefferson Avenue itself, most of whose shops are closed and windows boarded, there is no central place. There are 26 churches in the area; about 58 percent of them are within walking distance for the residents. Two community centers are currently in existence, though the Creekside Center will be closing in 2010. Fewer than ten percent of residents can walk to these centers. There are no coffee shops, cafes, taverns or even hangout spots nor a central space known for gathering. Less than one percent of the occupied area households lie within a quarter mile walking distance of the one public library. An overall perception of lack of safety keeps people indoors with most driving their cars to work or to the store. Still, when asked, over 50 percent of residents in the lower eastside cited “the people” as their favorite thing about their neighborhood.^x Between 75-80 percent of residents indicated that they share tools or supplies with neighbors or would ask their neighbor to watch their home if away. Jazzin’ on Jefferson, JEBA’s annual signature event, is the largest Jazz & Blues festival on the eastside, which closes down the streets every year. By celebrating the rich musical heritage of the lower eastside it has become a must-attend cultural happening. Providing a more established localized forum for this event

^x See Appendix 3 for full listing of Survey Results

and others and simultaneously giving residents a place to interact socially on an everyday-to-day basis could breed even more unity and strengthen these bonds to further the stability of the community.

Community Gardens

Another form of public space increasing in popularity, particularly in areas needing redevelopment, is the community garden. In addition to increasing food security, gardens empower individuals and communities, giving them a new purpose and solidarity, which can sustain morale during times of economic hardship. Through the development of networks and long-term connections and relationships, community farming can build social capital and catalyze community development.⁵⁹

Marty Heller, a research specialist with the C.S. Mott group for sustainable food systems at Michigan State University says, “When local agriculture and food production are integrated in community, food becomes part of a community’s problem-solving capacity rather than just a commodity that’s bought and sold”. Shifting from a focus on the food supply to a focus on enhancing sustainability of the food system with greater localization of the food source provides a myriad of opportunities linking the realms of public health, sustainable agriculture, environmental stewardship, and economic development. Gardens can build community pride by cleaning up vacant urban spaces and transforming them into aesthetic green spaces. They help serve as a source of recreation, exercise, and relaxation for many, a “refuge where they can work with the land and reconnect with nature.”^{60,61} Community gardens improve individual health, increase social capital, provide access to fresh food, and provide education opportunities.⁶² They stress grassroots principles of collective organization that can involve, educate and reinforce community.⁶³

Project Grow Community Gardens is a wonderful example of a garden program that provides Ann Arbor residents with space, procedural know-how, and inspiration to grow organic food. They identify underutilized land, arrange for its use, and maintain it as part of a network of community gardens. They provide programs for children, seniors, and gardeners with disabilities so participation is accessible to all. A private, non-profit organization, they will run individually crafted programs for schools, non-profit organizations and more.

Within Detroit’s lower eastside, there are currently three community gardens already in operation. Approximately 48.5 percent of the entire area is within walking distance of one of these gardens. Sixty-five percent of survey respondents indicated an interest in learning to garden. [Interestingly, 86 percent were interested in learning to grow food.]^{xi} Creating more of an integrated community garden network would be an investment in community that could foster horticulture clubs, sharing of tools, learning and local

^{xi} See Appendix 3 for full listing of Survey Results

participation, plus the added health benefits of better access to locally grown fresh produce and food security. One of our survey respondents referred to his garden as “a family park where he liked to spend time with his grandchildren.”

Psychological Effects

The physical environment has a huge impact on human behavior and the human experience. Congestion and crowding often lead to mental overload, which refers to a system’s inability to process inputs from the environment because there are too many to cope with, and thus the system must adapt. City life constitutes a continuous set of encounters with overload and thus causes people to adapt, often changing daily life on several levels: impinging performance, shifting social norms and interactions, and impaired cognitive functioning. Due to this overloaded mental state and other factors such as crime, city dwellers feel a greater sense of psychological (both physical and emotional) vulnerability which often leads to an unwillingness to be helpful to strangers and an innate distrust of their surroundings. In situations of high population density people cannot involve themselves in each others’ affairs because it would create continual distraction and frustrate their own purposeful action. Thus normal civilities and interactions are often forgone, giving rise to norms of uninvolvement.⁶⁴

This loss of civility can lead to worsening conditions. Violence is a reaction of mammals exposed to stress, the principal etiology of which is overcrowding; hence violence and aggression derived from an evolutionary adaptation mechanism for survival in an overpopulated world.⁶⁵ While living in groups and cities is natural and advantageous to the human species, the reaction to the presence of too many individuals creates increasing competition and declining quality of social interaction and sometimes violence and increased crime.⁶⁶

Community Benefits of Green Spaces

However, in disadvantaged urban neighborhoods, scientists are finding that green space can soften the impact of the built environment and play an important role in building stronger communities.⁶⁷ Those living in poverty often share their limited resources, but if social ties are weak, sharing will be limited, residents will be left with even fewer resources on which to rely. Also, without community loyalty, residents are less attached to the place.

Common green spaces can foster these necessary neighborhood social ties. Since community green spaces receive more use, this leads to chance meetings and interactions between neighbors, creating social ties, which establishes stronger, more supportive neighborhoods. From this foundation, community loyalty, attachment and a sense of place can develop.⁶⁸ Planting trees in urban spaces near homes has shown to provide fundamental benefits to inner-city neighborhood residents.⁶⁹ A Chicago study linked tree and grass cover to fewer property crimes, fewer violent crimes, stronger ties among

neighbors, more frequent use of common neighborhood spaces and a greater sense of safety.⁷⁰ Incidents of graffiti, vandalism, and littering are typically fewer in outdoor spaces with trees and grass than in spaces which are more barren. Social incivilities such as noisy, disruptive individuals, strangers, and illegal activity also tend to decrease in greener outdoor spaces.⁷¹

Crime & Safety

*This is something everyone knows: A well-used city street is apt to be a safe street. A deserted city street is apt to be unsafe.*⁷²

- Jane Jacobs

The health and well-being of communities is dependent on both the strength of social interaction, commitment to fostering a sense of community, and safety and protection from harm/crime. Streets tend to be safer when residents exert control over the spaces immediately surrounding their homes. Building design can strive to create a sense of territorialism, encouraging people to maintain their own portion of sidewalk and street. If a large number of people share a communal space, it is more difficult for people to identify it as their own or to take responsibility for it. Thus having entrances shared by few families or owners will make it more likely to be controlled.

Conversely, social psychologists and police officers tend to agree small aberrations in appearance of a neighborhood can send it into decay. According to Broken Window Theory, mentioned earlier, if a window in a building is broken *and left unrepaired*, all the rest of the windows will soon be broken. This is as true in nice neighborhoods as in run-down ones.⁷³ It is not that some areas are inhabited by determined window-breakers whereas others contain only window-lovers; rather, one unrepaired broken window is a signal that no one cares, and so breaking more windows costs nothing.⁷⁴ Fear of being caught in an act of disobedience is abated. Similarly, litter and graffiti make a neighborhood appear unsafe.

The concept of defensible spaces was developed by Oscar Newman in 1972, and adopted for use by the U.S. Department of Housing and Urban Development's Office of Policy Development and Research to utilize it as a proven strategy for enhancing our nation's quality of urban life.⁷⁵ Defensible spaces have a clear indication of ownership, provide opportunities for surveillance, and define specific areas for different types of activities. All of these characteristics encourage ownership and control, which leads to better personal functioning and stronger communities. When a space "belongs" to a set of people, there is more collective action to watch over it and enforce rules and care.⁷⁶ Thus engaging communities to care for their neighborhoods, will in turn involve them, hands on, in making their communities a safer place to live.

Joan Nassauer, a professor at the University of Michigan, and practitioner of



Figure 3 - Before and after the creation of Defensible Spaces in Clason Point⁷⁷

Landscape Ecology, has developed the Community Care Principle which states that “ecosystem services endure when they are achieved by local communities engaged in caring for the landscape.”⁷⁸ Well-cared for landscapes show that there are humans present and that they intend to care for and protect the place.⁷⁹ By caring for the landscape, a community can take ownership of a place and create pride in their home, in addition to gaining valuable knowledge about the local ecosystem. Time and community care can improve property values and the perception of safety. A well-cared for place is perceived as a safer, more satisfying place to be, and even a better place to shop.⁸⁰

Another recently developing option is Crime Prevention Through Environmental Design (CPTED), a movement in which planners and architects team with law enforcement personnel, citizens and professionals to address the relationship between crime and the built environment. Design guidelines and development standards are often created to further prevent crime, such as reducing opportunities for hiding behind landscaping and building elements and purposeful addition of amenities that increase ‘eyes on the street’, such as seating in areas that require surveillance.

Street Lighting

The perception that crime is lessened in areas with consistent and reliable night street lighting has been hotly debated. Scholarly research on the subject has provided mixed results. While noting that residents report almost unanimous increases in the perception of safety, many studies have proven statistically that new lighting does almost nothing to reduce actual incidents of crime.⁸¹ Studies that demonstrate otherwise are often tainted by confounding variables, additional safety measures happening concurrently, for example increased police presence or the introduction of a new community watch program.⁸² However, there is new evidence to suggest that while an overall increase in lighting is not effective, targeted increases may be. These situations may produce a localized reduction in crime, or reduce only certain types of crime, for example robbery or vehicle crime. Additionally, although the actual light may be ineffective, certain types of street lighting can produce human behavior that is successful at reducing crime.⁸³

In his review of studies measuring the effects of lighting and crime, Kean Pease found that the application of additional lighting produced complex results, concluding that it may be overly simplistic to assume that lighting either does or does not provide a reduction in crime. Because the installation of lighting improves the perception of safety, pedestrian traffic may improve the overall surveillance of an area. However, this new traffic may allow criminals to blend in more easily. It also may increase the amount of time after nightfall that residents spend outside or away from their home, heightening their susceptibility to home invasion. And while improved lighting may enhance a resident's ability to sense vice or criminal behavior, it also improves a criminal's ability to sense and evaluate a potential victim.⁸⁴

As the perception of safety increases rapidly with the application of new and better lighting, it is a very popular tactic used by municipalities to reduce crime rates and simultaneously improve sense of safety. However, this issue is not so simple to suggest that lighting is or is not effective at lessening crime rates in an area. Instead, it must be used as one of a portfolio of measures to improve safety, for example increased police presence, and an aware and watchful community.⁸⁵

Crime & Safety in Detroit

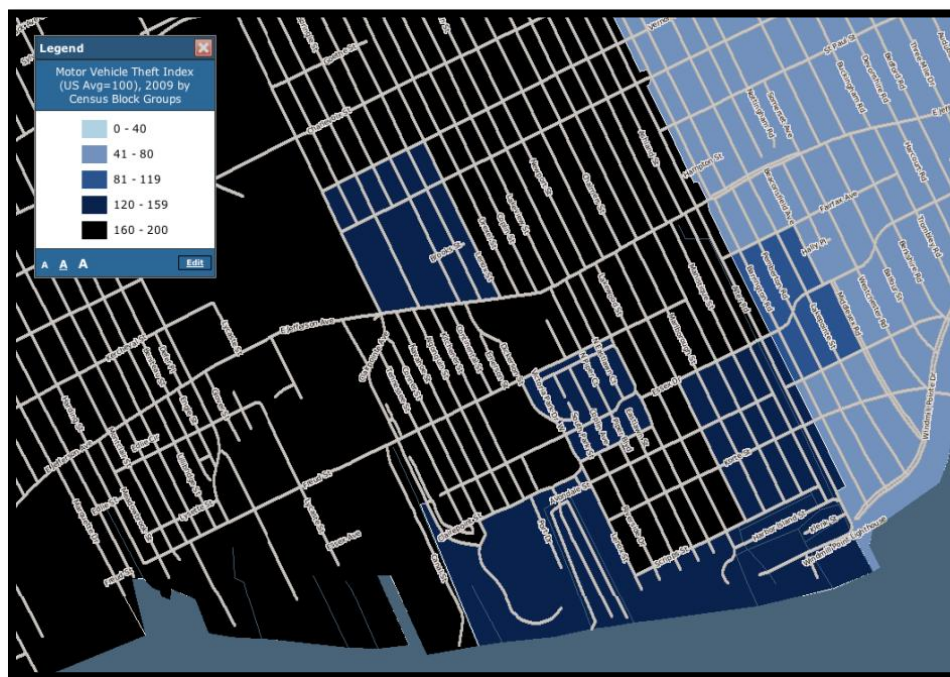
Although there is an indication that crime in Detroit has decreased significantly since the 1970s, in 2007 the city had the sixth highest number of violent crimes out of the twenty-five largest cities. Crime occurs with an uneven distribution across the city; specific statistics by neighborhood can be difficult to obtain, because as has been reported in the Detroit News, the Detroit Police Department under-reports homicides and other crimes through omissions and incorrect crime classification.⁸⁶

Table 1 - Detroit Crime Rates (2008)

Crime Type	Rate
Homicide	40.6
Forcible rape	36.4
Robbery	675.1
Aggravated assault	1,178.8
Violent Crime	1,924.1
Burglary	1,967.1
Larceny-theft	2,079.5
Motor vehicle theft	1,815.1
Arson	76.3
Property Crime	5,861.8
Notes	
Number of reported crimes per 100,000 population	
Source: FBI 2008 UCR data	

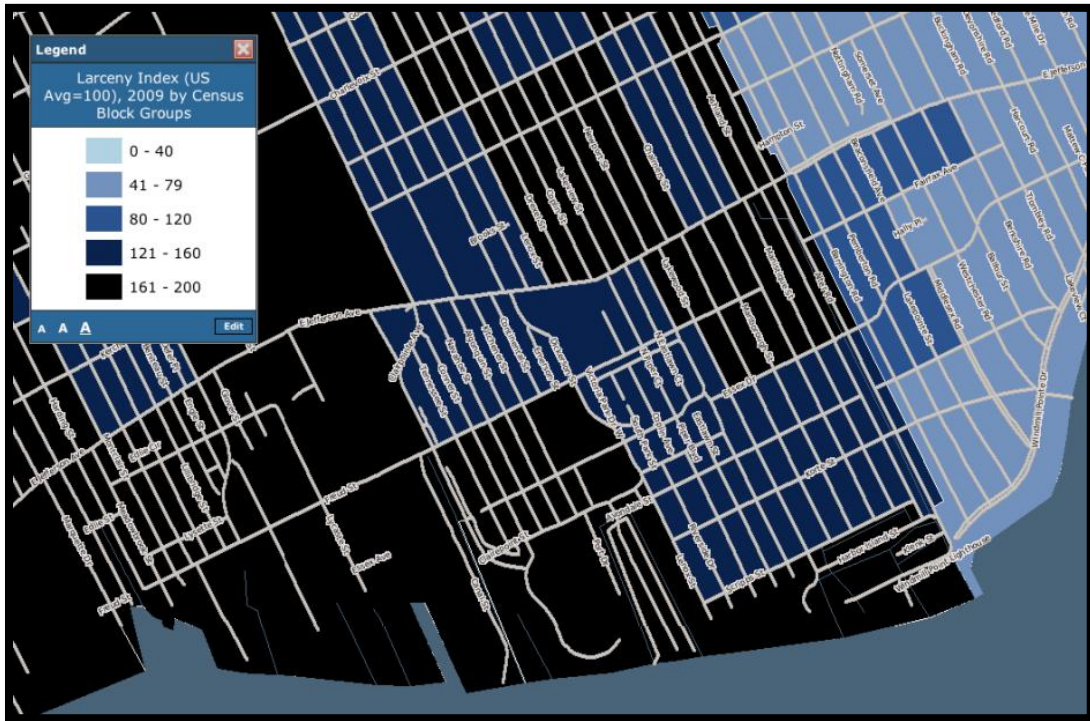
Crime rates in the lower eastside are significant (See Table 1); and the community perception of indicated that crime is in realistic agreement. In the maps below it is clearly illustrated how drastic the increase in crime rates is between the lower eastside within Detroit’s boundaries in comparison to the neighboring Grosse Pointe Park. Almost a hundred percent of respondents indicated that the neighborhood is not safe at night. 20 percent indicated it is not safe for children to play outside during the day. When asked their largest concern, nearly every item was related in some manner to safety. Twenty-four percent listed crime, eight percent drugs, five percent the need for better lighting, six percent safety overall. Twenty-seven percent listed vacancy as a large concern, with 20 percent saying that the main element of their community that needs to be changed is the repairing or demolishing of abandoned structures, getting at the idea that since their neighborhood appears untended to or uncared for is making it feel unsafe.^{xii}

There is no police station within the boundaries of this community, though there is a police dispatch center that appears nearly vacant. The “Eastern District” precinct is comprised of the former 5th and 9th precincts, and is located near the City Airport. It is approximately four miles from the center of this neighborhood. Almost 20 percent of residents suggested that increased police presence would make it feel safer, in addition to decreasing loitering in front of stores, fewer beggars, and the addition of neighborhood watch.

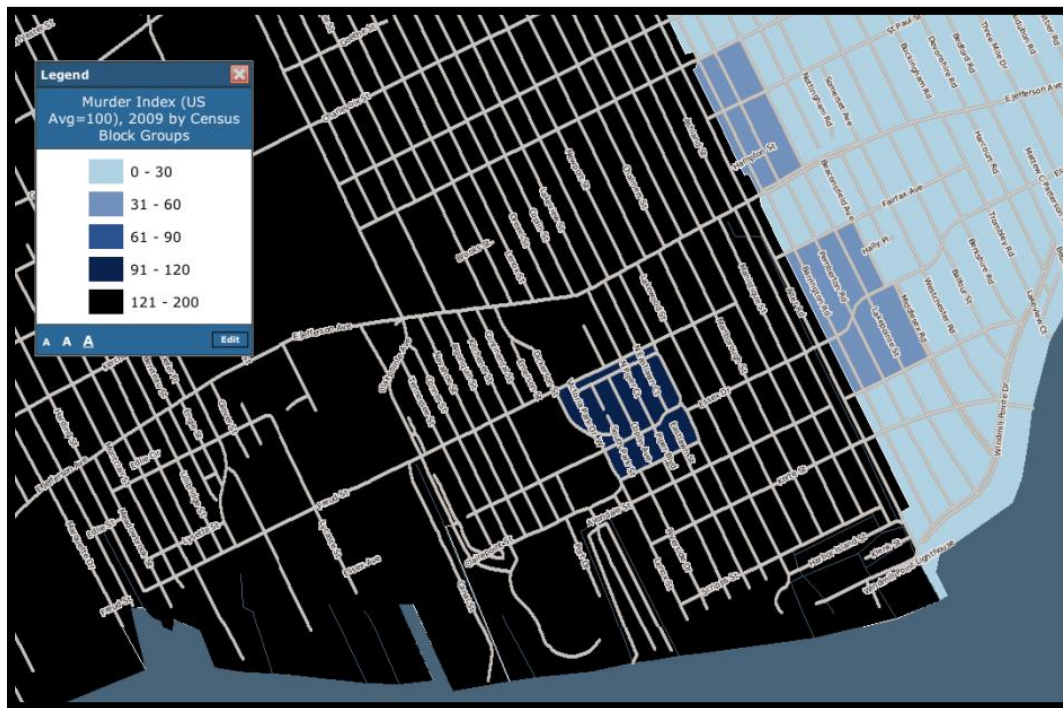


Map 11 - Motor Vehicle Theft, 2009⁸⁷

^{xii} See Appendix 3 for full listing of Survey Results



Map 12 - Larceny Index, 2009⁸⁸



Map 13 - Forcible Rape, 2009⁸⁹



Map 14 - Murder Index, 2009⁹⁰

The nearest fire station is on Jefferson, at the far western edge of the lower eastside.^{xiii} It is technically one mile out of the center of the neighborhood. Considering the prevalence of arson that has occurred to abandoned properties in Detroit in past years, perhaps the implementation of a volunteer fire department could be useful. In addition, a community organization or block leader could unite residents to volunteer for the City of Detroit’s Angels’ Night program, where volunteers and officials patrol the streets and monitor abandoned buildings to combat the efforts of Devil’s Night arsonists.

Organization amongst block associations or community groups for establishment of a neighborhood watch or ‘eyes on the street’ program could add to the safety and the perception of safety in the area. Currently no such program exists within the Jefferson corridor. Working together to create defensible spaces that appear cared for and tended to by those living in the neighborhood would increase the perception of safety within the neighborhood, for example a neighborhood clean-up program or additional Greening of Detroit plantings. A design plan should include elements that re-beautify for safety’s sake, for example targeted lighting, fixing broken windows, graffiti cleaning, and more.

The overall health and well-being of both individual residents and the community as a whole are inextricably linked and must be considered as an integral part of any design strategies towards creating a sustainable redevelopment plan. In our design we hope to promote socially equitable features that give access to amenities and easy mobility to residents of all ages and shapes, and colors. In designing to both prevent and mitigate

^{xiii} See to Appendix 6 for Additional Maps & Figures of the lower eastside.

against both physiological and mental health impacts of the built environment, we hope to create a more active and healthy neighborhood, with social interaction that ties people to the place with a sense of pride and identity, and overall, improve the quality of life for Detroit's lower eastside residents.

Chapter 2.4: Energy Systems

With only five percent of the world’s population, the United States consumes 26 percent of the world’s energy.¹ The abundance of low-cost fossil fuel energy allows humans to accomplish monumental tasks in a fraction of the time. However, as the World Energy Assessment team concluded, “Current energy generation and use are accompanied by environmental impacts at local, regional, and global levels that threaten human well-being now and well into the future.”² In addition to widespread concern for the environmental impacts of fossil-fuel usage, global issues of equity and security also exist.

First, fossil fuel energy resources are not replenishable or renewable. As they are used up, they become harder to attain, and therefore are more expensive. The burning of fossil fuels contributes significantly to local impacts such as poor air and water quality. On a large scale, it contributes to global climate change, because this process releases particulate matter and green house gas emissions, such as carbon dioxide, that are harmful to the atmosphere in abundance. Our never-ending appetite for energy indicates the need to evaluate and modify the nation’s habits. Meeting the challenge on a global level is beyond the scope of this report. However, local communities and regions can make a substantial impact on decreasing consumption through important design decisions of their own. There are two main ways to reduce energy consumption. The first is to reduce consumer consumption, or how people use energy. The second is to transform energy generation, or the way that energy is created and distributed.

Reducing energy consumption and considering alternate methods of energy generation are especially relevant to sustainable redevelopment because urban areas tend to have more energy intensive built elements and lifestyles. Many blighted areas have become devastated as the local economy diminished over time, leaving a population without access to jobs to maintain a high quality of life. Energy usage, seemingly tied to lifestyle in the United States, is near impossible without a steady stream of income. By reducing energy consumption, both through behavioral changes and energy efficient technologies, significant utility savings occur, reducing stress on community members with limited earnings. Additionally, the installation and maintenance of many new technologies and strategies require education and training, a perfect opportunity to engage the unemployed population and encourage new job skills. Improved air and water quality would also follow as fewer fossil fuels are burned.

Buildings

The United States utilizes a large amount of energy to install and maintain buildings. Buildings expend 62 percent of our total electricity usage, consume 36 percent of our oil and gas, and release 30 percent of all greenhouse gases that are emitted in the U.S. every

year,³ including carbon dioxide and sulfur dioxide.⁴ About 90 percent of this consumption occurs during the occupation phase of a building's life, as opposed to the construction and demolition phases.⁵

This section is organized into energy consumption in new construction and in existing construction. Each situation affords a different set of opportunities. In new construction, the blank slate of an empty lot makes it easier to make systemic design decisions, such as orientation or the size and location of major systems, which can allow a green building to use substantially less energy than a conventional complement over its lifecycle. These strategies would be cost prohibitive to execute in a retrofit, and thus feasible strategies for retrofit will be examined subsequently. It is important to note that the strategies for existing construction are relevant to new construction as well and should be considered in most major building applications.

In a blighted community, opportunities exist for both new construction and the retrofitting of existing construction. Specifically in Detroit's lower eastside, vast tracts of land have been left vacant or abandoned, and the remaining structures are in varying states of neglect and decay. According to our site analysis, 54.5 percent of lots are vacant or abandoned, with 29 percent of the area vacant. The lower eastside comprises a total of 1363 acres, 385 of which now stand vacant. We calculated approximately 245 abandoned buildings, however this number would need to be verified by the municipality. Addressing these structures and lots is a difficult task, but critical to redevelopment.

Green Development and New Construction

Green construction focuses on goals that reduce energy and resource use in the building process, utilizing passive design strategies like natural orientation, green roofs, and high efficiency windows and insulation, as well as active design strategies that improve the overall efficiency of HVAC systems, appliance, and lighting. These two systems, used in concert, can greatly improve the overall sustainability of the built environment.

Though generally perceived as a more expensive alternative, green design has many arguments that make economical sense. Any higher upfront costs are typically recouped in the form of utility savings over the building's life.⁶ And because green design tends to enhance occupant health and well-being,⁷ inhabitants tend to see a drop in incidents of respiratory illness, asthma, and Sick Building Syndrome.⁸ All of this adds up to reduced tenant costs, increased property values, and higher retail sales.⁹

In 2009, however, economic conditions caused home prices and commercial real-estate values to fall. To illustrate this claim, housing starts in the US are currently down more than 50 percent from their peak in 2005.¹⁰ In fact, the National Association of Homebuilders is not forecasting any increase in starts through their most distant projections in the spring of 2010.¹¹ This statistic is representative of the whole development industry. Essentially, almost all new development projects are on hold. Many homes have gone into

foreclosure or have been abandoned. However, according to Michele Russo, a research director at McGraw-Hill Construction, "the construction that is occurring is more likely to be green"¹²; the firm reported a 20 percent increase nationwide in environmentally responsible construction from 2004 to 2005.¹³ Venture capitalists have already invested \$465 million into U.S. green building in the first nine months of 2009, compared with \$284 million in 2008. "While the rest of the industry has retreated...green construction has actually grown," says Paul Holland, a partner at venture firm Foundation Capital.¹⁴

Federal funding exists for new energy efficient homes. A \$2,000 tax credit is available to home builders if their home achieves 50 percent energy savings for heating and cooling over the 2004 International Energy Conservation Code (IECC). Building envelope improvements must account for at least 20 percent of the energy savings. Contractors of homes conforming to Federal Manufactured Home Construction and Safety Standards are also eligible for the credit.

Additionally, within the LEED for New Construction and Major Renovations certification standard, a varying amount of points can be earned depending on the percentage of energy reduction achieved below a baseline. When implemented, the suggested strategies can help to achieve a maximum reduction.

HVAC systems

Active energy systems are the major building components that utilize or distribute energy. These large systems are important to controlling the comfort of a building, for example the HVAC (Heating, Ventilation, and Air Conditioning) systems. They differ from passive systems in that they cannot operate without some sort of mechanical input.

HVAC systems, use ducts to move conditioned (heated or cooled) air throughout a building for providing thermal comfort to occupants. These systems are a major drain on energy in buildings and costly to install. Therefore, they need to be carefully considered and properly designed from the beginning. An oversized system with undersized ducts is very common but inefficient. This unit will run short cycles without reducing humidity, causing a building to feel cold and clammy.¹⁵

Equipment and ducts must also be installed properly. The ducts should be fully enclosed, installed in conditioned spaces (temperature controlled), and the system should be tested to ensure maximum efficiency. For example, there should be no more than six percent of the fan flow leaking from the ducts.¹⁶

Air conditioners are another major source of energy use. In many climates, air conditioners are unnecessary, as natural ventilation can achieve the same results as a cooling system. However, if an air conditioner is required, they should be properly sized. Oversized air conditioners are common, but run short cycles, which, again, are inefficient and use more energy. A smaller air conditioner runs longer cycles and will cool a building more efficiently.¹⁷ Air conditioners also require a closed system of CFCs, or

chlorofluorocarbons, to cool air. These chemicals are known to cause damage to ozone. However, systems are available for purchase that are CFC-free.

Natural Orientations

In cold climates, planning a building's orientation to maximize natural exposures can reduce costly heating and cooling bills, a process of using resources strategically without mechanical systems known as passive design. Passive cooling uses natural methods to remove heat from a building; for example, installing well-insulated walls reduces the heat gain during daylight hours. The less heat gained the cooler it will be inside. Most American homes are instead cooled by active mechanical systems, like central air conditioning, which is used to remove any heat gained throughout the day while expending large amounts of energy.

Since human settlement began, people have used passive energy design to make their interior environments more comfortable. Indigenous tribes in the southwest built their homes out of adobe, a mixture of clay and straw, which is incredibly thermal resistant (heat does not move well through the material). Since the walls were thick, and did not transmit heat, the interior of these homes stayed cool during hot days in the desert without air conditioning.

Eskimos, too, used passive energy design to survive harsh arctic winters. They built homes out of the most abundant material available to them: snow and ice. These materials may seem counter intuitive, but they are actually extremely effective. The insulating quality of packed snow and ice is high; heat created inside does not easily escape. Additionally, it was traditional for families to hang elaborate and thickly woven tapestries onto the walls, which added to the warmth of the space.

In Europe, the building stock is very old and well-preserved. Many urban centers utilize the same structures for living and working that have been used since the Middle Ages. Almost all of these buildings have been retrofitted for electricity and running water, but lack central air or heating. In residential buildings, thick walls absorb solar heat gain on hot days, and radiate heat out later during cold nights. Additionally, well-fitted shutters are closed over windows on the hottest days, preventing any additional thermal gain. At night, the shutters are opened and cooler air is able to circulate. These types of designs are extremely effective passive methods, and they often do not require strict solar orientations.

As the industrial revolution began, developed societies began to discover new and innovative ways to provide thermal comfort in buildings. Air conditioning, central heating, and electric lights changed the ways humans interacted with the built environment. Lifestyles changed - now humans were unchained from the patterns of sun or weather. They no longer required natural light, heat, or ventilation to function. This new lifestyle led to an increase in energy usage, typically in the form of oil or natural gas. Now, as these resources are becoming more expensive and the inherent environmental damages



Figure 4 - The Heliotrope in Freiburg, Germany

associated with them are recognized, there is a strong push from some individuals and organizations to return to a more passive method of building to reduce energy usage, as well as to reconnect humans with nature and natural rhythms.

The Heliotrope, built in 1994 in Freiburg, Germany, is an example of modern passive design in motion. BBC Europe Editor Mark Mardell

commented, “From a distance Heliotrope looks like a water tower made of corrugated iron mounted on a giant mushroom stalk...It's like being in a cross between a luxurious yacht and a rather cool tree house.”¹⁸ By following the sun, the building is able to maximize solar gain and heat. Combined with the solar panels perched on the roof, the Heliotrope is able to produce five times the energy it consumes.^{19,20}

Detroit's lower eastside is located in a temperate climate in the northern hemisphere; the sun moves from east to west, through the southern half of the sky. This implies that southern facades of building gain more exposure and heat throughout the day, while western facades gain afternoon and evening exposure. Therefore, the southern façade of a building inherently collects the most solar radiation, and a window on the south façade will collect more solar heat than a window of the same size on the north façade. In residential applications, the bedrooms should be planned on the east end of a building, so occupants can rise with the morning sun. The west end of the building should be reserved for rooms that occupants use in the evening, like dining rooms and studies, to take advantage of the heat and sun exposure during later times of the day.

In a climate in which thermal heat gain is unnecessary, for example the American southwest, large windows on the south façade would be inappropriate. Conversely, in a region like Michigan solar heat gain would be welcomed in the winter.

The placement and size of awnings can also greatly affect the potential heat gain or loss from a building. In the summer months when the sun path runs high in the sky, an awning can completely block solar gain. In the winter months when the sun path runs low in the sky, the same window will be able to collect solar gain and heat without the addition of any mechanical system.

Green Roofs

Green roofs can also play an important role in passive design. Green roofs are systems that incorporate landscaping onto the roof of a building. The structure typically requires a waterproof membrane, drainage and irrigation systems, a lightweight growing medium, and planted vegetation. Due to the additional structure required to support the

extra load associated with a green roof, this strategy is not recommended for many retrofit projects which would require extensive investment to ensure adequate structural support. New construction, however, has the ability to plan for this load. It is simply cheaper to build a structural system from scratch than it is to rip apart an existing building and retrofit.

Most green roofs are six inches deep or shallower and typically consist of a three to four inch layer of lightweight, soil-like growth media.

The most recommended plants are succulents and herbs, typically drought tolerant and native species, like sedum.²¹ Deeper green roofs can support more intense species, like perennial plants and trees, but require irrigation and more maintenance.²²

While the upfront cost of green roofs exceeds the initial cost of conventional roof installation by approximately 40 percent, over the 40-year expected lifetime of a green roof, a green roof is more economical than a conventional roof; most conventional roofs are replaced after 20 years.²³ In many states, grant funding for green roofs is available through the EPA under the Clean Water Act Section 319 because green roofs address nonpoint source pollution. Green roof projects may also qualify for energy saving funds from the Department of Energy.

Additionally, since green roofs have a cooling effect on the immediate air temperature, they can help to minimize the urban heat island effect. As an example, when the Chicago City Hall installed a green roof, personnel noted a 30-degree temperature difference between the planted and unplanted section of the rooftop on some hot summer days.²⁴ Green roofs also have an insulating effect, and are capable of reducing the buildings energy consumption by up to ten percent. By regulating temperatures on the roof, mechanical systems do not have to work as hard to overcome seasonal or diurnal shifts in temperature.

In addition to the environmental and economic benefits, green roofs offer aesthetic and recreational opportunities to an urban area while potentially raising property values. Property values may improve as the lifecycle of a green roof is longer than a conventional roof, and lengthens the amount of time between roof repairs or replacements.^{25,26}

Green roofs provide many benefits that areas of redevelopment often need, for example stormwater retention, habitat space, air filtration, building insulation, heat island reduction, and beautification. However, Detroit's lower eastside, with its high level of neglected and abandoned buildings, may not benefit from a large-scale green roof initiative. These buildings are not up to code, and most likely structurally unsound. Installing a green



Figure 5 - Green Roof on the City Hall of Chicago

roof would require an enormous amount of structural modeling and renovation to ensure that the additional load of a green roof would be supported. Quite simply, it is just not cost-effective. However, larger industrial or commercial buildings may be in better condition, and structurally overbuilt; the load bearing components of the structural system are not near capacity. These applications would benefit from a green roof, and as they tend to have large, flat roofs with plenty of empty square footage. A large-scale green roof initiative targeted to large commercial or industrial buildings would maximize the benefits because they could be installed over a large area for the lowest cost. We recommend that JEBA and other local groups push for a policy initiative requiring any new retail, office or industrial buildings that are built or retrofitted contain a green roof or at least be structurally sound for green roof development in the future. Our design plan recommends a rehabilitation of the historic Vanity Ballroom. As the current structure will need a new roof regardless, we'd recommend a potential green roof which would add to the value of the building and be a community focal point. Additionally, it would present an opportunity to collaborate with local organizations that can train local residents to install and maintain these applications.

Retrofitting Existing Buildings

In the current social thought, blighted areas are expected to rebound as new construction becomes fiscally viable, generating tax revenue and revitalizing business districts. However, since the market for new construction has slowed dramatically in the last few years, this option is less accessible. Areas of poverty and blight tend to lack fiscal investments, even in a strong economy. As the national economy has worsened in previous years, capital investment into these areas has diminished even further.

While new construction may be difficult or impossible to finance in rustbelt cities, addressing neglected buildings can still be considered a primary goal for redevelopment. These buildings can be made habitable and safer with less overall expenditure than new construction. Additionally, by bringing poorly maintained building stock up to code and livable standards, the entire area can see a lift in property value and potential investor interest.

Areas of redevelopment pose specific challenges as they have an abundance of older, often neglected building stock. Therefore retrofitting, the process of upgrading an older building to incorporate new technologies and strategies, becomes more appropriate. These buildings use more energy than they should because they are aging, antiquated, or poorly maintained. Retrofitting is effective in areas with existing building stock because it does not require a clean slate to implement. By focusing on the areas of a building that require the greatest energy input, typically heating and cooling, major appliances, and lighting, significant savings can be achieved with limited funding.²⁷ This reduces stress on the community's financial resources and may have the dual benefit of bringing job opportunities and training to the area as well.

The U.S. Department of Energy is placing an emphasis on retrofitting, through the American Reinvestment and Recovery Stimulus Act. On September of 2009, the department announced the creation of a new program that would make available \$450 million to upgrade homes and businesses to higher energy efficiency.²⁸ This program, the Retrofit Ramp-Up, is expected to incentivize large-scale projects that may improve the energy efficiency of entire communities through partnerships between the private and public sectors.²⁹ For example, the Missouri DNR's Energize Missouri Communities was able to offer \$4,660,627 in grant awards to 21 communities or Rust Belt counties in the St. Louis area and northeast Missouri for energy efficiency projects, funded by the 2009 stimulus package. These public building energy efficiency retrofits have the potential to create over 100 jobs and reduce community CO₂ emissions by over 10,000 tons.³⁰

Cash for Caulkers was proposed by President Barack Obama as a spin-off of the successful Cash for Clunkers program in which consumers were given large rebates for purchasing a new, energy efficient vehicle. The President has said that he expects this program to create demand for insulation and efficient water heaters, in addition to jobs for unemployed Americans.³¹ Under the program consumers could receive a grant based on the percent of efficiency achieved.³² However, the plan still lacks approval from Congress.

In Detroit's lower eastside specifically, there are a large amount of vacant, neglected, and abandoned buildings. There are also a large number of buildings with historic or cultural significance which should be protected for posterity and the identity of the community. The first priority for local building stock should be to bring it up to code and structural stability. Existing construction should then be reviewed for potential to retrofit for energy efficiency. As this area of the country is temperate, with well-defined seasons and hot and cold extremes, the most important elements to upgrade are those which will improve the building's ability to resist heat transmittance, like high-efficiency windows or additional insulation. This will reduce energy use and save on utility bills. As funding is scarce, federal incentives and grants can help to mitigate high costs. As JEBA is already committed to façade improvement in the area, the organization could extend its leadership capabilities and implement an energy efficiency program. Local block clubs could be leveraged to train individuals in retrofitting neglected and abandoned homes. It is important to note that only programs and renovation schemes that create job opportunities and training programs for local individuals should be fully implemented.

High Performance Glazing

As a building's mechanical system heats or cools a building, this energy is lost from the building in the form of heat transmittance. Since thermal energy travels from hot to cold areas, in winter heat will radiate out of the building. In the summer, when it is colder inside, heat will radiate into a building. This creates the need for additional heating and air conditioning, over-expending money and energy.

Windows are the source of the greatest amount of heat transfer in a building. Window technology has improved greatly over the last decade. Originally, windows were a single pane of glass. Without any additional insulating qualities, they easily allow for non-optimal heat transfer. This heat transfer is measured and expressed as a U-factor. U-factors measure the amount of energy, or heat, which is transferred through a material over time. Single pane windows had a very high U-factor, meaning they readily and easily transfer heat. Newer window technologies are demonstrating a capacity for much lower U-factors, and therefore, much less heat transfer. The recommended U-factor for Detroit's lower eastside is .35 or less.³³

These new technologies include double and triple pane windows. A layer of air or gas between each pane improves the insulating quality without compromising on clarity or transparency. Low-emissivity coatings on windowpanes, which reflect radiant sunlight, can also improve the insulating qualities.

The investment in high performance windows with the lowest recommended U-factor may be a costly one, but it could potentially provide the greatest savings over the long term. It would also reduce stress on active energy systems, like heaters and air conditioning. The less heat that is allowed to move through the building envelope, the less these active systems will have to work to remove it.

Many federal, state, and local utility programs exist to incentivize window upgrades. DTE offers a rebate of between \$250 and \$750, depending on the efficiency, for window replacements. The federal government also offers tax credits for many improvements to the building envelope, most covering 30 percent of the upgrade.³⁴

These programs will be important to Detroit's lower eastside, as very few residents have the capital to invest in such projects but would benefit largely from the improvement. Local workers can be trained to install new window technology, creating a dual benefit associated with new job training.

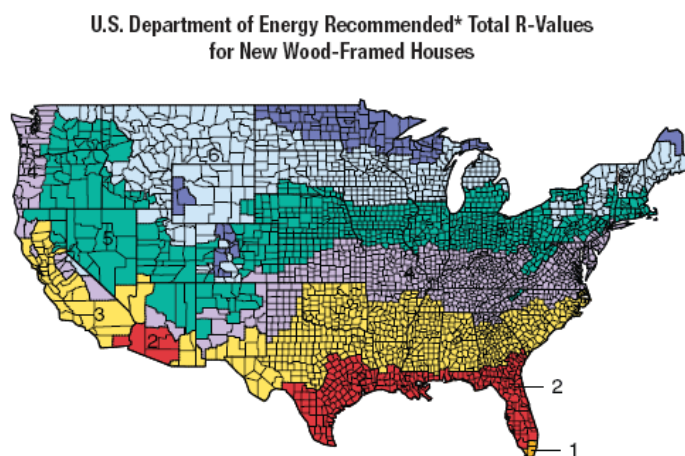


Figure 6 - Heating Zones in the Continental United States

Insulation

Insulation is one of the most important elements in a building, especially a home located in a colder climate, like Detroit. Insulation prevents heat from moving between the exterior elements of a building, like walls, roofs, and floors, and being lost. If a building is properly insulated, the HVAC system will not have to

work as hard to regulate temperature, making it more energy efficient. The best insulation, regardless of type, is one with the proper R-factor for the climate in which the building resides.³⁵ An R-factor measures a material's thermal resistance. The higher a material's R-factor, the less heat it allows to pass through. R-factors tend to increase with thickness, so four inches of insulation offer more thermal resistance than two inches of insulation.

Zone	Gas	Heat Pump	Fuel Oil	Electric Furnace	Attic	Cathedral Ceiling	Wall		Floor
							Cavity	Insulation Sheathing	
1	✓	✓	✓	✓	R30 to R49	R22 to R38	R13 to R15	None	R13
2	✓	✓	✓		R30 to R60	R22 to R38	R13 to R15	None	R13
2				✓	R30 to R60	R22 to R38	R13 to R15	None	R19 - R25
3	✓	✓	✓		R30 to R60	R22 to R38	R13 to R15	None	R25
3				✓	R30 to R60	R22 to R38	R13 to R15	R2.5 to R5	R25
4	✓	✓	✓		R38 to R60	R30 to R38	R13 to R15	R2.5 to R6	R25 - R30
4				✓	R38 to R60	R30 to R38	R13 to R15	R5 to R6	R25 - R30
5	✓	✓	✓		R38 to R60	R30 to R38	R13 to R15	R2.5 to R6	R25 - R30
5				✓	R38 to R60	R30 to R60	R13 to R21	R5 to R6	R25 - R30
6	✓	✓	✓	✓	R49 to R60	R30 to R60	R13 to R21	R5 to R6	R25 - R30
7	✓	✓	✓	✓	R49 to R60	R30 to R60	R13 to R21	R5 to R6	R25 - R30
8	✓	✓	✓	✓	R49 to R60	R30 to R60	R13 to R21	R5 to R6	R25 - R30

Figure 7 - R-Factors for the appropriate heating zone

Insulation may seem like an inappropriate choice for a retrofit system, as it needs to be installed inside each wall. However, by cutting a small hole between studs near the top of a wall and using blown-in insulation, the process can be fast and nonintrusive.

An appropriate R-factor is determined by heating zones (see Figure 6).³⁶ The colder a climate is, the higher the R-factor required to maintain a comfortable indoor environment. Detroit's lower eastside is in Zone 5, which has a cold winter climate. The appropriate R-factor for Detroit's lower eastside varies by the part of the building envelope. Higher R-factors are recommended for floor space above non-heated spaces, like basements or crawlspaces, and attics. For the attic and ceilings, a factor between R38 and R60 and in the floor, R25 to R30 is appropriate. In a typical residential wall, the recommended R-factor is R6. (See Figure 7)³⁷

Utility incentives exist in almost every state of the country that help to bridge the gap in capital required for the replacement of insulation. For Detroit's lower eastside, DTE offers up to \$350 to residents who improve their wall insulation, and up to \$600 for improving ceiling insulation.³⁸

Major Appliances

Major appliances are often one of largest drains on energy resources. Improving the efficiency of these systems when retrofitting can reduce energy usage in a building by a large percentage. Water heaters provide a great comfort to the home but are a significant source of energy consumption in buildings. Typically, the storage tank of a water heater will release heat into the building, causing a need for additional energy to reheat the stored water. On-demand tankless water heaters warm water as needed, and as a result do not

have the energy losses associated with the storage of hot water. In general, the only drawback to using an on-demand water heater is that they usually have lower flow rates than storage water heaters. If funding for this upgrade is scarce, an option is to cover an existing water heater with a heavy blanket or home insulation.

Major kitchen appliances, such as the refrigerator, oven, and clothes dryer, provide additional luxury but also use a large amount of electricity. In a residential setting, upgrading these few fixtures to more efficient models can reduce utility bills. However, this investment might be costly in the short term. Some steps can be taken to reduce energy usage in these appliances without a costly major purchase. First, raising the temperature in a refrigerator by even one degree will provide the same level of quality to food storage, but reduce energy demand. For clothes dryers, the no heat setting takes longer but uses far less energy.

When upgrading, Energy Star rated appliances are generally very efficient and reliable. Energy Star is a partnership between the US Environmental Protection Agency and the U.S. Department of Energy, which sets standards for appliances to reduce energy consumption. In 2008, Americans using Energy Star appliances “saved enough energy to avoid greenhouse gas emissions equivalent to those from 29 million cars — all while saving \$19 billion on their utility bills.”³⁹

Many federal, state, and utility incentives offer credits and rebates to individuals and businesses that choose to upgrade major appliances. The state of Michigan offers the Energy Efficient Home Improvement Tax Credit, awarding Michigan taxpayers who earn an individual income of less than \$37,500 a tax credit worth ten percent of the installed cost of Energy Star rated appliances like water heaters, furnaces, refrigerators and clothes washers.⁴⁰ The Residential Energy-Efficiency Appliance Rebate Program, funded by the 2009 stimulus package, offers rebates for appliances ranging between \$25 and \$100.⁴¹ The program also offers incentives to upgrade water and home heating systems. For example, the program will cover up to 20 percent of the cost of solar water heater and \$300 on new efficient propane or oil furnaces.⁴² DTE offers similar additional incentives.⁴³

These incentives are important in a neighborhood like the lower eastside of Detroit. Rebate programs and tax credits help to overcome the lack of available disposable income in the area, and allow the residents to achieve the significant savings associated with these upgrades. Organizations such as JEBA can help increase resident awareness of these programs.

Efficient Lighting

Electric lighting typically consumes 15 percent of a building’s overall electricity use.⁴⁴ This could be reduced significantly through the application of energy saving bulbs. The most common type of lighting in residential buildings is incandescent lighting, cornering 85 percent of the artificial lighting market.⁴⁵ When comparing initial cost, it is the most

inexpensive bulb type but it is highly inefficient and has a very short life span. As a result, these bulbs can be more costly to operate over their lifespan than new energy saving alternatives.

Fluorescent bulbs have been used for many commercial or office applications for several decades. They tend to be more efficient, using upwards of 75 percent less energy than a typical incandescent, but providing the same illumination. Their lifespan is also longer than an incandescent, providing on average ten times as many hours of light. These factors can lower the life cycle cost of a fluorescent tube, even though the initial cost can be much more expensive than an incandescent.

Most people tend to associate fluorescent bulbs with poor quality lighting. This perception has been true over time. Historically, fluorescent tubes had a low color rendering index and a very cold color temperature, resulting in a cold, bluish, sterile light. However, new advances in technology have resulted in a higher quality fluorescent that can provide light with a quality comparable to an incandescent. Compact Fluorescent Lights (CFLs) are also a major technological advance. Fluorescent tubes require a special fixture which made residential application difficult and cost prohibitive. CFLs provide all of the benefits of fluorescent tubes, but in a form that fits most fixtures designed for incandescent bulbs.

Fluorescent bulbs do contain a small amount of mercury. Since mercury is a toxic substance, burned out fluorescents must be returned to specific facilities that will dispose of the mercury without allowing it to leech into soil or groundwater, as could happen when bulbs disposed in ordinary landfills break. The argument could be made that fluorescent bulbs release less mercury into the environment over their lifetime, however. Mercury is also released into the atmosphere as coal is burned to produce energy, so fluorescent bulbs which use less energy will minimize mercury release in the long term.

LEDs, or light emitting diodes, are a new technology that uses a very small amount of energy to power. When compared to incandescent lights, they use as little as a half of the energy to power.⁴⁶ A lower energy requirement means that fewer greenhouse gases are emitted in the energy production process. They are also cheaper to maintain, because they have a much longer life.⁴⁷ However, the initial cost is much higher than typical incandescent, but dropping. In the beginning of 2009 LEDs were as much as 25 times more expensive, but by 2010 they were only 4 times as expensive.⁴⁸

Occupancy sensors installed in rooms can reduce energy used for lighting even further. These systems can be used to turn off lights when they no longer sense the presence of an occupant. Older systems relied on motion to sense occupancy, but new technologies that are more advanced have recently been developed. These new systems can now also detect occupants by sound and even heat radiation.⁴⁹ These systems have potential to be much more reliable and reduce unnecessary energy usage substantially.

Chapter 2.4: Energy Systems

Lighting is considered a low-hanging fruit of energy efficiency. This improvement often results in an incredible return on investment. The cost to upgrade to energy efficient fixtures may be prohibitively high in areas like Detroit's lower eastside, yet these residents could benefit greatly from the improvement. DTE and the State of Michigan both offer small rebates, typically \$1-2, for the purchase of an energy efficient bulb.⁵⁰ The best defense is to upgrade these elements slowly, as one older bulb burns out replace it with one energy efficient bulb. The lifespan of an incandescent is so short that it will not take long to upgrade every bulb in a home or business.

In a survey of lower eastside residents, many individuals expressed concern about safety at night, and articulated a desire for improved street lighting.^{xiv} While street lighting has not been proven to reduce crime or vice behavior, it does improve the perception of safety.⁵¹ Most major street lighting applications are high-pressure sodium (HPS) or mercury vapor, which are both more efficient than florescent lights, but produce a very poor light quality. The LED City Initiative, a national non-profit that provides technical support for the changeover from outdated lighting technology to LED lights, has been working with many cities across the country.⁵²

LEDs, or light emitting diode, lights are a new technology that uses a very small amount of energy to power. When compared to HPS lights, they use as little as a half of the energy to power, and in some cases, may use only a quarter of the power.⁵³ As such, the lower energy requirement to power LED lights means that less greenhouse gases are emitted in the energy production process. They are also cheaper to maintain, because they have a much longer life.⁵⁴

HPS bulbs tend to burn out every two years, whereas LED lights can last as long as ten years. There are also intangible benefits to LED lights, some of which may generate very real



Figure 8 - A parking lot in Racine, Wisconsin: Retrofit LED lights on the left, HPS lights on the right⁵⁵

^{xiv} See Appendix 3 for full listing of Survey Results

savings for the cities that opt to retrofit street light applications. First, LED lights emit a better quality light, due to the true nature of the light, which can lead to a better aesthetic quality, improving community pride and image.⁵⁶

LED lights have a much higher upfront cost than the typical bulb for a streetlight application.⁵⁷ The city of Ann Arbor joined the initiative with funding from the Ann Arbor Development Authority.⁵⁸ In that particular case, the cost of one bulb for an LED light was \$470, compared to \$37 for HPS.⁵⁹ That cost may be offset in part by the fact that LED lights last five times longer.⁶⁰ The rest of the upfront cost must be recouped through lifetime energy savings.

The lower eastside of Detroit could benefit from such an initiative. Would it not only reduce municipal electricity costs, it would also provide a better quality light, which would improve the perception of safety. As local residents have expressed concern over both safety and light quality, such an initiative could help to develop greater community pride.

Landscaping

One additional measure that is easily implemented when retrofitting is landscaping. This measure may not provide the most energy efficiency, but they can be use in concert with other methods of additional savings at minimal cost.

Landscaping can help to control thermal gain and loss in buildings. To prevent solar gain during the hot season, trees and shrubs can be planted that bloom in the spring and maintain foliage in the summer months thus shading building surfaces. These same plantings may be bare of leaves during the cold season, allowing solar gain to infiltrate and collect. Landscaping can also be effective at obstructing winter wind. For example, a well-placed coniferous or evergreen species that retains its foliage all year would provide a screen, blocking cold winter wind.

Detroit's lower eastside has also been targeted for landscaping programs, like the Greening of Detroit, which plants trees in areas that may have been devastated by the emerald ash borer and lack a tree canopy. In these instances, it will be valuable to strategize tree or other landscaping placement to provide passive energy savings to nearby buildings, creating the dual effect of improving the tree canopy, local ecosystems and saving energy costs in buildings.

Energy efficiency in buildings is an incredible relevant topic in areas of blight and poverty. A lack of steady income makes it difficult for many residents to afford high utility bills, and they tend to be most sensitive to the spikes in pricing associated with periods of shortage. Clearly, by improving the energy efficiency of a building, residents will have more disposable income with which they may reinvest into their community. A healthy by-product in this is the reduction of fossil fuels burned to produce electricity, which can improve air and water quality.

Overcoming the lack of available capital will be the most significant barrier to improving the energy efficiency in buildings. In new construction, many energy efficient elements come with a price premium, and with retrofits, these upgrades can be cost-prohibitive for local low-income residents. Therefore, the best elements to upgrade are those that provide the greatest return for the least investment: major appliances, the building envelope, and lighting. Federal incentives can bridge the gap in available financing.

Finally, every opportunity for new construction or retrofit is an opportunity for job training programs and local job creation. Partnerships and collaboration with local organizations can provide the guidance and education for unemployed residents. Local job creation and economic advancement is essential to the redevelopment of the most communities that have suffered from de-industrialization or blight; every energy efficient upgrade in a building should always be considered an opportunity.

Transportation

Travel by private passenger automobile is by far the most popular mode of transportation in the United States. Today there are over 139 million passenger cars, and 80 million personal trucks on the road.⁶¹ These vehicles use a substantial amount of energy. In the United States, 30 percent of overall energy usage and 70 percent of oil use is dedicated to the transportation sector alone.⁶²

Increased vehicular dependency is one factor in a number of social, fiscal, and environmental issues over time. Originally, the automobile freed people from public transportation. People no longer had to live near typical destinations, or rely on public transportation to get around. With a personal vehicle, people could live anywhere roads went. The government response to this new industry was to use fuel taxes to fund the construction of road and highway systems,⁶³ which in turn, promoted more auto usage.

Automobiles generate air pollution at a greater rate than any other form of transportation, particularly emissions like carbon monoxide and nitrous oxide.⁶⁴ Overall, 32 percent of greenhouse gases, 28 percent of common air pollutants, 51 percent of toxic air pollutants, and 23 percent of water pollutants are directly attributable to automobile traffic.⁶⁵ Since the mid-1970s, the Environmental Protection Agency has been in charge of regulating emissions like these and particulate matter. These regulations, in addition to advancements in vehicular technology have reduced the emissions of individual vehicles. However, a steady rise in the number of vehicles on the road puts continuous stress on air quality standards.

Redevelopment is often complicated by an overdependence on vehicles. People living in poverty and blight often lack the income to own or maintain a vehicle; however, the decaying state of public transit in inner cities makes it impossible to access food or employment without one. For many, it becomes a reinforcing cycle. An individual cannot

afford a vehicle, and therefore cannot access employment, making it even more difficult to come up with the financing to afford a vehicle. A recent survey by the U.S. Department of Labor found that transportation expenditures consumed 18 percent of household income in 2005.⁶⁶ Additionally, according to an AAA survey in 2006, the annual cost of owning a car is \$7,800.⁶⁷ Many low-income individuals simply do not have the disposable income to support such an expense. However, for those who do own a car, this expense is money that cannot be invested in appreciating assets.⁶⁸

Vehicles dependent on fossil fuels are sensitive to volatility of the foreign oil market, making alternative technologies attractive to individuals looking to insulate themselves. However, the cost prohibitive nature of investing in a new vehicle is an issue for residents of redeveloping communities, especially when new technologies come with price premium attached.

Compounding these issues, the state of public transit is worsening. Funding for public transit has been declining as budget shortfalls affect communities. This has led to service cuts, layoffs, and fare increases to help cover the difference.⁶⁹ When these adjustments are made poverty stricken areas lose access to resources such as grocery stores and opportunities for employment. Those who are able, turn to auto dependence thereby increasing emissions because the transport is no longer shared. Redevelopment in these areas would need to address the state of public transportation, increasing availability and the number of routes to help low-income residents access important goods and services.

The lower eastside of Detroit, however, is an interesting case. It lies on the outer edge of the urban center, partially the result of sprawl. At the center of the automobile industry throughout the majority of the 20th century, a sizable proportion of residents have access to vehicles and use them regularly and do not consider public transit a viable option for their daily needs. However, a large percentage of the population that remains has no access to a private vehicle (See Map 7, Chapter 2.2, page 7).⁷⁰ If residents in this area were able to redevelop their community, making it less dependent on vehicular traffic or more hospitable to alternative technologies, residents could see enormous savings in terms of fuel use and lifecycle cost, as well as improved access to jobs and services.

The LEED for Neighborhood Development certification standard addresses the issue of automobile overdependence by allotting points for providing alternate transportation options to residents, including public transportation, and alternate options like biking and walking. This can address issues of equitable access for residents without a vehicle, and also present an opportunity for residents who drive to reduce their vehicular dependence.

Alternative vehicular technology

Many redevelopment strategies strive to eliminate vehicular dependence and promote the more sustainable transit options, like public transit, biking, and walking.

However, America, like Detroit, is highly auto-centric. Reducing dependence through the availability of alternate options can diminish many impacts that vehicular infrastructure has on the environment, but may not be well received by those who prefer this mode of transit. As such, renewably powered vehicles have entered the market in order to bridge this gap. Many of these technologies are new, and therefore have an inherent price premium, which may make them unavailable to residents at or below the poverty line. However, as these technologies improve and become more common, they could eventually become one of a portfolio of viable methods that of reduce overall environmental impacts.

Electric vehicles are arguably the most road-ready technology. Despite the fact that electric vehicles were among the first engine prototypes, this technology quickly disappeared. Interest in electric vehicle technology has waxed and waned over time. The new fashionable mode of electric technology comes in the form of electric hybrids. Electric hybrids attempt to bridge the gap between battery technology limitations and the poor environmental impacts of fossil fuels. These cars use an electric drive train, including a battery, with a refuelable gasoline or diesel engine.⁷¹ Typically, regenerative braking charges the batteries by storing braking energy within it.⁷²

Interest and funding for plug-in electric hybrids (PHEV) are also increasing. These vehicles are plugged into the wall each night to charge and often benefit from off-peak energy pricing. Battery technology is still limited in range, but the technology has improved greatly. The Chevy Volt and the Nissan LEAF are promising examples of PHEV, and both will enter the market in late 2010.

Hydrogen vehicle technology has also gained much attention in the last decade. Hydrogen fuel cells are powered by an electrochemical reaction, which creates electricity but emits only water. According to studies from MIT and the Argonne National Lab, hydrogen fuel cells are twice as efficient as gasoline engines.⁷³ However, there are currently only 64 hydrogen-refueling stations in the United States, which represents a huge problem for large-scale production. Studies by the National Academy of Science suggest that the U.S. could implement a national hydrogen infrastructure with an investment between three and four billion dollars a year for 15 years.⁷⁴ The other major drawback of hydrogen power is the actual production of hydrogen. It is possible to produce the hydrogen from any source of electricity, but today it is typically extracted from a process involving natural gas and steam. This process creates carbon monoxide emissions, which may contradict environmental savings.⁷⁵

Biofuels technology is a popular alternative fuel, especially in the Midwest. These fuels can be made from forest residues, agricultural crops, or even some parts of municipal solid wastes.⁷⁶ The most common is ethanol, a grain alcohol that is typically made from corn. Widespread use of this fuel type presents a challenge because it takes a lot of corn growth to produce very little fuel. Currently, 14 percent of corn growth in the U.S. is

dedicated to ethanol, which only replaces 1.7 percent of gasoline usage.⁷⁷ Even if all corn grown in the US were devoted to ethanol, only 12 percent of gasoline usage would be offset.⁷⁸

There are a number of incentives designed to increase demand for vehicles powered by alternative sources. The Federal Government has implemented a tax credit of up to \$4,000 for purchasing a vehicle powered by compressed natural gas, liquefied natural gas, liquefied petroleum gas, hydrogen, or any liquid of at least 85 percent methanol.⁷⁹ The impact of this credit is limited, however, because there are very few vehicles available to the general public that meet these standards. In response to this, some states have implemented their own initiatives designed to improve demand for alternative vehicular technology.

Rhode Island has joined an initiative to increase demand for plug-in electric vehicles (PEVs) in the northeast. This initiative offers technical support to individual cities and encourages stakeholder engagement. Of critical importance, it offers advice and benchmarks to help individual cities prepare for a mass adoption of PEVs. The statewide goal is to have 10,000 PEVs on the road by 2015.⁸⁰

The Midwest is preparing for a similar market shift. States like Illinois, Iowa, Michigan, Minnesota, North Dakota, Ohio, South Dakota and Wisconsin have joined the Re-Amp initiative to improve overall vehicular efficiency and lower the carbon content of transportation fuels.⁸¹ This effort is working to mandate stricter fuel efficiencies and promote battery research and manufacturing.⁸² Of all the states, Michigan has been the most aggressive in trying to attract new firms that specialize in alternative vehicle manufacturing. The state is allowing substantial credits against the Michigan Business Tax based on expenditure of capital investment on better technology.⁸³

The Midwestern states, with their economy based in agriculture, are also providing incentives for vehicles powered by biomass. Some individual cities are offering tax breaks to attract ethanol plants, while others are less inviting with concerns about noise and odor.⁸⁴ According to Geoff Cooper, ethanol analyst at the National Corn Growers Association, "The presence of an ethanol plant really does ripple through the entire economy."⁸⁵ The plants create jobs, and feed the local economy as locals purchase the fuel for their vehicles.

Illinois provides arguably the most successful tax incentive for biodiesel. Certain blends, B10 and below, receive a sales tax reduction of up to 20 percent while a fuel with more than ten percent biofuels are completely exempt.⁸⁶ Missouri provides its incentives to producers, allowing cash grants per gallon of production.⁸⁷

On the other hand, California has created incentives for the young hydrogen fuel industry. One of the few states with hydrogen fueling stations already in place, many automotive firms are centering the roll-out of new hydrogen powered vehicles. In April of 2009, the Air Resources Board provided \$6.8 million in grants to construct enough refueling stations to double the hydrogen availability to Californians.⁸⁸ This funding is on top of over

\$25 million that the state of California has already invested into alternative vehicle fuels.⁸⁹ According to the California Fuel Cell Partnership, there are plans in place to increase the number of hydrogen fueling stations in California to 46 by the year 2014.⁹⁰

However, without significant local financing incentives, these options are generally unavailable to individuals in poverty-stricken areas. While Detroit's lower eastside has relied heavily on the automotive industry, the residents are generally unable to replace their vehicles. But as new vehicle technology is implemented, Detroit should become part of this new growth. Governor Granholm is encouraging the automotive industry to consider Michigan when locating the new facilities associated with electric vehicles, like battery production, to turn the rust belt into the green belt.⁹¹ NextCAT Inc., a Detroit-based company recently signed an option for biodiesel technology developed at the National Biofuels Energy Lab at Wayne State University, which allows producers to use cost-effective raw materials in their production. NextCAT receives outside funding from the Michigan Pre-Seed Capital Fund and with this technology are on the verge of moving the biofuels industry forward right in Detroit.⁹² Perhaps new markets within the automotive industry can bring prosperity back to this area.

Public Transportation

Across the country, the most common types of public transportation are bus systems and rail, including subway, commuter, and elevated lines. Many urban areas have implemented a system that incorporates several types of transit. Chicago, for example, has an excellent bus service as well as the "El", an elevated rail system, which provides coverage to a large portion of the city. San Francisco and Washington, D.C. both have far-reaching subway systems which provide extensive coverage to the center of the city as well as the surrounding areas. The implementation of public transportation creates an opportunity to reduce energy usage in transit systems.

Increased use of public transportation can reduce overall vehicle miles traveled, which is a measure of distance traveled by private vehicle. As travel by private vehicles tends to be the largest contributor to the energy consumption of a household, reducing overall usage can reduce fuel use, while helping a household realize significant financial savings.⁹³ Reduced fuel use also translates into reduced air emissions. However, both bus and subway systems can be a significant draw of energy if they are not properly scheduled. Optimally scheduled, they will run constantly at near capacity, maximizing ridership and reducing energy consumption per passenger. Conversely, a poorly scheduled transit system may run empty and consume more fuel than riders traveling individually in personal vehicles.

Renewable energy technologies can be applied to reduce fossil fuel use in public transportation. Many cities around the country have employed biodiesel and hybrid bus

systems. Cincinnati, for example, runs its 390 buses on a 50 percent soy-based biodiesel/50 percent diesel blend.⁹⁴ Ann Arbor, too, runs buses on both hybrid and biodiesel technology.

Public transit can be much more cost-effective for individuals. The cost of commuting via bus or subway is well below that of maintaining a vehicle. Reports suggest that a household can save up to 30 percent on its transportation costs, averaging out to \$6,251 per year.⁹⁵ Low-income communities, like Detroit's lower eastside, could significantly benefit from a reduction of expenditure on transportation. However, creating a new or more efficient public transit service can be cost-intensive, and while federal funding and stimulus dollars may reduce the cost burden on the community, grants will certainly be needed to fill in the gap.

Detroit's lower eastside is currently somewhat well-served by the Detroit Department of Transportation (DDOT) buses. At least one route is within one quarter mile of every area of the neighborhood. However, these existing routes do not run to the riverfront. As redevelopment projects are initiated along this valuable asset public transportation systems could be extended to serve this newly productive area. As a leader in the area, JEBA could promote an extension of current routes.

Alternative Options

Alternative transportation options, like walking and biking, can reduce costs for low-income residents, while providing opportunities for physical activity and increasing time spent outdoors. Currently, many blighted areas lack the well-maintained infrastructure required to support a bikeable or walkable community. Sidewalks and bike paths would need to be constructed or replaced and measures to improve pedestrian safety implemented.

Currently, there are about seven miles of bike lanes already in Detroit, although most of these paths are located on Belle Isle. However, Michigan Department of Transportation (MDOT) plans to install an additional 35 miles by the end of the year 2010.⁹⁶ Additionally, all DDOT bus routes will be equipped with bus racks by the spring of 2010.⁹⁷

Overdependence on private vehicles has been a major aggravator in many social, fiscal, and environmental issues. Automobiles generate air pollution at a greater rate than any other form of transportation and are costly to maintain.⁹⁸ Additionally, the volatility of foreign oil markets makes fuel prices sensitive to shocks. Many residents of blighted areas simply cannot afford to own a vehicle and therefore must rely on public transportation to access jobs and services. A lack of convenient and reliable access puts stress on ability to retain employment.

Reducing energy usage in the transportation sector will require a commitment to alternative transit options, and community-wide support of these new modes. Alternative vehicular technologies take stress off a non-renewable resource, fossil fuels, but are cost-intensive. Detroit's lower eastside would be unable to invest limited income from a low tax-

base in expensive vehicle technology. However, the already effective public transit system there can be expanded and leveraged to provide consistent and far-reaching access to residents of any income. Finally, overall energy usage can be reduced even further through the improvement of sidewalk and bike lane infrastructure, which create opportunities for zero-fossil fuel transportation. JEBA, as a unifier of the community, is in an advantageous position to advocate for design measures that reduce transportation energy use and encourage alternative options.

Energy Generation

An integral component of sustainable community development is consideration of energy sources. The U.S. heavily relies on fossil fuel energy for power. Burning finite resources such as coal and oil has resulted in the release of emissions that are harmful to humans, reduced the health and function of ecosystems, and threatened the stability of the global system.

Emissions from the burning of fossil fuels are the largest contributor of greenhouse gases to the atmosphere, a driver of global climate change. Global climate change is the process in which normal and expected weather patterns shift and change over time. Many climate change events have happened over the history of the Earth, but the current shift is driven by human activity.⁹⁹ When humans burn fossil fuel for energy to heat their homes or power their cars, they emit gases like carbon dioxide, which build up in the atmosphere.¹⁰⁰ As greenhouse gases build up in the atmosphere they act like a blanket, prohibiting heat transfer back into space and subsequently warming the Earth.¹⁰¹ This warming is causing some very significant impacts on the global environment. For example, data suggests that the sea levels are rising, and occurrences of extreme droughts and floods are increasing.¹⁰²

Global atmospheric concentrations of CO₂ were 35 percent higher in 2005 than they were before the Industrial Revolution.¹⁰³ Almost all of this increase is attributable to human or anthropogenic activities. In 2006, the CO₂ concentration in the atmosphere was approximately 328ppm.¹⁰⁴ Many scientists and climate experts have stated that the safe upper limit for atmospheric CO₂ concentration is 350ppm.¹⁰⁵ The need to change our behavior in order to avoid additional consequences of climate change is urgent and daunting. Reducing fossil fuel use is a step towards that process. Besides mitigating impacts of climate change, reducing fossil fuel use can improve overall air quality through the reduction of ground level ozone formation and emitted particulate matter.

The issues associated with excess fossil fuel use are especially pertinent in areas of sustainable redevelopment. Externalized pollution, like that from the burning of fossil fuels, is often consolidated to areas of poverty and blight, where the citizens rarely have the resources to protest. Factories that spew emissions and power plants that generate

electricity for wealthier communities upwind are typically sited in these areas, creating the epitome of social justice issues as discussed earlier.

Renewable Energy

The U.S. Department of Energy's Energy Information Administration (EIA) defines renewable energy as "energy sources that are naturally replenishing but flow limited."¹⁰⁶ Thus, renewable energy sources, such as solar, wind, geothermal, hydropower, and biomass offer an opportunity and a challenge: renewable energy is a source of essentially unlimited, free power; however, availability of that power does not always align with demand.

Over time the cost efficacy and efficiency of renewable energy sources have improved at increasingly rapid rates. Cost may still be a barrier for systems, depending on the region, but economies of scale are helpful. A community funded project, with proper placement and attention to locally available renewable power sources could be costly, but provide inexpensive and clean power over a long period of time. As of March 2010, renewable energy consumption in U.S. is only 8.2%, but growing.¹⁰⁷

The state of Michigan has the potential to benefit greatly from the implementation of renewable energy industries. The U.S. Department of Energy reported that a study completed in 2004 found that "the nation's renewable electricity standard for 2020 would produce a net gain of 4,900 jobs in Michigan. The study also concluded that renewable energy would create 2.3 times more jobs than electricity generated from new natural gas and coal power plants."¹⁰⁸

Renewable energy can be a unique opportunity in areas where redevelopment is occurring due to certain characteristics, like large tracts of open land and a pool of unemployed citizens who would benefit from new job training. There are two major obstacles, resource potential and capital investment and funding sources, as federal assistance typically covers only part of the system.

Ideally, if costs were covered, areas in need of redevelopment would benefit enormously from a renewable energy system that could reduce fossil fuel usage. First, these systems could occupy large tracts of currently available, which is currently unproductive in terms of both tax and social value. It is not generating revenue for the city, and it is dangerous to citizens, breeding vice behavior and illegal dumping. Second, as systems are implemented local labor could be employed in the production, installation, and long-term operation of the system. In addition to the investment in the community through the construction process, newly employed community members would be earning income to reinvest in their economy. Third and finally, the clean energy systems would be free of the shocks and shortages associated with imported oil. These rapid price fluctuations make energy difficult to afford for the low-income segments of society that reside in areas in need of redevelopment. Oil price spikes don't just affect residential car owners; City garbage pickup, school buses, police patrols, ambulances, fire trucks and snowplows are all affected

as well. Areas already struggling to pay for local infrastructure due to dwindling tax base are even further strained when prices increase. While areas utilizing renewable energy would still be sensitive to the intermittent nature of these systems, these issues are more manageable with improving technology over time, like battery storage technology, whereas volatility in the overseas oil markets are generally out of the control of an individual neighborhood.

As mentioned in discussion of human health, emissions on Detroit's lower eastside are extremely high due in part to the automotive industry, other industrial factories that reside nearby, and the Detroit incinerator. As the economy has faltered in recent years, these levels have dropped, mostly due to the closing of local factories, which has had the simultaneous effect of devastating to local job market and overall economy.¹⁰⁹ Reducing fossil fuel usage in this neighborhood and attracting greener businesses to the area could improve overall health as well as job markets.

Many states have begun requiring local utilities to invest in a certain percentage of renewable energy through a renewable energy portfolio. Each state may have a different standard, but the goal is to lessen dependence on foreign energy over time, with incremental goals. Currently, the state of Michigan is requiring all utilities to be served by ten percent renewable energy sources by the year 2015. Detroit Edison has a goal of providing 200 MW of renewable energy by the year 2013, and then 600 MW by 2015.

Other incentives, like Renewable Energy Renaissance Zones (RERZ), are a type of renaissance zone in which significant tax credits are awarded to facilities within the boundaries, for example exemption, from the Michigan Business Tax and property taxes.¹¹⁰ These zones are centered around facilities which produce renewable energy.

All seven utilities in Michigan offer renewable energy rebates for solar water heaters, photovoltaic systems, wind energy installations, site assessments, and long-term maintenance. The site assessment rebate could be invaluable for redevelopment, as the state will cover 75 percent of most assessments if a renewable-energy system is deemed feasible.¹¹¹ Additionally, funding for long-term maintenance is critical, as this phase of the systems life tends to be the most significant in terms of cost, and often overlooked. The state of Michigan will pay up to 50 percent of the cost of all services and repairs to PV or wind-energy systems, and includes both routine maintenance and major repairs.¹¹²

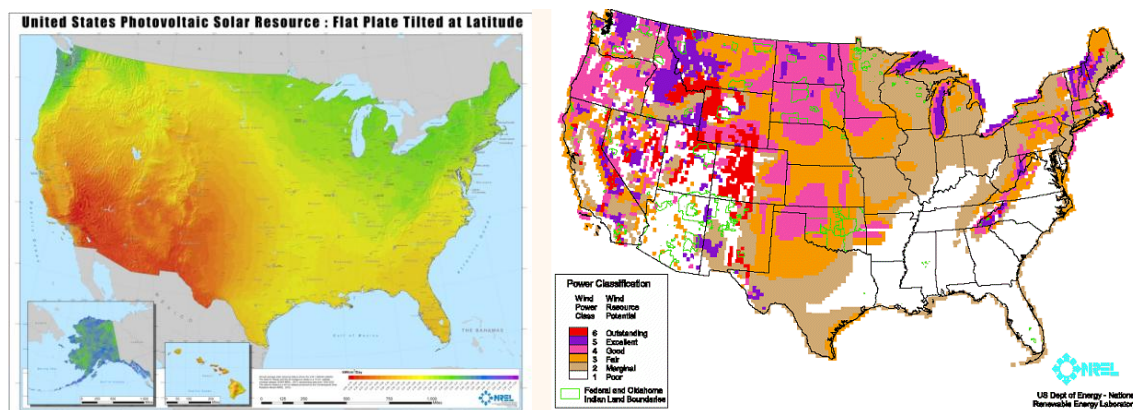
Federal incentives include the Energy Efficiency and Conservation Block Grant (EECBG) Program. The EECBG is a program that provides funds to local and state governments as well as Indian tribes and U.S. territories. The funding is to be used for the development and implementation of projects that will reduce energy use and fossil fuel emissions by improving energy efficiency within communities. The Office of Weatherization and Intergovernmental Programs within the Office of Energy Efficiency and Renewable Energy (EERE) is responsible for administering this program.¹¹³

Solar Energy and Photovoltaic (PV) Systems

Photovoltaic modules and arrays produce direct-current (DC) electricity by converting sunlight to electricity at the atomic level. PVs utilize an unlimited, clean, renewable resource and do not generate emissions during energy production. Most PV cells are made from silicon; types of cells include crystalline (efficiency of 10-30 percent and long life), polycrystalline (efficiency of 10-30 percent and long life), and thin film or amorphous silicon (efficiency of 5-10 percent, shorter life, more affordable, require less energy to produce). PV cells are approximately one half to four inches and generally produce one to two watts of power.¹¹⁴ In 2008, solar energy provided only 0.09 percent of total energy consumption in U.S. and 0.38 percent of residential energy consumption.¹¹⁵ However, assuming intermediate efficiency, PVs covering 0.4 percent of U.S. land area would generate as much electricity as the nation uses.¹¹⁶ Unobstructed access to sunlight for most of the day is needed for a PV system to work. Before deciding to use a PV system, it should be determined if this is a viable option based on the available sunlight in the area, on a case-by-case basis.¹¹⁷

Residential PV systems are either stand-alone or connected to the grid. If they are stand-alone systems, batteries to store electricity are required. Grid-connected PV systems enable homes to provide energy to the electrical grid. Most residential systems may require as little as 50 square feet for a small "starter" system, and up to as much as 1,000 square feet for larger systems. PV systems are sized according to electricity needs and budget, and can be installed on any type of roof.¹¹⁸ In the northern hemisphere, panels should be installed in a south-facing area that receives at least six hours of direct sunlight daily. A typical two-kW residential PV system on an appropriate site requires approximately 8 x 25 feet for solar panels.¹¹⁹

Unfortunately, the state of Michigan is not generally a prime location for a large scale



Left to right:

Figure 9 - Photovoltaic Solar Resource Potential Map of the United States.¹²⁰

Figure 10 - Wind Resource Potential Map of the United States.¹²¹

photovoltaic system. While Detroit's lower eastside has vast tracts of open land, which could easily be devoted to this system, national renewable energy potential maps show Detroit is not an efficient candidate for this technology. If implemented, this system would most likely not produce enough energy to recuperate costs over a reasonable payback period within the city of Detroit.

Wind Energy

Utilization of wind power as a source of electricity is growing in the United States: wind generation capacity in the U.S. was at 6,740 MW at the end of 2004. A goal of six percent electricity from wind by 2020 has been set by the U.S. Department of Energy.¹²² Power generation varies based on the size and number of turbines and the wind speed and consistency. A wind resource assessment measures the wind speed at a potential site before construction of any turbines. Small turbines generally require an annual average wind speed of more than four meters per second (m/s) or nine mph. An average of six m/s, or 13 mph is required for utility-scale turbines. The most common utility-scale turbines have a horizontal axis design with propellers and a 100 or greater kilowatt capacity, up to several megawatts (See Figure 11).¹²³ The electricity these turbines generate is collected and put into utility power lines.¹²⁴ The cube of wind speed is proportional to its available power; for example available power increases by a factor of eight if wind speed doubles. Even if a difference in speed is small, it translates into more available energy and potential electricity. Low wind speeds have little energy to harvest; wind is not a sensible solution if the area does not experience high enough wind speeds.

The Spirit Lake Turbine is a 250-kW turbine installed at the elementary school in Spirit Lake, Iowa. It provides an average of 350,000 kWh of electricity per year, more than is necessary for the 53,000-square-foot school. Excess electricity fed into the local utility system earned the school \$25,000 in its first five years of operation. The school uses

electricity from the utility at times when the wind does not blow. This project has been so successful that the Spirit Lake school district has since installed a second turbine with a capacity of 750 kW.¹²⁵

The city of Detroit may not be a prime location for wind energy. While large vacant land tracts are plentiful and could easily be devoted to a large wind farm, the national renewable energy potential maps show Detroit as having little potential for this technology well. Similarly to solar, this system

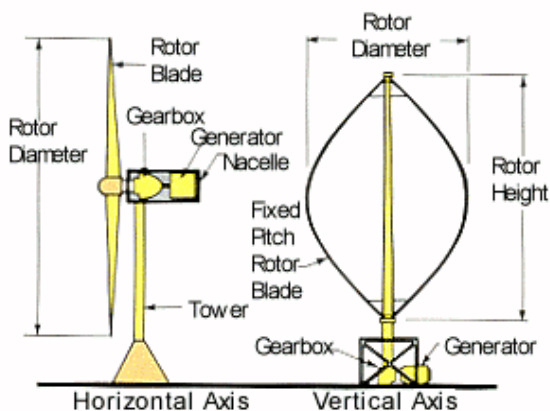


Figure 11 - Wind Turbine Configurations

would most likely not produce enough energy to recuperate costs over a reasonable payback period.

Geothermal Heat Pumps

Geothermal heat pumps use the Earth as a source for heating and cooling buildings. This is possible because the Earth remains at a consistent temperature year round, cooler than the ambient air temperature in the summer, and warmer than the ambient air temperature in the winter. To do this, a mixture of water and antifreeze is circulated in a series of pipes running between the building and the soil beneath it. As the fluid circulates, it either absorbs or relinquishes heat into the soil, depending on the season.¹²⁶ In the winter, the Earth is warmer than the ambient air temperature, and this heat can be transferred into the building. In the summer, heat is removed from the building and redistributed back into the ground.

Geothermal systems have an advantage over other renewable technologies: they are available consistently, and lack the intermittent problems associated with other renewable sources.¹²⁷ These systems are not entirely free of emissions. A small amount of electrical input is required to run the heat pump. However, it must be noted that this input is considerably small and creates far fewer emissions than a coal or natural gas power plant, and if powered by other renewable energy sources these emissions could be mitigated entirely.¹²⁸

Geothermal systems are extremely popular internationally. However, due to a lack of research and development funding within the U.S., this option has seen little growth over time.¹²⁹ However, research has demonstrated a potential of more than 100,000 MW (equivalent) could be achieved by geothermal technology in the United States.¹³⁰

Figure 12 illustrates the resource potential of geothermal in the United States, and demonstrates that this could be a viable option for Detroit's lower eastside, as well as greater Detroit.¹³¹ The areas labeled "Low" are considered appropriate for geothermal heat pump applications, which would be applied to heat and cool local buildings. The small footprint of a geothermal station combined with minimal emissions make this option attractive, and the installation of such a plant could create long-term

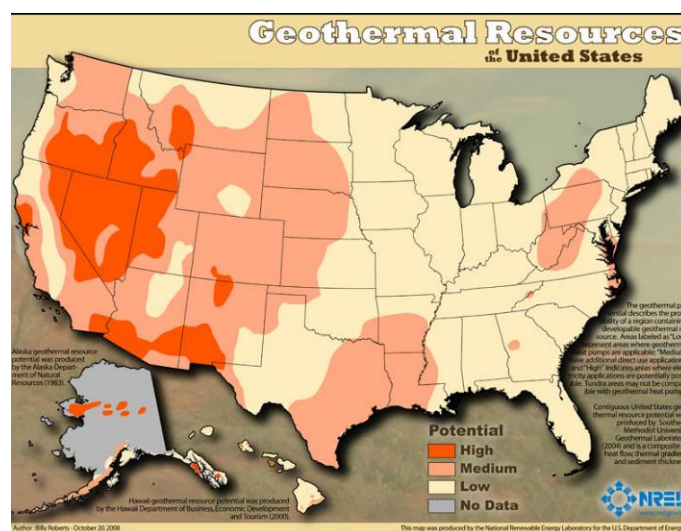


Figure 12 - Geothermal Resource Potential of the United States

employment opportunities for many local community members. The upfront cost associated with these systems is large, but could be offset through federal funding and external investments from organizations that award grants to install renewable technologies.

Hydropower

Hydropower is the use of water to create electricity. Water has been used throughout history as a source of power. It is reliable, constant, and naturally renewing through rainfall. Currently, most hydropower plants are located inside a large dam. Water flows through these dams and spin turbines, which are connected to power generators. Worldwide, this type of power is popular and has been effective for years, representing 19 percent of total global electricity production. The U.S., on the other hand, only utilizes hydropower for seven percent of total electricity production.¹³²

However, this type of power is not implemented without significant impacts. Dams are costly to construct and entirely dependent on rainfall for renewal. Areas with frequent drought events would be inappropriate sites for hydropower dams. Additionally, the installation of a dam can be extremely invasive on the local landscape, inundating nearby land and habitat and displacing population. Dams can also devastate local fish habitats through the entrapment or passage restriction of fish populations. Worldwide, many of the best locations for dam sites are already tapped.¹³³ Studies show that the future of hydropower is likely in local, small-scale plants that generate electricity for a single community.¹³⁴

Detroit has a local source of water that may be appropriate for a hydropower – the Detroit River. While the river may not have the flow rate to create electricity through damming, studies are currently underway to assess the rivers potential for VIVACE, or vortex-induced vibration for aquatic clean energy.¹³⁵ VIVACE is a system in which cylindrical devices are placed under the water and perpendicular to the current. As water runs over the cylinders, small vortices cause the cylinders to move up and down, creating electricity as they drive generators. The initial experiment is expected to go online in late 2010.¹³⁶ Research so far is optimistic, showing that a collection of these cylinders about “the size of a running track could produce energy at 5.5 cents per kilowatt hour and power about 100,000 houses.”¹³⁷

The landscape of energy generation is changing. Current technologies, which rely on the burning of fossil fuels, are dirty, playing a large role in global climate change, and releasing emissions that are often externalized in areas of poverty and blight. They are also costly. Fossil fuels are sensitive to shocks and abrupt price increases, which makes affordability difficult for people with low-income. More emphasis is being placed on addressing the way energy is generated. By investing in renewable technologies, a

community can see benefits in terms of new employment opportunities, cleaner air and water, and consistent prices.

Key opportunities for renewable energy generation are to form partnerships with organizations that have technical and financial capabilities to implement such large-scale projects. Also, these projects have great potential for job creation. The best projects would create jobs not just in the construction phase, but also throughout the entire life of the system. Long-term operations and maintenance are often overlooked when considering large-scale renewable energy projects, but are significant to cost. Renewable energy will most certainly be a part of the nation's path towards overall sustainability, and any area that can get ahead of that market curve will be well positioned into the future.

In the past century, the United States has increasingly relied on fossil fuels as a primary source of energy. The burning of fossil fuels creates a large number of environmental and social issues, often externalized from pricing structures. This includes the emissions that contribute to global climate change, as well as localized issues like particulate emissions and the creation of ground-level ozone. Additionally, the cost associated with fossil fuel energy is extremely volatile, and low-income individuals often must struggle to afford it.

Reducing the consumption of fossil fuels can be accomplished through consumer behavior and through changes in the way energy production. Consumer behaviors, such as the installation of energy efficient technologies, choosing strategic passive design, and utilizing public transportation and other alternate modes, can decrease the demand for fossil fuel energy, while energy generation methods that rely on clean and renewable sources can change the amount of fossil fuels necessary to supply energy.

The elements associated with energy are extremely necessary in fostering sustainable redevelopment. Implementation of programs that reduce energy consumption can help residents save on utility bills, while also improving their quality of life. These areas, having lost population and industry tend to have large tracts of open unproductive land, which will lend well to large-scale projects. They also tend to have high levels of unemployment, creating a large pool of willing workers for professional development and training. Changing our pattern of energy consumption has the additional effect of improving public health, by decreasing pollutants and emissions entering the air and water. Detroit's lower eastside would be remiss to ignore these opportunities for gain, as they offer the possibility to collaborate with any of a number of firms and organizations that possess the technical expertise and financial means to implement large-scale projects with the power to effect change. JEBA could leverage many of the above incentives and join other organizations in lobbying for policy alignment to bring green industries and jobs to the area for the benefit of both energy efficiency promotion and the well-being of its residents.

Chapter 2.5: Material & Resource Flows

Our planet is a closed system. According to the natural Law of Conservation of Matter and Energy, matter cannot be destroyed or created.¹ For millions of years, nature's core systems cycled organic matter from one form to another and from one location to another, endlessly. With the advent of industry, humans became the first species to isolate themselves from the natural order and create materials that could not easily be reabsorbed into the natural cycle.² This disconnect resulted in an immense growth of consumption, which, fueled by population growth, created a tremendous amount of indestructible waste, a concept previously unknown by nature. This waste is deposited or externalized to our landfills and natural systems often with inequitable impacts on lower income populations. As dwindling resources strain to support an ever-growing population, we must be mindful of our demands for raw materials, finished goods, and drinkable water.

In order to reduce the impacts of resource consumption we need to consider the life cycle of materials- from resource extraction to end of life. A life cycle analysis (LCA), which traces and quantifies the flow of a particular commodity, is a useful tool for assessing the environmental impact of a product or material. This analysis provides insight into which phases or components of a commodity's life contribute more or less to environmental impact, which can be used to target areas where energy consumption and waste generation can be reduced.³

The nature of consumption in the western world is to consume without regard to limits to regeneration or depletion rates; we are a throwaway culture. The raw material consumption that is required to support the average U.S. lifestyle and standard of living is significant, however, there is a finite amount of natural resources available, and global raw material stocks are declining.

Meeting these material demands has many environmental impacts. Extraction alone causes environmental degradation, habitat loss, and water quality impairment. The energy required to extract, produce, manufacture, and transport materials contributes significantly to global emissions.

The waste associated with such high levels of consumption is also significant. Waste is "all material unwanted by the generator," and therefore, it "exists where it is not wanted."⁴ The waste associated with materials, wastewater and byproducts of manufacturing, in addition to the ultimate disposition of materials and products in landfills, has environmental consequences as well. Landfills that store such waste consume open space and contribute to soil, water, and air pollution. The average American produced 4.6 pounds of municipal solid waste each day in 2007.⁵ Siting of landfills and waste treatment facilities has also led to the "Not in my backyard" phenomenon (NIMBY) where those who

can afford to externalize their waste deposition unconsciously externalize it to those who do not have the resources to object to having these facilities in their neighborhood.

Toxic waste and hazardous materials are an added concern for both human health and the environment. Worker exposure to harmful substances can occur during the extraction, processing, and manufacturing stages of a commodity's life, resulting in negative health effects. Toxic substances embodied within many building materials can off-gas into the environment, jeopardizing human health and air quality. When these materials are disposed of, the toxins leech into soil and groundwater and do not naturally degrade. A significant amount of the hazardous waste generated in the U.S., particularly electronic waste, is shipped to developing countries, creating serious health and environmental problems in other communities.

Detroit's lower eastside is not immune to the issues associated with waste or consumption. The urban area has had significant changes in population over time resulting in a major need to address institutional methods of managing consumption, virgin material extraction, and waste disposal. As mentioned earlier the city currently runs an incinerator to manage its waste. This facility generates an enormous amount of pollution, and some groups feel that it discourages the city from managing its waste issues in any other way.⁶ The incinerator, though dirty, still provides jobs to a struggling city, as well as a needed service. However, as the facility is one of the biggest in the country, garbage from other counties and even Canada are brought in to be incinerated. This is an instance of social inequality; Detroiters have to breathe the emissions and toxins created by burning the garbage of outside places. Perhaps, these needs could potentially be met through other strategies, such as a curbside recycling program and sorting center.

A sustainable population would use resources at a rate equal to or below the rate of regeneration. This means that the population would not extract more materials than could be naturally recreated before more materials are demanded. For example, a forest would be logged at the same rate that trees grow (or slower), and water removal from aquifers would be equal to the rate that water is recharged. Goods would be produced locally, encouraging reinvestment into the local economy and entrepreneurship rather than by creating more energy usage and emissions to transport them in from global sources.

A sustainable population in an area of poverty or blight would meet these material demands without significant income or stocks of resources. In essence, a population with a closed-loop material system should be self-sustaining and abide by principles of sufficiency rather than unchecked demand. A large amount of consumer education on consumption and waste will be required to create a major shift in current behaviors and practices. Institutional changes are also required in order to implement wide scale recycling or composting programs. Urban agriculture, in addition to increasing the availability of nutritional food, can also increase a city or neighborhood's self-sufficiency. In the event of

an emergency or in times of geopolitical or economic crisis, urban agriculture and the availability of locally produced food provides a buffer against potential food shortages and access.⁷

LEED for New Construction and Major Renovations addresses material cycles, requiring recycling facilities in all certified buildings, and allotting points for percentages of responsible material usage, which could be, for example reused, recycled, or locally sourced. BREEM and the Living Building Challenge address similar concerns.

Household Waste Disposal

Increasing population coupled with increasing availability of cheaply made and cheap to purchase goods has led to dramatic increases in American consumption over time. Americans can now consume more, for cheaper, and dispose of waste with little thought to the impact. In 2006, households, businesses, and institutions disposed of approximately 251 million tons of material solid wastes from homes, businesses, and institutions.⁸ This waste includes food scraps, clothes, furniture, appliances, and even tires. Household waste alone constitutes 55-65 percent of the total U.S. waste stream.⁹ Unfortunately, upwards of five percent of this waste is potentially reusable.¹⁰ A systemic approach to consumption and waste could utilize draw from recycling and composting to close the community material loop.

Recycling Consumer Goods

Currently, the U.S. recycling rate does not reflect the existing technology or ability to recycle products, or the social, environmental, or economic costs of not recycling; for example, one-third of all beverage containers in the U.S. are recycled.¹¹ Lack of incentives for both consumer and producers, access to recycling facilities, ease of pickup, or education about recycling are factors in the equation. Regardless, recycling has already been shown to be extremely effective at diverting waste to landfills. In the year 2000 alone, 55 million tons of municipal solid waste were diverted from landfills and recycled, the majority of which consisted of containers and packaging.¹²

Large-scale recycling could be highly beneficial to an area of poverty. These areas tend to lack a recycling system, which leads to an increase in waste disposal. Recycling programs also tend to create jobs and foster economic development.¹³ Additionally, the residents of these areas typically lack a large resource base from which to draw. Recycling and re-use strategies can add to that base, especially if neighbors are sharing resources between each other. Neighborhood exchanges through planned events, donations to the Salvation Army, and yard sales can facilitate this.

A bottle bill, a refundable fee on many beverages such as soda and alcohol, is one of the most effective ways to increase recycling rates of beverage containers;¹⁴ it encourages

Detroit's lower eastside has improved its recycling programs recently, but lacks the support for a widespread recycling program, through funding or political will. Currently, there are six Department of Public Works drop-off centers on Detroit's lower eastside with a regularly scheduled monthly pickup, ten 'RecycleHere!' locations, which accept many recycled materials, and limited curbside pickup from a pilot project serving about 30,000 homes.²⁰ To date, two million pounds of recycled materials has been collected at 'RecycleHere!' Facilities, a significant amount, especially when combined with the processing capacity of the Detroit Department of Public Works: 150 tons daily.^{21,22}

However, all of these require a vehicle to access them, a barrier to participation. Individual choices can contribute to making a big impact in increasing the amount of waste that is diverted to recycling centers. Block leaders and community groups can organize carpools to the recycling centers or arrange an alternating program between volunteers to take turns sharing the trip. Group motivation or a social norm could encourage participation from residents not likely to make the trip on their own. The continued existence of the incinerator makes large scale recycling programs hard to support, adding costs to the municipal budget and reducing demand for current infrastructure. However, a recycling program would contribute to the overall sustainability of the area.

Composting

Alarming, 26 percent of municipal solid waste is composed of yard trimming and food residue.²³ Detroit specifically generates 14,000 tons of yard waste and brush per year that is sent to landfills where it produces methane and decomposes more slowly.²⁴ Composting (decomposed organic material) is a wonderful way to take this plant matter from fruits, vegetables, and yard waste and reuse its nutrients rather than throw it away. It is highly valued as an organic fertilizer and soil amendment and could be diverted from the residential waste stream and used on farms within the local community or even sold to neighboring farms and gardens.²⁵ This helps to reduce waste, and can save individuals money by not having to purchase planting soil and fertilizer. The reduction in fertilizer use is also extremely beneficial to the environment in that it decreases nutrient loading. There are obviously associated costs with implementing composting programs. However, with the budding growth of community gardens and urban agriculture, composting is an easy step for individuals to take on their own. Composting can happen in one's backyard or be a productive use of vacant or abandoned land. There is currently no compost program run by the municipality of Detroit, though in the discussions regarding the City's capacity urban agriculture, zoning for composting facilities is a topic.

Reducing household waste is a critical tenet of sustainability. Recycling can help elongate the useful life of a material, while composting can naturally return organic waste

into usable fodder for new growth. These methods are the first step to becoming a closed-loop material system. Such a system would cycle reusable materials and resources indefinitely, without new input and self-sustain. Reducing consumption of materials and goods, also critical to sustainability, is a behavioral preference that can only be selected after education about the impacts of consumptive lifestyles. Individuals with little knowledge of their impact on each other or the environment have a grave effect. The more people understand, the more they can be willing to improve their community. However, knowledge alone is not enough. People have multiple behavioral motivations and creating stewardship behavior change requires a variety of programs to tap into them, such as procedural how-to knowledge, development of social norms, improving ease of use and access of recycling and composting services, incentives (monetary or otherwise), and feedback on the benefits created by the change they have made.

Water Consumption

While material consumption is a significant impact of the built environment, it must also be noted that water is also over-consumed by the building sector.²⁶ Every day, building occupants use 12.2 percent of the total water consumed in the United States. Of that total, 25.6 percent is used by commercial building occupants, and 74.4 percent by homeowners.²⁷ In the U.S., the average indoor per capita water consumption is 70 gallons per day, but can reach 125 gallons per day if lawn watering is included in totals.²⁸ The majority of this indoor water usage is spent on showering, flushing waste, and washing clothes.²⁹

Water management can be addressed through technological or behavioral changes. Technologically, strategies include reducing overall consumer consumption at the source with efficient fixtures, or substituting the source through which water is supplied for a lower

flowing mechanism. Behaviorally, a user can adjust the way they use water fixtures to conserve water. Many studies have tested programs that teach and encourage changes in behavior to reduce water consumption. Examples of behavioral changes include turning the faucet off while brushing your teeth or taking faster and fewer showers. However, “bigger technical changes to household water infrastructures (as well as greater changes to everyday norms) are necessary to achieve household sustainability.”³⁰

An overall reduction in indoor water use can be very effective at mitigating the stress on this valuable resource, as well as provide savings on utility bills.

While the state of Michigan and the city of Detroit,

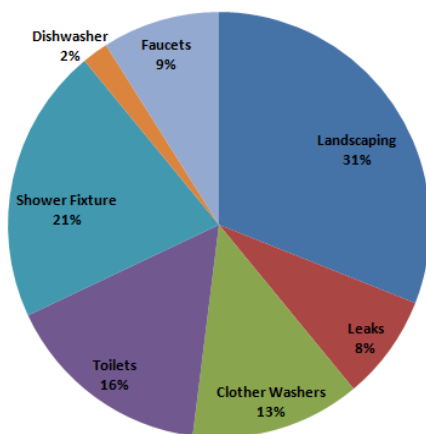


Figure 13 - Water Consumption in the Average U.S. Home

thanks to the Great Lakes, are not necessarily constrained in their water usage at the current time, there are a multitude of places in the country and globally where fresh water is a critical issue, and communities are in danger of exhausting their supply. Additionally, water subsidies are designed such that the price of water is less than the actual cost to supply it. However, any reduction in household or commercial water usage would result in a lower utility bill. This is something any individual could benefit from, particularly residents of blighted areas. Additionally, energy is required to heat water before it is used, therefore a reduction of water use would result in a simultaneous reduction in energy use.

LEED for New Construction and Major Renovations, LEED for Neighborhood Development, and the Sustainable Sites Initiative all offer credit for responsible water management. The strategies which reduce water usage overall can aid in attaining these certifications.

Water Demand and Consumption

Water consumption reduction at a household level should focus on upgrading the fixtures that egregiously overuse the most water: landscaping, toilets, and washing machines. In an effort to promote water conservation, manufacturers have been producing water efficient fixtures since the 1980s.³¹ In 1992 Congress passed the Energy Policy Act, establishing for the first time a national standard to promote water conservation.³² These standards set a maximum flow rate for water fixtures by type. Since that ruling, several states have set their own, stricter, standards, generally in response to regional water scarcity.

In June of 2006, the U.S. EPA launched Water Sense, a program that certifies water fixtures that meet a set conservation standard. “The main goal of the program is to decrease indoor and outdoor nonagricultural water use through more efficient products, equipment, and programs.”³³ This program also tests and verifies performance of products, while “encouraging innovation in manufacturing.”³⁴

In Detroit specifically, water rates have been increasing over time to compensate for declining population and per capita water usage, and the need for continuing maintenance to existing infrastructure.³⁵ This change in consumption is directly correlated with regional declines in employment and population.³⁶ Additionally, major infrastructure in the city is aging and in need of replacement adding to the stress. This strain on the region’s supply could be partially mitigated by a reduction in peak water usage through off-peak lawn watering.³⁷ This will reduce the need for a major capital investment projects to improve infrastructure or increase peak capacity.

Modern Water-Saving Appliances

Clothes and dishwashing can also be a very water intensive activity in a home. Rather than avoiding these activities, building owners should consider investing in water

saving appliances, like those certified by the WaterSense program; however, this can be a very costly investment.

A new low-flow toilet installed in the home is a cost-effective way to reduce water usage. A low-flow toilet can operate as effectively as an older toilet, but uses a third of the water per flush. Current standards require any toilet labeled as “low-flow” to use less than 1.6 gallons of water per flush, which is a drastic improvement over some older toilets that use more than five gallons per flush.³⁸

There is a genuine sense of urgency to conserve water in Texas, where incidents of drought are increasing. Austin has implemented several programs to mitigate a potential water shortage. To encourage the use of water efficient fixtures, Austin is supplying water efficient toilets to residents. Some residents need only pay a \$20 fee and fill out a short form, while others are eligible to receive the new fixture completely free of charge.³⁹ Additionally, the city will rebate up to \$40,000 worth of new equipment that conserves water in existing facilities for residential, commercial, and industrial applications.⁴⁰ Between the years of 2003 and 2008 the city supplied 68,230 free toilets and 48,492 toilets at the reduced price.⁴¹ This amounts to an overall water savings of 2,494,000 gallons of water per day.⁴²

Aerators installed in showers or faucets can reduce water usage as well. Rather than letting water flow freely, aerators introduce small bursts of air into the flow. This process maintains water pressure but reduces water usage. Some fixtures can even cut water use in half. They are relatively inexpensive and easy to install but still require customer initiative.

Efficient Landscaping

The average US household dedicates upwards of 150 gallons per day to watering landscaping. By reducing the amount of water for landscaping, the household has an immediate potential to make a large impact on their overall water usage. Xeriscaping is a type of landscaping that utilizes only species native and adaptive to the region. This method ensures that no additional watering is required because the plants are acclimated to survive on the precipitation average of the area.

In situations where landscaping requires supplemental watering, water consumption could be reduced by watering more efficiently. By watering in the early hours, or after dark, less water will evaporate, making each gallon utilized more effective. One other option is to install a more effective controller. Controllers that utilize impact or flooding, like sprinklers, may be wasteful because of improper aim and overuse.⁴³ Drip irrigation, a system of buried water lines that allows water to drip slowly onto the roots of plants, is much more effective.⁴⁴ Since the application is targeted directly to plants less water is wasted.

Water Supply

There is significant potential to reduce potable water demand by utilizing excess rainwater for outdoor water and other non-potable uses. Potable water is water that is both clean and of high enough quality to consume. Non-potable water may be treated and usable in applications like lawn watering or toilet flushing but is not safe for human or animal consumption. Harvesting systems, such as rain barrels and cisterns, collect rainwater and then store or distribute it;⁴⁵ they can also reduce energy demand and CO₂ emissions.⁴⁶

Harvesting rainwater can provide many additional environmental benefits, like reducing stormwater runoff. In general, one inch of rainfall on a 1000 square foot impervious surface generates 600 gallons of runoff.⁴⁷ This is a substantial amount of water that could be retained and reused. Because the captured rainwater does not run straight to the gutter, erosion and water pollution caused by the assimilation of pollutants from urban pavement are minimized.⁴⁸ This method can also help to reduce demand on municipal water supplies as less water must be treated and transported using city infrastructure, thus saving money.⁴⁹

Rain Barrels and Cisterns

Rain barrels are an easy, inexpensive method of collecting, retaining, and slowing rainwater runoff from the roofs of houses. A rain barrel costs between \$40 and \$260, depending on the size, and can be constructed at home for lower cost.⁵⁰ Many areas, for example like Milwaukee, Ann Arbor, and the state of Delaware, have established programs to distribute rain barrels either completely free of charge or at significantly reduced



Left to right:
Figure 14 - Rain barrel attached to downspout⁵¹
Figure 15 - Rainwater cistern⁵²

prices.^{53,54,55} In some communities, like Albuquerque, their relatively low cost is further augmented by stormwater tax credits and other incentives.^{56,57,58} While the annual tax savings are typically small, homeowners can begin to realize significant cost savings on their water bills by using rainwater to irrigate their lawns and gardens. With 30 to 70 percent of total residential water usage dedicated to lawn watering, using stored rainwater for this purpose could result in significant reductions in residential water usage.^{59,60}

In 2000 and 2001, the City of Dearborn, MI collaborated with Friends of the Rouge River to distribute 400 54-gallon rain barrels for free as part of an effort to clean and protect the Rouge River.⁶¹ The objective was to protect river and water quality, and to save in infrastructure costs by reducing the volume of rainwater that had so often overwhelmed the combined and separated sewer systems in the city.⁶² The project effectively reduced the amount of runoff flowing into the Rouge River.⁶³ The city of Windsor, Canada launched a similar program in 2008 that targeted landowners who were experiencing basement flooding. Over 110 residents participated in the program. Results of this pilot program included reduced sewage overflow, reduced basement flooding, and reduced pollution in the Detroit River.⁶⁴ A program such as this could be somewhat easily taken on and implemented by local community groups in the lower eastside following the Dearborn model as part of a larger sustainability design program.

A cistern is a system designed to collect runoff from a rooftop and store for later use. It is equipped with an overflow pipe that enables excess water to be diverted from storage, as well as a pump to bring water from the bottom of the cistern up for use.⁶⁵ The key difference between a rain barrel and a cistern is that a cistern is typically much larger. Cisterns, which can range in size from 100 to several thousand gallons, can similarly be connected to downspouts or other drains to store even greater volumes of rainwater. Due to their larger size, cisterns are often buried, although in some instances, such as at the Kresge Foundation headquarters, cisterns are left visible as an architectural feature. Other models have been designed with a relatively thin profile to allow easy connection to the side of a house or placed horizontally under decking structures.⁶⁶

While rain barrels and cisterns contribute to water conservation and provide savings to homeowners, unless employed by multiple landowners in a given area, runoff mitigation potential is minimal and limited to the roof area if it is only attached to a downspout.⁶⁷ However, a group of unified individuals or an entire block implemented these strategies the potential grows quickly.

While the city of Detroit may not be particularly constrained by water usage, it is important to consider reduced consumption of water within a holistic move toward sustainability. There are other benefits to attain including reduced pollutants entering the water stream by reducing runoff. The residents could benefit from a reduction in their

utility bills, as well as see a drop in energy as less water is heated for use. Additionally, despite the lack of concern in this region of the country, water is a stressed resource worldwide. Likely, future generations in this region will have to deal with issues associated with water depletion or exhaustion. A long-term goal of minimizing water usage will help to mitigate the occurrence of such a crisis.

Building Materials

The construction of buildings is a huge drain on the country's material resources. Every year, new construction in this country consumes 3 billion tons of raw materials,⁶⁸ including clay to make bricks, sand for concrete, plus trees, glass, and plastic for other building components.⁶⁹ Even more alarming, the demolition rate of buildings is rising; 90 percent of used building materials ultimately end up in a landfill, accounting for the greatest amount of waste in our economy.⁷⁰

Additionally, the square footage of the average home has increased dramatically over the past century, exploiting more materials to construct and furnish and requiring more energy to condition. In 1950, the average home size was about 290 square feet of living space per resident. In 2003, the average home size was about 900 square feet of living space per resident.⁷¹ Even more dramatic, in the United States, Americans own 5.7 million non-rental vacation homes that are larger than 1,300 square feet.⁷² This is enough surplus living space to accommodate the nation's homeless ten times over. In addition to the material extraction created through this phenomenon, all of this construction diminishes open space, fragments natural habitats, increases air pollution from the added congestion and commuter traffic, and expands the amount of installed impermeable surfaces, like concrete and asphalt.⁷³ These problems could be addressed through conscientious design and building methods, as well as conservative human behavior, all of which contribute to the overall sustainability of a community.

Similarly to Chapter 2.4, this section is also organized into material consumption during new construction and material consumption through the retrofitting of existing structures, each affording unique opportunities for sustainability. New construction is extremely costly in terms of resource extraction, but without the constraints of existing construction, so large-scale systemic design decisions can easily be made. These decisions can draw resources from supplies that may be renewable, recyclable, adaptive, and local, which supports the area's economy. Retrofitting existing construction draws from similar methods, but presents an opportunity in terms of the surplus of salvageable materials and building components on site.

On Detroit's lower eastside, there are opportunities to build new structures, as well as an abundance of neglected and abandoned buildings to retrofit, which can either return a building to its original use when again necessary or repurpose for other usage. While

these structures are pervasive and potentially arduous to manage, the task of improving the building stock is critical to redevelopment and must be addressed.

Green Development and New Construction

Green development is a design method that reduces a building's impact on the local and global environment. As material consumption is such a pervasive issue in western society, an inherent goal of green development is to reduce natural resource depletion, virgin material consumption, and waste disposal. New construction and developments have historically had a positive impact on local economies. New buildings bring a larger tax base, higher property values, and encourage more new development. They also create opportunities for job creation, critical to areas of poverty or blight. While the current economic climate may not produce the financing needed for large-scale development projects, blighted communities, like Detroit's lower eastside, certainly have plenty of prospective sites for small scale or targeted developments. While many material reduction strategies do not necessarily save money in the up-front long-term costs, they are an integral component of a holistic sustainability strategy.

There are two phases in a construction process where material consumption and waste can be reduced. The first is in the design process. Reducing material consumption through design strategies and material specifications decreases the need to harvest virgin materials and the energy involved in processing them into usable products.⁷⁴ This is also more economical for the builder or contractor, as this reduces up-front costs on unnecessary materials. The second phase for material reduction is during the construction process. Proper waste management can divert many usable materials from the landfill and also create savings off the cost of waste removal.

Recycled materials

Recycling takes materials that would have become waste and reprocesses them into valuable resources, typically in a new application. Using materials made from recycled content reduces solid waste, energy and water consumption, and pollution. Recycling materials diverts materials from waste streams and landfills back into production and use, closing a portion of the material flow loop. Recycled content often requires less energy to remanufacture than virgin materials. This industry offers the opportunity to pair reuse of local materials with the creation of local jobs.⁷⁵ Postconsumer recycled content is recovered from the end of the material stream after a consumer has disposed of it. Pre-consumer recycled content, on the other hand, is recovered from industrial processes from waste created during processing, manufacturing, or fabrication. Recycled content varies among products; those with the highest post-consumer content are typically more 'green' because these materials have already completed one whole lifecycle, and the recycling process extends their life even further.

There is a wide variety of recycled content materials available for use in construction. For example, recycled newspaper and cotton can be used for insulation, recycled glass can be used for tile, and recycled plastic bottles can be made into carpets.

Reused (salvage)

Reused materials are salvaged, or diverted from landfills, and reused again in the same application in a new location, for example, windows or chairs. Reusing building materials decreases landfill waste and pollution as well as reduces the consumption of new resources. Organizations such as the Building Materials Reuse Association, BMRA, strive to increase the opportunities for recovery and reuse of building materials in a financially sustainable and environmentally friendly way.⁷⁶ This strategy of reuse is especially effective in areas with a pervasive level of abandoned structures. The structures that are older, abandoned, or inappropriate for rehab can become a source of scrap material for new construction, in a process known as deconstruction. Deconstruction is a careful disassembly of a building at the end of its life, with a goal of reclaiming materials. This process may be more expensive and time consuming than demolition, but it can create fiscal savings by lessening purchases of new material, and also improve the sustainability of the area by reducing waste.⁷⁷ Deconstruction and material reuse programs can also result in low skill job creation as large-scale salvage projects typically require a large labor force to implement, as deconstruction creates five times more jobs than demolition.⁷⁸ These jobs could provide residents with the skills that make them eligible for training in higher skilled construction jobs.

Locally, the Architectural Salvage Warehouse of Detroit, a non-profit working in southeast Michigan, has been performing deconstruction work in areas of Detroit since 2003.⁷⁹ This organization has collaborated with the Young Detroit Builders, who train high school students in carpentry, while encouraging them to get their GED.⁸⁰ JEBA could partner with these organizations for their façade and building renovation initiatives in the lower eastside to improve salvage rates and job creation.

Rapidly renewing

In the building industry many virgin materials are used every year to install new homes and businesses. Many of these are finite materials, like oil products, or take centuries to regenerate, like old growth timber. Using rapidly renewable resources in the building process is a more sustainable alternative to finite resources and reduces resource depletion. Wood certified by the Forest Stewardship Council, for example, ensures that wood is harvested from sustainably managed forests. This ensures a supply of timber now and in future generations. Other rapidly renewable materials include wool, cotton insulation, agrifiber, strawboard and cork.

Waterproofing

Water damage is one of the greatest causes of emergency building repairs. These repairs can be extremely wasteful in terms of material and energy. For example, a poorly maintained roof can leak into a building causing stains, mold, and eventually structural damage. Conversely, a properly installed high quality roof will limit the need for maintenance and repairs in the long-term, saving valuable time, materials, and money. Correctly sized and installed flashings work to direct water away from vulnerable connections in roofs and near foundations. They prevent water infiltration into wall and roof cavities. Additionally, installing bathroom exhaust fans that are separate from lights is one other crafty way to prevent water damage; the ventilation will remove excess humidity from areas prone to water or mold damage, helping to save buildings from future costly repairs and make the materials last longer, cutting down on future natural resource use.

Local Sourcing

Local materials were used for thousands of years in building applications. While materials were occasionally moved long distances for buildings of significant cultural importance, such as palaces or places of worship, it was cost and time prohibitive to do so for an average home or commercial building. In the past century, however, mass production and industrialization and the advent of fast and efficient transportation technologies has allowed large quantities of any good to be moved across the nation quickly and often more cheaply than from a local source. As a result, building materials now crisscross the country and the globe. Buildings are no longer built in reference to their local environmental context. All of this transportation uses fuel, produces emissions, and creates social justice issues, as affluent communities that import resources are able to unconsciously externalize the environmental impacts of degradation associated with extraction.

Utilizing local materials can reduce this degradation, as well as encourage new local economic growth. This is a great option for redevelopment in areas of poverty or blight. Purchasing locally reinvests money in the local economy. New business and entrepreneurship can be encouraged, and new jobs can be created. This option also saves costs in the construction process, as shipping costs can be a significant factor in new building. Less shipping also reduces fuel use, saving emissions, which improve the climate and overall air quality.

LEED for new construction recommends a 500-mile radius from which to draw local materials. However, this area is 800,000 square miles. That means that new construction in Detroit can deplete resources as far away as New York, Kentucky, or Missouri. Perhaps a more reasonable approach would be to utilize materials that are native to the state.

Construction waste management

While the above strategies described methods that reduce material consumption through appropriate building specification and design methodologies, another vital component of sustainable new construction is the management of jobsite construction waste. Proper management of materials and their use at construction sites helps to reduce waste and lowers environmental impact. Debris generated during construction, renovation and demolition of structures is known as construction and demolition (C&D) materials. Composition of C&D includes concrete, wood, glass, metal and other building components. Reducing and recycling C&D materials is important because it lowers the impact on the environment from new material production, helps to conserve landfill space, as well as decrease construction project costs.⁸¹ One form of construction waste management is to recycle and reuse scrap or unused materials. Three materials that make up 75 percent of job-site construction waste: cardboard, wood and drywall. All three are fully recyclable; however, recycling facilities are not always available, and demand does not always exist.⁸²

A large amount of construction waste is material packaging. This can be reduced by buying in bulk to avoid individual item packaging, using items with returnable containers or reusing containers and packaging. Using scrap materials instead of cutting new when possible also helps to reduce on-site waste. When using materials that need to be mixed or prepared, for example cement, working in smaller batches helps to reduce throwing away materials that spoil if not used entirely.

Best practices for effective construction waste management include waste management planning by defining and setting realistic goals for how much waste can be reduced or recycled. Several aspects that should be included in the plan are waste categorization, a list of materials that will be recycled or salvaged, and identifying recycling facilities in the area. The design of the facility to be built is a very important aspect of waste reduction. This can be achieved by efficiency of the architect's and engineer's design as well as the contractor's management of the project, ensuring efficient techniques and methods of construction. Having clear requirements regarding waste management should be part of the construction contract; the contractor should be required to submit a C&D waste management plan.

It is important to note that demolition processes have the potential to create human and ecological health liabilities, if not properly managed. Demolishing older buildings with lead paint or asbestos insulation could release these toxins into the surrounding environment, increasing the risk of exposure. See Chapter 2.2 for more discussion on indoor air quality as it relates to human health. Demolition projects in Detroit were halted as of April 2, 2010, after an asbestos concern was raised regarding a recently demolished building.⁸³ Proper tracking of the structures with high possibility of toxic materials can reduce risk of exposure.

As noted in the Chapter 2.4, Energy Flows, new construction may be difficult or impossible to finance in blighted areas, especially as the market for development has slowed in recent years. Regardless, addressing neglected buildings is a primary goal for redevelopment. The prevalence of abandoned or neglected buildings in areas of blight poses a challenge and an opportunity. Retrofitting these buildings can improve the tax base, improve overall property value, and reduce run-down spaces that are being used for criminal behavior or activity. Additionally, retrofitting older buildings avoids the costs and energy usage associated with a full demolition. A demolition strategy may be appropriate for buildings with far too much damage to repair cost-effectively; however, used too extensively this method would overuse energy, money, and materials. Retrofitting can either bring the building's initial use back to life or repurpose the structure to satisfy a need of the community. For example, the St. Louis School District has had wonderful success with developers repurposing closed school buildings as senior housing. At least five buildings thus far have been redeveloped into facilities for different purposes. In Kansas City, KS an old junior high school building downtown, closed for declining enrollment was reopened as a 43-unit apartment building. This property had been previously deemed historic; developers were able to renovate and revitalize its architectural quality for housing needs. There are often state and federal tax credits available for historic properties and state tax credits for creating housing projects.⁸⁴ As the lower eastside has seen schools closing due to similar enrollment decline, these tax credits for repurposing buildings should be kept in mind to fill other voids in the community.

When retrofitting, it is important to consider all of the approaches mentioned with respect to new development and construction. Where new material input is required in a rehab project, make use of renewable, recycled, or reused content. In areas with an abundance of neglected and abandoned buildings, like Detroit's lower eastside, these materials can be salvaged for material stock of new rehab. Doors and windows salvaged from a structurally unsound structure can breathe new life into a rehab project, and minimize cost.

These existing buildings must be analyzed, tracked, and cataloged for potential to rehab. The buildings with potential to rehab will be structurally sound and lacking any major water or fire damage. Those that can should be brought up to code and retrofitted. The rest can be salvaged and slated for demolition. Job training and programs can be linked with these initiatives, improving opportunities for residents and the local economy. As mentioned previously, care should be taken when drawing materials from older buildings. Some of these materials may be toxic by today's standards. For example, window frames once painted with lead paint or old asbestos insulation should be carefully disposed of according to local producers and regulations. As previously mentioned most building stock

in Detroit originated before the 1970s when lead paint was banned, so the possibility of its prevalent existence in this neighborhood is likely.

Buildings, as a major exploiter of raw materials, contribute greatly to the problems of consumption and waste within today's society. By utilizing design strategies that reduce virgin material extraction, and extend the life of usable products and materials, buildings could become an integral part of the solution. These methods may not add much to the rate of return of a redeveloped community, but they will contribute to holistic local and global sustainability.

The overall themes of material flows and resource use are overconsumption and improper disposal. The United States tends to overuse resources in tremendous proportions. Household goods, water, and building construction materials are critical components that could be addressed to achieve a more sustainable community.

Areas of blight and poverty could benefit specifically from some of these initiatives. Recycling programs in particular tend to create jobs and monetary incentives for environmentally responsible behavior. Local material production can jump start local entrepreneurship, which contributes directly to the local economy. Also, an abundance of neglected and abandoned building stock can become the supply of material for a large-scale building and rehab initiative. Overall, these strategies tend to add to a communities' level of sustainability. Each reduction in material consumption and reinvestment in closed-loop cycling of natural resources leads a step closer to self-sufficiency.

Chapter 2.6: Ecosystem Services

Ecosystem or ecological services are benefits provided for humans by the function of natural systems.¹ On a global scale, these important natural cycles support, provide, and regulate the basic conditions on which our lives depend. At a regional or local scale, ecosystem services include processes such as nutrient cycling, carbon sequestration, pollination, air filtration/purification, stormwater management, flood regulation, and water filtration. Social benefits from natural elements such as recreation, cultural value and noise reduction are also often considered ecosystem services.² Supporting the function of natural systems is essential for regulating macro and microclimates, ensuring the health and well-being of humans, as well as providing adequate habitat for other species.

Redevelopment offers an opportunity to incorporate strategies to both protect and utilize ecological systems within an urban context. This section includes a discussion of ecosystem services and how they are valued, as well as a review of approaches to utilizing green infrastructure to support ecosystem services and mitigate the impacts of development on human and natural systems. Detroit's lower eastside contains a variety of natural systems, some of which are degraded. There is the opportunity to restore the ecological components through the creation of new green infrastructure such as green roofs and stormwater management practices. This will inevitably also better the health and well-being of both the residents and the ecosystem as a whole.

Valuing Ecosystem Services

In addition to providing the natural services that enable life on earth, ecosystem services also have a significant economic value to municipalities, one that is often taken for granted. Ecosystem valuation, defined as the "process of estimating or assessing the value of a change in an ecosystem, its components, or the services it provides," can offer incentives towards securing the integrity of natural systems.³ Four commonly employed methods for valuing ecosystem services include hedonic pricing (derived from related market prices), replacement cost (the cost of replacing the service with technology), travel cost (the price people will pay to visit a place), and contingent valuation (a survey method that seeks to assess how much an individual would hypothetically pay to visit or preserve a place).⁴ For example, the urban tree canopy (which is 48 percent of the land area) in the Washington D.C. Metropolitan area replaces the need for stormwater retention structures. Its value in terms of replacement cost is \$4.7 billion, the cost of providing man-made retention structures.⁵

A 1997 study by Costanza et al. estimated that ecosystems provided over \$33 trillion dollars of services annually- nearly twice as much as the GDP in 1997.⁶ Valuation of ecosystem services can also call attention to the significance of these services and encourage their protection. The Catskill/Delaware watershed case study is commonly cited as an example of how the recognition of the value of ecosystem services led to the

protection of a watershed and provided significant cost savings to the municipality. When the quality of New York City's water supply decreased below standards, the City assessed the cost of a filtration plant and compared it to that of protecting and restoring the watershed. The analysis clearly demonstrated that cost savings and benefits of protecting the watershed (approximately \$1-\$1.5 billion) outweighed building a new treatment facility (over \$6 billion). As a result, land protection measures were adopted to restore the natural capital of the watershed.⁷

Ecosystem services such as the water purification provided by the soils and vegetation of the Catskill/Delaware watershed are not unique to Upstate New York; however, the impact of development in the urban watersheds of Southeast Michigan has weakened the function of these natural systems. Thus, reaping the benefits of these services may require the integrity of natural systems first be repaired. At a local level, there are ample opportunities to utilize and support ecosystem services in the lower eastside of Detroit. For example, surveys of the existing urban tree canopy and an effort to quantify the benefits of urban trees could give insight into the true value being provided towards environmental, economic and health benefits. Though challenging, this insight would prove invaluable in creating future programs to preserve and restore the ecosystem that supports us.

Market Approaches

Though slightly out of the scope of this project it is important to mention that in urban environments markets involve trading the rights to develop land and thus can play a significant role in both mitigation of the negative impacts of development and preservation of open space. Markets have been developed or proposed for air and water quality, endangered species habitats, aquatic systems, and impervious surfaces.⁸ For example, markets are just beginning to emerge for the purchasing and offsetting of carbon emissions. One ecosystem system service that is generating significant attention today is carbon sequestration. Evidence and concerns of the consequences of increased atmospheric carbon dioxide result in a growing interest in using landscapes to sequester and store carbon. Because markets provide the opportunity to generate revenue on public and private land, and thus act as an incentive for incorporating sustainable elements within a redevelopment, a brief discussion of forest carbon markets and wetland mitigation banking is provided

Climate Management

It is increasingly recognized that the built environment we constructed has a tremendous impact on local and regional climate; we are also increasingly aware that this is posing a threat to humans, ecological systems, and even infrastructure. One such threat is the urban heat island effect, the phenomenon in which the air temperature of urban areas is much higher than the temperature in non-urban areas, by approximately 2.5 C (5 F).⁹ This

effect is caused by a combination of dark paved surfaces and buildings, which absorb and re-radiate heat, and a lack of vegetation to assist in temperature regulation through shade and evapotranspiration. The release of emissions and particulates from power plants and vehicles creates ground-level ozone, or smog, which exacerbates this warming effect.¹⁰ Urban heat island is a perpetuating cycle: as urban temperatures rise, more energy is used to cool indoor spaces, leading to an increase in ground-level ozone.

This increase in temperature has direct impacts on human health, causing swelling, heat cramps, heat exhaustion, and heat stroke. The elderly, bedridden, and homebound are especially vulnerable to heat because they tend to dehydrate faster and often lack the ability to pay to condition their living space or seek refuge in a cooler location. Research has demonstrated that socially and economically marginalized people, who lack the resources to adjust to environmental change, are more vulnerable to heat.¹¹ Further, research in Milwaukee, WI, for example, indicates inequitable distribution of tree canopy cover among social economic gradients; tree canopy cover in low-income and minority communities was less than the tree canopy in higher income communities.¹² Thus, the need to adopt strategies to mitigate the high temperatures and poor air quality associated with the urban heat island effect in low income and minority communities is especially important. In a redevelopment scenario, there is ample opportunity to integrate ecosystem service-providing green infrastructure within the urban fabric of a community.

Green infrastructure practices are increasingly being used to reduce the detrimental effects of development on human and natural systems by enabling healthy function of natural processes. In this report, the term green infrastructure refers to both the ecological features that provide ecosystem services and the constructed features that support the function of these systems. This network of coupled human-natural systems has emerged as an effort to address pervasive issues such as poor air and water quality within the built environment via technologies and practices including green roofs, rain gardens, permeable pavements, vegetated swales, reforestation, and constructed wetlands.¹³ Integrated planning efforts that incorporate green infrastructure and strategies into redevelopments can address existing problems, such as the urban heat island effect.

Tree Canopy Cover & Urban Forests

Trees and parks are a mode of green infrastructure that play a significant role in supporting ecosystem function as well human well-being. In an urban setting, street trees and pocket parks have an immediate impact on the local environment and provide environmental, social, and economic benefits for communities.

Trees help cool the heat island effect of inner cities, reducing temperatures by up to 0.04-0.2 degrees C per percent canopy cover increase.¹⁴ The collective effect of a large area of transpiring trees (evaporating water) reduces the air temperature in these areas through shading and evapotranspiration¹⁵ (See Figure 16¹⁶). Lower air temperature improves urban

air quality by limiting ozone formation of temperature dependent chemicals and pollutants.¹⁷ Additionally, tree shade on buildings can reduce the energy and cost associated with cooling systems in building by up to 30 percent.¹⁸ In dry climates, evaporation of moisture increases humidity, creating a more comfortable environment. In colder climates, trees act as a windbreak, mitigating harsh conditions in the wintertime.¹⁹

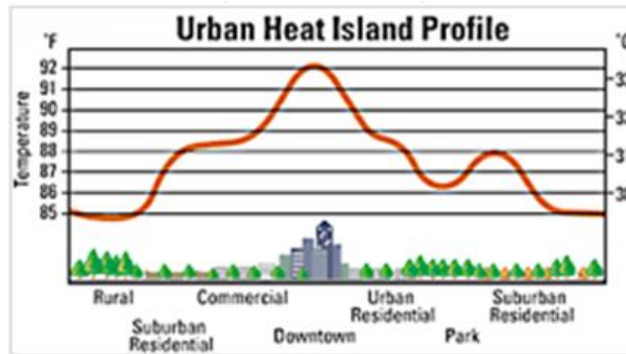


Figure 16 - Urban Heat Island Effect

Urban trees in the U.S. store an estimated 700 million metric tons of carbon- a \$14,300 million value- and have an annual gross sequestration rate of 22.8 million metric tons of carbon.²⁰ Within the 69 million acres of urban land in the U.S., the annual net carbon storage is approximately 6.5 million tons, and about 800 million tons of carbon is stored by trees in total.²¹ This is equivalent to removing over five million cars from the road annually.²²

Urban trees filter dust, pollen, smoke, and harmful pollutants from the air. Planting trees in an urban community where automobile pollution is prevalent, for example, can improve air quality and directly benefit human well-being. As discussed earlier children living within 75 meters of major roadways have an increased risk of developing asthma. Early life exposures to traffic-related pollutants in urban environments appear to affect the immune system by increasing allergic responses, which can lead to respiratory symptoms in children at young ages.²³ While air pollutant removal by trees is variable by species and location, the results of one national modeling study indicate effectiveness as well as the economic benefit of utilizing trees to remove air pollutants. The value of total pollution removal in cities studied ranged from 11,100 metric tons annually (\$60.7 million) in Jacksonville, FL to 22 metric tons annually (\$116,000) in Bridgeport, CT.²⁴

Urban trees increase local biodiversity and play a role in meeting many ecological needs. Trees and other vegetation create local ecosystems that provide habitat and food for birds and animals. They offer suitable mini-climates for plants that would otherwise be absent from urban areas. Tree root systems and leaves support ecosystem services by increasing soil permeability and aiding in stormwater management. Increased biodiversity is not only an important part of a healthy ecosystem, but it also creates educational opportunities and supports human well-being. Research indicates that oases of biodiversity can provide valuable mental health benefits to urban residents. This can foster stronger relationships between the resident and their environment, which can increase regard for

and stewardship of the land. Richer, more complex spaces provide opportunities for restorative benefits; as size and biodiversity increase, people perceive a space more positively and develop stronger connections to it.²⁵ As Detroit is currently suffering from a shrinking population, in order to sustainably redevelop it is crucial to take advantage of any opportunities to foster loyalty and ties to a neighborhood.

In addition to providing economically valuable ecosystem services, healthy trees can increase residential property values by as much as 15 percent and increase the desirability of office and industrial places.²⁶ Trees increase community economic stability by creating a more aesthetic and livable environment that can attract tourists and businesses. Studies have been done on the relationship between retail land use, neighborhood satisfaction, and the moderating and mediating effects of trees and shrubs. Results indicate that tree cover within a 1500 ft radius of households decreases the negative effects of nearby retail land use, such as increased noise, garbage, and traffic; they can also increase contact with nature, provide privacy, and increase home values.²⁷

Street trees and greenway networks provide a number of social, environmental, and economic benefits such as conserving natural ecosystem values and functions.²⁸ Greenspaces increase the aesthetic appeal and opportunities for recreation in neighborhoods and communities, which can stimulate economic development.²⁹ From a biophysical perspective, greenspaces increase a city's ability to adapt to climate change.³⁰ Increasing the tree canopy in urban environments provides significant savings and benefits. Replacing these innate services with technology would require significant investment, and many benefits are not readily replaceable. From a financial perspective, the cost of planting trees is lower than fulfilling the role through other, also more energy intensive means, such as air conditioning. Planting trees is an inexpensive method to provide multiple direct and indirect benefits and services to a community. Community revitalization efforts, therefore, should seek to increase the urban tree canopy cover and involve the community in reforestation efforts. In Detroit's lower eastside since the Greening of Detroit is already working towards these goals, local community efforts should continue to be supportive and encourage volunteer events with local residents.

Forest Carbon Markets

In the 1990s, forestry projects emerged that sought to pair reforestation with greenhouse gas emissions reductions via sequestering or capturing carbon in trees.³¹ Though these initial efforts were set back by the Kyoto Protocol's greenhouse gas regulations, voluntary markets stepped in to play a role in enabling a market for forest carbon sequestration.³² In late 2009, notable steps were taken regarding the adoption of a carbon market; the U.S. included land-based carbon offsets in climate legislation, and the Copenhagen Accord offered rewards for land use practices that support carbon

sequestration in trees.³³ While as a whole, most forest carbon markets remain as yet unimplemented, they should not be overlooked.

Urban forests and urban tree farms have a potential role to play in future carbon markets. To be viable, urban tree forest projects must be quantifiable and cost-effective. A 2007 study investigated the cost-effectiveness of urban tree planting projects participating in carbon markets. Results found that from a purely carbon-market perspective, this is not yet a viable strategy to generate revenue; however it is important to consider the additional benefits of trees that may not be taken into a traditional cost-benefit analysis.³⁴ For example, planting trees can be a cost-effective strategy for a city in terms of energy savings and reduced infrastructure costs and maintenance.³⁵ Further, recently introduced cap and trade legislation and emerging policy is likely to have a significant impact on the value of carbon credits. The Michigan Department of Natural Resources (MDNR) has a revolving fund that aims to promote planting trees to mitigate air pollution and cooling costs and to support carbon market development that fosters sustainable forestry.³⁶ Such government support will increase viability of projects.

Regional Tree Canopy

A recent study of urban trees quantified their value across the U.S. and determined that tree canopy accounts for approximately 19 percent of urban land in Michigan. This is approximately 20 percent less than the 25 percent tree canopy cover recommended by American Forests.³⁷ The estimated carbon storage in these urban forests is 14,800,000 metric tons of carbon and the estimated carbon sequestration is 489,000 metric tons carbon/year.³⁸ Further, the analysis concluded that the total air pollution, including CO₂, NO₂, SO₂, and PM₁₀, removed by urban trees was 10,680 million metric tons per year.³⁹ The value of these services was calculated to be \$337,400,000 for carbon storage, \$11,149,000/year for carbon sequestration, and \$87,700,000/year for air pollution removal.⁴⁰

As development within the state increases, tree canopy decreases. Between 1991 and 2002, Wayne County experienced a significant loss of open space and tree cover and an increase in urban surfaces.⁴¹ A similar trend occurred in regional watersheds; this land cover change in the Rouge, St. Clair, and Encorse Watersheds contributes to water quality degradation.⁴² Currently, approximately 61 percent of the 394,000 acres in Wayne County are urban.⁴³ In Detroit, land cover is comprised of 41,843 acres (47 percent of total land cover) urban land or impervious surfaces, 27,863 acres (31 percent) tree cover, 17,860 (20 percent) open space (defined by grass and scattered trees), 1,335 (two percent) bare soil, and 314 acres (less than one percent) water, indicating a relatively high urban tree cover (note data reflects 2002 land cover).⁴⁴



Figure 17 - Trees along streets and in vacant lots in the lower eastside of Detroit⁴⁵

The value of Detroit's tree canopy cover is significant. Within the city, tree canopy alone provides 191 million cubic feet of stormwater management (\$382 million value), 2.1 million pounds of air pollution removal (valued at \$5.1 million annually), stores 1.2 million tons of carbon and sequesters 9,334 pounds of carbon annually.⁴⁶ Increasing this tree canopy cover will increase the value of this asset and build the city's capacity to cope with future environmental change and infrastructure stress.

A windshield survey indicated that tree cover of the lower eastside of Detroit was variable with a notable absence along a majority of neighborhood streets and Jefferson Avenue (Figure 17) Increasing tree cover will provide direct benefits, such as energy savings, increased aesthetics and pride and opportunity for recreation, increased property value and improved air quality. Further, neighborhood beautification is likely to attract new residents and businesses to the community. In order to realize these benefits, landscaping and tree ordinances that encourage, support, and even mandate diverse, abundant vegetation are necessary. It should be noted that educating the community and providing the incentives and resources to implement tree planting are fundamental to increasing canopy cover.

As earlier mentioned 501(c)(3) non-profit Greening of Detroit is already leading the growth of Detroit's tree canopy. Established with a mission of guiding and inspiring reforestation in the city, they have since expanded to include in their vision creating a 'greener' city through planting of trees and educational programs, also supporting environmental leadership and community capacity building. Over 1500 volunteers each year host planting projects to revitalize public spaces such as Detroit, Hamtramck, and Highland Park. Community partners coordinate planting and volunteer recruitment from the surrounding neighborhood to generate local involvement. The Greening also provides the community group with information on how to maintain their planting sites and volunteer assistance for the future.⁴⁷ By working with the communities, Greening is empowering citizens to have ownership over their land, giving them ecological and procedural knowledge of ecology, and how trees are an important part of the natural system. Simultaneously, social interaction and community development is encouraged through the creation of shared values and knowledge. In the year of 2009-2010 alone,

Greening has added 3,034 trees to the urban canopy with the help of local community members.

Green Roofs

Green roofs are an increasingly prevalent type of green infrastructure adopted to provide ecosystem services in addition to energy savings. Green roofs provide many benefits similar to green spaces. Plants improve air quality by absorbing airborne pollutants and also provide stormwater management. Green roofs, like green spaces, help to slow and filter stormwater by up to 60 -100 percent as it moves towards the local water system.^{48,49} This helps to improve water quality, minimize incidence of flooding, and reduce stress on stormwater management systems. In municipalities such as Minneapolis, for example, where each building is charged for stormwater runoff, a green roof can help alleviate these costs by reducing immediate runoff by as much as 90 percent.⁵⁰

There is growing interest in the potential to sequester carbon via the added vegetation on rooftops. Just as the capacity to effectively manage stormwater varies by vegetation and growing medium, the ability to sequester carbon with green roofs varies. The carbon storage potential of one extensive green roof study found that roofs that contained a 2.5 to 12.7 centimeter deep layer and sedum species stored an average of 162 grams of carbon per square meter in biomass above the surface.⁵¹ In addition, this study determined that over 370 grams of carbon per square meter was stored in above and below surface biomass and substrate organic matter of a seven centimeter deep green roof in Lansing, MI.⁵²

Many green roofs have been planted throughout Detroit. In 2004, a 6800 square foot extensive green roof was installed on the Detroit Performing Arts High School.⁵³ Then, in 2008, a 6,000 square foot green roof was installed at the Detroit People Mover's Joe Louis Arena Station. The installation has 12 species of sedum and contains a layer for retaining water, drainage, and barrier layer separating the building and roots.⁵⁴ The Ford



Figure 18 - Green Roof on the River Rouge Plant in Dearborn, MI

River Rouge Factory in Dearborn, MI boasts one of the largest in the world (See Figure 18⁵⁵). It houses a 454,000 square foot green roof, installed in 2003. The same year, it won the 2004 Green Roofs for Healthy Cities Award of Excellence in the Extensive Industrial Commercial Category.⁵⁶ Many birds now call the roof home, including some species that have not habituated in the region for decades.

In Detroit, there is significant potential to use green roofs to remove carbon dioxide from the air. The carbon sequestration potential of plants and substrate installed on green roofs on commercial (6335 hectares) and industrial (8399 hectares) land in Detroit has been estimated at 55,252 tons of carbon.⁵⁷ This is equivalent to carbon that would be not be emitted if 10,000 mid-sized SUVs or trucks were taken off the road for a year.⁵⁸ If the emissions associated with the lower heating and cooling loads of buildings with green roofs was included in this estimate, even greater carbon dioxide reduction would result.

Water Purification & Management

Water purification is an important ecosystem service provided by soil and vegetation. In an urban setting, impervious surfaces limit infiltration of precipitation and contribute to the degradation of water bodies that human and other species rely on.

Water quality has a huge impact on human health. Water assimilates substances such as minerals, nutrients, wastes, and pollutants, as it travels over the surface of the land. When these materials are deposited into river, lakes, streams, and springs, they can contaminate our drinking water. Drinking water can contain contaminants such as microbial viruses or bacteria from sewage treatment plants, septic systems, agricultural operations and wildlife. It can also contain inorganic contaminants such as salts or metals which can occur naturally or from urban stormwater runoff, industrial or domestic wastewater discharge, oil and gas production, mining, or farming, pesticides and herbicides. Other categories of contamination include organic chemical, which are byproducts from industrial processes, and radioactive contaminants occurring either naturally or as a result of oil and gas production and mining activities. One study found that 58 out of 260 contaminants detected in a national tap water quality survey were attributable to road runoff, lawn pesticides, and human waste associated with sprawl and urban development; almost half of the contaminants exceeded health limits.⁵⁹

Contaminated drinking water contributes to a host of diseases. Cryptosporidium, a microbial pathogen found in surface water throughout the U.S., causes abdominal infections. Elevated levels of lead can cause serious health impacts, particularly in pregnant women or children. Diarrheal disease alone accounts for approximately 4.1 percent of the global burden of disease, resulting in 1.8 million deaths every year; it is estimated that 88 percent of that is attributable to unsafe water supply, sanitation and hygiene.

Large stormwater events can cause the volume of runoff and/or sewage to exceed the capacity of municipal infrastructure resulting in water pollution, property damage, and flooding. While separate sanitary sewers are designed to transport sewage only to wastewater treatment plants and eventually a nearby body of water, combined sewer systems convey both sewage and stormwater to treatment plants.⁶⁰ In the later system, the combination of stormwater surges and already overburdened sewer systems can result in

sewer overflows, where stormwater and often untreated, raw sewage discharges from combined sewers or sanitary sewers.⁶¹

Results of a national study of water quality impairment reflect the disproportionate impact of surface runoff from urban areas (as compared to nonurban areas) on water bodies. Stormwater from urban areas, which account for approximately 3 percent of land area, is the main cause of reduced water quality in 13 percent of rivers, 18 percent of lakes, and 42 percent of the estuaries assessed.⁶²

Though the U.S.'s primary water legislation, the 1972 Clean Water Act, imposes regulation to limit pollutant discharge into water bodies, compliance is lacking. A combination of lax enforcement of point source discharge and the challenge of regulating nonpoint source pollution (pollution resulting from agricultural and urban runoff, precipitation and atmospheric deposition, and groundwater seepage), contributes to water quality impairment.⁶³ In addition to the negative implications this has for the health and well-being of humans, water quality affects natural systems, habitats, and recreational opportunities.

Stormwater runoff is a leading cause of water body pollution in the United States.⁶⁴ Urban areas have more impervious surfaces, such as rooftops, streets, and sidewalks, which significantly increase the velocity and volume of stormwater runoff and prevent surface water from percolating into the ground. As a result, rainwater is channeled across the surface and into sewers, resulting in higher peak discharges.⁶⁵ The combination of an increase in impervious surfaces and stormwater infrastructure designed to move water offsite rather than enable infiltration disrupts natural hydrological cycles.^{66,67} In addition, the sediment, nutrients, organic waste, and pollutants, including heavy metals, oils, and toxins, collected by runoff and deposited in local bodies of water are harmful to aquatic biology.⁶⁸ When urban stormwater runoff enters aquatic habitats, it alters natural conditions and can place too much stress on systems, causing a loss of species and diversity. Habitat loss associated with sedimentation and decreased food sources also contribute to biodiversity decline and degradation of ecosystem quality.⁶⁹ Loss of species, such as insects, has implications for their predators; the loss of fish has implications for commercial and recreational fishing. Additionally, water pollution also affects leisure and profitable activities such as swimming and tourism. It is not uncommon for beaches to be closed to swimming after large rainfall when water quality monitoring indicates too much contamination.

Stormwater Best Management Practices

Managing stormwater at the local level is imperative in ensuring adequate water quality. Urban redevelopment offers the opportunity to reduce the degradation of receiving waters by reducing the area of impervious surfaces in a watershed.⁷⁰ New technology and simple design strategies can improve urban stormwater management and reduce water

pollution associated with urban runoff. Green infrastructure technologies can be implemented at a site, neighborhood, or watershed scale. A review of these stormwater management techniques follows.

Retention and Detention

Retention and detention methods are alternatives to traditional sewer system stormwater management that effectively hold large volumes of stormwater to reduce the potential of flooding.⁷¹ These designs hold, or retain, water until it evaporates, percolates, or is used by plants. The purpose of detention basins is similar; however, detention ponds function to receive and slow discharge rates rather than to hold water.⁷² Both retention systems and detention ponds can be retrofitted to capture, control, and filter stormwater in combination with other stormwater designs where development already exists.⁷³

Low Impact Development

Low Impact Development (LID) design is a site-specific method that utilizes green infrastructure to manage and restore water quality by reducing water and pollutant runoff at its source rather than allowing it to flow over the landscape. This type of design is focused on installing and preserving site features that encourage the retention and infiltration of stormwater, as opposed to runoff. By mimicking natural water cycles, LID also improves degraded ecosystem functions.⁷⁴ This is an increasingly prevalent design strategy for conserving, conveying, storing, and infiltrating stormwater in infill situations.⁷⁵ An EPA study of 17 sites concluded that in addition to improving environmental performance, LID has the potential to reduce cost. Capital savings when LID techniques were implemented ranged between 15 and 80 percent of conventional stormwater management. Further LID had the potential to provide increased aesthetic quality, recreational opportunities, and property values.⁷⁶

Because designs can be tailored to site-specific conditions and community needs, LID is particularly suitable for retrofitting and redevelopment. LID strategies such as bioretention systems or rain gardens, turf depression storage, and parking lot or street storage and filtration systems are implemented at the lot level, an appropriate scale for managing stormwater in developed areas. LID methods can be adapted to multiple land uses to decrease the impervious surfaces of commercial, residential, industrial, and public property, thus enabling greater absorption, storage, and filtration of stormwater via natural processes. These LID strategies will be integrated into our recommended design for Detroit's lower eastside.

Rain Gardens and Bioretention

Rain gardens (See Figure 19⁷⁷), or bioretention systems, utilize deep soils and plants to filter water and remove pollutants on site. They also augment the landscape with native, easy to care for plants. Rain gardens are designed to hold water on the landscape, rather

than allowing it to run off. They are capable of retaining stormwater for four hours for one-inch of rain, or up to 24 hours after larger storm events.^{78,79} Rain gardens have proven effective in managing stormwater runoff in residential yards, parking lots, and building roofs.⁸⁰ Rain gardens are designed to endure extreme moisture levels and can remove metals, nutrients, sediment and fecal coli from the soil.^{81,82} The subsurface features of these bioretention systems imitate the hydrologic action of a healthy forest; engineered soils and appropriate plant selection aid in cleaning and reducing water volume and reducing nutrient and sediment load.⁸³

Two types of rain garden systems include under-drained systems and self-contained systems. Under-drained systems are appropriate for sites where infiltration is not desired. In these systems, water is channeled slowly through porous planting media and drains into conventional storm sewer systems. The plants used in these systems must tolerate drought and flooding. Self-contained systems retain water longer and require plants that can withstand almost complete inundation.⁸⁴

Plant selection is important; species with deep fibrous roots have proved to be most effective in cleaning and filtering water. Native herbaceous perennials, woody shrubs, and trees, which are adapted to local conditions, are often the best choice for rain gardens.⁸⁵ Native plants are generally recommended because of their evolutionary adaptations to local climates and tolerance of harsh conditions such as drought or extreme cold or heat. Additionally, the maintenance of established native plants is typically minimal as compared to nonnative species, thus reducing minimal additional water consumption, fertilizer application, and mowing.⁸⁶



Figure 19 – Rain garden along Michigan Avenue in Lansing, MI

In addition to improving environmental quality, utilizing the services provided by natural systems to manage stormwater is often more economical than traditional stormwater management. For example, a 660-foot block Seattle Public Utilities redevelopment project aiming to design a more livable community retrofitted the street with bioswales, trees and shrubs, ultimately reducing impervious surfaces by 18 percent. Public Utilities saved 29 percent by managing stormwater with LID design as opposed to a conventional street retrofit as well as 49 percent of paving costs by reducing street widths. A significant portion of this savings is attributable to the avoided costs of stormwater infrastructure. Further, the street's design features reduced total potential surface runoff by 99 percent. In Bellingham, Washington, a parking lot retrofit project also demonstrated

stormwater management cost savings. Rather than installing underground vaults to manage parking lot stormwater, rain gardens were installed in three of the 60 parking spots in the lot. The cost of installing the rain garden was an estimated 80 percent (\$22,000) less than installing an underground vault. In nearby Bloedel Bonovan Park, a retrofit that converted a 550-square-foot area adjacent to a catch basin to a rain garden saved 76 percent compared to the cost of installing and underground basin. While the design and associated benefits of green infrastructure are unique and variable by site, LID stormwater management strategies are widely applicable and typically quite economical, though of course, initial capital investment is necessary.⁸⁷

Infiltration Trench

An additional green infrastructure technology that controls and stores stormwater is an infiltration trench.⁸⁸ Infiltration trenches are linear troughs that are designed to hold and then drain stormwater within 72 hours of a rain event. Infiltration trenches consist of a perforated PVC pipe surrounded by a rock, gravel, and sand-filled trench.⁸⁹ These systems function primarily to remove pollutants from the soil and are typically used in conjunction with other stormwater management techniques.⁹⁰ Infiltration trenches are commonly constructed along roads or adjacent to other impervious surfaces. From a design standpoint, the visual aesthetics of these systems are quite variable, ranging from a linear gravel path to a landscaped patch. A distinguishable feature of infiltration trenches is that unlike swales and many other LID designs, infiltration trenches are typically constructed to be flush with the ground surface. Consequently, because they lack a trash and debris-collecting depression, infiltration trenches are often amenable to urban areas.

Pervious Pavement

As previously mentioned impervious surfaces prevent rainwater from percolating through to the soil below and increase the volume, flow, temperature, and pollutant load entering water bodies.⁹¹ This contributes to water quality impairment and degradation of hydrologic functions. In contrast, pervious pavement reduces urban runoff by allowing stormwater to infiltrate into soils.^{92,93} Infiltration replenishes groundwater and promotes natural hydrological and biological processes.⁹⁴ An EPA study found that permeable pavement systems can significantly minimize runoff volume and control peak discharge.⁹⁵ In addition, permeable pavement systems have demonstrated effectiveness in treating water efficiently and reducing “suspended solids, biochemical oxygen demand, and ammonia levels.”⁹⁶ Additionally, there is cost savings associated with reducing the volume of water requiring conveyance, as well as with the maintenance requirements of pervious pavement.^{97,98}

Traditionally, pervious pavement was limited to brick or stone pavers held by sand. Because this form of pavement is essentially open-jointed, it allows infiltration rates

between 20 and 95 percent.⁹⁹ In fact, up through the 1920s, brick was the most popular street material in the United States.¹⁰⁰ However, brick manufacturing is an energy intensive, extensive process that generates substantial waste.¹⁰¹ While recent innovations, such as the use of recycled glass to reduce the required firing temperatures in kilns, have lessened some of the environmental impact concerns, the high cost still limits the use of brick to high-end design.¹⁰² As a result, concrete pavers have become more popular.

Permeable concrete and porous asphalt are two new permeable surface technologies. Permeable concrete allows water to flow through spaces created by the removal of the fine aggregate typically present in concrete, to the soil.¹⁰³ Porous asphalt is comprised of open-graded coarse aggregate that is bonded with asphalt cement.¹⁰⁴ Porous materials enable water to be filtered, detained, and infiltrated into the ground.¹⁰⁵ These materials can be substituted for conventional pavement, provided certain conditions are met: the soils under permeable pavement systems should have permeability rates of at least one half inch per hour and bedrock or the water table should be at least four feet below the system.¹⁰⁶ In urban situations, the development of porous concrete and asphalt offer the most promise. The EPA recommends use of porous concrete as a best management practice for stormwater design.

Beyond stormwater infiltration, porous pavement can minimize the need for curbs and storm sewers, offer better skid resistance for vehicles, and encourage local aquifer recharge. Permeable pavement, however, is not designed to treat fuel and other toxic chemicals that make leak from vehicles and therefore creates a potential risk for groundwater contamination. Stormwater quality should be ascertained before implementing this element.¹⁰⁷

In 2007, the City of Portland, Oregon adopted a comprehensive Green Street resolution and policy to utilize natural systems to manage stormwater, thereby meeting regulatory compliance and achieving resource protection goals.¹⁰⁸ The Green Streets strategy addresses stormwater management at a watershed scale, utilizing watershed-based land use zoning, planning, and land conservation strategies that focus on reducing impervious surface cover through design solutions such as permeable pavements, invisible curbs, infiltration basins, filter strips and swales, and street tree wells.¹⁰⁹ As noted in the Green Streets report, “the environment, urban or otherwise, is not a collection of discrete units; rather everything overlaps and everything is connected.”¹¹⁰ Results of this management approach include, among many other benefits, reduced stormwater flow, improved water quality, and greater watershed health. Portland provides a great model of the potential to co-manage natural and built systems in a cost-effective, aesthetic, and functional way.

Though the lower eastside Jefferson corridor of Detroit is quite different from Portland, the need to address stormwater management and implement best management

practices is omnipresent. In this area where significantly less funding or political support are available, it would be up to a unified group of stakeholders to explore these options and push for their implementation. Perhaps our design recommendations will provide a jumping off point.

The Detroit River's water quality is an indication that stormwater management requires improvement. The Detroit River is a 32-mile channel connecting international boundaries between Lake St. Clair and the upper Great Lakes to Lake Erie. The EPA has established the Detroit River Area of Concern (AOC), which drains about 700 square miles of land in Michigan and Ontario and 107 square miles of the City of Detroit "sewershed." Eleven beneficial use impairments, caused by urban and industrial development, have been identified in the watershed, including bacteria, PCBs, PAHs, metals and oils and greases. In addition to stormwater runoff, combined sewer overflows (CSOs) and municipal and industrial discharges also contaminate the AOC. Among the environmental concerns attributable to water quality impairment include the impacts of invasive species, fish population changes, and habitat degradation. As a result of water contamination, the EPA has declared multiple impaired uses in the Detroit River such as fish and wildlife consumption restrictions, drinking water restrictions, wildlife population degradation, and loss of wildlife habitat. To mitigate poor water quality, sewer outflow and capacity and stormwater runoff need to be addressed.¹¹¹

In Detroit, most stormwater runoff is conveyed to the City's combined sewer system, a single pipe that moves stormwater and sanitary waste. This aging system serves an area of approximately 97,240 acres and the population of Detroit.¹¹² The sewage plant typically processes approximately 600 million gallons per day and has the capacity to accommodate as much as 1,700 million gallons a day through primary treatment during storm events. However, wet weather flows that exceed 930 million gallons per day do not receive secondary treatment before release into the Detroit River.¹¹³ Combined sewage is discharged at 78 permitted locations along the Detroit and Rouge Rivers. Additionally, 50 municipally-owned storm sewers discharge into the Detroit (22 outfalls) and Rouge (28) Rivers, including one outfall at Lakewood East Park Bridge at Riverside Drive in the lower eastside of Detroit.¹¹⁴ Several privately-owned drainage systems are located on private property and convey water directly into receiving rivers.¹¹⁵ Intermittent combined sewer overflow releases contaminants into the river resulting in water quality impairment.¹¹⁶ The cost of managing stormwater overflow and capacity issues over the next three decades is estimated at \$14-26 billion.¹¹⁷ It is important to consider the role green infrastructure can play in reducing the burden on municipal sewer systems, lowering stormwater management expenditures, and increasing ecosystem services at a local level.

Wetlands

Wetlands provide many ecosystem services including water purification, flood prevention, recreation, and wildlife habitation.¹¹⁸ Wetlands are very proactive biological systems that support a significant biodiversity; in the U.S., an estimated 43 percent of threatened and endangered species rely on wetlands.¹¹⁹ There are two primary types of wetlands: tidal or coastal wetlands and inland wetlands. Wetlands vary regionally and locally, yet each is inundated with water frequently enough to support vegetation that requires wet soil.¹²⁰ Furthermore, all wetlands act as a sink or storage basin for surface water, a significant service in developed settings.

However, the level of wetland destruction indicates that their importance is not yet fully recognized. Wetland loss and degradation are occurring at a greater rate than other ecosystems.¹²¹ There are many factors influencing the loss of these systems; among the direct drivers of wetland loss and degradation are development pressure and construction of new infrastructure, land use change, water withdrawal, nutrient overloading and runoff pollution, and invasive species.¹²² Climate change further exacerbates stress on wetland systems.¹²³

In response to growing concern of the loss of this valuable ecosystem, the U.S. adopted a 'no net loss' of wetlands policy under the Clean Water Act. This policy, adopted by the EPA and U.S. Army Corps of Engineers, requires that development that would negatively impact or result in the loss of a wetland is required to compensate for this loss by increasing the area of wetland elsewhere. In 2008, innovative standards to improve wetlands and wetland policy were introduced to address avoidance of adverse impacts, minimization of impacts, and compensation for unavoidable impacts. A consolidated area of wetlands that is restored and protected to compensate for the impact or loss of other wetlands is known as a wetland mitigation bank. This market-based approach to wetland protection usually involves restoration of former wetlands and has proved to be reliable and verifiable.¹²⁴ Wetlands are widely used markets for offsetting the impacts of development and have become a part of public and private planning.¹²⁵ Mitigation banks play a significant role in wetland restoration and currently account for one third of aquatic compensation projects.¹²⁶

Wetlands and urban land are not incompatible land uses. In fact in its 2010 Comprehensive Land Use Plan, the City of Youngstown, OH incorporates wetland mitigation banking into its rightsizing strategy.¹²⁷ Faced with population decline and abundance of abandoned and unimproved land, as well as poorly drained, flat terrain and wetland vegetation, the city recognized the opportunity to implement wetland banking as part of a land consolidation plan.¹²⁸ By establishing a wetland mitigation bank, the city will restore, preserve, and enhance wetland resources in addition to selling mitigation credits to developers who are required to compensate for the adverse impacts caused by a project.

Though mitigation credits are currently available in OH, there is no mitigation bank within the local watershed, which many allow the city to price credits higher. Further, the community will benefit from the addition of recreational and educational opportunities, and improved water quality and stormwater management provided by the wetland.¹²⁹

Similar to Youngstown, OH, there is significant opportunity to pair vacancy and wetlands in the lower eastside of Detroit. Prior to development much of the region was a wetland, and its proximity to the Detroit River floodway and floodplain and flat terrain make it amenable to wetland reconstruction. The opportunity to replace the wetland functions and services lost to impervious surfaces with wetland mitigation banking would provide economic incentives in addition to improving water quality, groundwater recharge, and stormwater management. Further, wetlands would increase the capacity to absorb stormwater and to cope with potential flooding. Given the predicted intensity and variability of precipitation associated with climate change, the presence of a high water table, and the adjacent river, created functioning wetlands within the community is an advisable adaptation strategy. Wetland mitigation banking could aid in integrating local urban growth and land use plans with watershed plans.¹³⁰

Planning to maximize ecosystem services can prevent and mitigate the degradation of the natural systems that are critical for life on earth and currently threatened by anthropogenic activity. Cities must aim to protect these assets from degradation associated with infrastructure, energy consumption, and land use change. Municipalities that anticipate participating in developing carbon markets or wetland mitigation banking are likely to benefit from the increasing development of these systems. Urban redevelopment and restructuring of land use invites the opportunity to investigate the potential economic benefits an urban forest or wetland might provide. Many strategies to maximize ecosystem services, combat the urban heat island effect, and adapt to external and internal change at a local scale are apt for retrofits and redevelopment.

Increasing canopy cover along street and in yards and parks and decreasing impervious surfaces by opting for permeable pavement in low traffic areas, for example, are local actions that directly impact environmental quality and human well-being within a community. Wetland reconstruction and restoration of Fox Creek can dramatically improve stormwater management and also increase recreation opportunities. Implementing green infrastructure is an optimal redevelopment strategy for the Jefferson Corridor in the lower



Left to right:
 Figure 20 - Fox Creek
 Figure 21 - Pollution in Fox Creek

eastside of Detroit, where improved air and water quality, as well as jobs that come in its creation, are needed.

Redevelopment in the lower eastside should seek to maximize the benefits derived from well-functioning natural systems by reducing impervious surfaces and increasing vegetation. In a community in need of a fresh coat of paint, flowers and vegetation can make a vast improvement to the overall neighborhood aesthetic and character. While rain gardens are shown to be visual, effective techniques for managing stormwater, infiltration trenches offer a more discrete method to filter water; both techniques are suitable for urban communities. Incorporating such green infrastructure practices into a redevelopment plan is crucial to improving local and regional water quality. Fox Creek, one of the lower eastside's unique assets, pictured in Figure 20 and, Figure 21 is quite polluted. Generating community support around the need to improve the water quality of the Creek as well as the opportunity to do so via green infrastructure is a great opportunity to gain the support of local volunteers, increase awareness of maintaining healthy natural systems, and bring the community together. Improving the appearance and quality of Fox Creek should be considered an attainable and important goal for the neighborhood.

Wetlands are an extremely valuable resource, and Detroit's lower eastside community should seek to capture the benefits a restored wetland would provide. With ample open space, the need for purposeful, unifying landscaping, and the lingering soil and hydrological characteristics of the region's former wetland, the appropriateness of a wetland is strong. Furthermore, additional incentive is present in the potential to utilize wetland mitigation banking to increase the area of wetlands within the community's low lying, and nearly vacant, streets while offsetting the impacts of increased development.

Sustainable redevelopment necessarily requires recognizing and celebrating the importance and value of ecosystem services at a local level. Without healthy, functioning natural systems maintaining and improving air and water quality would be futile. By integrating green infrastructure throughout Detroit's lower eastside, the community will demonstrate commitment to environmental quality and to the well-being of both present and future residents, as well as establishing itself as a model of sustainability in Detroit.

Chapter 3: Laying the Foundation for Sustainable Redevelopment

The successful adoption of the innovative sustainable redevelopment solutions and best practices that were reviewed in the previous sections requires re-evaluation of the way land is managed and regulated. Existing policies are often a barrier to sustainable development efforts in cities. In urban areas, where community revitalization hinges on the physical transformation of existing streetscapes, vacant land, and residential units in order to spur economic development and draw in new residents, addressing land regulation is a significant need. Further, redevelopment provides an opportunity to note the importance of integrating and coordinating planning efforts at multiple levels, which is crucial component of sustainability.

Cities are not isolated entities; the flow of energy and materials required by heavily populated urban areas is vast. The physical impacts of the built environment far exceed the political boundaries of the city. Energy consumption, pollution, and waste generation are products of any human environment, but are significantly more pronounced in urban environments. Currently, nearly 82 percent of the population of the U.S. lives in urban areas; by 2050 this is projected to increase to over 90 percent of the population.^{1,2} As both urbanization, the conversion of forest or agricultural land to suburban and urban uses, and population continue to increase, the space, energy, materials, and sinks will also grow. Left unchecked, this growth will consume massive amounts of open space, require significant new infrastructure development, and result in an increasingly auto-dependant, fossil fuel-consuming society.

The environmental, social, and economic impacts of cities must be addressed at multiple scales: site to region, site to site, and site to architecture.³ Accordingly, the restructuring of urban places must occur on multiple, coordinated levels from the regional and metropolitan, through the city and community, and down to the level of individual buildings.⁴ In order to meet the demands of a growing urban population, protect natural resources, and enhance human well-being, a combination of regional coordination and local action are necessary. Increasingly, U.S. cities are adopting new land use management that support, rather than hinder, more sustainable development.

There is significant opportunity for local planning to increase community sustainability. At a local scale, planning influences the energy use, transportation, environmental quality, and quality of life for residents. By addressing and preventing existing and future problems, planning can guide change in a way that optimizes growth and improves the health, safety, and general welfare of inhabitants. Cities should strive to

Laying the Foundation for Sustainable Redevelopment

provide residents with housing and transit options, clean air and water, access to employment and recreation opportunities, and social services and support. Because local residents have a stake in the policy decisions that are made, including the community in the planning process is crucial. A brief description of prevalent barriers and potential solutions to land use and planning issues in sustainable redevelopment are presented below.

Chapter 3.1: Regional Planning

Regional planning addresses aspects of planning that are broader than city or county boundaries. This level of planning encompasses the multi-county and state agency coordination that is crucial to the development of efficient and sustainable systems. One type of regional planning that places particular emphasis on ensuring sustainable natural systems is watershed planning.

In the United States, political boundaries are not typically aligned with the natural boundaries of the ecological landscape. This disconnect between the topographical and hydrological patterns that define a watershed (an area of land where all the water that falls on it ends up in the same water body) and the politically-defined boundaries of a city has significant implications for resource management. As the water travels across land surfaces, it collects all substances, including pollutants, oils, and sediment, that it encounters. These substances are then carried to rivers, ultimately impacting communities further downstream in the watershed. When a watershed is the functional unit at which planning decisions are made, the effects of poor stormwater management, for example, can be addressed in the immediate community, as opposed to the downstream communities. This can encourage more responsible stormwater management.

Planning within the regional context of a watershed requires a comprehensive understanding of natural systems. This understanding offers insight to place-specific resources, energy, and environmental quality, as well as enabling more accurate accounting of resource and energy flows within and beyond city limits. This can inform better decision making and lead to increased natural resource protection.¹ For example, by assessing the vegetative cover of the entire watershed, rather than solely within the boundaries of the city, environmental quality and ecosystem function can be more accurately analyzed. In addition to being a more successful way to manage the integration of human and natural systems, regional coordination that is not constrained by city, county, and state political boundaries can be an effective means to manage and share resources and expertise more efficiently and equitably.

Regional planning is essential for long term environmental and land use planning. However, many regions lack an effective regional planning entity to coordinate municipalities and agencies. While the logistics of planning at a regional level are likely to be more challenging in metropolitan regions that lack a central planning body, many cities have transit authorities and parks departments or watershed coalitions, for example, that could fill a regional level role. In regions that lack ample funding to meet the needs of individual municipalities, regional coordination is crucial.

One new model of regional coordination in a Rust Belt region is Southwest Ohio's Agenda 360. This initiative was designed to address Southwest Ohio's pressing issues as well

as the challenges of the greater 15-county metropolitan area.² Agenda 360 was established in 2007 by leaders from over 30 organizations throughout four counties (Butler, Clermont, Hamilton and Warren) within the Cincinnati-Northern Kentucky-Middletown metropolitan tri-state region. Agenda 360's implementation process includes volunteer leadership, community dialogues, a community survey, and identification of community priorities.³ The foundation of Agenda 360 consists of its three overarching goals: "to keep talented workers in the region and attract new ones, to grow new jobs and retain existing jobs, to provide economic opportunity and a chance for a good quality of life for everyone who calls the region home," as well as a set of six operatives. These unified areas include quality place, business growth, qualified workforce, transportation, inclusion, and government collaboration.⁴

Though the Agenda 360 plan is still in its infancy, stakeholder communication has enabled coordinators to gain much insight. Leaders have learned many lessons from Northern Kentucky's Vision 2015 regional plan, which shaped Agenda 360's framework, and from the project's first three years. They've noted that collaborative efforts can lead to resource leveraging efficiencies, the public is open and willing to engage in regional planning, and aware of both the complexity and need to do so, representation and diversity across groups has increased and should continue to do so, and finally, that the public desires a regional economic hub.⁵ Future success will be measured by a set of established metrics. For example, by 2020, success will be considered by the creation of 200,000 new jobs, the addition of 150,000 workforce employees between the ages of 20 and 34, and an increase in self-sufficiency measured by an income level of 250 percent above the federal unemployment level.⁶

When initiating local sustainable redevelopment, it is important to recognize concurrent planning efforts occurring at all scales. In Southeast Michigan, the Southeast Michigan Council of Government (SEMCOG) plays a leading role in coordination at the regional level. Established in 1968, SEMCOG aims to solve regional problems and improve quality of life through by increasing intergovernmental efficiency and effectiveness.⁷ Through three overarching roles, which include assisting local governments in planning regionally, facilitating coordination among stakeholders, and advocating for necessary public policy change, SEMCOG supports counties, cities, villages, townships, and educational institutions in Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne Counties.⁸ While this entity provides a significant broad, multi-jurisdictional perspective, SEMCOG's ability to drive change within regional systems is limited by its lack of political power. In contrast, Metro, the regional governmental agency for the Oregon portion of the Portland metropolitan area, is the only directly-elected planning organization in the U.S. It has significant power and is responsible for maintaining the urban growth boundary, planning the region's transportation system management of several park facilities,

maintenance of a closed landfill, and two garbage, hazardous waste and recycling transfer stations, planning for wildlife habitat protection and other land use planning authorities.⁹ These significant responsibilities and authority in adopting new policy have led them to have great success in establishing a comprehensive regional master plan oriented towards New Urbanist principles.

Coordination efforts which seep beyond immediate political boundaries, including those of SEMCOG and other entities such as the Detroit Greenways Coalition and Michigan Trails Alliance, Michigan Department of Transportation, can effectively manage shared resources. The impacts and influences of regional planning influence both the greater area that encompasses the regional and the local communities. Ultimately, regional planning in Michigan will likely require that power is transferred from municipalities to counties and regional agencies. Regional planning entities such as SEMCOG provide resources and support for the groups of Detroit's lower eastside which are part of these broader regions; neighborhood planning should aim to frame objectives and planning effort within the context of regional goals.

Prevent Systemic Sprawl

A number of factors, including population growth, decentralization, land use regulation (such as minimum lot size), the demand for the single family home, and inexpensive land drive sprawling urban growth patterns. Unlimited and non-contiguous outward expansion, single use zoning, and auto dependency characterize this type of development, which has typified American development for the last 50 years.¹⁰

The negative impacts of sprawl are extensive. Greenfield development, or development of open space, requires significant investment in new infrastructure to provide access and services to new homes. Construction of new roads literally paves the way for additional development. This new infrastructure is essentially permanent; building up or reversing this growth form is not readily accomplished.

The impacts of sprawl are widespread and represent a variety of significant sources of environmental degradation. Open space and habitat are eliminated as land is converted for development. The increased impervious surfaces associated with development, including concrete, asphalt, and buildings themselves, contribute to stormwater runoff, flooding, urban heat island effect, and water quality degradation. Septic systems and lawn fertilizers further threaten water quality.¹¹ Finally, high automobile usage causes local air pollution.¹²

Sprawling development has many social costs associated with driving and traffic, such as time lost waiting in traffic, health care costs due to the effects of poor air quality resulting from pollution left by auto exhaust, and obesity from leading sedentary lives. The widespread, auto-centric nature of sprawl discourages a sense of place and can result in the loss of historic sites to encroaching urban expansion. Because population density is

lowered, the opportunity for a viable public transportation system is lost, furthering private vehicle dependency and increasing energy demands. One study of emissions and energy consumption found that low-density development has 2.5 times the annual greenhouse gas emissions and twice the annual energy use of high-density development on a per capita basis.¹³

Promoting growth patterns that have a lower social, environmental, and economic impact is essential to increasing the sustainability of the built environment. Adopting urban growth boundaries, smart growth design principles, and encouraging infill and brownfield development within city limits can promote higher density and open space preservation, while revitalizing existing towns and cities.^{14,15}

Open Space Preservation

There are a number of legal tools that promote compact urban form and open space preservation. These include: true agriculture zoning, form-based codes, conservation easements, transfer of development rights (TDR), purchase of development rights (PDR), agricultural use value taxation, and conservation subdivisions. Each mechanism functions to counteract the impact of sprawl, promote the benefits of smart growth, or some combination of the two.

One of the most inexpensive and effective ways to protect rural areas is true agricultural zoning. However, because this land regulation strategy lowers property value and reduces the landowner's ability to sell land, it places the burden of risk on the landowner, or farmer, rather than the developer. A second policy tool is the right-to-farm law, which supports regional greenspace preservation by providing farmers with more legal protection against developers who encroach upon farms and then file nuisance claims against the farmer. Conservation easements are another legal mechanism that aid in open space preservation. A conservation easement is a transfer of development rights from property owner to a land trust or body of government, such as a Purchase of Development Rights (PDR) Committee. This voluntary agreement provides tax incentives to the landowner and ensures that the land is not developed.

Greenbelts

One effective strategy in condensing urban growth is the greenbelt. A greenbelt is a boundary drawn around an urban area to establish where development should and should not occur for the purpose of preserving open space and agricultural land. In addition to managing growth, a greenbelt increases access to greenspace in urban areas.

The City of Ann Arbor, MI, has successfully acquired over 1700 acres for the city's Greenbelt. The goal of this policy is to "protect the Huron River watershed, from which Ann Arbor receives most of its water, from overdevelopment; to lessen the burden on expensive urban infrastructure; and to provide a permanent scenic complement to the urban

landscape.”¹⁶ Residents recently voted in support of a half mill tax^{xv} for 30 years to provide funding for parks and open space preservation within the Greenbelt’s district boundaries and natural habitats and agricultural land beyond the district.¹⁷ Ann Arbor uses this millage and leverages additional funding through a variety of sources including private, township, state, and federal grants.¹⁸ These funds are used to purchase land from willing landowners and to establish preservation through conservation easements.¹⁹

Acquiring the resources to finance a greenbelt program may be particularly challenging in economically depressed regions. As evident in the case above, funding strategies that rely on public investment and creativity can be successful. Identifying how a greenbelt program will benefit a city or region can aid in generating public and private support. Establishing a greenbelt can help communities identify and prioritize land for preservation. In areas where the amount of vacant, unmaintained land is great, consolidation of adjacent parcels, ownership reclamation, and restoration of parcels to functional greenspace has widespread benefit. In Detroit, establishing a greenbelt can inform and provide structure and purpose to citywide redevelopment. Bands of preserved open space could be designated wildlife habitats, connecting the City’s greenspaces with those in adjacent communities, such as the greenways along the Rouge River. Preserving land would promote greater development in Detroit’s urban core, rather than on the periphery, stemming further sprawl. In addition, creating open space would enable the individual health and community benefits that access to green space provide.

Encompassing the southeast corner of the City, the lower eastside is uniquely situated as a city boundary that links Grosse Pointe, downtown, and the Detroit River. A citywide greenbelt program targeted in this location would require the neighborhood’s support and active participation in identifying suitable parcels for preservation on the borderline, determining the use and design of preserved land, and even taking on leadership roles in maintaining lots.

Infill & Higher Density Building

In cities plagued by depopulation and vacant land, mitigating and preventing further spatial expansion and urban encroachment into greenfields is especially important. New development should be targeted near existing development within city boundaries to promote inner city revitalization, localize a tax base around currently existing infrastructure and municipal services, and protect open space. Urban infill is a socially and economically beneficial redevelopment strategy that utilizes underused and undervalued land while increasing density. Density is a measurement of the number of people or residential units per unit of land area.²⁰ Achieving higher residential density is necessary for supporting

^{xv} A mill tax is a tax based on real estate or property value which an owner is required to pay. A half mill is equivalent to 0.05 percent of property value.

public transportation systems, an essential component of urban revitalization. Research also indicates an inverse relationship between density and transportation energy demand: the economic and environmental costs of energy consumption on a per capita basis are dramatically reduced with higher-density development.^{21,22} Dense development also provides the vibrant activity necessary to draw new businesses and a customer base to depressed main streets such as Jefferson Avenue.

Often, however, municipal zoning regulations limit dense development. Zoning is a common form of land regulation in the U.S. originally established to protect residential development and separate incompatible land uses. This type of land regulation has provided local governments with a mechanism to shape how land is used, developed, and valued within municipal boundaries. However, conventional zoning, or Euclidean zoning, which strictly regulates lot size, building height, and setback, and often prohibits commercial uses, is increasingly recognized as a barrier to sustainable redevelopment. For example, zoning codes that limit density, building height, and minimum lot size influence the rate of development and promote low-density development and expansion of cities into greenfields. The result of these regulations is often unattractive, inefficient, and undesirable residential developments and cities.²³

Encourage Mixed-Use Development

Mixed-use development emerged as a redevelopment strategy to address segregation and low intensity land use associated with single-use zoning. Mixed-use zoning enables compatible but varied land uses to occupy the same area through zoning overlays of inclusionary zoning.²⁴ Mixed-use developments typically consist of commercial or retail on the first floor, office space on the second floor, and residential units on the floors above. This development strategy creates vibrant ground level activity, allows residents and visitors to meet multiple needs at a single destination, reduces transit needs, and provides live-work opportunities. Mixed-use development also increases urban density and walkability.

Zoning codes often need to be changed to allow for the greater density and diversity of mixed-use development. The support of the local unit of government is thus essential to enabling and encouraging these developments. One strategy is to allow planned unit developments (PUD). In a PUD, an area of land is controlled, designed, and developed according to a plan by a single entity. Because a PUD is not confined by the zoning designation of the particular location, practical, creative, and efficient mixed-use development can be established.²⁵

Regions that experienced rapid spatial growth and little community planning are now realizing the implications of low-density development that lacks a vibrant urban core. Michigan's Macomb Township, for example, recently established a PUD district with a New Urbanism Center. The center currently consists of a state of the art recreation center, community center, and ice rink in the middle of a field surrounded by sprawling residential

subdivisions. However, the community’s long-term vision to densely develop the parcel to provide the amenities and social center that the community currently lacks is hopeful.

With its numerous historic and vacant buildings, adjacent residential development, and capacity for increased public transportation ridership, the Jefferson Avenue corridor is a good candidate for mixed-use development. By fostering a live-work-play environment with multiple housing options along Jefferson’s commercial strip, the community could achieve multiple goals such as increasing self-sufficiency, enticing new young talent to the area, and reducing auto dependency.

The lower eastside of Detroit is zoned for single family and multifamily residential development, general business and government services. North of Jefferson, zoning is primarily residential, however many parcels south of Jefferson contain planned development zoning, which provides greater flexibility and enables mixed uses.²⁶ New ordinances and amendments to Detroit’s Master Plan that reflect current land uses and needs could drive more efficient, economical, and sustainable redevelopment. Rezoning to allow for more mixed uses or establishing a PUD, for example, would foster a more pedestrian-oriented neighborhood. The flexibility and the increased retail sales associated with pedestrian-friendly design may entice developers, which in turn could attract new residents.²⁷ With its proximity to the riverfront, amenities in adjacent Grosse Pointe, easy access to downtown Detroit, and historic, underused buildings, East Jefferson Avenue is a great candidate for new mixed-use development and retrofits. An investment to convert vacant buildings to ground level retail and office space for a business incubator or café and upper level lofts, for example, could significantly increase the appeal of the neighborhood, drawing in new residents as well as better providing for the needs of current residents.

Adopt Form-based Code

One development strategy that provides developers and planners with greater flexibility to redevelop parcels and communities in a sustainable manner is the adoption of form-based code. Form-based codes are regulatory codes that “address the relationship between building facades and the public realm, the form and mass of buildings in relation to one another, and the scale and types of streets and blocks.”²⁸ Form-based codes invert the use-form focus of conventional development. This shift of focus from regulating land by separating and segregating uses via zoning codes to regulation by physical form increases the flexibility of the development. This tool provides a community with greater ability to shape and influence the public realm and promote traditional urban forms such as main streets or neighborhood centers, by establishing regulations for the scale, mass, and façade of buildings, for example.²⁹

Communities that are undergoing redevelopment projects have the opportunity to reform design codes and zoning regulations. Because form-based code is based on the experience of the resident rather than the function of use, they can readily address the

needs and dissatisfaction specific to the location and community.³⁰ Streetscapes and spaces between buildings are often areas where people interact and congregate; to encourage social interaction and develop a sense of community, it is important that design is attractive, interesting, and pedestrian-oriented.³¹ Adopting form-based code also enables communities to influence the design of a redevelopment or infill project. Charrettes, for example, can be effective tools for engaging a community in the redevelopment of an attractive neighborhood in which they would feel comfortable and enjoy walking around.³² Citizens who participate in creating design codes for their communities also feel more confident that developers and politicians will not challenge efforts.³³

Implement Smart Growth & New Urbanism Development Principles

One movement that addresses growth management and community sustainability is ‘smart growth’. Smart growth is an urban planning and transportation theory that advocates for long-term regional sustainability through compact, transit-oriented, walkable, and bicycle-friendly land use with complete streets and mixed-use development. It was developed out of changing demographics, growing environmental concerns, and increasing financial and social concerns.³⁴ In 2003 the EPA provided the American Planning Association (APA) with funding to develop a guidebook, *Smart Codes: Model Land-Development Regulations* of 21 model codes (ordinances and regulations) to promote smart growth principles.³⁵ Among the APA’s smart growth guiding principles include: “1) Mixed land uses, 2) Communities where transportation options include walking, biking, and mass transit, 3) Decreasing traffic congestion, 4) Density, 5) Protecting open space, wetlands, and prime agricultural land, 6) Urban revitalization, 7) Decreasing taxes and costs of infrastructure.”³⁶ These principles have been widely adopted throughout the U.S.

For example, one component of Maryland’s Smart Growth initiative is a Building Rehabilitation Code Program (BRCP). The program, modeled after New Jersey’s Rehabilitation Subcode (which increased investment in rehabilitation projects up to 80 percent in Jersey City one year after it was adopted), promotes neighborhood investment through rehabilitation and reuse of existing buildings.³⁷ The BRCP integrates multiple codes into a single, comprehensive document that identifies rehabilitation requirements and establishes a framework of code requirements reflecting the scope and magnitude of individual projects. These requirements are more feasible because they vary by project, and thus are more readily adopted. The program also encourages property owners to maintain and upgrade abandoned buildings, preserve historic buildings, and help conserve greenspaces by promoting infill. To assist in funding projects, the state provides financial incentives.³⁸

New Urbanism is a second design movement that complements smart growth. While both smart growth and New Urbanism aim to counter sprawling patterns that have dominated contemporary development, new urbanist principles more specifically target

design and architecture. This movement seeks to enhance community well-being by increasing options for urban living and improving local amenities and public spaces, while concurrently recognizing the need to reduce resource consumption and the environmental impacts of development. New Urbanism emphasizes the front porch community and the promotion of walkable, diverse neighborhoods with a variety of housing and job types.

One community that has embraced New Urbanist principles is Kentlands, MD, designed by Andrew Duany. Located in the Washington, DC metropolitan area, this combination of single-family homes, town homes, condominiums, and rental apartments, as well as office, commercial, and retail enables people to reach work, shopping, and school destinations by walking. In addition to providing pedestrian access to residential and downtown areas, Kentlands fosters community through clubs, organizations, and recreation programs, as well as through a homeowners association that maintains common areas and amenities, and a community foundation that provides outreach, volunteerism, and promotes culture.³⁹

In addition to informing new sustainable developments, New Urbanist design principles can play a significant role in shaping redevelopment projects. In fact, a 2002 survey of New Urbanist projects found that nearly half of neighborhood scale U.S. projects were infill redevelopments.⁴⁰

Planning academics and professionals Deitrick and Ellis argue that practical New Urbanism design principles are “especially appropriate for affordable infill projects in central cities,” because “good design can improve the quality, durability, marketability, and community acceptance of inner-city revitalization efforts.”⁴¹ Additionally, contrary to conventional market-based approach to housing provision, these principles emphasize community involvement and housing diversity.⁴² A case study of four projects undertaken in Pittsburgh, PA, demonstrates how New Urbanism principles can guide successful inner city redevelopment.

The City of Pittsburg has shown that New Urbanism design principles can effectively integrate key elements of urban revitalization such as affordable housing, pedestrian oriented development, and community-based design. These principles include those that emphasize streetscape and building improvements for historic character preservation, establish a coherent urban form, and support connectivity and public amenities.⁴³

An older industrial city, Pittsburgh faces many of the same challenges as Detroit. The decline of industrial manufacturing and job loss associated with the fall of this industry lead to significant population loss and high unemployment. This economic downturn spurred a decline in the housing stock, a visible expression of the community’s distress. In a time when Pittsburgh, along with other Rust Belt cities, was suffering from the inner city turmoil of segregation, racism, and urban renewal efforts as well as broader issues of suburbanization, and “regional stagnation,” there existed a strong need to address

depopulation, changing demographics, and deteriorating buildings and infrastructure. New Urbanism emerged as a foundation for guiding redevelopment where affordable housing and revitalization of the housing market were key goals.

The Pittsburgh neighborhoods that adopted these redevelopment principles ranged in scale and infill needs; however, each emphasized a collaborative process between CDCs, urban designers, architects, community groups, and residents. The community-based planning process ensured that design was both informed by the unique social and economic characteristics of the neighborhood and also included a neighborhood plan that would meet the needs of existing and future residents.⁴⁴ For example, the neighborhood residents determined they wanted owner-occupied units and so a condominium association was created. In one neighborhood, the CDC focused on commercial revitalization of the main thoroughfare to build a market to new business and housing. In another, the redevelopment project emphasized restoration and rehab of existing buildings. Design was informed by existing neighborhood character, and utilized a range of high quality materials, for example, neighborhoods squares were designed to look like the downtown.⁴⁵

Creative financing strategies where partnerships leveraged public, private, and foundation support and designs that included a range of housing materials and construction were implemented to increase the financial feasibility of the affordable housing projects. In some instances, semi-manufactured housing was used to keep the costs down and build quality units within the constraints of available financing and development costs. Where riverfront and affordable housing were less closely aligned, the financial gap between construction and appraisal values was filled with foundation grants and second mortgages from the Urban Redevelopment Authority. A variety of prices and construction techniques and materials enabled successful financing and marketing of the infill developments in the neighborhoods.⁴⁶

Chapter 3.2: Vacant Land and Brownfields

Vacant or underutilized land is an issue that plagues many urban post-industrial communities. Vacant lots or properties with dilapidated or abandoned buildings can decrease property value, encourage crime, and pollution, and detract from the aesthetic appeal of a neighborhood.¹ In commercial or retail areas, vacant property is likely to decrease business, in addition to property value. Property that is condemned or not maintained in residential areas can also decrease a residents' sense of well-being and neighborhood pride. Vacant property is often perceived as, and can be, unsafe or dangerous. Protecting and maintaining these lots becomes the burden of the city, which must spend tax money to provide police and fire protection, and maintenance, such as mowing and landscaping. In addition to these costs, land that is vacant or otherwise underutilized does not contribute to a city's tax base, reducing a city's potential revenue stream.

Often, toxic substances, such as lead or other dangerous chemicals, contaminate properties that have a history of industrial use or buried remains of demolished buildings. These 'brownfield' properties, defined by the EPA as "real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contamination,"² can be a hazard to human health as well as a source of environmental degradation. Brownfield remediation can be a costly, time consuming, and complex process that is often a significant barrier to redevelopment.

Through enabling legislation, a variety of financial tools and mechanisms are made available for funding brownfield revitalization projects. The array of funding options offers opportunity for flexibility and creativity when financing a project. Financial incentives fill the gap between the cost of developing greenfields and brownfields in a city making the land more attractive for redevelopment.³ Examples of economic incentives include grants, low-interest loans, government-back loans (SBA), tax credits, income tax, property tax, tax exemptions, tax increment financing, and accelerated depreciation.⁴ Federal, state, or private trusts are an effective approach to ensuring long-term sustainability.⁵ The incentives can be used for many aspects of brownfield redevelopment including, but not limited to, land acquisition, due diligence, construction, insurance, and environmental remediation.⁶

Michigan brownfields law contains standards and incentives that aid in removing liability barriers and encouraging the return of contaminated property to profitable and safe uses through remediation. MI Public Act 259 provides statutory authority for tax-foreclosed, "blighted and functionally obsolete" property to qualify as a brownfield and thus extends eligibility for brownfield redevelopment financing.^{7,8,9} As potential contamination is a deterrent to purchasing abandoned or vacant urban land, the freedom from liability and the

provision of financial assistance to clean up residual contamination significantly increases the feasibility and practicality of vacant lot redevelopment. Financial tools and incentives can be used for land acquisition, due diligence, construction, insurance, and environmental remediation.¹⁰ These mechanisms increase the feasibility and attractiveness of brownfield redevelopment and offer the opportunity for flexible and creative project financing. Examples of these incentives include grants, low or government backed loans, tax increment financing (TIF), tax credits and incentives, and accelerated depreciation.¹¹ In addition, federal, state, or private trusts, and the Brownfield Redevelopment Financing Act (1996), which provided municipalities with the ability to create brownfield redevelopment authorities and to capture incremental taxes, aid in brownfield cleanup and redevelopment financing.^{12, 13}

Stabilizing Vacant Land

Land Banks

One policy mechanism that promotes vacant land reuse is a land bank. A land bank aligns real estate markets with federal, state, and local properties in order to address the barriers commonly faced by municipalities regarding vacant land issues.¹⁴ Under the Natural Resources and Environmental Protection Act (1994), a land bank authority is able to acquire, hold, and sell property without taking on liability for any potential contamination.¹⁵ Land banks enable a local authority to take, hold, and strategically convey a property's title to new ownership.^{16,17} Prior to the land bank legislation, tax-reverted properties had to be acquired through tax lien sales or foreclosure.¹⁸ Because land banks enable more efficient and deliberate transition of vacant, contaminated or potentially contaminated, or foreclosed property into productive land uses, they reduce the social costs of unoccupied land.¹⁹ Further, land banks can foster regional prosperity by promoting the conversion of neglected land into tax generating residential or commercial units or community spaces and gardens.²⁰

One of the most progressive and successful land bank models in the country is the Genesee County Land Bank (GCLB) in Michigan. This land bank demonstrates, for example, how a combination of legal instruments and financial incentives can be utilized to return brownfields to safe and profitable uses.²¹ Since 2002, the GCLB has acquired and encouraged the re-use of over 4,000 tax-foreclosed properties.²² Between 2002 and 2005, over \$112 million in economic benefits was leveraged from an investment of \$3.5 in rehabilitation and reclamation of tax delinquent properties.²³

Cleveland's Land Bank is another successful model that has facilitated redevelopment from conditions comparable to Detroit. Like Detroit, Cleveland has lost 48 percent of its population since 1950.²⁴ Ohio adopted legislation in 1976 that would accelerate the return of tax-foreclosed properties to the revenue-generating base. This was

followed by the creation of a land bank in 1988, to oversee the collection and rehabilitation of delinquent properties. Michigan has only recently adopted similar legislation. Without a mechanism to provide a clear title for tax delinquent properties, a number of severely neglected properties accumulated.²⁵ The effect of a lag in policy adoption and action is evident, and Cleveland's Land Bank has demonstrated more success than that of Detroit's; As of 2005, the Cleveland Land Bank has sold two-thirds of its parcels since the 1970s while Detroit had sold approximately 43 percent, 30 percent of which had no plans for development.²⁶ Cleveland's Land Bank demonstrates the importance of prioritizing the selling of property, establishing a written, transparent disposition policy, collaborating with residents, establishing a strong connection between property disposition and reuse, clearing property titles, and establishing pricing and inventory systems.²⁷

Detroit's City Council approved the formation of the City's land bank in 2008, and Michigan's State Land Bank Authority has since approved an Intergovernmental Agreement.²⁸ The City's land bank will have a significant role to play in returning underused land to productive use. A land bank that is able to remove the stigma of liability and clear a property's title may provide the incentive developers need to purchase and develop land, especially given the low price of land in Detroit. In addition, a land bank that holds land will ease the process of acquiring multiple parcels of land. Though the financing of a land bank in Detroit is likely to be a challenging task, a number of Michigan counties and rustbelt cities demonstrate both the effectiveness and potential of creative financing mechanisms such as TIFs and brownfields funds. Removing abandoned, decaying buildings will have an immediate impact on the health, safety and well-being of residents, in addition to improving the neighborhood's visual character.

Restructuring Vacant Land

Establishing city and statewide vacant property agendas, collecting current data, and establishing networks among cities facing vacancy and depopulation are techniques that may guide a plan for consolidating underused land and realigning market incentives to encourage redevelopment.²⁹ 'Rightsizing' is the "stabilizing [of] dysfunctional markets and distressed neighborhoods by more closely aligning a city's built environment with the needs of existing and foreseeable future populations by adjusting the amount of land available for development." This redevelopment strategy is aimed at reducing the social and economic cost of blighted properties.³⁰ Both Philadelphia and Baltimore have established initiatives to address vacant property, and the strategy has been discussed by leaders in the public and private sector since 2007.^{31,32} Rightsizing and establishing green space in former industry-heavy cities such as Philadelphia and Baltimore has enabled regeneration of vacant properties for parks and gardens and restoration of ecological systems as well as fostering community empowerment through greening projects and partnerships.³³

A neighborhood plan could strengthen the restructuring of land or the creation of a land bank.³⁴ Philadelphia’s neighborhood typology model, for example, is based on demographic analyses that provide information to support site specific, tailored revitalization projects. This model has aided city official’s efforts in determining the degree of government intervention and suitability for “rightsizing through green infrastructure,” on a neighborhood basis.³⁵ One of the major challenges officials faced was engaging and empowering stakeholders in this comprehensive planning process. Youngstown, OH’s 2010 comprehensive planning process exemplifies effective citizen involvement. Responding to resident’s fear of the impact of revitalization and restructuring of land and potential relocation, the city sought to engage citizens and maintain a clear and transparent process.³⁶ Youngstown’s process included visioning workshops with residents, community and private sector leaders, and a public engagement consultant, which resulted in the creation of four vision principles. Following this, officials constructed neighborhood meetings, a citywide branding campaign, and finally a presentation of the comprehensive plan. Youngstown demonstrated that engaging the community and skeptics through dialogue and a carefully articulated plan is an effective way to build public support for a new city vision, strategize for the future, as well as rebuild social capital.³⁷

The degree and location of vacancy has significant implications for future land use plans in the City of Detroit. A recent study of residential vacancy conducted by the Detroit Data Collaborative found that 35 percent (approximately 254,000 houses) of the City’s 348,849 residential lots were vacant. Approximately four percent of the existing housing stock was rated as in poor condition.³⁸ Data from the Detroit Residential Parcel Survey shows that vacancy rate for residential structures with one to four units in the lower eastside is variable, with the majority of vacancy rates falling between seven and 20 percent. These rates are comparable to much of Detroit.³⁹ The area north of Jefferson Avenue was among those with the fewest existing housing structures, while the area south of Jefferson Avenue had a much higher rate.⁴⁰ A walking survey in the lower eastside indicated that 3,420, or 55 percent of, the 6,255 properties surveyed were vacant and/or abandoned. Of these 3173 had no visible structure and 247 had an abandoned building.

Vacant land and depopulation threaten the vitality of Detroit, and there is growing concern to find solutions to these systemic problems. While vacancy is not unique to Detroit, the City’s extensive land area exacerbates the lack of reinvestment funds, decreasing population, and unemployment rate that fuel vacancy. Without first stabilizing vacant land, redevelopment will be challenging. This area, like many regions of the City, has lost a significant number of residential units. As full neighborhood redevelopment is not likely to occur in the near future, residential and commercial redevelopment efforts should target areas with existing amenities. Building in proximity to amenities such as good housing stock, commercial hubs, and new infrastructure, while increasing the value of vacant land

through alternative land uses including public open space, gardens, and natural areas will establish purposeful patterns of density and open space. Such patterns will foster more resource efficient and livable communities than the checkerboard of occupied and vacant lots that currently exists.

When it comes to improving the quality of life for residents, however, there is ample opportunity to do so by rethinking land use. Diversifying urban land uses to weave in green infrastructure and community-oriented uses offer many benefits to humans and natural systems. Relatively inexpensive strategies to transform vacant lots into useful spaces may include allocating space for community and private garden plots, establishing patches of urban forest, initiating an urban tree farm, allowing residents to purchase side lots for gardens, producing food and developing urban agriculture businesses, and restoring the wetlands that formerly occupied the region.

While large-scale reforestation of an urban region is not a common redevelopment strategy in cities faced with depopulation and vacant land, Detroit has a very large land area and an existing successful tree-planting program could provide just the combination to support such an effort. A forested urban park could be incorporated into existing greenway plans and contribute to a greater greenspace network. In addition to improving natural systems, purposeful tree planting provides a functional, aesthetic solution to increasing the value of underused land. Though the feasibility of this strategy is contingent on the ability to address safety concerns and generate the support of the public as well as elected officials, the benefits of planting trees, including energy savings, carbon sequestration and urban heat island reduction are significant enough that this opportunity should not be overlooked.⁴¹

There is opportunity to partner with the Greening of Detroit to plant street and park trees, and community leaders can play a role in initiating tree plantings within the neighborhood. While the Greening of Detroit aims to increase the canopy cover of the City as a whole, plantings locations are influenced by the engagement of the community itself, in addition to tree canopy need. Because maintenance is a crucial component of successful tree planting programs, community interest and volunteer support are important aspects of determining where tree plantings occur. One Greening of Detroit initiative, the Neighborhood Nursery Program, provides neighborhoods with the opportunity to grow and care for trees on city-owned property within the neighborhood and then plant the matured trees on local streets.⁴² Creekside, for example, has a nursery on Kitchener Street in Detroit. Such a nursery in the lower eastside can increase community interaction, give community members the opportunity to learn about tree care, and ultimately increase the neighborhood's tree canopy.

Urban agriculture, another viable land reuse approach, is generating increasing attention in many U.S. cities, including Detroit. Detroit itself boasts many successful small-

scale farms and community gardens that afford numerous benefits, from access to fresh food to jobs to exercise and more. While logistics such as farm management skills, tools, soil testing, and water access may require investment and planning, adequate models and sharing of knowledge may help to overcome these roadblocks. However, there are significant policy and urban planning barriers to farming in cities in the U.S, such as land use regulation that prohibits alternative purposing. Detroit's Master Plan and Official Zoning Ordinances, for example, do not recognize urban agriculture as an allowable land use. The abundance of vacant land north of Jefferson Avenue makes this area suitable to a community based, job-generating, farming operations; policies that support urban agriculture are essential to the long-term success of agriculture in an urban region.⁴³ Cleveland, OH's urban garden zoning district has aided the City in establishing 225 community gardens and 25-for-profit urban farms.⁴⁴ Recognizing that urban agriculture may represent the highest and best use for many of the community lots, adopting a policy similar to Cleveland's would significantly increase the practicality of farming.

Integrating alternative land uses within the landscape of the lower eastside can ensure adequate greenspace and aid in creating a livable urban form. In addition to supporting long-term environmental sustainability, greenspaces can also play a more temporary role. Parks and gardens, for example, can act as nonpermanent land uses until demand for urban space returns. This both returns property to a useful state and confers perception of care. The role of beautification that landscaping provides can have significant community benefits.⁴⁵ Cleveland's *Vacant Land Patternbook*, published in 2008 by the Cleveland Urban Design Collaborative and Neighborhood Progress, Inc, for example, recommends creative land-holding strategies, including flexible, temporary uses that can transform an eyesore into an asset, many of which are applicable to vacant land in Detroit. In reframing the problem, the lower eastside's vacancy provides a blank slate opportunity to re-envision and rebuild the neighborhood in a way that supports economic, social, and environmental objectives.

Chapter 4: The REPAIR Model

Through the study of the successful case studies referenced in Chapter 2, an approach to sustainable redevelopment emerged and was clarified. To summarize those best practices, we devised the REPAIR model of community redevelopment. This model, a six-step framework shown in Figure 22, can be applied by other communities with redevelopment needs.

The first step of the REPAIR model, *Review*, avoids legacy biases and instead opts for a data-driven approach to community health evaluation. In this stage, the emphasis is on accumulating data on a number of metrics and indicators in the community, providing an accurate status of the local environmental, social, and economic conditions. These metrics indicate areas of need or concern within the community, important for targeting appropriate initiatives to undertake locally.

Next in the process is *Examine*, in which an inventory of all available community assets is created. The goal of this phase is to determine physical and social sources of strength, competitive advantage, and community pride. As seen in many examples of redevelopment, communities can their local assets to jumpstart their economy. The assets identified in this step will be built upon in later steps to affect change.

Participate highlights the importance of inclusionary planning and stakeholder engagement. Rather than designing for a community, our research has indicated that the most successful redevelopment projects are planned with direct input from all local stakeholders, including residents, businesses, non-profits, and governmental entities.

The next step is to *Articulate* a clear vision for the community's future. In this phase, design strategies are developed and enhanced. With this plan, community members, non-profits, CDCs, and others can cull the necessary resources, funding, and stakeholder support to *Implement*. It is important to remain flexible during this stage. Upon encountering setbacks or unexpected developments, the process allows for a loop back to the *Participate* step, to adjust the plan as necessary. In the event of a major setback, the reengagement of local stakeholders can provide an innovative new direction or the guidance necessary to redirect the process along a more appropriate path.

Lastly, once a plan, design, or initiative is implemented, communities should *Revisit* the process at regularly defined intervals or when certain thresholds are met. A truly sustainable society must implement contingency planning, such as climate action plans, and methods of adaptability, which incorporate resilience to major shocks and stresses in the future.

In the pages that follow, we discuss the REPAIR model step-by-step, applying it to Detroit's lower eastside. Due to time and resource constraints, we were unable to follow

the process through the whole cycle. Where applicable, however, next steps and guidance for relevant community organizations are provided.

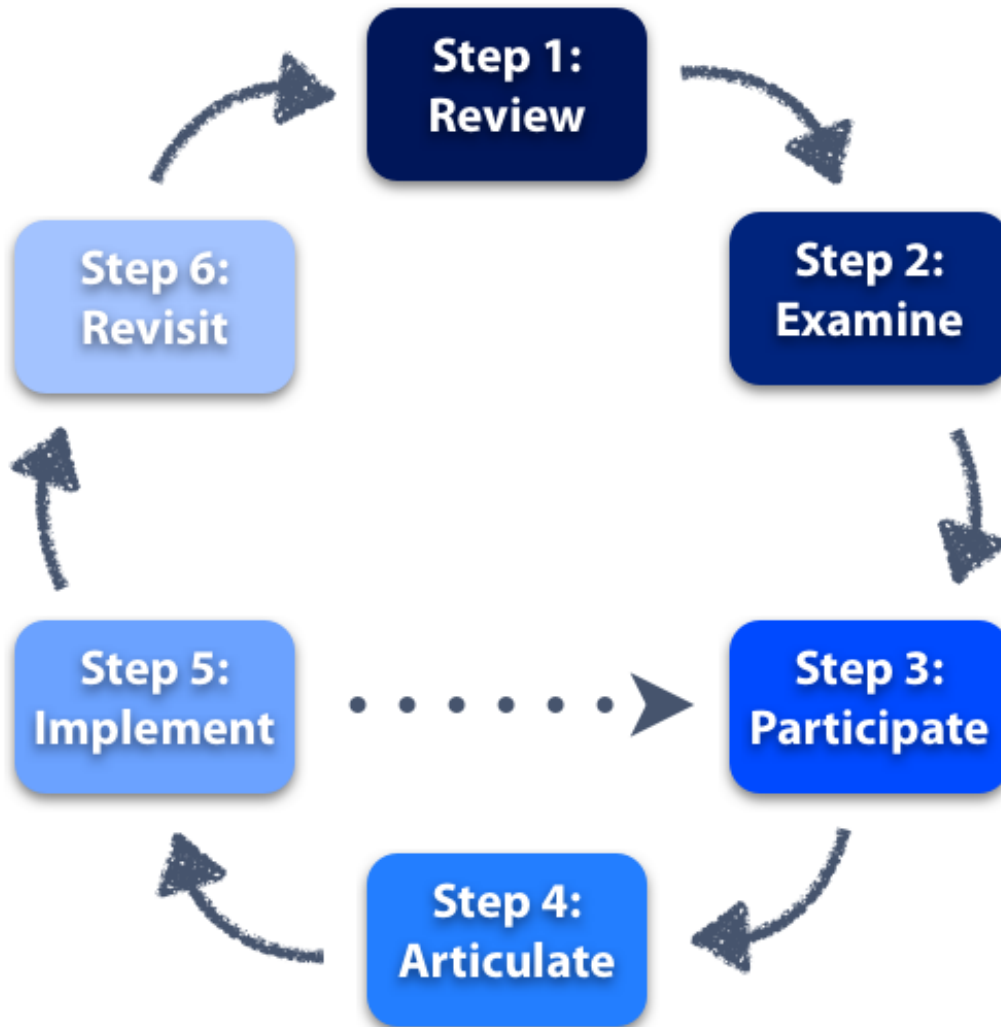


Figure 22 - REPAIR Model of Community Redevelopment

Chapter 4.1: Review

The first step in the REPAIR model is *Review*. Here we assess the economic, social and environmental health of the community through careful data analysis. The results from such an analysis allow policymakers and community groups to target appropriate resources towards highest priority elements. Many cities have embraced an information-driven approach to redevelopment with significant results. In Chicago and Manhattan, for example, low-income food deserts were identified through data collection and analysis. The results sparked action from city council to attract large-box grocery tenants. The City of Cleveland's Strategic Investment Initiative addresses issues of vacant and abandoned properties by using direct on-site surveys, property data, and an aggressive network of knowledgeable CDCs. This data, shared amongst a number of civic, non-profit, and neighborhood organizations, has led to a steady increase in the quality of conditions within the city.¹

Though time, resources and the availability of data prohibited extensive data gathering for this project, we were able to collect substantial data through secondary sources, such as regional and federal databanks and censuses and local government statistics. In many cases, specialized data from non-profit community-based organizations was included in this effort. Where possible, data was supplemented with primary research from interviews and surveys. This section serves not to provide a comprehensive analysis of each metric we researched. Rather, it provides a general overview of Detroit's lower eastside as a starting point for beginning to understand trends, patterns, and the interconnectivity of the topics we addressed in Chapter 2. To further understand how these metrics impact and are affected by each other, a causal relationship matrix was constructed.^{xvi}

Selected metrics are summarized in the table below:

^{xvi} See Appendix 8 for the complete Metrics Matrix

Table 2 - Indicators and Metrics

ECONOMIC PROSPERITY	
<i>Income</i>	While the national average median is \$54,180, median income in the lower eastside is \$27, 509. ² The percent of households where annual income <\$25,000 is 15.25% compared to the national average, 9.54%. The percent of households where annual income = \$75,000-\$99,999 is only 5.93%, while the national average is 13.67%. ³ Over 40% of lower eastside residents live below the official U.S. poverty level, and 57% live at or below 200% of the federal poverty level of \$20,800. ⁴
<i>Unemployment</i>	At over 20%, the unemployment rate is very high ⁵ compared to the national rate unemployment rate of 9.7%. Many residents who participated in our survey indicated that they had recently become unemployed.
<i>Education</i>	Educational attainment in the lower eastside is lower than national averages. While 80.4% of the US population over age 25 has received a high school diploma and 12.7% has received a bachelor’s degree, less than 70% of lower eastside residents and only 7% have a college degree. ⁶
<i>Local CDCs & Organization</i>	There are a number of local organizations in the community including the JEBA, the Jefferson-Chalmers CDC, and the Creekside CDC. Detroit Workforce Development Department s Connor location lies on the northwestern edge of the lower eastside.
<i>Job Creation</i>	Though JEBA helped to support and create 150 jobs in 2009 alone, the community like many other communities, in Detroit and nationwide, need more opportunities for employment opportunities. ⁷
<i>Businesses</i>	There are over 40 commercial and office entities in the neighborhood most are located along Jefferson. The windshield survey revealed that many businesses on Jefferson were closed. ⁸ Depopulation and loss of industry have significantly reduced the city’s tax base, slowing efforts to attract new business. ⁹

Human Health	
<i>Overall Status</i>	According to Census data, the majority of the population (58.64%) report being excellent or very good health, and less than 15% report being in fair or poor health. The national percent of population in excellent or very good health is slightly higher, at 60.80%, and the percent of population in fair or poor health is slightly lower. ¹⁰
<i>Access to Fresh Food</i>	Though Detroit has a number of urban farms and amenities such as Eastern Market, access to fresh produce and nutritious food can be a challenge. The availability of cheap fast food and lack of few grocery stores contribute to poor eating and health. Detroit is cited as a food desert, and the lower eastside is no exception to this claim. While only 15% of residents live within a mile of the community's sole grocery store, 30% live within ¼ mile of 4 fast food chains, and 46% live within walking distance of the 9 liquor/gas/convenience stores. ¹¹ The entire city only has 40 grocery stores, of which only 8% are real grocery stores. ¹²
<i>Health Care</i>	There are 4 Primary Care Providers located within the lower eastside. The percent of individuals without health insurance (16%) in Wayne County, twice the statewide average. ¹³ The area's St. John Detroit Riverview Hospital closed in 2007 due to financial loss. ¹⁴
<i>Obesity</i>	Obesity rates are high. The Michigan Department of Community Health indicates that 70% of Detroit residents are obese or overweight. Census data indications that over 27% of residents have an obese rate Body Mass Index (BMI), 33.04% are overweight, 33.53% have a healthy weight, and 1.53% are underweight. ¹⁵ These rates are comparable to U.S. averages of 24.77%, 33.46%, 35.41%, and 1.58%, respectively. The obesity rate of low-income pre-school aged children is an alarming 15-20%. ^{16,17}
<i>Disease</i>	Asthma is an issue for many Detroit residents. Over 9% over children have asthma, and Wayne County's asthma related hospitalizations are over 75% higher than the state as a whole. ^{18,19} Asthma rates in Detroit children are as high as 27% in Detroit, compared to the 7% national average. ²⁰ The prevalence of diabetes in Detroit (affecting 6-8% of population) is higher than that of adjacent Grosse Pointe Park (4-6%). ²¹
<i>Exposure to Toxics</i>	Toxic chemicals and pollutants associated with the local incinerator, auto emission, and vacant property increase human exposure to toxics. In 2008, 182,588 lbs of chemicals were released into the air. ²² As of 2004, 6% of all children age six and younger in Detroit had lead poisoning. ²³

VIBRANT COMMUNITIES

<i>Parks & Gardens</i>	Six parks in the lower eastside, account for over 135 acres of the lower eastside. Most parkland is along the riverfront. There are scattered but minimal small neighborhood parks. Only 20% of occupied households are within ¼ of a mile of walking distance to these parks. ^{xvii} 86% of survey respondents indicated that they enjoy and would like to be closer to parks. ²⁴
<i>Transportation</i>	Four bus lines serve the neighborhood. Like the rest of the City, the community depends on private autos. There are no bike lanes along Jefferson. Michigan ranks 27 th in the nation in gasoline consumption per capita (497/gallons/person/yr). ²⁵
<i>Crime</i>	Against the U.S. averages, each below 100, the community has a have than average forcible robber index (137), forcible rape index (129), burglary index (185), and aggravated assault index (168). ²⁶ Almost all of survey respondents indicated that the neighborhood is not safe and 20% indicated that it's not safe for children to play outside during the day. 24% listed crime, 8% drugs, 5% the need for better lighting, and 6% safety overall as their biggest concern. ⁱ
<i>Churches & Community Centers</i>	There are 26 churches in the area. Fifty-eight% of the occupied households are within ¼ mile walking distance of one or more churches. Fewer than 10% of occupied households are within ¼ mile walking distance to the 2 local community centers. ²⁷
<i>School</i>	Mayor Bing recently announced a plan to shutter 42 school buildings in the city, one of which 4 schools are located within the community. The City of Detroit has recently closed many schools, one of white is located in the lower eastside. ²⁸

^{xvii} See Appendix 3 for full listing of Survey Results

MATERIAL FLOWS & ENERGY

Solid Waste	In 2009, the City of Detroit disposed of 280,000 tons of refuse, 48,000 tons of bulk items and 14,000 tons of yard waste and brush. ²⁹ The lower eastside has mobile facility that provides opportunity for a monthly a monthly drop-off. ³⁰ Detroit's incinerator burns 4,000 tons of municipal solid waste per day and produces 720,000 pounds of steam per hour. ³¹
Per Capita Energy Demand	Michigan per capital energy consumption is ranked 36 nationally (313 million Btu/yr). ³²
Energy Supply	Fossil fuels, primarily coal, account for approximately 80% of DTE's energy supply. ³³
GHG Output	Detroit's incinerator may emit as much as 750,000 tons of CO ₂ emissions/year. ³⁴ Residential and transportation carbon footprint of Detroit residents in 2005 was 2.350 metric tons of carbon per capita. ³⁵ The regional GHG output in Michigan is 62.59 million metric tons of CO ₂ e ³⁶

ECOSYSTEM SERVICES

<i>Air Quality</i>	Like many U.S. cities, the air quality in Detroit is poor. Factors such as auto dependency, the local incinerator, and urban heat island effect exacerbate air quality. Between 1974 and 2008, total generation of all emissions increased 56%. ³⁷
<i>Water Quality</i>	Urban runoff, invasive species, an ageing sewer system, combined sewer discharge contribute to water quality impairment. The Rouge and Detroit River watersheds' urban land cover contributes to water quality impairment. Surface water discharges have fluctuated but are decreasing. ³⁸
<i>Impervious Surfaces</i>	47% (41, 843 acres) of Detroit's land cover is impervious In Detroit, land cover is comprised of 41,843 acres. ³⁹
<i>Tree Canopy Cover</i>	A recent study indicated that canopy accounts for only 19% of urban land in Michigan, which is less than the 25% recommended tree canopy cover. ⁴⁰ As measured in 2006, the urban tree canopy in Detroit accounted for 31% of the City's land area. ⁴¹ Lower eastside-specific tree canopy data is not available; However, a walk in the community reveals a sparse and unevenly distributed tree canopy cover. ⁴²

VACANT LAND

	<p>Vacancy is high in the lower eastside. Over 26% of the community’s land area, approximately 385 of the 1363 total acreage is vacant. 27% of survey respondents indicated that vacancy as a large concern. The lower eastside has approximately 245 abandoned buildings. High vacancy drives current efforts to rightsize the city, and Mayor Bing plans to “save the city” by relocating residents from vacant neighborhoods, investing in more populated areas, tearing down dangerous buildings, and closing dozens of schools.⁴³</p>
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Throughout our process we emphasize the interconnectivity and complexity of creating a sustainable community. In order to more accurately assess these metrics and identify the underlying interactions that formulate the current economic, social and environmental state, we constructed a causal relationship matrix. This matrix allows us to tease out the relationships between variables and target specific points of intervention. Analyzing the community from this systemic perspective will ultimately aid in determining the optimal places to invest action and resources. While this analysis was not extensive, the 30 indicators displayed in the matrix represent key components of a community system.^{xviii}

The analysis indicates that variables that tended to have the most causal impact on other variables included:

- Presence of Community Centers and Organizations
- Industry
- Tree Canopy
- Access to Diverse & Affordable Housing

The variables that tended to be a consequence of other variables included:

- Health
- Desire to Stay in the Neighborhood
- Vulnerability to Climate Events
- Ability to Meet Basic Needs Locally

And finally, the variables that were the most connected included:

- Health
- Desire to Stay in the Neighborhood
- Poverty
- Access to Diverse and Affordable Quality Housing
- Local Businesses
- Ability to Meet Basic Needs Locally

^{xviii} See Appendix 8 for the complete Metrics Matrix

These causal relationships can be used to shape a more comprehensive analysis of the community indicators and to make assumptions about the state of the community. The analysis indicates that most of the highly connected variables relate to aspects of quality of life, such as health, economic status, access to local goods and services. The strongest drivers in this simplified community system include industry, the community centers and organizations, tree canopy cover, and access to diverse and affordable housing; each influences quality of life. Variables that are most influenced by these and other drivers include health, the desire to stay in the neighborhood, vulnerability to climate, and the ability to meet basic needs. From this system analysis, we can draw the assumption that the economic development and job creation provided by industry, social support, services and activities provided by local organizations, the shade, ecosystem services, and aesthetics provided by trees, and the access and reduced energy associated with public transportation are among the more significant forces in a community system.

Given limited time and resources, the lower eastside, like most communities, must target investment and change where it has the greatest potential to have widespread impacts. Gathering data, identifying patterns and trends, and drawing assumptions about the causal relationships that influence the status of these indicators can guide decisions and actions. For example, we noted the benefits of urban trees in Chapter 2, and here have highlighted the interconnected nature of tree canopy relative to other elements of a community system. Surveys from 2006 indicate that, relative to that of other urban areas, Detroit's tree canopy is adequate. A state-wide tree canopy assessment, however, indicated that across the state, urban tree canopy is 25 percent lower than the recommended cover. The canopy cover of the lower eastside warrants improvement; it is patchy throughout the community and particularly sparse on Jefferson Avenue. Tree planting should be prioritized because planting addresses many issues simultaneously and provides a number of benefits that improve the quality of life to residents such as: reducing the urban heat island effect, improving air quality, attracting business, and restoring vacant land to a useful, aesthetic state.

By supplementing available data and studies with primary research, and investigating connections between different aspects of the community, we gained a greater understanding of the community as a whole. This insight then informed specific design elements that could potentially have a great impact on the lower eastside community as well as the ability to address multiple issues simultaneously.

Chapter 4.2: Examine

The next step in community redevelopment is to recognize that no matter how dire the circumstance, every community has valuable assets that can be of social/cultural, economic, or environmental significance. Community assets can also be identified in key organizations, social groups, and emerging leaders.¹ The significance is that the multiplicative effect of these assets can be drawn on to accelerate a redevelopment transformation. For example, as seen earlier in the Bethlehem, PA example the city turned what was commonly regarded as a liability, the aging brownfield U.S. Steel plant, into its greatest asset and economic driver. Each community will have a unique set of assets and it is crucial to decide how to utilize them for best effect.

Assets are positive entities that already exist within a community, as compared to needs, which demonstrate a deficiency of a good or service. Assets focus on efficiencies, help to build interdependencies, and seek to empower people.² Spurring economic development, improving residents’ livelihoods, building and strengthening a sense of community, and improving health and well-being are also accomplished through existing neighborhood assets.

Once the community has catalogued its assets, it can plan from a position of strength. By surveying the neighborhood and talking with Josh Elling, the executive director of JEBA, we have compiled a list of assets for Detroit’s lower eastside. This does not include other organizations located outside of the lower eastside neighborhood that may be influential or able to assist in the recovery and redevelopment process; these will be addressed in the *Implement* step.

Table 3 - Community Assets of Detroit's lower eastside

Category	Asset
Social	<ol style="list-style-type: none"> 1. Historic District 2. Crossroads of Michigan 3. St. Columba Hall & Church 4. Vanity Ballroom 5. Jazzin’ on Jefferson 6. Golightly Career and Technical Center 7. Robinson/Young Elementary & Middle School 8. Stark Elementary School 9. Guyton Elementary School 10. Health Care Providers 11. Monteith Library 12. Fire Department/Police Presence 13. Critical Population Mass south of Jefferson Ave

Environmental	<ol style="list-style-type: none"> 1. Riverfront access 2. Inland & Riverfront Parks 3. New Trees along Jefferson 4. Existing Tree Canopy 5. Open Space
Economic	<ol style="list-style-type: none"> 1. JEBA 2. Platte Motor Sales Building 3. Savarine Hotel Development 4. Chalmers Square 5. Riverbend Plaza 6. Chrysler Plant 7. Vacant & Abandoned Buildings 8. New Infrastructure north of Jefferson Avenue 9. Proximity to Grosse Pointe 10. Railroad tracks 11. Immigration Center 12. Canals

Social Assets

Social assets are those that address human-oriented aspects of a community such as institutions, health, equity, and interaction. These assets promote learning and well-being, foster a sense of place or community identity, facilitate communication between residents, and provide forums for gathering, socialization, sharing and spiritual fulfillment. This set of assets can include a wide variety of elements from educational institutions to medical facilities, community centers and events to religious organizations. What follows is a delineation of the social assets already present in Detroit's lower eastside.

Historic District

As previously mentioned the lower eastside has a rich historical background. The Jefferson-Chalmers Historic Business District was listed on the National Register of Historic places in 2004.³ Historic structures exist along Jefferson Avenue running from Eastlawn Street, near the Vanity Ballroom, to Alter Road. The area is significant and qualifies for preservation. During the 1920s it was the center of the neighborhood's commercial, social, and cultural life, containing two big-band era ballrooms that were the hub of the 20th century social scene. A *Metro Times* Detroit blogger wrote that the houses "still have beauty and character despite weathering over the years."⁴ The neighborhood once also contained three racetracks, one of which was a popular racing spot for Henry Ford before he started his own automobile company, adding history of the neighborhood.⁵ Nick Sinacori, a lifetime

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resident of the area and founder of the Village of Fairview Historic Society, documents significant past cultural aspects of the neighborhood over the course of its evolution. Nick's invaluable knowledge has been used to advocate for preservation and revitalization.

Crossroads of Michigan

Another asset is the east office of Crossroads of Michigan, a 40-year old social service outreach agency whose goal is to provide counseling, emergency assistance and advocacy to those in need. This organization runs a soup kitchen and a social service unit for counseling on immediate needs, including helping residents obtain identification cards in order to access better medical care, subsidized housing, education, and other governmentally sponsored programs, as well as organizing an employment office and job club. The job club helps to empower community members with employment skills, work ethic, and a sense of self-worth and commitment. They also aid citizens in purchasing prescription medication, as many do not have health insurance.⁶ The organization, run by donations from the community and foundations, a small paid staff, and reliable volunteers, provides these invaluable services to almost 3,000 residents each year.^{7,8,9}

St. Columba Hall & Church

St. Columba's Episcopal Church was established in 1913 in Detroit's lower eastside as a mission extension of the Old Christ Church. The original church was on Manistique Avenue near Jefferson, and was a simple wood frame building; a beautiful new permanent structure was crafted in 1928. The church was very active throughout the 1950s during Detroit's boom, though membership declined in following years. As the economic situation of the area waned, the St. Columba Outreach ministry incorporated in 1984 to provide valuable services to the community such as the Headstart thrift shop and job placement services. Finally in 2003 doors were officially closed by the Diocese of Detroit,¹⁰ though the building is still utilized as a parish and community center for a variety of activities. Due to its architectural prominence and long history of community service, the building has been identified by JEBA as a historically and culturally significant structure within the community.

Vanity Ballroom

The Vanity Ballroom is perhaps one of the most significant social assets of the lower eastside. Located on the corner of Newport and Jefferson, it was completed in 1929, one of six large ballrooms constructed during the 1920's in Detroit. It was listed on the National Register of Historic Places in November of 1982 due to its status as the last remaining intact ballroom of the Detroit dance halls that hosted big band music in the 1930s-50s. This venue hosted famous musicians such as Tommy Dorsey, Duke Ellington, and Benny Goodman. Its Aztec and Art Deco designs crafted by architect Charles N. Agree cause this building to stand out on Jefferson even though it has been shuttered and dilapidated since the 1980s. This

building has retail or commercial shop space on the first floor with the ballroom located on the second, making it an asset with architectural, economic and cultural potential. Though some have planned to restore the building to its former glory, none have been able to move forward as of yet.^{11,12}

Jazzin' on Jefferson

Now in its seventh year, Jazzin' on Jefferson is a favorite annual two-day community festival produced by JEBA. The event's popularity shuts down the streets, which teem with local and national jazz and blues artists, food, arts & crafts and other activities, all made possible by 200 volunteers. The festival unites the community and draws over 20,000 people annually, highlighting and celebrating the rich history of the lower eastside.¹³

Golightly Career and Technical Center

Golightly Career and Technical Center is an educational social asset located on Dickerson Avenue, just south of Jefferson Avenue in Detroit's lower eastside. This vocational school offers sixteen programs, from computer graphics to diversified hospitality to agriscience, providing critical career planning and job training. They also offer college and career prep and financial aid assistance for higher education, plus a particularly targeted five-week entrepreneurial class on business management.¹⁴ In an area with over 20 percent unemployment and over 30 percent of residents lacking a high school degree, this asset is providing a much-needed social service.

Remus Robinson/Whitney Young Elementary & Middle School

Located on Essex Avenue south of Jefferson, this elementary and middle school integration is the only remaining compulsory educational institution in the lower eastside. The school provides primary education and extracurricular activities such as choir, sports, technology and IT training, and accelerated math and reading. It also hosts Detroit Positive Youth Development after-school programs that are beneficial outlets for the neighborhood youth.¹⁵

Stark Elementary

Stark Elementary School, located next to Maheras-Gentry Park along the river is currently closed to educational purposes. However it is currently being used as an administrative center and also a few pre-kindergarten services. The ongoing usage and care of the building indicates that it could resume its former DPS standing in the future.¹⁶

Guyton Elementary

Guyton Elementary School was one educational institution that was an exception to the Detroit Public School (DPS) system. Achieving adequate yearly progress (AYP) goals every year, it was an excellent school that older residents in the community still reminisce

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about attending. Residents formed Community Partners to Revitalize Guyton to fight to keep the school open, just one example of the social resolve of the community, though it finally was shuttered in 2009.¹⁷ Located on the corner of Avondale and Marlborough, the building is still in decent condition, though it would require many structural improvements to meet DPS standards. As there is so much loyalty to the school it could eventually be reopened should the neighborhood recover, or the structure could provide alternate uses such as retail or housing.

Primary Health Care Providers

In a region where at least 16 percent are uninsured and a majority is on federal health assistance many wind up in hospital emergency rooms to deal with primary care health concerns.¹⁸ Though there are nowhere near enough physicians or providers for the needs of people living under the poverty level, there are currently three primary safety net providers operating in the boundaries of the lower eastside. They are Detroit Community Health Connection, St. John Health Connect, and Park Family Health Care. Though Riverview Hospital closed in 2007, there are three ERs serving the area, Detroit Medical Center, St. John Hospital and Medical Center and Henry Ford Hospital, all of which serve the lower eastside but are outside of the boundaries of our examination site.

Monteith Library

The ornately-detailed Monteith Library is located at Kercheval Street and Lakewood Street. A prominent lower eastside historic feature, the building opened to the public in 1926, the first to be designed according to a regional plan. Today its service area extends from the riverfront to Mack Avenue and from Conner to Alter Road, the only public library serving the lower eastside. Stained glass windows, symbolic carvings and beautifully restored renovations make this a distinctive and well preserved building that is host to a variety of children's programming and community meetings.

Fire Department/Police Presence

Vital to the security of a community are the dedicated public servants who protect it from crime and danger. The nearest fire station is on Jefferson Avenue near Terminal Street at the far western edge of our site boundaries. It is technically one mile out of the center of the neighborhood. In October of 2008, the Detroit Police Department opened four new police mini-stations, one of which is located in the Riverbend Plaza on Jefferson Avenue. This station increased the police presence in the neighborhood and adds to the perception of safety. Both of these public services are assets to the social well-being of the lower eastside.

Critical Population Mass south of Jefferson Ave

While Detroit has lost approximately 50% of its population small islands of density still exist within the city. In the lower eastside there still remains a critical population mass in the zone south Jefferson Avenue. This population mass is an asset because creates efficiencies: a sufficient ridership for improvement of transit lines, a tax base for supporting municipal services and infrastructure, costs of these services are distributed more effectively amongst a larger group. The population also provides a customer base for supporting a vibrant business corridor, and also puts more eyes on the street, creating the perception of safety and potential for sharing the burden of maintenance of community care cues.

Environmental Assets

Environmental assets are the natural capital of a region, providing a flow of services over time. They include naturally-occurring environmental features such as streams, rivers, lakes, coastline, forests, parks, greenspaces, landscaping and community gardens that provide a wide range of benefits to the ecosystem as well as the human beings living in it. For example, these assets can improve air and water quality, supply virgin materials for product generation, add to the aesthetic of a place which in turn can draw investment and increase property values, and provide habitat for biodiversity. These assets, though often forgotten, are intricately tied to both social and economic assets and so must be valued on par with both.

Riverfront

Detroit's lower eastside features a stretch along the shore of the Detroit River and a lovely view of Windsor, Canada. This asset adds scenic value to the community, draws visitors, and has been one of JEBA's focuses for advertising the uniqueness of the neighborhood. As the downtown Detroit revitalization efforts have included much focus on the RiverWalk, extension into the lower eastside along the riverfront is highly feasible.

Inland and Riverfront Parks

Detroit's lower eastside features four riverfront parks: Ford-Brush Park, Lakewood East Park, Maheras-Gentry Memorial Park, and Mariners' Park, also known as Windmill Point. There are also two inland parks, Hansen Playground on Avondale Street, and a neighborhood park at the corner of Alter Road and Jefferson Avenue. These parks are wonderful assets for outdoor recreation, providing space for children to play and adults to socialize in nature.

New trees along Jefferson

During November 2009 local non-profit Greening of Detroit held an immense volunteer event and planted 540 trees along the stretch of Jefferson Avenue between

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Grosse Pointe Park and downtown Detroit. The trees will advance not only the aesthetic of the Jefferson corridor, but will also help improve air quality and slow infiltration of stormwater. They also will replace some of the historic greenery that was lost as a result of the spread of Dutch elm disease in the 1950s and the more recent emerald ash borer.

Existing Tree Canopy

As measured in 2006, the urban tree canopy in Detroit accounted for 31% of the City's land area.¹⁹ While we were unable to obtain specific lower eastside-specific tree canopy, a simple street survey reveals a sparse and unevenly distributed tree canopy cover.²⁰ Some of the residential streets such as Lakewood are lined with lush foliage, though other areas saw their Elm and Ash populations decimated and replaced by invasives such as the Boxelder and Tree-of-heaven, which can prove detrimental to the natural ecosystem. The tree canopy that does still exist provides the benefits discussed in Chapter 2.6, Ecological Services: improved water quality, energy savings, lowered city temperatures and potential urban heat island effect, reduced pollutants, enhanced property values, wildlife habitat, and added aesthetic value.

Open Space

Open space and natural lands are key assets in any sustainable community for scenic resources, recreational opportunities, and biodiversity habitat. Though urban areas are often quite limited in their open space areas, as the lower eastside is on the edge of the city, they have more of these essential spaces than would usually be expected. The lower eastside contains 134.62 acres of park land open space. In addition, there are 385 acres of vacant land, 26.7 percent of the total acreage within our study area. This vacant land, while currently rundown and overgrown has tremendous potential for adaptive repurposing to fill community needs. The creation of more productive open spaces can provide opportunities for alternative transportation methods, urban agriculture and community gardens, and park space for exercise and recreation.

Economic Assets

Economic assets are those that function as stores of value, often over which ownership rights can be enforced; economic benefit may be derived for the viability of either individuals or a community. These include businesses, as well as development and construction projects, both of which provide jobs and income to residents in addition to consumable goods and services. Business associations are vital assets in helping to promote business development and employment opportunities within the area. Economic resources may also include features that boost the property values within the community, for example, new infrastructure and proximity to other assets, such as schools and parks.

Jefferson East Business Association (JEBA)

Jefferson East Business Association has been an active organization in Detroit's lower eastside since 1994. Committed to improving the lives of residents through increased business and employment opportunities, they strive for development of the commercial corridor and rehabilitation of several residential areas, all along the east end of the Jefferson Avenue Corridor. They are working to improve and maintain existing business and encouraging professional development of new ventures. They also host community events, provide services and training for start-ups, and offer grants for façade improvement to create a safer and more aesthetic business district.^{21,22,23} JEBA is obviously an essential crux to the economic redevelopment of Detroit's lower eastside.

Development Projects

JEBA is currently focused on three redevelopment projects. The first is the Platte Motor Sales Building, a warehouse which will become artist work/sell and loft space.²⁴ The goal for all projects is to provide jobs, housing and retail space for the community once completed. The projects are all utilizing existing structures, rather than creating entirely new development, thus reusing building stock and extraction of virgin materials.

Located across from Golightly Career and Technical Center, the former Savarine Hotel is a local historic landmark from 1926, a luxury hotel that was most recently renovated into low-income housing. The unit fell into disrepair and, in 2004, lost its Housing Assistance Payment contract which guaranteed residents federal assistance. In 2006 the MEDC allocated funding in single-business brownfield tax credits for renovation.²⁵ It now is being developed under the name Winston Place Apartments, a mixed-use development consisting of 106 renovated living units, 20,000 square feet of retail space and 10,000 square feet of office space.²⁶ This is a key economic asset as it will provide jobs while under construction, historic preservation, and new housing for the community once completed.

The Chalmers Square Building, another significant asset, located at 1025 Newport Street in Detroit's lower eastside just north of Jefferson Avenue, is currently being rehabilitated to its original residential/retail use. The mid-rise building is being renovated into 50 apartment units with an additional 17,000 square feet of retail space.²⁷ This building will likely add sufficient capacity to the underserved area.

Riverbend Plaza

The Riverbend Shopping Plaza is a high-traffic and highly visibility commercial center and economic anchor located on the south side of Jefferson Avenue. It contains the additional assets of a Parkway Foods grocery store and national chain locations of Radio Shack and a Rent-A-Center, which provide both food and semi-walkable employment opportunities for residents. Situated near the relatively higher density housing and growing

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downtown business district, the plaza is demonstrating potential to spur further economic development in the neighborhood.²⁸

Chrysler Plant

A 2.7 million square foot Chrysler LLC assembly plant is located on Conner Street, just north of Jefferson Avenue in Detroit's lower eastside. The "flex plant", which has the ability to make different vehicle models on the same line, opened in 1993 and expanded services in 1999. This Chrysler facility employs over 2,800 people;²⁹ however the majority of employees commute from outside of the neighborhood.

Vacant & Abandoned Buildings

There are several key historic vacant or abandoned buildings along Jefferson Avenue, for example:

- North & South side of Jefferson, mainly vacant two-story row buildings
- Empty Bank Building at 14555 Jefferson
- Empty Warehouse at 14701 Jefferson

These three existing structures have beautiful facades and historic architecture, which add aesthetic character to the commercial corridor. They hold enormous potential as incubator spaces as their large floor plate could be divided amongst a number of new ventures. They will be further discussed in the *Implement* section.

New Infrastructure north of Jefferson

The city has recently invested in new infrastructure in various sections of the neighborhood north of Jefferson Avenue in Detroit's lower eastside. The infrastructure includes streetlights, electric lines, sewer, storm drains and repaved roads. TIF funds were used to provide these infrastructure improvements, which in general, always provide benefit to a community. However, the area in which they were applied is currently highly vacant indicating that it may be some time before these tax-driven services are utilized to full benefit. Redevelopment of this area to productive use is necessary to maximize the cost-benefit of infrastructure implementation.

Proximity to Grosse Pointe

Detroit's lower eastside borders Grosse Pointe Park at Alter Road, an affluent neighborhood of high-end homes and lush landscape. Alter Road is the eastern city limit of Detroit; actual landscape obstructions and socioeconomic barriers are embodied by this road, a symbol for segregation. However, the proximity provides an asset because it is a gateway, increasing traffic flow along the Jefferson commercial corridor and a potential patron base for redevelopment. Residents of the lower eastside do not have access to Grosse Pointe's infrastructure or services but can utilize their commercial amenities.

Railroad tracks

Railroad tracks run from the northwest down into the Conner Creek Industrial complex. These tracks provide an economic asset because they would serve future industrial development as it repopulates the vacant land along Jefferson Avenue. This amenity is attractive to new potential business tenants.

Immigration Center

There is a U.S. Citizenship and Immigration Services (USCIS) office located on East Jefferson Avenue. The office provides interim employment authorization cards for immigrants and residents with either refugee or asylum status. They also offer orphan adoption services and a variety of other legal services regarding citizenship issues. They also offer education and information on USCIS policies, program and benefits for a public that may be in need albeit uninformed.

Canals

A number of canals provide access to the river, particularly in the southeastern portion of the neighborhood. The canals offer unique recreational and exercise opportunities, such as boating and kayaking, for area residents. While the channelized nature of the canals limits ecological benefit, returning wildlife has shown an affinity for the canal's calm waters, with a notable example of a beaver setting up residence in the Conner Creek canal.³⁰ With the exception of a boat dock on Riverside Drive, public access to the canals is currently limited. Additional access points, especially along the Fox Creek canal, would improve the value of these amenities.

Chapter 4.3: Participate

Community redevelopment projects are complex and take many years, sometimes decades, to reach their true vision. A crucial element of incorporating the sustainable solutions into these projects both initially and over time is having a clearly articulated form of stakeholder engagement and participatory planning built into the design process.

Particularly for sustainable redevelopment in areas that have faced severe degradation, local community members often need to undergo a process of *conscientization* (consciousness raising, critical thinking) and decision-making towards an understanding for quality of life, social justice and the common good.¹ Participation in decision-making can help build social ties and foster the trust in neighbors and community organizations that is necessary in adopting a communal (vs. individualistic) strategy for solving problems and needs.² When community members play an active role in the shaping of their neighborhood's design, it becomes a place in which they have ownership and pride. Their input can result in designated indoor and outdoor community spaces or the addition of public art to the nearby park. Ownership also fosters stewardship behavior, meaning they will care for the maintenance of their community more actively.

Methods of Community Engagement

The Sustainable Sites Initiative (SSI) includes as a credit the need to encourage stakeholders (e.g. site users, interest groups, and nearby residential commercial neighbors) to participate in the site design process.³ This is necessary because often local residents can contribute local existing preferences, needs, and knowledge to the professional expertise. The results are designs that better serve the people most affected, maximizing benefits and minimizing adverse effects.⁴ Public participation, if done properly, can enhance stewardship, sense of place, and feelings of ownership for site users resulting in innovations that enhance community economic development.⁵

There are a variety of recommendations that can lead to successful participation. Site users and stakeholders need to be engaged early and often in the design process in order to feel as though their contribution is meaningful. There should be multiple opportunities for participation, including informal methods. Designers should communicate a range of design alternatives, incorporating stakeholder ideas and associated outcomes using visual representations (e.g., sketches, models, or photo-simulations) that will speak to a wide audience rather than coming to the session with a pre-developed design in hand. Feedback from stakeholders should be documented and incorporated, outlining the needs of various groups. Opportunities should be made available for feedback to be provided and then made clear how it is incorporated into the design.⁶

There are a variety of other techniques that can be used in facilitating community engagement. These include discussion group techniques, such as focus groups or conflict resolution, public event techniques, such as open houses or interactive displays and community seminars or conferences. Other methods can create capacity building and support using participatory work such as community visioning, action research, participatory evaluation and budgeting. There are also methods of engagement that use the arts, such as community murals or participatory theater workshops.⁷

Surveys

One particularly effective option for assessing citizen needs and wants are survey techniques. Resident opinion surveys involve questionnaires or interviews and are a way of finding out local opinions on a certain topic for future analysis. It can also provide a way of gathering data on the profile of an area to be used as a baseline in measuring changes. While they are useful for the surveyor they also help to let the people of the community know that a study or initiative is taking place, which could prompt further involvement if they express interest. Since the methods of surveying can be widespread they may reach a larger number of people and can gauge the views of otherwise disengaged audiences.⁸

Charrettes

The charrette is one established method of facilitating stakeholder participation. In the context of modern planning, a design charrette refers to a five to seven day collaborative planning process in which community members and planning experts come together to create a buildable plan. The underlying philosophy is that “an informed citizenry knows what is best.” Charrettes typically consist of a combination of workshops, open houses, and “pen to paper” work sessions. Although costs vary according to the size and complexity of the study area, charrettes can cost between \$250,000 and \$300,000.⁹ In this process, a design team spends time studying the area and then relies on local experts to understand the community’s vision to ensure the plan that emerges at the end of the charrettes will truly reflect the values of the area.

A charrette system is vital in creating sustainable development because it can help to change project users’ mindsets and preconceptions about sustainability. They create an immersive, shared-learning environment that promotes this conceptual mind shift and new understanding. Since sustainable projects have an incredibly complex set of environmental, economic and social variable in addition to a large, almost always diverse set of stakeholders, the charrette addresses complexities by integrating design with a comprehensive community involvement process.¹⁰

An example of a successful charrette model in a city in desperate need of redevelopment is that of Greensburg, Kansas. The town of Greensburg was hit by a tornado of magnitude EF5 in the spring of 2007, leveling more than 95 percent of the built

environment beyond repair (see Figure 23).¹¹ Though the tornado was a disaster of epic proportions for its 1,500 inhabitants, the citizens opted to use their clean slate as an opportunity to rebuild as sustainably as possible. They are the first town to become entirely LEED certified and are a “model of sustainable living for the world.”¹²



Figure 23 - An aerial view of Greensburg, Kansas, after the tornado

The town utilized the design charrette model, involving many entities – the U.S. Environmental Protection Agency, National Renewable Energy Laboratory, the Department of Agriculture, Federal Emergency Management Agency and others – who offered assistance. The EPA, NREL, Greensburg Greentown, and Hathmore Technologies (a consulting firm) have worked together in creating the Greensburg Green Guide, the first city-specific green building guide, to help residents understand the need to build green according to their climate, location and circumstances. Students of the Kansas State University’s College of Architecture were also involved in the charrette process and invented prefabricated modular cubes with energy efficient elements and also designed and built the new Arts Center.¹³ Student representatives from the local high school were included in the process as a way to encourage the loyalty of the younger generation.

In another case, that of Columbia Pike, Virginia, the County Board created the Columbia Pike Initiative to build a safer, cleaner, more competitive and vibrant community. A long-range vision and plan was established to focus on economic development, land use and zoning, urban design, transportation and public infrastructure initiatives in addition to existing and future open space and recreational needs. The community participated in an intensive charrette in the fall of 2002 that produced specific design recommendations based on community values, for example the presence of a weekly farmers’ market made it clear that they valued public space and interaction. These recommendations became the basis of their Form-based coding. Form-based codes are an alternative to conventional zoning codes which emphasize the appropriate size and placement of buildings, instead of land use or density requirements. These “rules for predictable growth” were pivotal in the Columbia Pike corridor design Plan. “The Form-based Code represents a cutting-edge, revitalization and redevelopment tool. It is a legal document that regulates land development by setting careful and clear controls on building form – with broad parameters on building use – to shape clear public space (good streets, neighborhoods and parks) with a healthy mix of uses. With proper urban form, a greater integration of building uses is both natural and comfortable. The code uses simple and clear graphic prescriptions and parameters for

height, sitting and building elements to address the basic necessities for forming good public space.”¹⁴

Charrettes generate excitement among the public participants. The ownership that is developed over the project can translate into political support. As implementation of the plans can be challenging, making sure public officials and technicians are in attendance at public meetings during the charrettes so they can see the political will and force behind it, which can turn into power for accomplishing things.

The National Charrette Institute (NCI), a non-profit educational institution, has developed and teaches their own Charrette System, which is a design-based, accelerated, collaborative project management system that harnesses the talents and energies of all interested parties to create and support feasible planning.¹⁵ The NCI Charrette System identifies a variety of benefits from implementation of its practices. These include saving time and money through reducing rework due to successful feedback loops, shorter work sessions, and broader support from community members, professionals and staff. This support increases the probability of design implementation and also focuses on engineering and finance early on. It brings all decision makers together for a compressed period of time. Meaningful public involvement and education promotes trust between citizens and the government so input may affect the outcome while simultaneously building long-term community goodwill, an important element of a sustainable design. Including a wide variety of stakeholders ensures that the process is not hijacked by any one party.¹⁶

NCI has also identified a series of strategies for running successful charrettes processes. The first involves working collaboratively; involving all interested parties from the beginning will help participants to understand and support a project’s rationale. Designing cross-functionally utilizes a multi-disciplinary team method to create realistic decisions and eliminated the need for rework since design will reflect expertise of an assortment of specialties. Compressing time to sessions and meetings of usually around four days accelerates problem solving and decision making by encouraging thinking outside of the box. Other suggestions of successful strategies include communication in short feedback loops that build trust into the process, foster understanding and support. Studying both the details and the whole is informative and necessary. Producing feasible plans includes fully informing all decision points, particularly at the legal, financial and engineering levels throughout the process. Multiple day charrettes need to be held on multiple occasions to allow for the feedback loops to occur. Charrettes need to be held on or near the site in order to facilitate understanding of local values and traditions and provide easy access for the involved stakeholders to participate. Design can be used to achieve a shared vision and create holistic solutions that are satisfying to all.¹⁷

Developers must realize that to create sustainable development they must first understand the needs and wants of the local people, to whom the complexities of

“sustainable” may be new. Community engagement means actively bringing together and involving all members of the local community into the discussion, young and old, at all levels of education. It means thinking first of their needs and second of the design itself. Involving people equally means considering when and where workshops are held, to accommodate different schedules and transportation, avoiding bias, elitism, “expert” views, non-representation, and putting forth education if and when the need arises so community members understand the importance or intricacies of their options. Communities cannot make decisions unless they understand what sustainability is and how their options can contribute to the sustainability of their community. Feedback systems need to be incorporated so that people can review designs or proposals. In a process where people can listen and share their ideas, mutual learning and understanding from different perspectives can occur, and even help the developer to understand which sustainability options will work best. Processes can be short-term or long-term, leaving groups with opportunities for further education, and the ability to adapt with flexibility as facts and future needs become apparent.

There are many challenges, costs, and barriers to any engagement process, particularly in a region in need of sustainable redevelopment. The risks of embarking on these endeavors can come from both the developer side and the community itself. Within development organizations there is often a lack of support, a level of accountability and transparency that is difficult to achieve, and risk of not recouping upfront costs. Councils and governments may not support this form of approach, preferring to keep community members in the dark for the sake of convenience. Acquiring funding from partners is always a difficulty in cases of uncertainty.

On the part of the community, there are on occasion, inappropriate behaviors, minor and major disagreement, weather and traffic that prevent attendance, logistical failures.

Some of the associated costs include training staff, bringing in consultants or expert facilitators to convene actual meetings, additional time and effort for revamping process, preparation of materials for engagement purposes, regular communication with those involved and taking feedback into account, time-consuming ongoing liaison, community educational materials and more. The barriers include the following: unrealistic time expectations, community expectations, difficult sustainability policies, funding constraints, scale of project, levels of difficulty in getting approvals, unconvinced local government or authority, angry local community members, activist organizations with strong opposition, communities who are already disenchanted with these processes, passive or disempowered communities, negative media, or strongly polarized community members.¹⁸

However, the savings can also be tremendous. It affords the opportunity to incorporate expert views made up of local knowledge, faster passage of statutory processes

if local politicians are on board, trust built between community and development that could lead to future projects, and media support should it go well.¹⁹

Our Process

Due to the academic parameters and scope of this project, we did not have sufficient time or resources to undergo the entire six-step process. Our on-the-ground activities ended partially between the *Participate* and *Articulate* steps. However, our research and experience in this area has given us background to provide recommendations for JEBA and the other organizations and partners who choose to move forward with this redevelopment. What follows are the avenues in which we were able to engage with the community and recommendations on how to most effectively move forward with this effort.

While we were not able to complete a full charrette process with stakeholders, we did attend a small-scale charrette sponsored by JEBA with regards to the rebranding of the lower eastside, a part of their Cool Cities grant. This was an interesting instance of the challenges of working with a community as diverse as the lower eastside. The morning-long workshop involved trying to come to agreement on a brand strategy for the area to develop signage. The atmosphere had moments that seemed somewhat contentious and frustrating, but ultimately the experiment proved fruitful; a group of people with very different interests were able to come to a consensus. In planning future events for a similar purpose we would advise JEBA to be mindful of including key players in the discussion. The Jefferson-Chalmers CDC representatives were unable to attend, which has the potential to affect the ease of implementing the decision later on.

Our next avenue of engagement with the community was to perform a series of interviews with local community groups. Individually or in groups of twos and threes, we met with Detroit's lower eastside neighborhood leaders, including representatives from the Creekside CDC, the Jefferson-Chalmers CDC, the Conner Creek CDC, and U-Snap-Bac, to identify the efforts already being undergone by community-based organizations in area improvements. We met with University of Michigan students and researchers who had developed other projects regarding similar neighborhoods in Detroit. We communicated with area developers such as the New Far Eastside, researched Hamilton Anderson plans, and also spoke with Professor Dan Pitera of the University of Detroit Mercy Collaborative Design Center to identify what plans had already been conceived for the area. We also met with eastside resident and founder of the Village of Fairview Historical Society, Nick Sinacori, who lives in the same home his grandfather bought before he went off to help fight World War I. Nick gives an accelerated history lesson about the entire area, including the origin of virtually every street name and a biography of the namesakes or anecdotes

Chapter 4.3: Participate

about why they were named as they were. This gave us insight into the rich historic character of the neighborhood that deserves preservation and revitalization.

Our group also volunteered with the Greening of Detroit to engage in an on-the-ground outdoor interaction with the community residents. We participated in a 20th anniversary event that involved planting over 300 trees along Jefferson Avenue in an attempt to re-beautify the corridor and return some of the ecosystem services that trees can provide. Their volunteer opportunities provide an avenue for community residents to interact with each other while simultaneously spending time in nature. They are able to learn about the ecosystem of their neighborhood and the potential for re-greening the area, which was devastated by Dutch elm disease and emerald ash borer. The Greening of Detroit, also a provider of job training programs, is a stakeholder that should be continually involved in all design strategy.

Based on the effectiveness of assessing citizen needs and wants we also chose to include a small-scale survey of the Detroit lower eastside residents. During JEBA's annual Holiday event, we executed one-on-one surveys with all residents in attendance. We found that the face-to-face interaction made people feel more comfortable and willing to extrapolate on their answers giving us a more in depth look at their concerns for the area. Our survey results have been incorporated throughout into our assessment, design, and design narrative as a way of including feedback from our resident stakeholders. Their local knowledge and expertise is invaluable; we would recommend a more widespread and intensive survey be undertaken as part of a future design strategy, as our respondents were mainly of one particular demographic and it would be beneficial to have a wider variety of responses. For a more in depth look at our survey results, see Appendix 3.

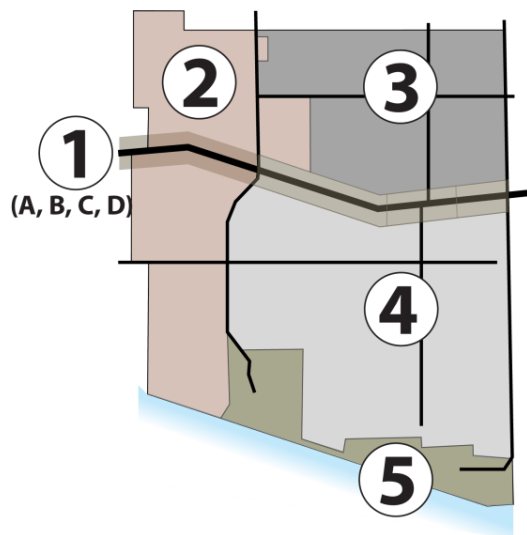
Our final engagement suggestion is to strongly encourage a charrette process that engages key stakeholders as early and often as possible. While involving every single player is neither feasible nor economical in terms of time, it is still crucial to identify who these key players are and make sure they are on board and at the table for this process. In the long run it will lead to a more sustainable design, one that community members agree with and are excited to help implement, thus avoiding other costly delays. For a more comprehensive list of potential stakeholders see Appendix 4. JEBA with its unique focus on economic development, large network of contacts to the spectrum of organizations and block leaders within the area, and deep-rooted ties to the history of the neighborhood could potentially serve as a focal point in bringing stakeholders together for this sort of intensive collaborative design engagement process.

Chapter 4.4: Articulate

Once all stakeholders are identified and engaged, the design process can begin. Informed by the concepts and sustainable innovations presented in the prior chapters and additional considerations regarding the long term needs of the community, we have developed a first draft design strategy for Detroit's lower eastside, accounting for the unique socioeconomic circumstances of this neighborhood. The proposed design would be the first iteration in a series of designs, with full expectation that community input via design charrettes and other participatory forums would drive the progression towards a final product. Features which enhance community interaction, walkability, and aesthetics serve the dual purpose of celebrating the area's history and respecting its ecological significance. While anticipating that significant conversations with community members and leaders are still to come, we feel the following recommendations provide a strong step in the right direction towards the creation of a sustainable community.

As discussed in Chapter 2, a number of interrelated elements are required to create a sustainable community. While it may be tempting to focus exclusively on economics as the critical factor for success in redevelopment areas, these other factors must also be taken into consideration for a holistically sustainable design to emerge. For example, the success of one of the neighborhood's principal assets, the riverfront, is dependent upon ecological considerations. One of the primary goals of the design is to drive visitors south to this underutilized amenity, generating an economic driver for the community in the process. A healthy and vibrant riverfront with open public park space increases the value of surrounding residential property. It also contributes to greater health and prosperity among area residents and, in turn, drives demand for increased transportation and walkable access to commercial and recreational facilities along key corridors in the community. To achieve its goals, our design and follow-up implementation must increase the visibility of these parks so their presence can be more fully utilized and appreciated.

The current street configuration channels traffic in an east-west fashion towards downtown Detroit along East Jefferson Avenue. There is no "heart" to the neighborhood; it is also difficult to distinguish the outer borders of the neighborhood. The major goal of this design is to create a focal point for the community which will reenergize its identity and aesthetic, and in turn, attract economic reinvestment and restore necessary ecological elements that will lead the improved quality of life and social well-being.



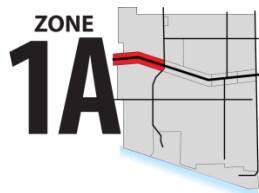
A Plan for Detroit’s Lower Eastside

Defining the Community

The Jefferson Avenue corridor is immense. Six lanes of traffic, a turning median, two parking lanes, and exceptionally wide sidewalk spaces combine to form a span of impervious concrete and asphalt that reaches as wide as 120 feet in many places. Through the 1950s, the presence of streetcars helped temper the overwhelming street size by reducing traffic to a more human scale of four lanes. While Jefferson Avenue ties the region together, its personality changes dramatically from block to block.

For purposes of discussion, we have divided the lower eastside into five distinct zones. These zones have their own focal points and characteristics, some existing and some suggested in this design, which will shape development patterns in the future. Zone 1, the Jefferson corridor, is further separated into four segments. Due to Jefferson’s primary importance to the neighborhood, we begin by reviewing the corridor and its four segments first, and then delve into the individual zones bordering Jefferson Avenue to the north and south.

Strategies along Jefferson Avenue



Zone 1A: Jefferson Avenue’s Industrial Corridor

Entering the lower eastside from downtown Detroit, visitors first encounter Jefferson Avenue as the industrial corridor running from Clairpointe Street to St. Jean Street. The Chrysler plant on the north side of Jefferson is the primary focus of this stretch. Fenced off and hidden behind a large berm, the plant becomes an enormous barrier between the lower eastside and the Indian Village neighborhood to the west. Large open fields to the south present the opportunity for industrial development infill. Ideally, a “clean”



Figure 24 - Griffith Park Composting Facility, Los Angeles, CA

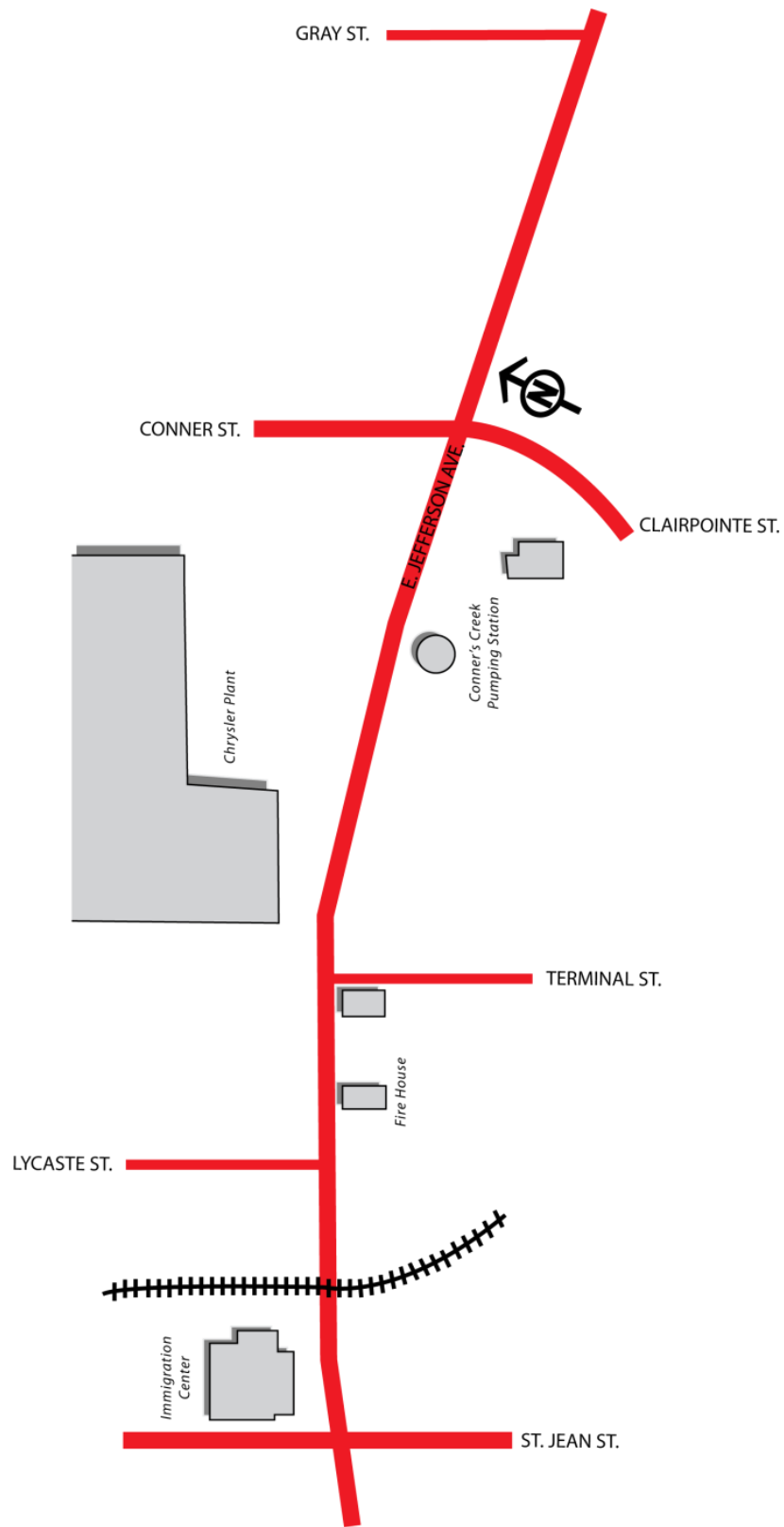


Figure 25 - Zone 1A boundaries and key buildings

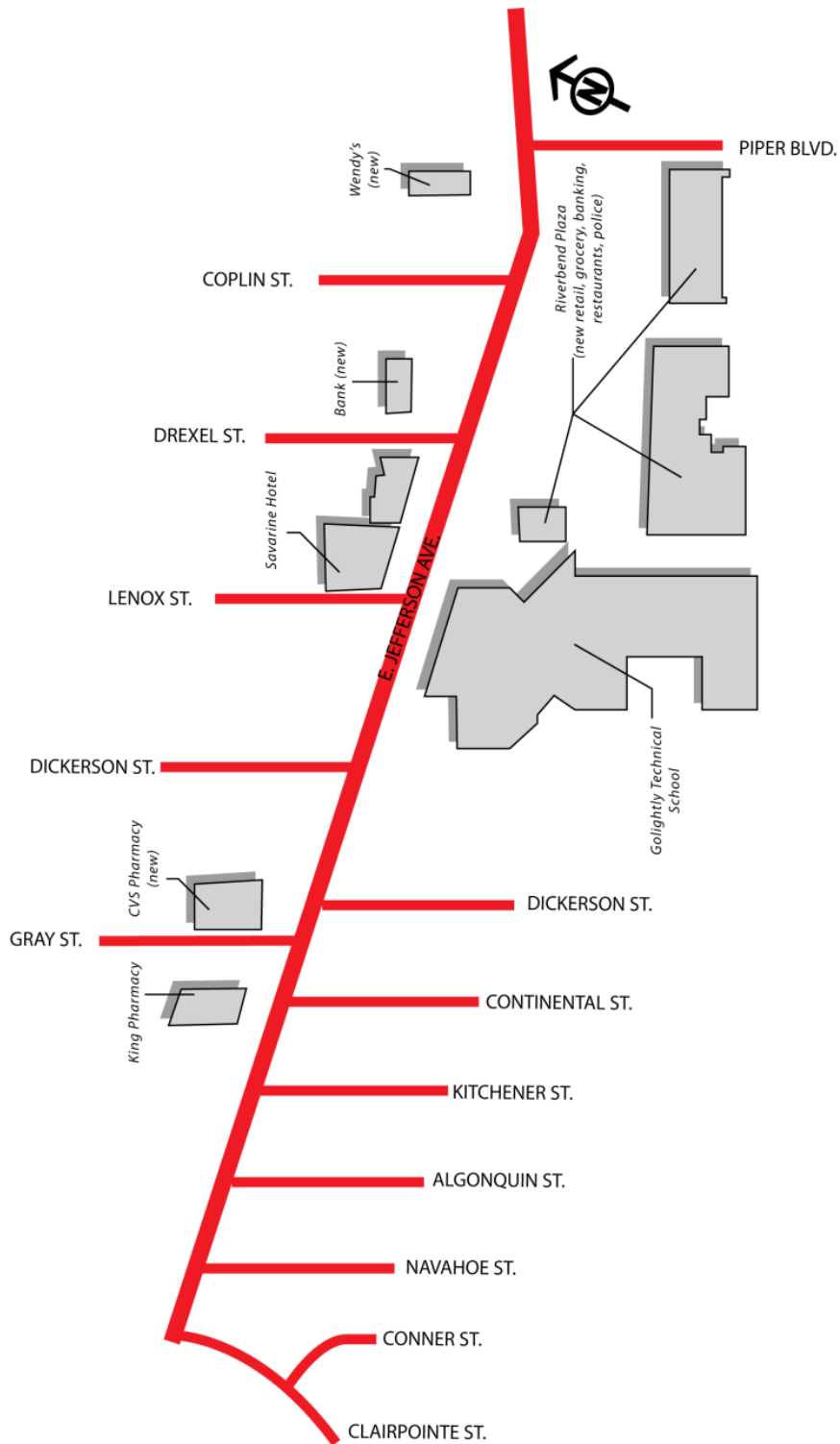
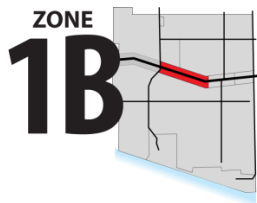


Figure 26 - Zone 1B boundaries and key buildings

industrial facility would be the preferred option. As mentioned in Chapter 2.5, composting and/or recycling facilities offer the possibility of job creation while addressing ecological and material flow considerations, the facility pictured in Figure 24 is an example of a composting facility in California.¹ As discussed in Chapter 2.4, geothermal heat pump facilities offer intriguing promise for better energy efficiency, and this region may be well suited to its use. Further feasibility testing is recommended.

While this region is zoned as industrial, some restaurant and other retail presence along the corridor would provide options for plant employees. Rather than encouraging workers to drive to Indian Village or the lower eastside during breaks or after their shifts, a mixed-use industrial/commercial corridor would provide shopping opportunities for immediate needs, while leaving the center of the surrounding village free for other retail forms.



**Zone 1B: Newport to Clairpointe –
A retail renaissance**

Vast tracts of open land and new suburban-style retail development are the current primary features of this area. Golightly Career and Technical Center provides an institutional anchor, while Riverbend Plaza has quickly become a high traffic and high visibility commercial center with national retailers such as Radio Shack and Rent-A-Center. It is uniquely situated near the growing residential and downtown business district and offers additional amenities such as a grocery store, bank, fast food options, and a “mini police station” designed to increase police presence in the neighborhood.² Riverbend demonstrates the potential for new establishments to spur development nearby. Across the street another bank, a fast-food Wendy’s, and a CVS/pharmacy have appeared in response to Riverbend’s strong daytime employment population and customer traffic, showing the beginnings of an infill pattern. A U.S. Postal Service branch at Algonquin Street corner, a Family Dollar grocery store, and the Park Medical Center add an additional range of facilities to the neighborhood.

The zoning setbacks from the road of most of these establishments and the traditionally strip mall-style architecture demonstrate the area’s sprawling movement towards suburban-style amenities. The challenge for this region will be balancing auto-centric necessity with the need and desire for a walkable community.

Savarine Hotel Development – Dickerson St. & Jefferson Ave

Strategically located across from Golightly Career and Technical center, the former Savarine Hotel, pictured left)³ is less than one quarter mile west of Riverbend Shopping Plaza and adjacent to a new CVS/pharmacy. The hotel’s developers received \$277,270 in tax

credits in the fall of 2006 to reinvent it as the mixed-use Winston Place Apartments, providing 118 residential units, although this number has been adjusted downward to 106 apartments to accommodate 20,000 square feet of retail and 10,000 square feet of office space.⁴ Successful implementation of this project will greatly impact growth in the large vacant lots between Emerson Street and Algonquin Street, as well as the empty lot between the hotel and the CVS/pharmacy.



Figure 27 - Savarine Hotel Rehabilitation

Empty lots – Newport Street to Piper Boulevard and Dickerson Street to Kitchener Street

Zone 1B offers enormous potential in the form of large tracts of empty land along a prime commercial corridor. We recommend creating mixed-use venues along Jefferson Avenue, with a combination of single family townhomes, condos and apartments between Jefferson and Freud Street. Buildings located directly on Jefferson Avenue would be configured to include ground level retail opportunities with housing or office use on upper floors. These retail facilities can include a wide variety of services, much like those found at 14700 – 14742 East Jefferson Avenue, including restaurants, specialty and/or general stores. This diversity of facilities is most likely to increase socially equitable residency opportunity and create job opportunities for amenities that do not conflict with existing businesses in the corridor.

Alternately, the large scale of these lots offers possibilities for big box development. Lack of freeway access could pose a problem in attracting such businesses, and the local government may not have the required tax incentives available to draw a Wal-mart or Home Depot scale store. Of more concern is the potential impact of big box stores on the neighborhood fabric. While the convenience of a large big box store and immediate new jobs were mentioned as being attractive by our survey respondents, evidence suggests that local retail generates two to three times the economic activity of a national chain. For every dollar spent at a big box store, only 16 percent stays in the community in the form of wages, donations, or other spending.⁵ For every new job created by a superstore, 1.4 jobs are lost due to downsizing or closing of other local stores.⁶ Finally, the auto-centric nature of large-scale parking lot big box stores discourages walkability, which is one of the main characteristics we are hoping to achieve in this neighborhood design. Thus, we are not recommending big box development along the corridor at this time.

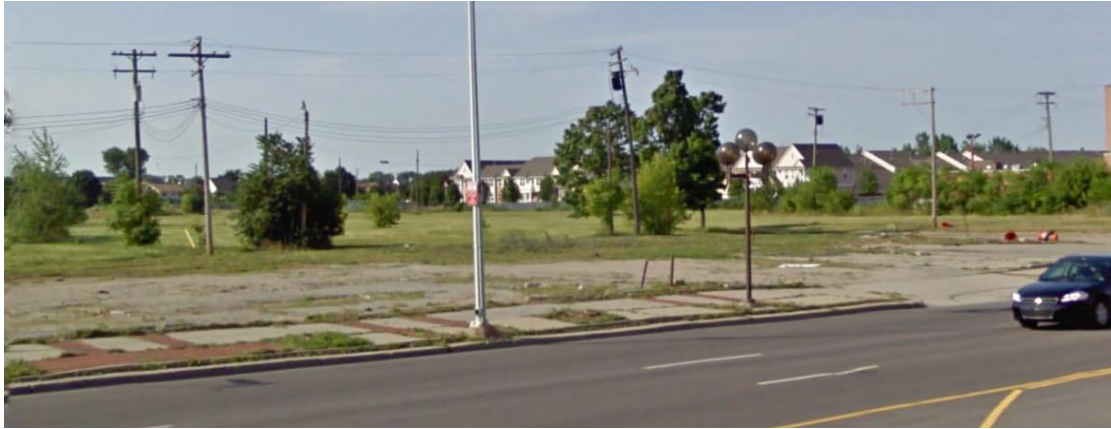


Figure 28 - View south between Kitchener Street and Dickerson Street⁷



**Zone 1C: Chalmers Street to Lakeview Street -
The heart of the lower eastside**

The stretch of Jefferson Avenue from Chalmers Street to Lakeview Street was once a key entertainment destination for the city from the 1930s through the 1960s. Though somewhat depressed, these blocks are now positioned to redefine the lower eastside. A reconfiguration of Lakewood Street introduces a strong north-south axis, increasing directional pull towards the riverfront.

The Vanity Ballroom and Lakewood Square

The remarkable Vanity Ballroom is a fundamental potential amenity within this area. Listed in the National Registry of Historical Places, the ballroom once hosted impressive acts such as Tommy Dorsey, Cab Calloway, and Count Basie’s Big Band, and was hailed as “Detroit’s most beautiful dance rendezvous.”⁸ A restored theater/concert hall could become an impetus for neighborhood development in a fashion similar to Cleveland’s Gordon Square Art District, discussed in Chapter 2.1.



Left to right:
Figure 29 - Vanity Ballroom in its heyday⁹
Figure 30 - Vanity ballroom exterior, present¹⁰

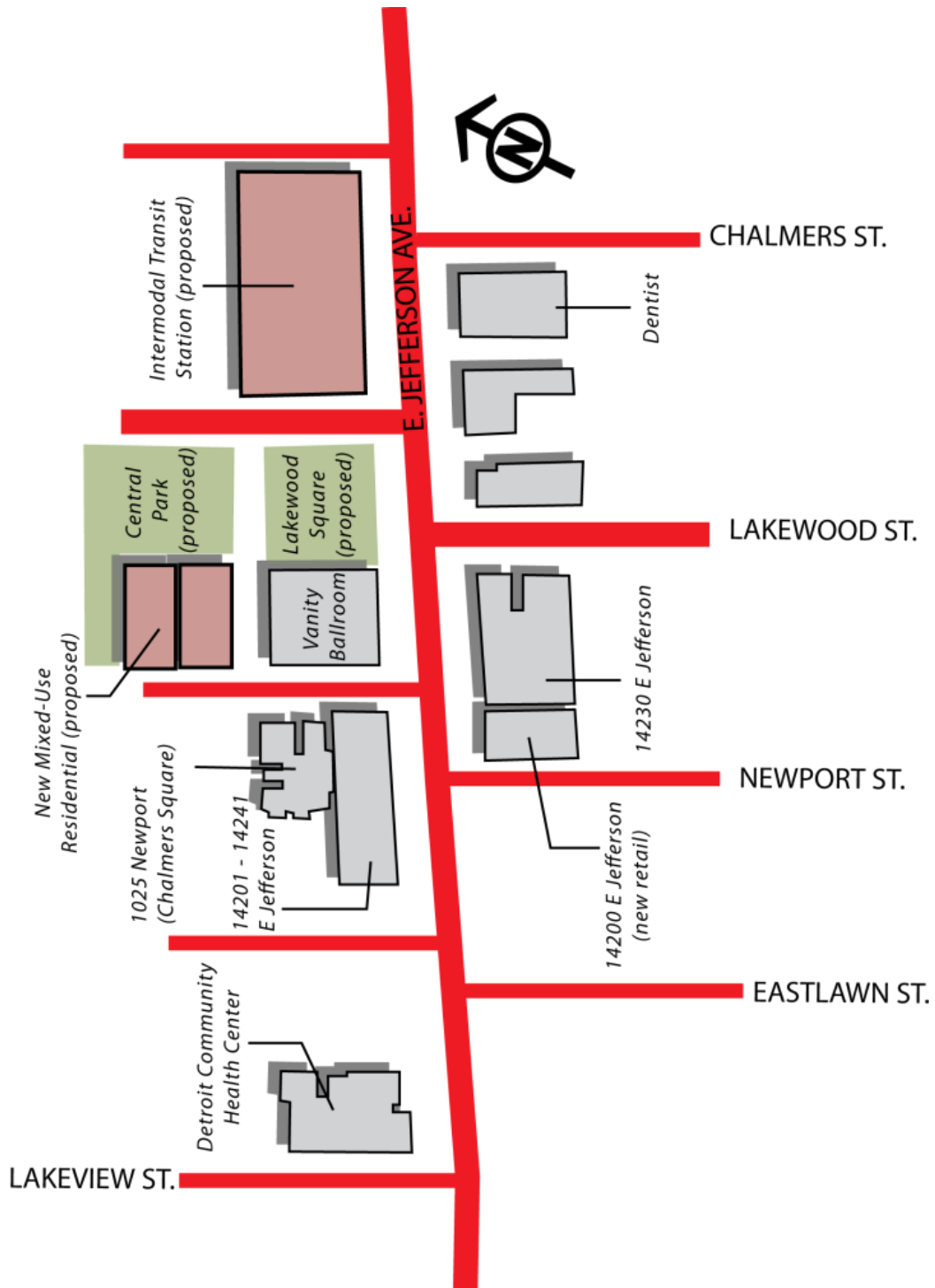


Figure 31 - Zone 1C boundaries and key buildings

The Vanity Ballroom (pictured, left)¹¹ has been used to host a variety of activities over the years, from swing dancing to rock concerts, and was last open for business in 1987.¹² The Ballroom's potential to draw visitors and capital from outside the neighborhood is an encouraging prospect.

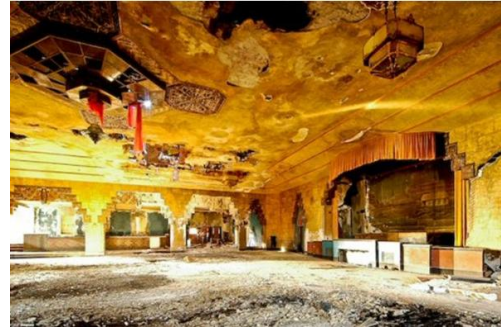


Figure 32 - Vanity Ballroom Interior, present

Perhaps even more important than the Ballroom building itself, however, is the prospect of development of the two lots immediately east of the structure. The lots, 14241 and 14229 East Jefferson Avenue, are an optimal location for a new town square, a public gathering point that could incorporate the retail opportunities along the Vanity's ground floor and become a social hub for shopping and interaction in the neighborhood. Currently home to the Jefferson Tire Shop and a vacant two-story building, the combined spaces are ideally suited for a mid-sized plaza space. While relocation of a currently successful business is a difficult choice, we feel the attractive potential of access to multiple empty lots along Jefferson Avenue makes the relocation of the store to a more appropriately sized lot more palatable. Discussion with the business owner should be facilitated to help identify additional locations that might be pleasing and beneficial for his business to ease his transition.

The 150 foot x 125 foot plaza would be lined with small-scale retail to the west, populated by establishments such as coffee shops, restaurants, or other facilities that would take advantage of the outdoor space. The design of the square would reflect the history of the area. Important events and landmarks such as the Detroit Driving Club's horse racing tracks, famous African American jockeys, and the motor race that vaulted an unknown Henry Ford into public prominence could be celebrated. Possible design examples include arches mimicking the Driving Club's grand entrance, street lamps and wayfinding signage incorporating a reminiscent design motif, or public art or statues which recognize key public



Left to right:

Figure 33 - Racetrack motif from Detroit Driving Club could be used for wayfinding signs¹³



Figure 34 - Modern wayfinding signs¹⁴

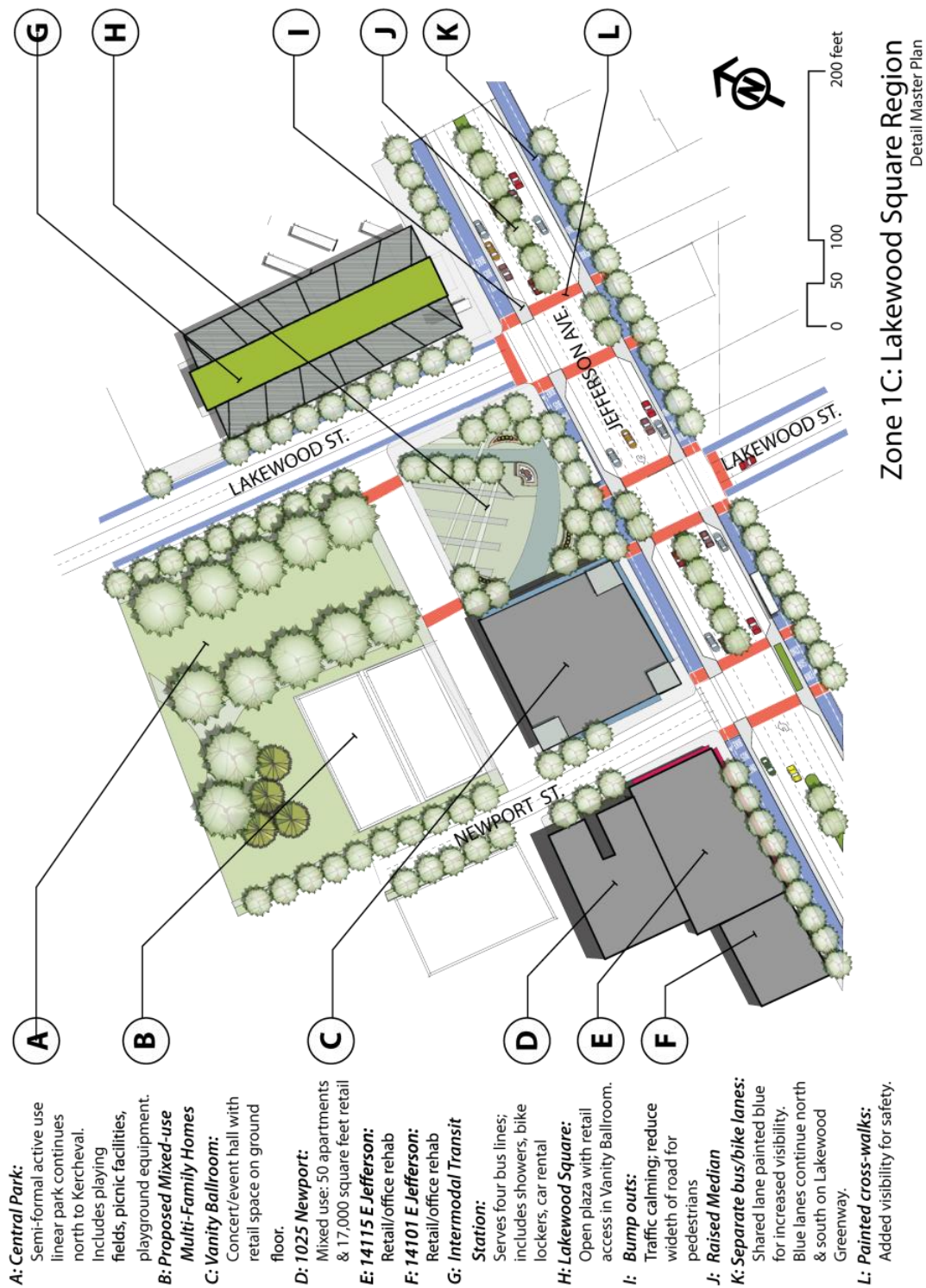


Figure 35 - Detail plan of Lakewood Square.

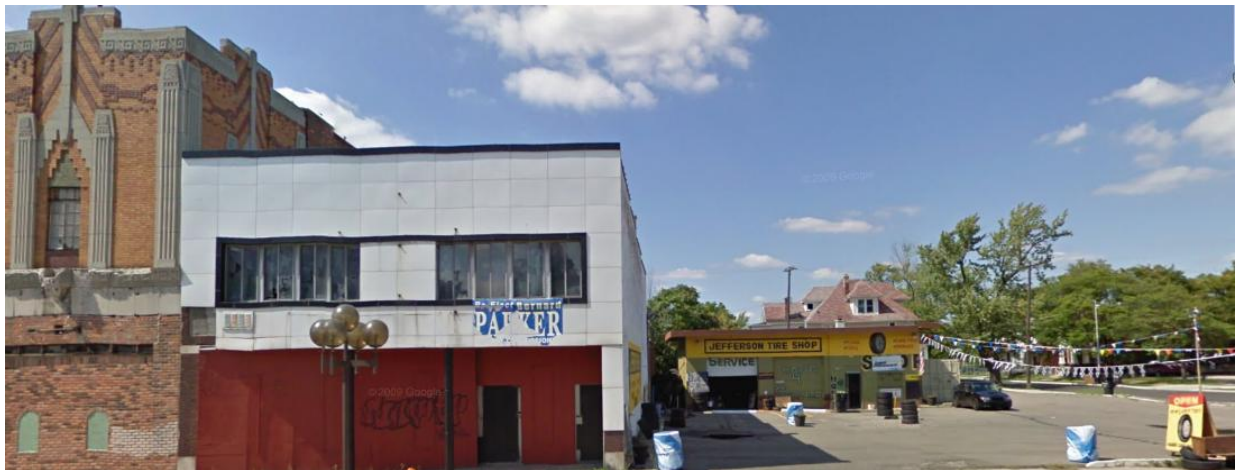


Figure 36 - Current usage of Lakewood Square site¹⁵



Figure 37 - Conceptual rendering of Lakewood Square



Figure 38 - Lower Eastside Multimodal Transit Station

or historical figures. Incorporating these elements provides an opportunity clearly rebrand the lower eastside with identity that recognizes its culture and history. To the north, a new linear “central park” would extend the square’s capacity, creating a potential venue for events such as Jazzin’ on Jefferson, art fairs, holiday parties or other neighborhood activities.

The site’s proximity to the Vanity ballroom and the nearby



Figure 39 - Aerial view of Vanity Ballroom and Lakewood Square

Chalmers Square apartment project suggest relatively high population density in the immediate vicinity. The Chalmers Square project is slated to add 17,000 square feet of retail and 50 apartments upon completion. The fate of both Chalmers Square and Lakewood Square can be directly linked, as both projects stand to gain if the other is brought to fruition. Perhaps the most critical reason for placing the square at this location is that the plaza forms a terminus for Lakewood Street. Lakewood is poised to become the key north-south corridor for the region, primarily due to its strong housing stock and its direct access to the parks along the Detroit River. While Lakewood Street does continue upwards, a dogleg in the street’s path at Jefferson Avenue creates the opportunity for open space. Creation of a plaza at this intersection provides an immediate visual cue to the significance of this intersection, even without the use of signage.

Multimodal Transit Station – Jefferson Ave & Chalmers St.

Lots 14301 to 14319 currently house a dry-cleaner and a large surface parking lot and are ideally situated for a multimodal transit station. Two of the regions four main transit routes either pass by or directly utilize these lots, and a third route (the #13) could easily be rerouted to take advantage of a new transit station. A proposed greenway along Chalmers Street would also pass directly through this site. Siting the station next to the proposed Vanity Ballroom and Lakewood Square projects only serves to strengthen the viability of both the projects and station alike. As outlined in Chapter 2.3, a multimodal station would accommodate a number of services including bus transfers, car rental, and bike lockers and showers, ultimately promoting alternative transport options and trying to encourage decreased auto usage and emissions.

Lakewood Street – Connecting to the River

The warm residential feel of Lakewood Street does not, and should not, easily lend itself to commercial strip development. Any growth along this corridor should be carefully planned with input from the neighborhood residents who have worked diligently to keep their homes in excellent condition despite the abandonment and devastation on nearby blocks. We recommend limited rezoning for this street, which would allow carefully controlled, small-scale commercial development at intersections such as Essex Drive, Avondale Street, Korte Street, and Scripps Street. Establishments such as high-end convenience stores, bars or bait shops would enhance the park experience for visitors, providing amenities for picnickers or fishermen who might have forgotten supplies for their visit to Ford-Brush Park, while other businesses such as restaurants, bakeries, or professional service firms could act primarily to serve local residents.

Three other throughways outside of Zone 1 should be considered for further development. Alter Road, the combined thoroughfares of Emerson, Dickerson, Lenox Streets, and the similarly connected Clairpointe and Conner Streets, all offer direct access to the riverfront parks and offer enormous connectivity potential. All three roads have been picked as routes for our proposed greenway development (discussed below). Alter Road, in particular, would benefit from development as a way to overcome its long held negative association as the “moat” separating Detroit from neighboring Grosse Pointe Park. A number of lots along Riverside Drive (where Alter Road meets the river) were previously used for commercial purposes and offer an excellent opportunity to bring riverfront dining to the neighborhood.



Figure 40 - Lakewood Street¹⁶



Figure 41 - Conceptual commercial properties at Lakewood Street & Essex Drive¹⁷



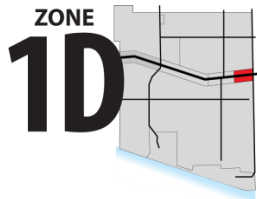
Figure 42 - Alter Road.
A canal, berm and 6 foot chain-link fence act as a physical and psychological barrier between Detroit and Grosse Pointe Park.¹⁸



Figure 43 - The site of a former marina at Riverside Boulevard & Alter Road.
The site offers canal access on two sides and river access via two adjacent parks.¹⁹

Other key buildings in Zone 1C

A new liquor store at 14200 East Jefferson Avenue and a dentist at 14350 East Jefferson both show the potential for a return to productivity. Vintage mixed-use apartments on the southwestern corner of Lakewood Street and Jefferson Avenue also stand to benefit greatly from any revitalization efforts taking place across the street.



Zone 1D: Alter Road to Marlborough Street - Detroit's Gateway

Jefferson Avenue's nearly 64 mile journey spans multiple communities and ends two miles east of Detroit in Grosse Pointe Park. The quarter-mile stretch of Jefferson Avenue running between Alter Road and Marlborough, Zone 1D becomes the de facto eastern "gate" to Detroit, welcoming visitors from the adjacent suburbs. Unfortunately, this border currently marks one of the starkest social and economic divisions in the United States. The neatly manicured lawns and beautifully landscaped median that characterize Jefferson Avenue in Grosse Pointe Park are abruptly replaced by wide expanses of asphalt upon entering the Detroit city limits. While Grosse Pointe Park may not be pedestrian friendly, it does present an attractive style that appeals both to residents and prospective businesses.

In an effort to make the lower eastside more attractive to business, we recommend a reconfiguration of Jefferson Avenue. The new configuration will continue the boulevard format from Grosse Pointe Park into the lower eastside, modified slightly to reflect a more urban aesthetic. The median should be elevated two to three feet from the street surface to help minimize the effects of salt spray on vegetation. Salt tolerant tree species such as

Common Hackberry (*Celtis occidentalis*) or Ginkgo (*Ginkgo biloba*) will help to ensure survival of the median species; additional appropriate species can be recommended by the Greening of Detroit or a contractor hired for planting and design. In addition to visual appeal, the median's tree canopy will provide ecological services described in Chapter 2.6.

A new welcome sign at the border emphasizes the gateway aspect of this zone. Whether it takes the form of a simple low sign, similar to Grosse Pointe Park's, or a grander structure similar in form to the archways adorning the streets of downtown Flint, MI, the signs should emphasize the entrance into Detroit's historic lower eastside as part of its rebranding. Unlike the other three regions along Jefferson Avenue, this entire section becomes a focal point, announcing one's entrance into the city. This ties in with the façade improvement investments being made by JEBA and its partners.

Four lanes of the six existing lanes of traffic (nine feet each) will be kept intact, as will the two eight foot parking lanes. Remaining space will be dedicated to two 16-foot

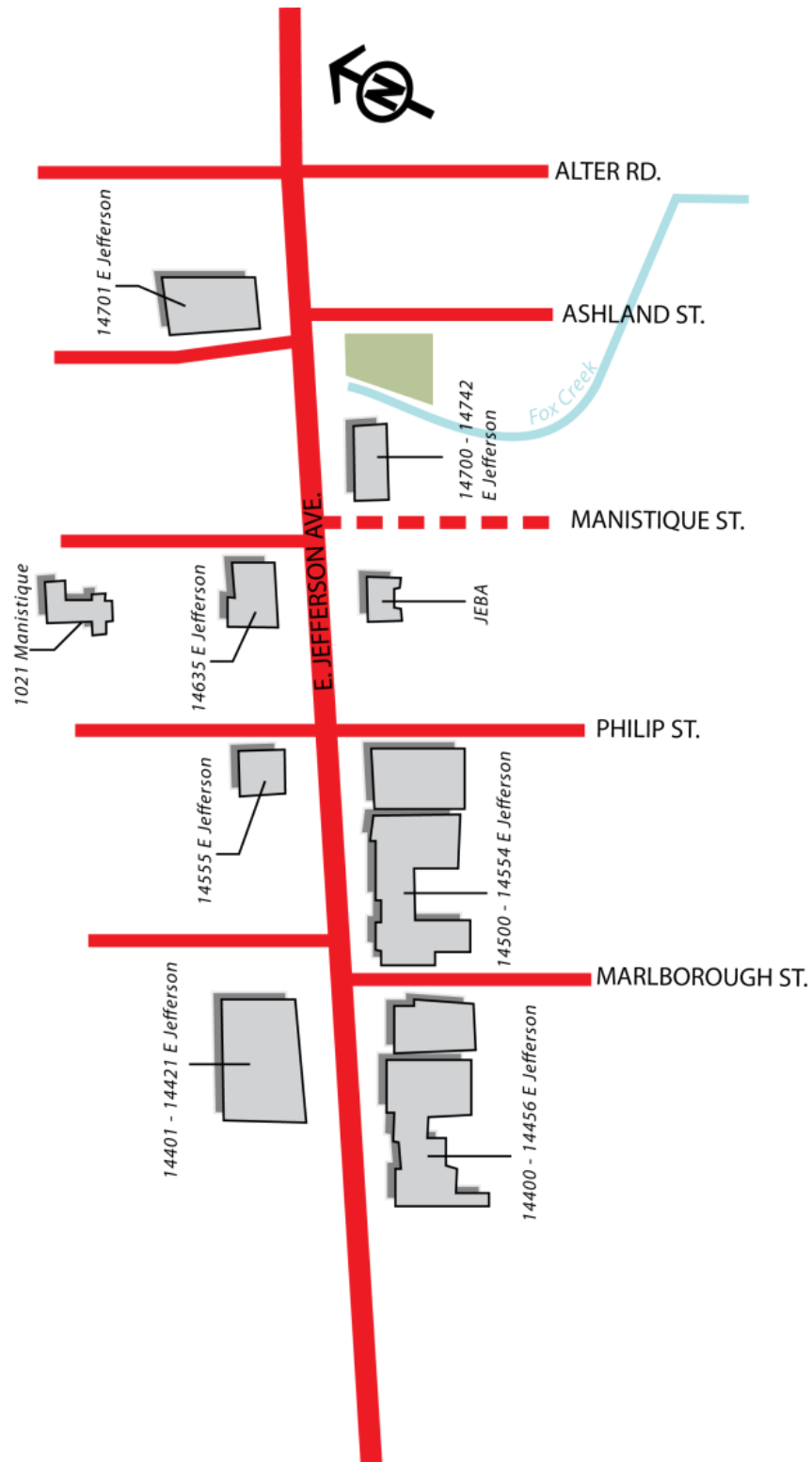


Figure 44 - Zone 1D boundaries and key buildings



Figure 45 - Welcome sign concept for Alter Road & Jefferson Avenue

shared bike and bus lanes, which will be separated from the parking lanes by a four foot curb. Shared bus/bike lanes have become more common in recent years, with cities as diverse as Madison, WI, Tucson, AZ, Philadelphia, PA, Toronto, ON, and even Rust Belt Cleveland, OH adopting the practice. In addition to standard bike lane markings, painting the lanes blue will provide an immediate visual cue that these lanes are special and not part of the vehicular traffic flow.²⁰ Thermoplastic paint provides durability and visibility at a lower cost than colored asphalt. Studies in Europe found that using separate colors for bike lanes increased safety per bicyclist by as much as 20 percent. Blue was the color of choice for Portland, OR, due to its high visibility factor and because it would not be confused with other “reserved” colors uses, i.e., green meaning go, red stop, or yellow reserved for centerlines.²¹ While blue lanes are not as critical for safety in the Jefferson Avenue configuration, they do set a precedent that can be utilized throughout the rest of the region where a curb buffer is not available.

Ten feet of this configuration come at the expense of the area’s exceptionally wide sidewalks. Sidewalks in the neighborhood range from ten to 25 feet wide, and in areas where the walk is a relatively narrow (ten feet); the sidewalk on the opposite side of the road tends to be commensurately wider (up to 25 feet in one location). The minimum sidewalk width will remain at ten feet overall and will be wider when space allows.

Aesthetic appeal should not be limited to the medians. JEBA should continue to invest in simple techniques such as planting street trees, affixing banners or hanging



Figure 46 - Bus and bike lane configuration along Jefferson Avenue

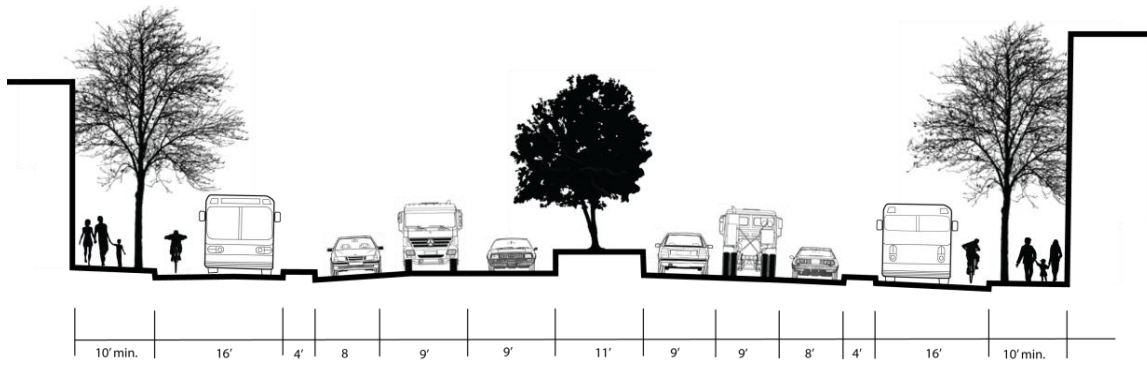


Figure 47 - Proposed East Jefferson Avenue configuration - cross section

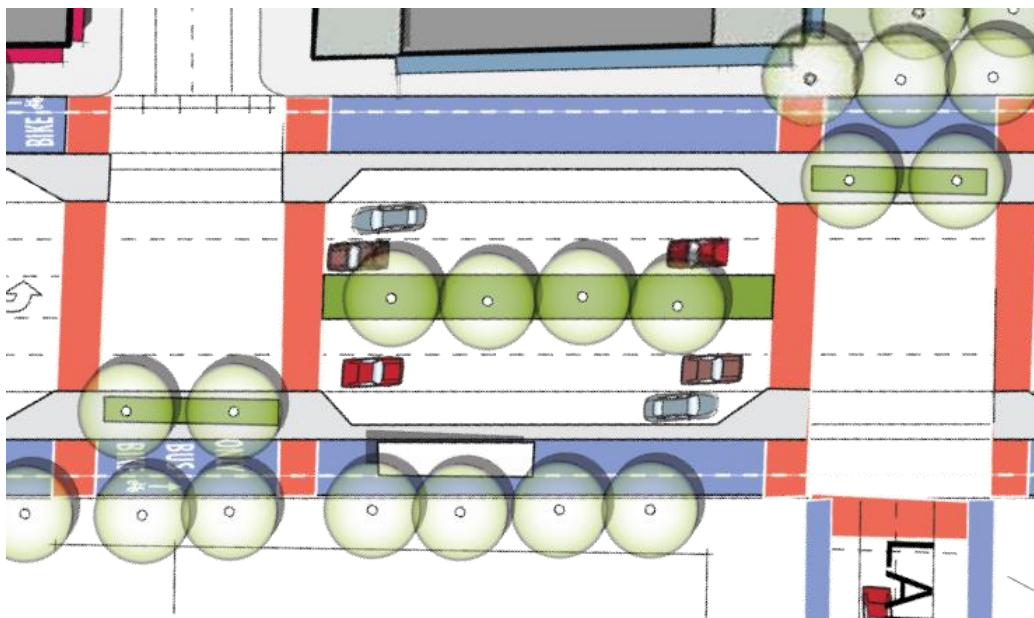


Figure 48 - Proposed East Jefferson Avenue configuration - plan view



Figure 49 - Current view looking west from Ashland Street & Jefferson Avenue. A new community park is on the left side of the photo.²²

planters to lighting posts or signposts that can affordably provide a strong neighborhood identity. More permanent fixtures, such as fixed planters, historical markers, or statuary can be designed with local history in mind. Such techniques provide a sense of place and instill pride in a neighborhood. Street furnishings such as benches may further encourage community interaction and improve the walkability of the neighborhood by providing periodic resting places for visitors.

1021 Manistique Street & 14635 Jefferson Avenue



Figure 50 - Saint Columba Hall

JEBA identified St. Columba's Parish Hall, pictured left,²³ located at 1021 Manistique Street, as a strategic asset. The visual quality of its architecture is exceptional, and its historic nature makes it an important preservation piece. The ability to continue to use the building as a community center will be important as the neighborhood population grows.



Figure 51 - Streetscape revision, 14635 East Jefferson Avenue

A more immediate impact, however, can be made with the large Church Rectory building at 14635 East Jefferson Avenue, pictured left.²⁴ The building currently houses significant activity, including a church congregation, the Creekside CDC, and the Na Pua 'Ilima Hula Academy, a Michigan domestic non-profit. Minor improvements to the façade, namely opening up the archways on the ground level, could create excellent additional business incubator spaces for retail or social organizations at street level while allowing

for continued use of the upper floors as a church and community center. While some interior modifications would potentially be required to create these incubator lots, such as hanging drywall to organize the new spaces, this type of work is inexpensive. This new configuration would bring increased revenue for the building and could jumpstart development in nearby buildings.

14400 to 14554 East Jefferson Avenue

The buildings along the south side of Jefferson Avenue, bounded by Philip Street and Chalmers Street, offer enormous potential as incubator spaces for businesses. The awnings on the vintage structures hint at the former commercial productivity of this particular strip. Redevelopment of either of these blocks could have a domino effect on the surrounding structures, including the beautiful and relatively active building strip at 14401 to 14421 East Jefferson Avenue. This commercial segment houses a diverse set of businesses, including a bar, a bait shop, a candy store, and natural hair salon that address a number of social needs for the area. This model of diversity can easily be adopted for future developments along Jefferson Avenue.

Chapter 4.4: Articulate



Figure 52 - 14400 to 14456 East Jefferson Avenue²⁵



Figure 53 - 14500 to 14554 East Jefferson Avenue²⁶



Figure 54 - 14401 to 14421 East Jefferson Avenue²⁷



Figure 55 - Successful redevelopment at 14700 to 14742 East Jefferson Avenue²⁸

14555 and 14801 East Jefferson Avenue

The former bank building at 14555 East Jefferson Avenue appears ready to take on new tenants with minimal restoration. Nearby 14801 East Jefferson Avenue, the former Platte Motor Sales building is a prime candidate for urban housing or office space. The building has recently had façade improvements and structural modifications to the top three floors. The warehouse would make ideal loft spaces for artists, tenants, or small businesses, and has been considered as a potential space for Habitat for Humanity. Another business that might do well in such an open setting is a gym facility or YMCA. Such a tenant would serve multiple needs by providing active living opportunities for residents, encouraging community interaction, as well providing a new, highly visible storefront. The Platte Motor Sales building’s unique footprint might also work well as a grocery store, acting as a replacement for the now defunct Dollar King next door.



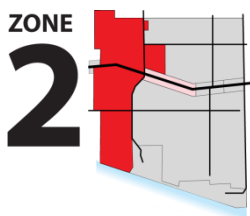
Figure 56 - Platte Motor Sales building²⁹



Figure 57 - 14555 East Jefferson Avenue³⁰

Neighborhood Zone Strategies

While Jefferson Avenue is clearly a major driver for this community and warrants particular attention, the areas north and south of the business corridor must also be taken into consideration to create a holistic sustainable redevelopment design strategy. From the riverfront on the south side to the largely vacant parcels north of Kercheval Street, these sections offer tremendous opportunities for redevelopment.



Zone 2: Connor Creek Industrial Corridor

This zone is primarily identified by the immense Chrysler plant north of Jefferson Avenue and is home to the Connor Creek Industrial complex. While home to several



Figure 58 - Detroit Edison Conner Creek Power Plant



Figure 59 - Proposed Canal Drive Park



Figure 60 - Landschaftspark Duisburg-Nord, a park created on reclaimed industrial land

“industrial park” similar to Germany’s Landschaftspark Duisburg-Nord, pictured in Figure 60,³³ a recreational park built on the site of former steel and coal facilities. The park acknowledges and celebrates its industrial past, utilizing the architectural skeletons of its former tenants to form an intriguing blend of natural and industrial visions.³⁴ While this site’s steel skeletons are much less dramatic than those of Duisburg-Nord, the towering steam stacks and remaining conveyor belts would make an a dramatic backdrop to a restored peninsula.

manufacturing facilities, the corridor’s industrial heritage has eroded over the past several decades. Vast fields sit unused, the threat of potential contamination a deterrent to further development; however, over half of the parcels in this area are still actively used. The local municipality and JEBA could consider pursuing available brownfield development grants to clean up the sites and then encourage further industrial development in this corridor, particularly in the region near Jefferson Avenue. “Clean” industries such as composting facilities offer the possibility of bringing investment and new jobs to the area with a considerably smaller environmental impact than the industrial giants of the past.

That being said, there is no denying that the riverfront has been transformed primarily to housing and recreational use. Million dollar homes sit in the shadow of the Detroit Edison power plant, their owners drawn by riverfront views. The plant is one of the last industrial bastions; all but two of the remaining parcels between St. Jean Street and Canal Street are either private housing or boating facilities. The power plant, pictured in Figure 58,³¹ grounds offer an intriguing possibility for new park space. The canal made international headlines in 2009 when the first beaver spotted on the Detroit River in 75 years decided to make its home next to the plant.³² Much of the southern grounds of the creekway are already being utilized by the Edison Boat Club as a marina. The southern tip of Canal Street could be converted into an

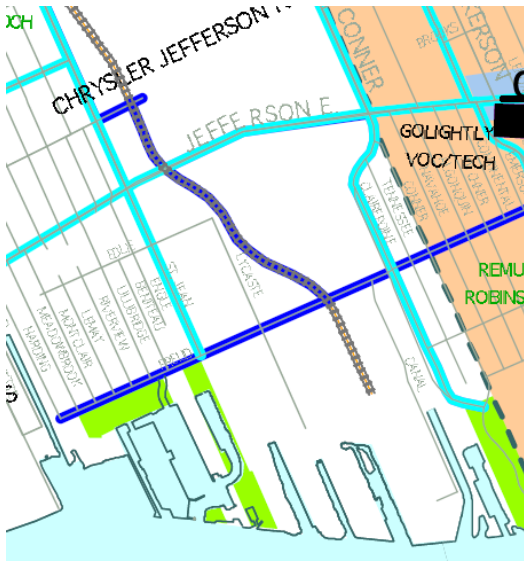
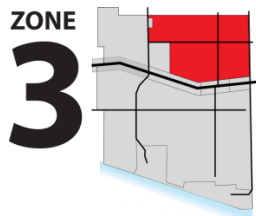


Figure 61 -Detail of Detroit Greenways Coalition's proposed rail path

Further north, Detroit Greenways Coalition's choice to utilize a working rail line as greenway space is questionable. Railroads are notoriously reluctant to allow use of their right-of-way due to liability concerns, and this particular spot offers few if any advantages to the proposed greenways along St. Jean Street and Clairpointe Street. Including a greenway along this spur has the potential to limit rail access for future industrial developments that might come in to the vacant land along Jefferson Avenue. Additionally, planned greenways immediately to the east and west would make a rail-to-trail based greenway redundant, as shown in Figure 61.³⁵ For these reasons, we chose to leave this

stretch of potential greenway off our master plan.

Instead, we chose to add new park space along Clairpointe that could accommodate a bike trail and provide much-needed open space to one of the poorer sections of the neighborhood. This park would be targeted primarily toward families with young children and should include playground equipment.



Zone 3: Jefferson North

The area to the north provides perhaps the starkest evidence of the state of the city. Half-mile city blocks hosting three or four dilapidated homes are the norm. These vast tracts of land, once slated for development, now represent both the challenges and missed opportunities faced by previous administrations and the potential available for forward-thinking individuals. For Detroit's lower eastside, these tracts provide a chance to explore new paradigms and help reinvent the fabric of the city.

Physical assets in this region are fairly limited; all are located along Kercheval Street. The ornately-detailed Monteith Library at Kercheval Street and Lakewood Street, the only public library serving the lower eastside, is the one clear neighborhood amenity. A block east of the library, a relatively new apartment complex sits near two venerable cathedrals, while further down the road a dialysis center operates. Scattered businesses, including a



Figure 62 - View west from the intersection of Kercheval Street and Lakewood Street³⁶

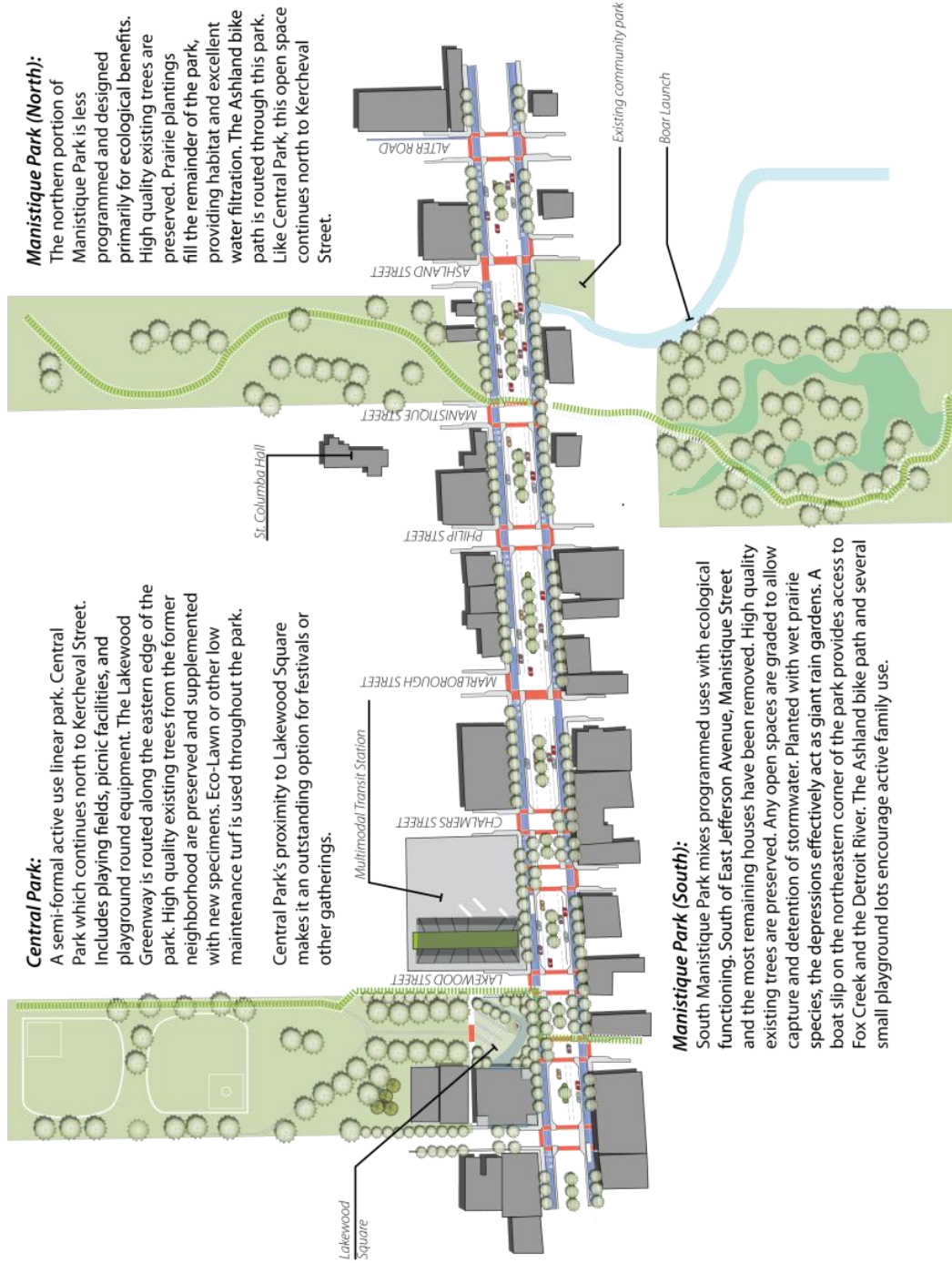
bar/restaurant near the Chrysler plant to the west, are still up and running, but most of the remaining commercial buildings have been abandoned. Empty fields have replaced virtually all of the commercial and industrial buildings. Only religious institutions seem to survive here; no fewer than eight religious organizations are located along this stretch.

Jefferson north, then, is essentially a blank slate. Transitioning from an urban to a suburban or even exurban plan is appropriate for this region, especially when viewed in the context of rightsizing as discussed in Chapter 3. In the region bordered by Jefferson Avenue and Kercheval Street, we recommend a more suburban-style home layout with a larger lot. Lot sizes would be roughly 50 percent greater than those to the south, allowing for much larger homes and/or yards. To avoid creating social and economic segregation, we recommend interspersing medium density mixed-use and mixed-income housing throughout the neighborhood.

Housing in this area also could benefit greatly from the introduction of sustainable energy generation methods. As discussed in section 2.4, geothermal heat pumps offer enormous potential for reducing energy consumption, but are expensive to retrofit into existing housing stock. In new buildings, particularly in situations where economies of scale come into play, geothermal heat pumps are only moderately more expensive than traditional systems in the short term and provide significant cost savings in the long term.

Manistique Park (see full description in Zone 4) is continued north from Jefferson Avenue, although the width is limited to the space between Manistique Street and Ashland Street. This smaller footprint is a design response to St. Columba Hall, which would sit opposite the new park in our plan. As with its counterpart south of Jefferson Avenue, the form of this park is primarily a large urban prairie, lined with street trees. This could be inexpensively maintained via prescribed burns.

We recommend a second elongated park directly north of Lakewood Square, to complete the linear axis along the south portion of Lakewood Street. This park is more



Zones 1C, 1D, 3 & 4: Park Configuration

Figure 63 - Manistique and Central Park layout

formal than Manistique Park, offering amenities such as playground equipment, picnic facilities, and athletic fields. A smaller family park located near Brooks Street and Dickerson Street would also provide immediate outdoor access for residents in this area.

North of Kercheval Street, the convergence of several new land uses could begin to reinvent the city structure. We have removed sections of four underutilized roads (Anderdon, Springle, Marlborough and Philip Streets) to create large contiguous plots. This configuration could be continued north beyond the boundaries of the lower eastside; at least one conceptual plan under consideration by City Hall already shows the area through I-94 dedicated to urban agriculture.³⁷ These new spaces, some as large as 20 acres, become the backbone of a new urban agriculture initiative, the social, economic and ecological benefits of which are discussed throughout Chapter 2. Smaller three-and-a-half to five acre lots, which have not been consolidated, are likewise recommended for repurposing as agricultural land. These farms could conceivably be used for a range of agricultural activities, such as livestock, produce or tree farms. Unlike smaller scale community gardens, which are intended for direct use by local residents, these larger farms could be defined by specialty crops (see Chapter 2.1) that could be sold as a commodity outside of the immediate region or outside of the city itself. The farms may be covered by hoop houses, thereby extending the growing season, or left open air.

As this region has been primarily residential for over 100 years, the most likely soil contaminant would be lead left over from peeling paint. Thorough soil toxicity tests should be conducted prior to implementing any large scale farming efforts, but were beyond the scope of this project. If significant lead contamination is discovered, one potential approach for treating the soil involves installing hyper-accumulating plant species known for uptaking lead into their biomass. These plants can be harvested yearly, and the accumulated metals recycled, providing job opportunities both at harvesting time and heavy metal processing throughout the year. This technique is very time intensive and lead uptake potential is limited to plant root depth.³⁸ Because of the demand for immediate crop productivity for

this region, more traditional remediation techniques may be required. The phytoremediation approach may instead be best utilized in vacant lots which can sit empty for a number of years.

Our design intersperses a series of constructed wetlands amongst the new farming tracts. As we learned from Youngstown, OH, pictured in Figure 64,³⁹ excess lands can be productively redeveloped into wetlands to ease pressure on aging sewage infrastructure by treating and infiltrating significant



Figure 64 - Urban agriculture in Sandusky, OH

amounts of water. Treated stormwater could be pumped and held in large cisterns on the agricultural fields, to be used later for field irrigation.

Constructed wetlands, like the one pictured in Figure 65,⁴⁰ can take on any number of different forms, but because these would be placed in or near relatively fragile neighborhoods, there would be an emphasis on aesthetics.

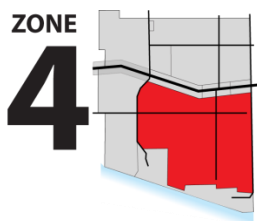


Figure 65 - Constructed Wetland

The design for these wetlands must

address a number of issues. They must be visually pleasing, allow passive use (e.g. bike trails), address safety concerns, such as drowning risks or the likelihood of mosquito-borne diseases, all while simultaneously treating stormwater. Educational signs can help to inform visitors of the functionality and benefits of the wetland while allaying many of these common fears.⁴¹

In this scenario, a portion of Kercheval Street's vacant storefronts could be given new life as market spaces for farm products. Landscaping companies, butchers, farmers, restaurateurs, and grocers could take advantage of this source of fresh produce, making it a regional destination for shoppers from the city and surrounding suburbs. As the street's reputation grows, infill will almost certainly follow as banks and other services look to capitalize on the newfound wealth. Like Jefferson Avenue, Kercheval Street should be attractively landscaped to present an inviting front for visitors and residents.



Zone 4: Scripps St. to E. Jefferson Ave.

Detroit's lower eastside is a study in contrasts. Tidy houses on tree-lined streets quickly give way to crumbling homes, broken sidewalks and vacant lots. Suburban gated communities clash with 1920s era bungalows. The tree canopy, devastated by the combined effects of Dutch elm disease and the emerald ash borer, is utterly barren in many sections but replaced in others by thick colonies of Tree-of-heaven, Cottonwood, Boxelder and other adventitious species. In the Scripps Street to Jefferson Avenue zone, these contrasts are often found on the same block. The unfortunate common thread tying the neighborhood together is the threat of foreclosure. Every section of the lower eastside is experiencing vacancies and abandonment at some level.

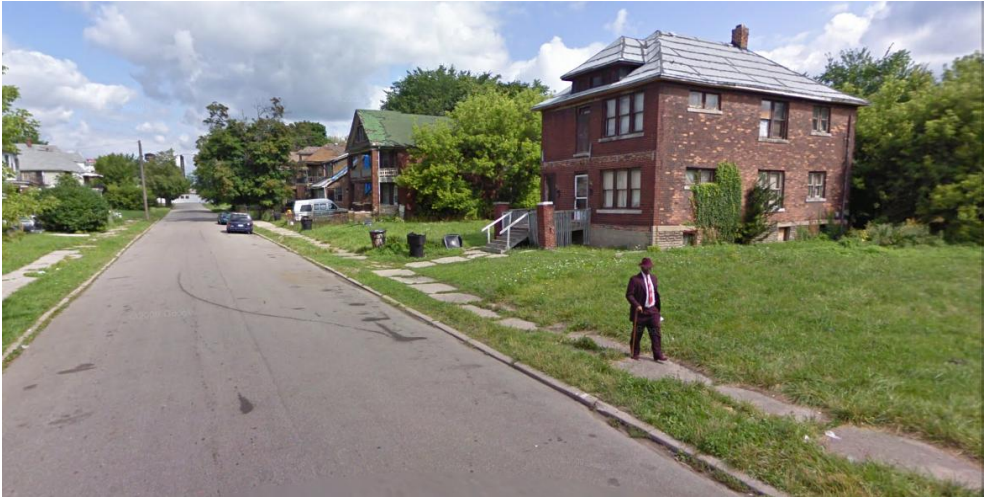


Figure 66 - Continental Street near Freud Street⁴²



Figure 67 - Piper Court in Victoria Estates⁴³



Figure 68 - Eastlawn Street near Avondale Street⁴⁴

New construction and infill have occurred sporadically throughout the area, but the number of vacant lots continues to grow and outpaces demand for new homes. A number of strategies, such as allowing neighbors to purchase empty lots at drastically reduced prices, have made an impact on the vacancy pool, but the ability to continue these practices is limited by interest and the shrinking population. The neighborhood has reached a point where groups of lots need to be addressed on a community-wide level, with the goal of turning safety liabilities and abandoned blight into assets.

Our overall strategy for all properties, abandoned or vacant, revolves around the concept of “cues for care.” As mentioned earlier in Chapter 2.3, simple actions that demonstrate continued attention to a property will inhibit further destruction by vandals. Because funds for maintaining these properties are limited, it is important to look for low cost solutions for ongoing maintenance issues.

On a broad level, one of the simplest options for a well-maintained appearance is incorporation of low-grow grass mix such as Eco-Lawn on abandoned and vacant properties. The species selected for this mix were chosen for their deep root structure which imparts significant drought resistance to the grass. These species are relatively slow growing and reach a maximum height of six to eight inches. While traditional lawns require mowing two to four times a month in order to maintain a manicured appearance, a low-grow lawn only requires mowing once or twice in the same period. The mix was also selected for its propensity to become green at different times during the season, ensuring that the lawn will stay green throughout the summer. The net result is a low-maintenance, attractive lawn and a visual cue of care which hopefully will deter instances of illegal dumping and vandalism present in the area.

In addition to turf, careful planting of prairie wildflowers, particularly those species that fix nitrogen, can be a way to establish the appearance of a well-cared for environment.



Left to right:

Figure 69 - Purple prairie clover (*Petalostemum purpureum*)⁴⁵

Figure 70 - Partridge pea (*Chamaecrista fasciculata*)⁴⁶

A good prairie seed mix, preferably comprised of local genotype species, applied along the interior edges of a property will add color to a property while simultaneously restoring soil function.

Reestablishment of the tree canopy cover throughout the area and management of existing trees will be critical to the ecological, social and economic success of the neighborhood. As mentioned earlier, a number of trees, most notably ash and elm, were lost due to disease and insect issues over the past decade, resulting in entire blocks with little to no canopy cover. The Greening of Detroit has begun to make headway in replacing these trees with a variety of salt and stress tolerant species. Yearly monitoring of these new saplings will allow timely replacement of trees in the event of one dying. Engagement of the community in both the planting of and continual care for these trees gives ownership, knowledge of local ecosystem health, pride and loyalty to the neighborhood as additional benefits to the aesthetic value, increased property values and purified air quality.

In addition to adding new trees, invasive species removal is a priority for restoring and maintaining the ecological health of the community. Invasive species, such as Tree-of-heaven (*Ailanthus altissima*), have a weedy habit in the lower eastside that can quickly overtake a property, causing severe foundation and roof damage to otherwise stable homes. From an ecological perspective, *Ailanthus* and other invasives form monocultures which supplant all other flora. These are also opportunities for non-profits to promote programs that engender volunteer engagement helping people to form social ties, become educated on the importance of ecological stability, and develop familiarity with the species that are native to their specific locality.

On a more individual level, management of vacant and abandoned lots will need to be based on existing patterns within each block. Because it may be less expensive to maintain an empty lot than an abandoned home, we recommend implementing an aggressive teardown strategy. Homes that have little redeeming value should be removed as soon as legally possible. This strategy, already in motion as detailed by Mayor Bing's rightsizing plan, will create larger open tracts of land which will prove more attractive to developers over time and easier to manage in the short run. However, as noted in Chapter 2.5, salvage of any potentially reusable materials should be encouraged to decrease the waste produced by the teardown. This operation also could temporarily employ local residents.

Block level maintenance and care should also focus on fixing and widening existing sidewalks, as well as improving existing lighting. Lowering the lamp height to 13 feet and shortening the distances between lamps, especially on high traffic pedestrian routes, creates a more intimate feel and enhances the perception of safety. A more thorough survey should be undertaken to get a better understanding of light coverage for the area so that inadequacies can be appropriately addressed. The short term approach for vacant properties, then, should involve proper sealing and boarding of potentially salvageable homes. cursory external inspections of the property should be held every three to six

months to check for evidence of looting or other damage. Once a year, a more vigorous inspection should be held to check for less obvious signs of damage, looting, or squatting. If the property owners have not taken significant actions to rehabilitate or repopulate the home after two years, the city should consider tearing down all but the most architecturally significant properties. This continual data gathering and upkeep is a crucial step in the future feedback system of the process.

The preferred approach to repurposing vacant properties depends on the pattern of vacancies in a particular block. Proximity of other amenities will also affect the decision process.

High vacancy patterns (generally 50 percent or greater vacancy rates in an overall block) offer the most potential for future development and for large-scale immediate uses. These situations offer the opportunity to dramatically reduce the cost of city infrastructure in underutilized neighborhoods while simultaneously providing new financial, social, and ecological benefits to remaining residents. This sort of pattern is typified south of Jefferson as the area between Ashland Street and Philip Street to the east and west, and south to Scripps Street.

While other large-scale options exist for tracts of this size, for this particular zone we chose to create a large linear park (hereafter referred to as “Manistique Park”) stretching from the riverfront up beyond the boundary of the lower eastside. For this design, we removed Manistique Street south of Jefferson Avenue, maintaining only the entrance off Jefferson to allow access to nearby businesses and churches (See image 40 for clarification). While removal of a street is a somewhat controversial move, we believe that the resultant



Low density vacancies

- Encourage lot splitting by adjacent neighbors via tax breaks or giving property for very low price
- For lots that cannot be sold, use low grow / low maintenance lawn (e.g Eco-lawn) and plantings to provide “cues for care”

Medium density vacancies

- Encourage lot splitting by adjacent neighbors via tax breaks or giving property for very low price
- For lots that cannot be sold, create community maintained holding solutions, i.e. rain gardens, community gardens, or playlots

High density vacancies

- Offer incentives to encourage remaining homeowners to vacate
- Allow large scale development; new parks, urban agriculture, redevelop as multi-family housing, etc.

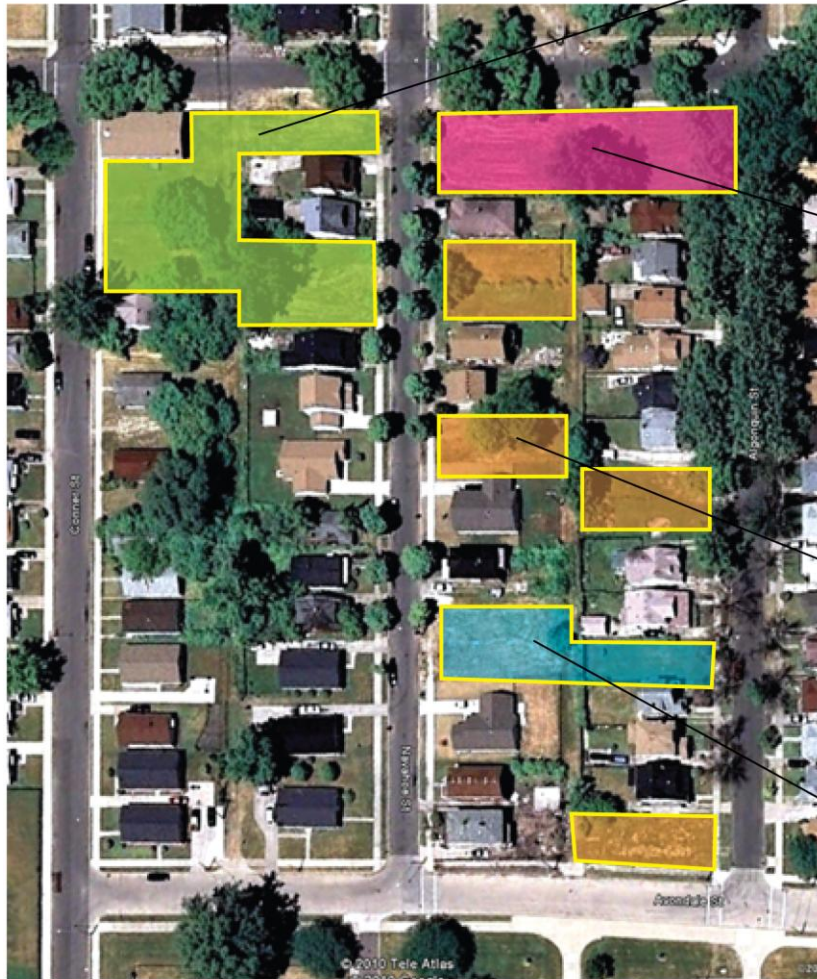
Figure 71 - Lot density strategies

benefits to community health, societal well-being, and economic prosperity justify the choice. Higher quality homes on the northern and southern edges of the park would be preserved. Existing homes along Fox Creek, still of relatively good quality and building stock, will be left in place. A boat launch on the northern end of Manistique Park would provide a new access point to the river; kayak and canoe rental facilities could be included on the site making use of the currently underutilized canal assets. An extension of the aforementioned greenway would wind north through the park, continuing north after a brief interruption at Jefferson, then on past Kercheval Street and northward. Programmatically, Manistique Park would be intended primarily for a passive-use gathering space. Crime and safety concerns limit the ability to position this park as an urban forest. Instead, the park would be graded to act as a large, shallow depression and planted with wet prairie species, allowing collection, cleaning, and infiltration of stormwater runoff. The prairie would be hemmed by a mown path, providing clear views and thereby enhancing safety.

For moderate (25 – 50 percent) vacancies, the preferred option would be lot splitting by adjacent neighbors. When this option is not feasible, groups of vacant lots can be dedicated either as a rain garden, community garden, or community-maintained pocket park. Location of lot groupings should help to determine ideal usage. Community gardens are best situated next to high activity areas, such as churches or community centers or on corner lots, where having “eyes on the garden” can help deter theft and vandalism. These gardens have the perhaps greatest potential to address local fresh food access and obesity issues. Unlike the larger gardens to the north, the produce from these gardens are intended specifically to be used for local residents, and offer immediate access at virtually no cost.

Pocket parks, on the other hand, can occupy a wider variety of spaces, but would best be situated near larger, contiguous blocks of homes. These small parks serve the dual purpose of increasing social interaction among families and providing immediate outdoor and park space for children. Because individual lots tend to be narrow and elongated with less than optimal light, single lot vacancies may be best served by a rain garden, though larger lots could also accommodate these ecologically beneficial stormwater management systems.

The sample plan below demonstrates a possible setup for a medium density neighborhood.



Community Garden

Large group wraps around community centerpiece. Proximity to church ensures eyes on the garden, deters theft and vandalism.

Play Lot

Large lot on corner offers good visibility. Mature shade trees that would be problematic for a garden space are an amenity for a playground.

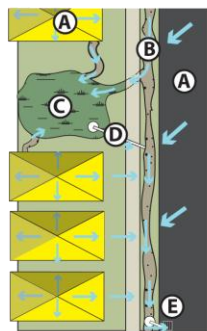
Lot split / Infill Planting

Smaller lot groups offer good potential for neighbor lot splitting or outright purchase. Low maintenance planting keeps lot from becoming an eyesore.

Rain Garden

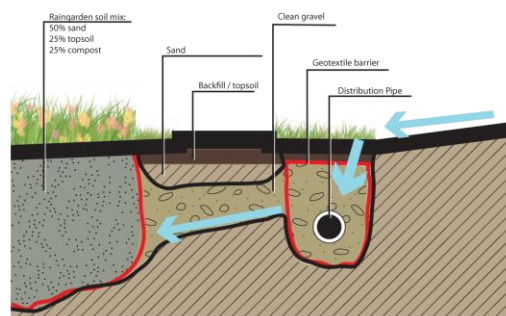
Larger lot surrounded by homes on southern edge of block. Good spot to infiltrate / treat water before it heads into the sewer system.

Figure 72 - Lot strategy plan for medium density vacancy situation.



Plan View

Water runs off impervious surfaces such as rooftops and roads (A) into an infiltration trench (B and Cross Section). Water is channeled into rain gardens in empty lots (C), where it is allowed to infiltrate as much as possible. Any overflow from the rain garden is directed back into the trench (D) and on to the city's existing sewage infrastructure (E).



Infiltration Trench Cross Section

Figure 73 - Rain garden & infiltration trench connectivity



Left to right:
Figure 74 - Rain garden near Philadelphia⁴⁷
Figure 75 - Rain garden near Minneapolis⁴⁸
Figure 76 - Brightmoor community garden in Detroit⁴⁹



Figure 77 - Guyton Elementary School⁵⁰

One particular vacant building in Zone 4 requires special attention. As mentioned in Chapter 4.1, Guyton Elementary School was shuttered in 2009 due to low enrollment. Both Guyton and Stark Elementary students were transferred to Robinson Middle School, which was then integrated into a kindergarten through 8th grade school. While the Stark Elementary building was repurposed as an administrative center with some pre-kindergarten functions, Guyton continues to sit unused. Guyton, among others, has been mentioned as a possible charter school site, and was recently unveiled to prospective buyers at a DPS surplus site auction.⁵¹

Repurposing the building may prove challenging. Guyton's grand, 1920s era architectural style and enormous capacity are both an asset and a liability. While generally structurally sound, the building would need an estimated \$3.6 million investment in the roof, windows, heating, electrical and fire safety systems to bring the facility up to DPS standards.⁵²

One possible solution would be to use the building as a combination library and community center. If a portion of the building were used as a library space, it would fill a definite public service void in the neighborhood. Currently the only public library in the region is located on Kercheval Street, well outside average walking distance for the majority of residents. The challenge is finding funding for either reconstruction.

Another concept that has been utilized effectively in other redeveloping cities is repurposing the building as apartments or senior housing, as discussed in Chapter 2.5. The St. Louis School District has seen at least five of their former buildings reconfigured as housing complexes, and the Kansas City School District is forming a task force to investigate doing the same with some of their 30 plus available properties.⁵³ Guyton's wood floors, tile walls, and intricate stained glass detailing would certainly offer a unique living experience.⁵⁴

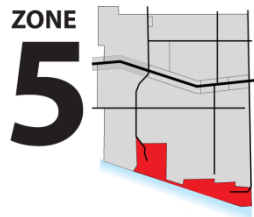
Regardless of the final use, careful consideration of the disposition of school grounds will be required. While our introduction of Manistique Park just east of the school helps alleviate some of the pressure to keep the grounds open, the programmatic aspect of the playground equipment must be accounted for. If the building is ultimately turned over for development, a playground space must be incorporated into the new park. If the park remains as a charter school or community center/library, the equipment could remain on the school grounds and allow the new park to function as a green corridor. Either way, the materials should be reused.

Ultimately, this zone will begin to fill in as people rediscover its charms and amenities. As growth reemerges, housing patterns need careful attention. For the region south of Freud, we suggest continuing the high density feel of the existing neighborhoods. The gated suburban-style enclave of Victoria Park, though successful, had an enormously disruptive effect on the cohesion of the neighborhood and presents pedestrian flow challenges. Infill using existing lot or "lot and a half" patterns would be much more effective for preserving the fabric of the neighborhood.

For the area between Freud Street and Jefferson Avenue, mixed-use townhomes and apartments with medium-to-high density would be most appropriate. The Heritage Townhouses, tucked behind Riverbend Plaza, offer a suggestion of what this form of housing might look like.



Figure 78 - The Heritage Townhouses⁵⁵



Zone 5: The Riverfront

The final zone in our design description is second in importance only to the revisioning of Jefferson Avenue. Our design is, in part, driven by the recent opportune announcement regarding expansion of the Detroit RiverWalk east to Fox Creek. The prospect of partnership with the Detroit Riverfront Coalition indicates potential new funding; a direct connection to the existing RiverWalk will stimulate new traffic and life for the lower eastside. Connectivity and visibility will be the key to success along this currently underutilized stretch of the river. The existing riverfront parks could become a valuable destination for residents of the lower eastside, Detroiters, and outside visitors.

Each of the four main riverfront parks, Maheras-Gentry, Ford-Brush, Lakewood East, and Mariners', offer opportunities for distinct programmatic styles. Of the four parks, Maheras-Gentry is the most clearly defined as an athletic recreation destination. Its location at the foot of the proposed Conner Creek Greenway, along with its ballparks and other athletic amenities, ensures a consistent flow of visitors. Mariners' Park (aka Windmill Point) is a well-known as fishing hotspot within the community. Ford-Brush and Lakewood East, however, lack any clear definition of use. Lakewood East, in particular, shows the effects of years of indifference and neglect. This roughly 26 acre park sits virtually abandoned; overgrown grass, facilities in extreme disrepair, and a parking lot potholed nearly to the point of being unusable testify to the lack of maintenance and usage.

Our approach to maximizing the potential of the four parks is to diversify and specialize their uses to the variety of recreational purposes for which they are best suited. Maheras-Gentry is well-positioned as it stands now. Ford-Brush, on the other hand, has enormous expanses of open space that would benefit from some simple programming. The addition of one or two soccer/football fields, for example, could bring in visitors through youth leagues, for a minor investment. The current state of Lakewood East makes it a likely candidate for passive recreation, such as picnicking and hiking. Several simply delineated trails and shelters would make this an excellent escape from the stress of urban living. The expansive lawn and parking access of Mariners' Park make this an optimal summer gathering place. JEBA might consider arranging tournaments, markets/fairs, or other events that could utilize the lawn space, thereby bringing attention to the adjacent parks as well.

The lower eastside's riverfront faces similar challenges as other locations along the Detroit RiverWalk. Park continuity is broken by high-end housing developments and industrial uses at various points between Belle Isle and Alter Road. Even when two parks are mainly contiguous, canals present an impassible barrier. To improve flow through Lakewood East and Ford-Brush Parks, we recommend construction of a new pedestrian bridge at the mouth of the western canal which would correspond with introduction of the new

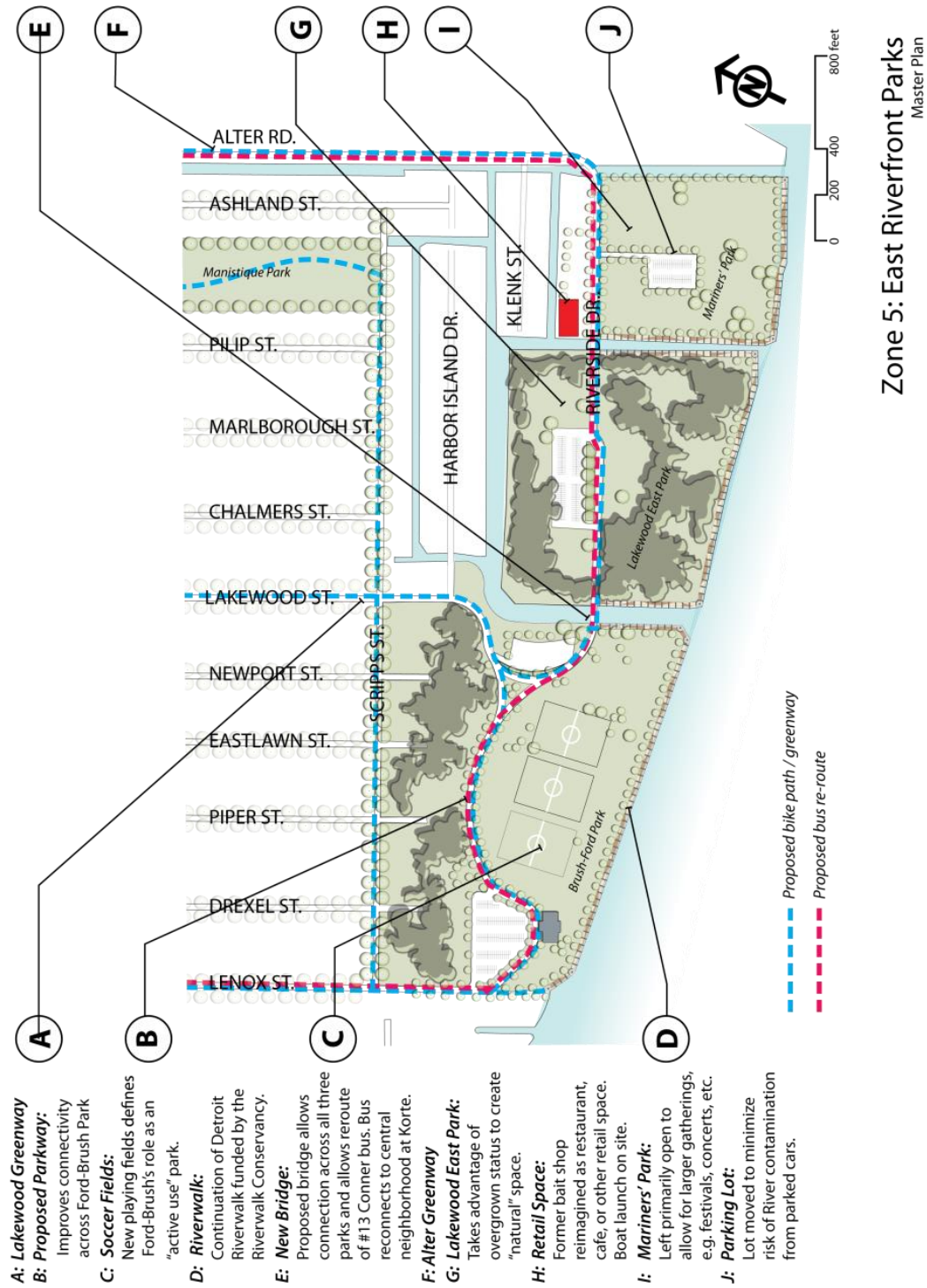


Figure 79 - Ford-Brush, Lakewood East, & Mariners' Parks Plan

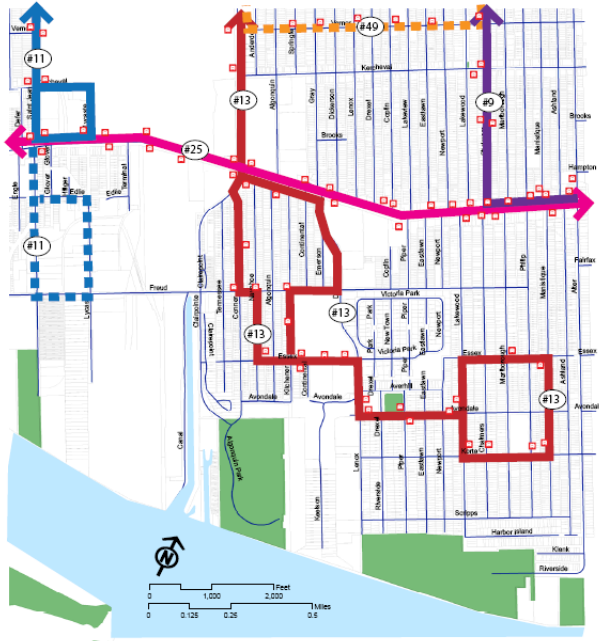
RiverWalk path. Additionally, we recommend a bridge capable of handling vehicular traffic and an access road connecting Ford-Brush and Lakewood East's three parking lots. Placed slightly inland, such a crossing point could dramatically increase visitor presence across the two parks, and would allow the possibility of a bus reroute to bring visitors directly south to the parks (see public transit below).

One piece of property located between Mariners' Park and Lakewood East Park is currently zoned for luxury townhome development. Ideally, this plot would be a continuation of Mariners' Park. Assuming this land will eventually be developed, it is important that the City and Detroit Riverfront Conservancy work with the developer to ensure that the RiverWalk continuity is maintained along the shore. Careful planning can help retain high property values for the owners while ensuring free and open access to the riverfront for the general public.

As a primary asset of the lower eastside, the river should be easily and equitably accessible to all, by multiple forms of transportation. The Detroit Department of Transportation (DDOT) bus routes currently do an admirable job of covering the lower eastside. All points inside the neighborhood boundaries are within the recommended quarter mile walking distance to a least one route. Though service is not available 24 hours a day for all routes, they do all run at least part-time seven days a week. Route 13, in particular, has extensive hours and covers the southern portion of the lower eastside. Unfortunately, while the bus reaches most points of the neighborhood, it stops just short of reaching the riverfront, especially the eastern parks. See Figure 56 for the current transit routes and our proposed addendum.

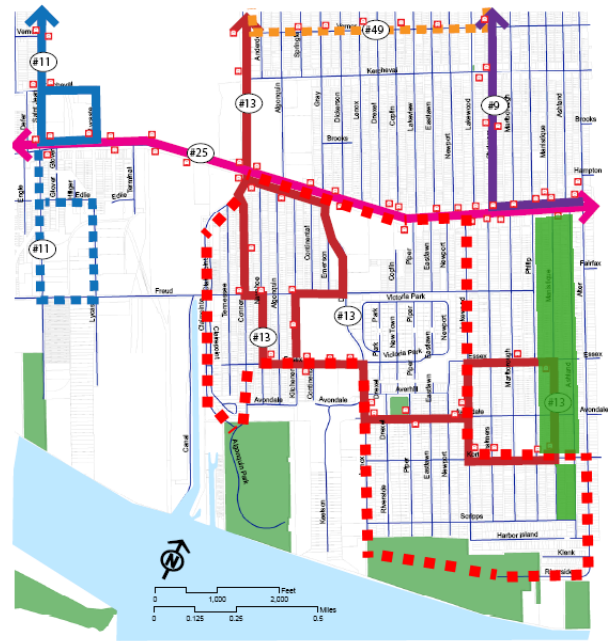
A new road and bridge through Ford-Brush and Lakewood East Parks, combined with a slight modification to the existing transit routes, would give transit riders exceptional access to the riverfront. Connecting the transit line back up along Lakewood would further emphasize the north/south corridor configuration. Riverfront and park proximity and ease of access should be properly identified with wayfinding signage in an effort to align with the new rebranding strategy. Increased visibility will also have a positive impact on the neighborhood's property values and livable desirability.

While motorized transit is important, the ability to use alternate forms of transportation to and from the parks, such as walking or biking, will add a crucial component to the sustainability of the neighborhood. As discussed throughout Chapter 2, a comprehensive greenway network can provide many social and physical benefits to the health and well-being of neighborhood residents. Fortunately, several organizations across Detroit have already been developing greenway master plans for the city. While organizations have slightly different visions about the paths their greenways would take, the basic layout has been relatively consistent.



- #9 Chalmers
- #11 St. Jean
- #25 Jefferson
- #13 Conner
- #49 Express (peak hours only)
- bus stop (approximate)

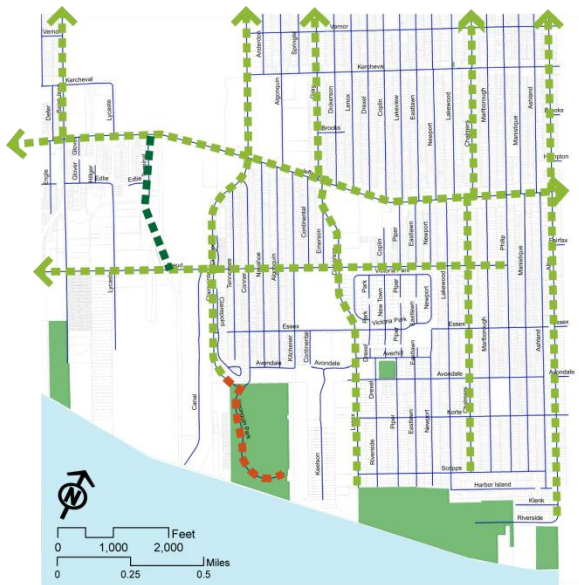
Existing bus routes



- #9 Chalmers
- #11 St. Jean
- #25 Jefferson
- #13 Conner
- #49 Express (peak hours only)
- bus stop (approximate)

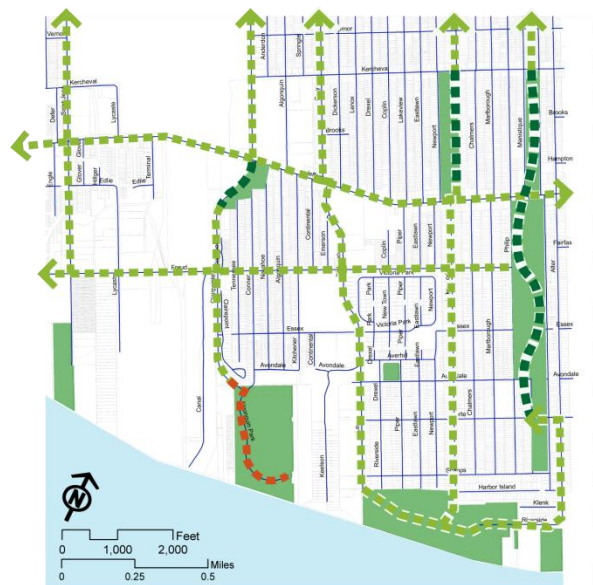
Proposed Route 13 Change

Figure 80 - DDOT Lower eastside transit routes



- Off-Street Greenway (Conceptual)
- On-Street Greenway (Conceptual)

Greenways Approved by Detroit City Council



- Off-Street Greenway (Conceptual)
- On-Street Greenway (Conceptual)

Proposed Greenway Configuration

Figure 81 - Proposed greenway configuration

Source: Giffels Webster Engineers, Carter Burgess, Archibald & Brogan & Partners, Detroit Non-Motorized Path - Citywide Destinations & Paths Map, Digital Image, City of Detroit Non-Motorized Urban Transportation Plan, Giffels Webster Engineers, June 2006, Web, 11 Apr. 2010. <http://www.giffelswebster.com/resources/attach/40/masterplan.pdf>

Chapter 4.4: Articulate

Our design recommendation combines the two prevailing concepts, the Detroit Non-Motorized Plan and the Connor Creek Greenway Coalition Plan, but pulls the greenway southward and along the river (See Figure 81).

Depending on the location of the path, the greenway would typically take one of three basic forms:

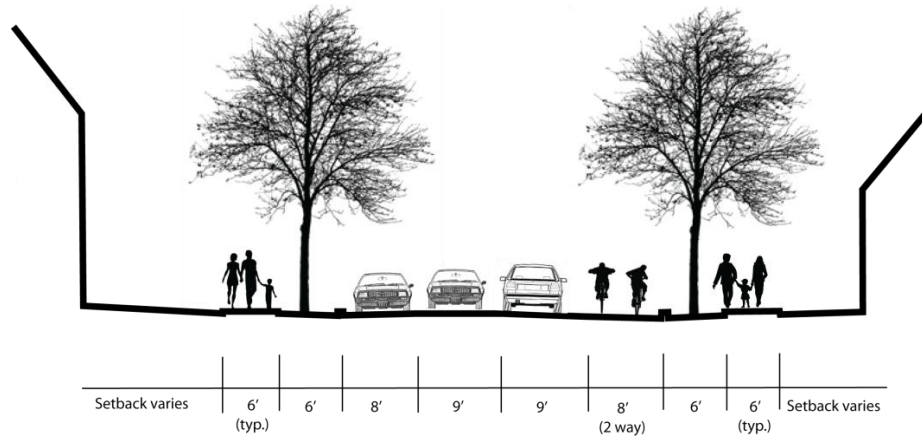


Figure 82 - Typical local street configuration

1) Local Streets (e.g., Avondale, Scripps, Lakewood streets): residential with high quality trees and generally low traffic levels. These streets, which usually have off-street parking for residents, will include two four foot bike lanes, two nine foot travel lanes, and one eight foot parking lane. As with Jefferson Avenue, these bike paths would be clearly marked with thermoplastic blue paint. It should be noted that even though Lakewood is being repurposed as an important north-south conduit, its existing residential qualities should be preserved, which is why it is included in this particular street category.

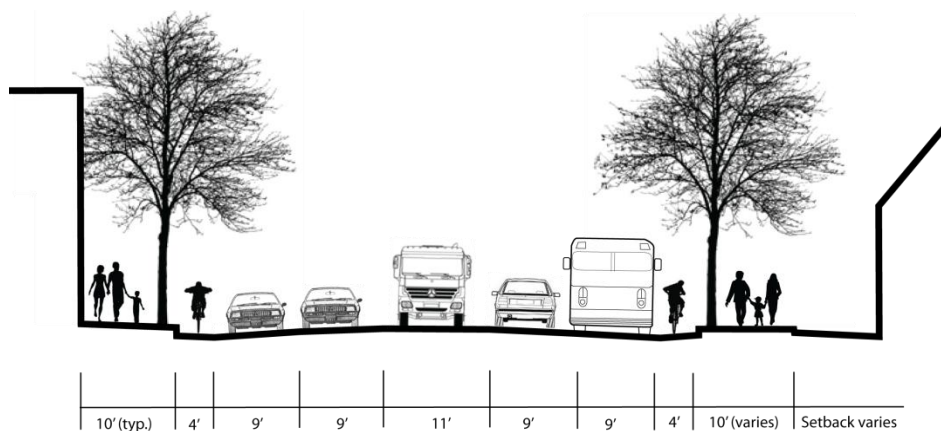


Figure 83 - Typical collector street cross section

2) Collector Streets (e.g., Kercheval, Dickerson Streets): busier streets with a mix of residential and other uses. On-street parking, while available, often has much lower use

rates than local streets. The design eliminates one lane of parking and devotes the space to two four foot bike lanes. Blue thermoplastic paint is again used to designate bike lanes.

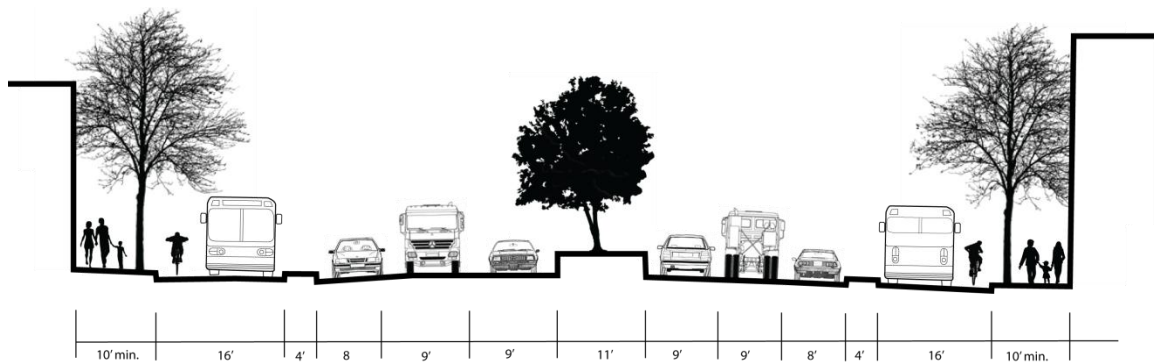


Figure 84 - Typical arterial street cross section

3) Arterial Streets, (e.g., Jefferson Avenue, Conner Street): Very wide, highly trafficked streets typically with six lanes of traffic. Variability in width and traffic patterns makes implementing a single design strategy for these two thoroughfares challenging. A detailed plan, which is beyond the scope of this paper, would be required to ensure that relevant design criteria are met. The Detroit Eastside Community Collaborative (DECC), in conjunction with the Detroit Greenway Coalition (DGC), has made huge strides in developing a plan for the Conner Creek Greenway. The DGC in particular will be a critical ally for JEBA in helping to develop a comprehensive, well-connected greenway system for the lower eastside. Our general plan for the Jefferson Avenue corridor as outlined earlier should complement the DECC and DGC's plans.

In summary, we have delineated five zones within Detroit's lower eastside, with four sections directly along Jefferson Avenue that, united via an interconnected network of greenways and newly created parks and open public spaces, would revitalize the community. The design takes advantage of the strong variety of currently existing assets, preserves and restores historic amenities, and reintegrates a cultural identity back into the fabric of the streets. We have attempted to create a holistic design that can address a variety of interrelated issues of sustainable redevelopment while maintaining the sense of community that is already very much a part of the area.

Chapter 4.5: Implement

The previous chapter, *Articulate*, presented a number of redevelopment strategies that demonstrate how design can contribute to increased social, environmental, and economic sustainability of the lower eastside. A bottom-up process that is informed by a range of stakeholders and community organizations can shape strategic planning that results in meeting the needs of current residents and accommodating future uses. Likewise, implementation of the design recommendations will require thoughtful planning, community engagement, and substantial financial and human capital. For this *Implement* step, it will be critical to leverage existing funding sources, operational expertise, and community processes. Collaborating with local organizations as well as utilizing state and national resources is a crucial component of sustainable redevelopment.

In order to implement a design, particularly in an area of limited resources, the hierarchy of needs must to be identified and prioritized so that funding can be best allocated. By laying out a flexible development phasing plan communities can account for unforeseen circumstances. Short and long term objectives should be outlined, especially in regards to vacant land. Projects should be categorized by cost and overall impact, so that a phased approach to project implementation can be realized.

Many local and regional organizations currently work to improve the quality of life in Detroit. We have highlighted a number of organizations whose purpose and actions may serve to guide and support revitalization in the lower eastside.^{xix} It's important to note that this process is dynamic and group efforts are constantly evolving. Our list is not comprehensive but it serves to gauge current activities and identify potential partnerships, pairing design recommendations with resources and local assets. Further, it highlights areas where an absence of leadership and action is noticeable. Where local groups do not exist, funding must be secured to build sufficient capacity or, alternatively, national partnerships must be forged to fulfill the remaining portions of the design vision.

Our lower eastside design was divided geographically into four Jefferson Avenue segments and five neighborhood zones. While many of the design recommendations in these nine areas are unique to particular locations, there is significant overlap between the design elements and modifications across the lower eastside. To reflect this overlap and in recognition that redevelopment will occur incrementally as resources become available and groups and individuals step forward, this implementation guide is structured by design element, rather than by area.

^{xix} See Appendix 4 for a full listing of Stakeholders & Opportunities for Collaboration.

Community-Wide Neighborhood Planning and Design

Planning and designing a sustainable redevelopment requires strategic planning both within the boundaries of the neighborhood and within the greater city and regional context. Collaborating with the many organizations already engaged in planning, revitalization, and capacity building efforts and partnerships can accelerate the efficient and effective transformation of the lower eastside. We recommend partnering with organizations such as the Detroit Local Initiatives Support Collaborative (LISC), which invests capital into neighborhood development projects, or the Warren Connor Development Coalition, which works to improve neighborhoods and establish livable communities at large. In addition, organizations such as the Community Development Advocates of Detroit (CDAD) in accordance with their recently released Strategic Revitalization Framework, can play a significant role in guiding cross sector and multi-organization cooperation, a role that community members reflect is noticeably absent in the lower eastside. Finally, we recommend that the Jefferson East Business Association, as the sole organization working towards economic development along the Jefferson Corridor, undertake the opportunity to unite business, community, and individual interests.

Community development funding opportunities include City-administered federal assistance programs through the American Recovery and Reinvestment Act of 2009 and Neighborhood Stabilization funds through the Department of Housing and Urban Development. Incentives such as the Michigan Economic Growth Corporation's Michigan's Renaissance Zones™, or tax-free zones, increase the feasibility of attracting new businesses. Finally, the lower eastside should seek a share of the recent Bank of America commitment of \$25 billion in community development funds for Detroit.¹

Streetscape Improvement

Improving the aesthetics and function of streetscapes can revitalize businesses, maintain ecological processes, and improve the quality of life for community members. The level of investment required for streetscape improvements varies significantly depending on the scale of the required change. Tree planting, new construction and infrastructure deconstruction require dramatically different levels of social and economic capital for completion. Integrating sustainable design strategies within the lower eastside's urban fabric offers potential widespread benefits and greater return on investment to individuals, organizations, and the community at large.

The Greening of Detroit is already focused on one level of streetscape improvement, tailoring species selection to those which will thrive in city conditions. They are working with Structural Soil, a new technology which supports pavement, yet allows roots to penetrate it freely. They have expertise in how arrangements can enhance tree life expectancy. They are already looking for opportunities to implement streetscape projects in

conjunction with the City of Detroit, Wayne County and MI DOT² so their partnership is key creating in this element.

Building Improvement, Retrofits, and New Development

Façade Improvements

JEBA maintains and administers a façade improvement program to enhance the aesthetics of the Jefferson corridor. In addition, the Village of Fairview Historic Society aims to recognize and preserve historic buildings, improving streetscape aesthetics and maintaining a strong cultural base. The Architectural Salvage Organization also invests funding in historic preservation projects. The Jefferson-Chalmers CDC also has interest in preserving historical integrity. These organizations may be particularly helpful resources regarding the proposed façade improvements of Jefferson's Vanity Ball Room and St. Columba Hall (Jefferson Zone 1C & 1D), and the Savarine Hotel Development (Jefferson Zone 1B). Federal Historic Tax Credits can help offset the costs of historic preservation and adaptive re-use along the Jefferson corridor, especially when used to stretch the value of grants and donations.

Retrofitting & Rehabilitation

Residential buildings throughout the lower eastside and commercial structures along Jefferson Avenue are in are in need of various degrees of repair. To initiate a large scale effort to convert vacant structures into mixed-use buildings in Zone 1, or retrofit buildings with energy-saving technologies, we recommend bringing in organizations with expertise in commercial revitalizations, home repair and owner occupied rehabilitation and building improvements such as U-SNAP-BAC. To increase the feasibility of such projects, we recommend collaborating with the Messiah Housing Corporation and Creekside CDC, both of which are involved in marketing and leasing new low to medium income housing. While there is currently very little new development in the City, the federal grants and tax credits available for 'green development' and the adoption of energy-saving techniques may increase the feasibility these projects. For example, Michigan received over \$82 million to reduce energy consumption in state-owned government buildings and to facilitate energy efficiency in the private sector from the Michigan State Energy Program (SEP) for the American Recovery and Reinvestment Act.³ In addition, the Michigan Energy Efficiency & Conservation Block Grant provides assistance for retrofitting through weatherizing and installing new efficiency technology, for example.⁴

Infrastructure Improvements

Implementing design elements such as the proposed median and right of way improvements will require coordination with the Detroit Department of Transportation. Implementing design recommendations on state-owned Jefferson Avenue, such as asphalt

removal in Zone 1D, requires bringing MDOT to the table. In order to improve river access in Zone 5, we recommend that an organization with a reputation such as JEBA, which has demonstrated commitment and capability in representing community interests and visibly improving the lower eastside, approach the City regarding new road construction, perhaps as part of a larger community coalition. To successfully construct a median that extends to Grosse Pointe, we recommend that community organizations collaborate with Detroit, Grosse Pointe, and the State to establish long-term plans and objectives. Further, we recommend additional coordination with projects such as the Michigan Cool Cities Initiative and Greenways Initiatives, both of which work to increase pedestrian friendliness. JEBA and the Creekside CDC received a grant from the Cool Cities Initiative in 2009 to develop a wayfinding system. Coupled with support from the Local Initiative Support Corporation, the funds are intended for installation of a large neighborhood information kiosk at the Jefferson-Chalmers intersection and four wayfinding signs to highlight amenities in the area.⁵

In order to offset some of the costs of infrastructure modifications, we recommend seeking federal and state funding for roadway improvements through the American Recovery and Reinvestment Act and the Michigan Department of Transportation TIGER grants.

Landscaping

To improve and extend greenways within the lower eastside, we recommend collaborating with the Detroit Greenways Coalition and organizations, such as the Connor Creek Greenway Coalition, which leads the effort to establish greenways in Detroit. Additionally, connecting with Detroit Grosse Pointe Collaborative, which seeks to make community improvements at large, may foster the coordination necessary to implement the recommended greenway and park connections with the neighboring community. Because connectivity is a fundamental aspect of greenways, design collaboration on planned local and regional greenways is especially important. Funding for non-motorized transit is available through the Michigan Department of Transportation's TIGER Grants⁶; establishing a recreation plan that includes non-motorized transit in tandem with a greenway plan may open the door for such funding opportunities.

To implement suggested designs along the riverfront, we recommend collaborating with two organizations with expertise in riverfront planning and familiarity with long term riverfront plans such as the Detroit Riverfront Coalition and the Detroit Riverfront Conservancy. To revitalize Ford-Brush and Lakewood East parks, we stress the value individuals and groups from the community can bring to the table in terms of providing care and maintenance, establishing educational or recreational programs, and determining appropriate and desired park uses.

Chapter 4.5: Implement

To create the envisioned parks and landscapes, we recommend partnering with the Greening of Detroit, whose expertise, programming, and resources can provide significant support for tree planting efforts. The Greening of Detroit has multiple tree planting programs, ranging from community plantings, to street tree plantings, to neighborhood run temporary nurseries, and more. The Greening of Detroit seeks to increase the tree canopy throughout the City; however, as the survival of newly planted trees depends on care and maintenance, the organization favors working in areas where community interest and support are strong. Therefore, there is a crucial role for community organizations, such as the Jefferson-Chalmers CDC, businesses, and individuals to play in bringing trees to the lower eastside. The Greening also received a \$147,000 grant from the Greenways Initiative to develop maintenance routines and employ a crew of four to collect litter, sweep trails and address landscaping special needs.⁷

In order to increase public spaces such as the parks recommended in Zones 3 and 4, we recommend seeking the support of organizations such as the Greening of Detroit, the City of Detroit, as well as community leaders, and school and religious groups. The Jefferson- Chalmers CDC and Creekside, both of which have demonstrated interest in improving safety of and access to parks and open space, may also provide support and expertise.

In addition to utilizing the support provided by the Greening of Detroit, we recommend seeking the assistance of Michigan Urban Forest Council, which is administered by the Michigan Department of Natural Resources, and often provides grants for urban and community forestry. The DNR provides extensive grant opportunities for improving recreational and natural areas, including urban forestry grants. Further, we recommend investigating the opportunity to generate funding for parks and open space through the Michigan Natural Resources trust fund, which is supported by royalties generated from State-owned mineral resources.

Vacant land Reuse

There is growing interest in developing a strategy to address population decline and vacant land in Detroit. Institutions such as the Detroit Land Bank can play a significant role in redevelopment of abandoned and vacant properties; however, there is significant opportunity for community members and organizations to influence land development in their neighborhood.

Returning vacant land to a useful state will require a wide range of expertise and support. We recommend initiating discussion and action regarding vacant land by utilizing resources such as the Detroit Vacant Property Campaign and building on and providing support to the Lower Eastside's Vacant Land Reuse Planning Project. In Zone 1B, where construction of new mixed-use buildings that compliment and support adjacent businesses and provide additional amenities for the community is desired, we recommend

organizations such as JEBA take a lead in bringing in new developers and businesses. However, in areas such as Zone 4, where foreclosure and vacancy are a significant presence, we recommend establishment of community groups who will maintain vacant lots that are transformed to community gardens. One strategy we suggest for transforming vacant lots in Zone is to partner with the many religious institutions and Monteith Library to generate community support through volunteers and adopt vacant lots. Another strategy is for JEBA to seek partnerships with developers here and establish an interim strategy for preserving and/or healing the land until such development can take place. Additionally, to establish the proposed farms and markets in this region, we advise collaborating with organizations that have expertise in urban food systems, such as the Detroit Black Community Food Security Network and capitalizing on funding opportunities such as loans and insurance for crops and community block grants. Finally, in Zone 1A, we recommend seeking the assistance of the Detroit Land Bank and the Detroit Brownfield Redevelopment Authority which provide incentives and play an instrumental role in redeveloping brownfields in the former industrial corridor. Vacant property in Michigan qualifies for brownfield funding, and brownfield funding and tax incentives are definitely available.

Community Involvement

The ability and desire of residents, neighborhood groups and local organizations to support local sustainable redevelopment should not be underestimated. There is significant opportunity to collaborate with schools, universities, religious groups, and other community groups who currently work to realize many of the design elements recommended in Chapter 4. Disparate efforts towards common goals need unification. JEBA should also work to identify community and block leaders whose local knowledge of citizen interests and leadership would be valuable and cumulative. Utilizing local resources and assets for the purpose of revitalizing the community ensures long-term investment and care. Orchestrating such a variety of organizations and individuals towards a common goal can be challenging, and the need for greater direction and shared focus among groups is great. To facilitate redevelopment, therefore, we advise establishing a lower eastside redevelopment collaboration or coalition to represent community interests and guide and shape redevelopment efforts.^{xx}

^{xx} See Appendix 4 for a full listing of Stakeholders & Opportunities for Collaboration

Chapter 4.6: Revisit

Accounting for the future uncertainty of economic limitations, ongoing or emerging environmental crisis, and further ecological constraints is vital to realizing a sustainable future. While definitions and interpretation of the term sustainability vary, that sustainability necessarily implies perpetuity and a long-term horizon, is seldom disputed. A ‘green’ community that lacks the capacity to adapt to a changing environment, therefore, is unable to realize true sustainability. Provisions that allow a community to build resilience in a changing environment need to be developed to enable long-term sustainability.¹

Revisit is the process of continual improvement through which communities adapt to changing conditions and progress toward holistic sustainability. Utilizing mechanisms within the institutional structure, the process of continual improvement provides a community with the tools it needs to advance into the future, self-reliantly. Mechanisms that allow for continuous feedback include adaptive management, institutional collaboration, and the creation of diverse systems.

Adaptive Management

Adaptive management is a process commonly employed to manage protected natural areas. The iterative, responsive, and optimal-goal-seeking nature of this management strategy enables effective resource management. Figure 85 displays a typical adaptive management process.

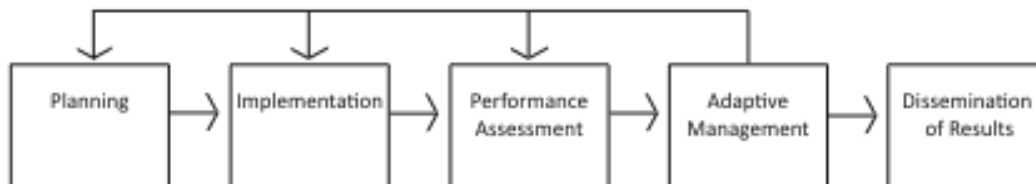


Figure 85 - Adaptive Management Process (adopted from NOAA)²

This process is appropriate where complexity and a continuously changing environment result in high levels of uncertainty in both the optimal management actions and the outcome of applied strategies.³ It is thus readily transferable to the process of community redevelopment. In the context of redevelopment, adaptive management can help to maintain and perpetuate a socially, environmentally, and economically prosperous community through a ‘learning while doing’⁴ process based on data collection, analysis, and adjustment to reflect internal and external changes and needs as they evolve.

The selection and implementation of best management practices, such as those identified in Chapter 2, provide the foundation for adaptive management in the lower eastside of Detroit. This management strategy will require persistent monitoring and

analysis of relevant metrics within the system to reveal emerging needs in the form of weaknesses, failures, or general areas of concern. After identification of new needs and challenges or failures of the system, subsequent management of these issues must occur.

In Detroit's lower eastside, the metrics defined in the *Review* phase provide just some of the potentially continuously-collectable data about the state of the community. Local community development organizations currently monitor and strive for continual improvement of many of these factors. For example, the Greening of Detroit continuously evaluates the quantity and quality of the local tree canopy, and adjusts the location of tree plantings to address deficiencies and the community's desire for trees. In the event of a crisis, such as the destruction by emerald ash borers, the Greening of Detroit would be a first responder. One could easily imagine the Mayor implementing a task force, similar to the CDAD team, to monitor and evaluate a condensed dashboard of the most important metrics on a regularly-scheduled basis. Such a system would be particularly effective in an area of redevelopment because it would monitor strategies that are new to the area. In the event that a program fails to achieve its goal, it would quickly become apparent in data obtained through the metrics defined during *Review*.

Institutional Collaboration

Adaptive management cannot occur in a vacuum. The organizations that are working to address the needs of the community cannot understand the state of one part of the system without deep insight of the entire system. For example, an organization monitoring the effects of a new recycling drop-off center on Jefferson Avenue may identify a decrease in the amount of waste that is hauled to the Detroit's incinerator. Sharing this finding with the municipal waste collection services could enable the waste collection service to adjust hauling schedules. Furthermore, knowledge of where the Greening of Detroit plans to plant trees next can benefit a group working to improve energy efficiency in Detroit's lower eastside residences. Strategically planting appropriate trees provides the benefits of both increased canopy cover and passive energy savings to nearby buildings, effectively meeting two goals with less funding.

Similarly, the exchange of knowledge and experiences could benefit organizations working towards analogous goals. For instance, organizations could learn from the successes and failure of projects and initiatives targeting the redevelopment of a blighted community undertaken by other initiatives. There is potential that some organizations may consider such knowledge proprietary, and the recognition that sharing knowledge is essential to the process of redeveloping a functional lower eastside is imperative. All groups working in the lower eastside seek the same essential goal: to breathe new life into a blighted community. Through the process of learning from each other, organizations can focus on successful strategies and avoid the tactics that have proven inappropriate

elsewhere. This collaborative effort may potentially save time and money and result in a more sustainable community.

Accomplishing this requires the implementation of a mechanism that facilitates dissemination of this wisdom through all organizations that have a stake in the community. An institutional collaborative or coalition made up of the organizations working in the area can organize these proceedings and create a place for internal learning. A collaborative team consisting of relevant stakeholders including CDCs, government leaders, businesses, and the directors of major community meeting places like churches and community centers, would be a significant asset to the community.

Currently, the leading organizations in Detroit's lower eastside are fragmented and competing for resources. However, the creation of an institutional collaborative could enable equitable and efficient partitioning of resources, thus improving the success rate of projects in the community. Together, programs can be assessed and combined for greatest effect. In addition, funding can be synchronized to maximize impacts, and knowledge can be shared to improve the overall success rate of all local initiatives. As previously mentioned, the Community Development Advocates of Detroit (CDAD) have recently begun a process to unify and focus efforts for sustainable development across the city. Their Strategic Revitalization Framework, released in February of 2010 is supported by Mayor Bing and is highly aligned with a majority of principles we have called forth in this document. We support such an endeavor and hope JEBA has the opportunity to partner with them in the future in order to see the model duplicated at the local neighborhood scale in the lower eastside.

Diversity

Akin to that of natural systems, diversity within human systems cultivates a healthier, stronger community. From an ecological perspective, a biologically diverse system has greater stability and built-in regulation than a less diverse system. Similarly, a diverse human population embodies a broader set of skills, knowledge, and resources than a homogeneous population. This diversity in age, culture, and socio-economic status results in an increase both in supply of and demand for a greater variety of economic opportunities within a community.

In terms of economic stability, a diverse community supports a variety of industries, businesses, and recreational opportunities. In addition to increasing a community's self-sufficiency, providing jobs, and enabling the need of residents to be met, a diverse economy reduces a community's dependence on one industry, thereby reducing vulnerability to economic collapse. Overreliance on one industry for employment can have significant economic and social implications. For example, Detroit's lower eastside experienced a loss of jobs, income, and revenue when the success of the auto industry declined. This collapse was ultimately a driving force behind the transition from prosperity to blight in the region.

Diverse redevelopment, which draws from a wide range of industries and expands available employment opportunities, requires an array of specialties, education, and experiences. Generational planning, or planning for the full spectrum of ages, provides appropriate and necessary services to the entire range of ages living in a community. This includes, for example, schools for small children, job training programs for adolescents, housing of different sizes and styles to accommodate families of any makeup, and facilities designed to care for the elderly, like nursing homes and special care clinics. Because generational planning targets all generations, it attracts a variety of business and provides the services elderly populations require and the amenities young, working populations look for in a community, such as parks, retail, affordable housing, and schools.

A range of housing options is required to attract and support a diverse population, bring a range of skills to the job pool, and foster economic diversity. Providing single and multi family homes, opportunities to rent and own property, and high, medium, and low income housing options enables citizens of all generations and socio-economic status to become residents and contribute to the community. Exacerbated by systemic issues such as land use regulation, the social tendency to segregate across class, ethnicity, and race can result in highly inequitable and homogeneous communities. This phenomenon is evident in Detroit, where the distribution of income and race across space is highly segregated. Greater housing diversity can benefit and guide an integrated, cohesive, and more efficient community. In the lower eastside, attracting new residents with a variety of housing options can generate revenue for the community at large. Furthermore, increasing the presence of individuals with a higher level of education and higher income job may attract and demand new businesses and services that can be enjoyed by all members of the community.

Security is a commonly cited concern of affluent members of a diversifying community. However, case studies demonstrate that, coupled with increased security measures like night lighting, graffiti removal, and aware citizens, crime rates will actually drop as mixed-income housing development occurs.⁵ According to the CEO of the Chicago Dwellings Association, a non-profit working to rehabilitate public housing within the city, "We have a history of isolating and concentrating the poor outside the social mainstream. Mixed-income housing provides an opportunity to embrace them and bring them back into the social mainstream."⁶

A diverse community is more stable, resilient to change, and socially just. The lower eastside, dominated by a single income class (low), a single race (African-American), and a limited number of employment opportunities (primarily a few manufacturing firms), would benefit from the stability, resilience, equity, and opportunities a greater diversity would provide. Redevelopment that meets the needs of current and future residents of all ages, statuses, and backgrounds, and provides the amenities to attract new residents can aid in establishing a greater diversity in the lower eastside.

Longer term considerations

Given both the impacts of climate change and the inevitable adoption of more stringent emissions standards, it is imperative that planning and redevelopment efforts seek to address these challenges. It is crucial to address the implications of climate change and variability at a local level, in addition to addressing issues that transcend regional boundaries. Climate change is expected to cause more extreme heat events; in cities that already suffer from the urban heat island effect, this will place further demands on energy and infrastructure and additional harm on human health. Low-income individuals who struggle to afford the high energy bills will be particularly vulnerable to an increase in temperature. Creating a climate action plan for the city of Detroit could help plan for and perhaps even mitigate some of these impacts.

Cities, regions, and states such as Washington, Chicago, New York City, and Oregon, are increasingly adopting climate action plans to address anthropogenic influences on climate as well as the potential impact of climate change on human well-being and the built and natural environments. These strategies are numerous, ranging from risk and vulnerability assessments to resource allocation and information sharing; yet notably, all require collaboration of stakeholders in all sectors.⁷ It is imperative to establish clear policies to reduce GHG emissions. This may include for example, green building standards, energy efficiency requirements, renewable energy requirements that go beyond state minimum requirements, and regulation of impervious surfaces. Further, building local adaptation capacity will require multi-stakeholder coordination and leadership among all sectors to educate and provide resources for citizens.

Over 1,000 U.S. cities have climate action plans committing to reducing greenhouse gasses. The City of Cincinnati, for example, adopted the Green Cincinnati Plan, a “roadmap for how [the city] can become a national leader in addressing global climate change and thus make Cincinnati a healthier place to live,” under the leadership of Mayor Mark Mallory in 2008.⁸ The plan strategically evaluated GHG gas reduction measures by monitoring the expected reduction in emissions, the cost and benefit associated with a ton of GHG emissions reductions, and the long term economic, social, and environmental sustainability. They also questioned how the proposal would impact the achievement of other local goals.⁹

City climate action plans support regional, national, and global efforts to reduce emissions as well as build local capacity to cope with the impacts of temperature, precipitation, and severe weather events associated with climate change. Communities that have already faced some form of devastation are more vulnerable to these events; they will often face disproportionate impacts because they lack the resources to adapt, thus making it even more crucial that they adopt comprehensive action and adaptation plans. As local governments play a key role in responding to natural disasters, it is essential that they establish a plan to both mitigate and adapt to potential disasters.¹⁰

Though individual Michigan cities such as Detroit have not yet initiated climate action plans, comprehensive planning efforts exist at the state and interstate level. At a regional level, Michigan is a member of the Midwestern Regional Greenhouse Gas Reduction Accord, an agreement established in 2007 between six states and one Canadian province. The goal of the Accord is a 60-80 percent reduction of emissions below current levels and the development of a cap-and-trade system.¹¹ Since 2007, Michigan has adopted a number of statewide climate-related actions including the Governor-initiated Executive Directive to Reduce State Greenhouse Gas Emissions, Climate Action Plan, Renewable Energy and Energy Efficiency Legislation, Public Benefit Fund, and Green Building Standards.¹² Michigan's Climate Action Plan, released by the Michigan Climate Action Council (MCAC) in 2009, provides state and federal policy and regulation recommendations to reduce greenhouse gas emissions. Among MCAC's quantifiable goals include a reduction in Michigan's emissions of 33 percent below 2005 emissions levels by 2025, which would generate a net cumulative savings of ten billion dollars.¹³ Studies, including a macroeconomic analysis, indicate that if the 54 recommended policy strategies of Michigan's Climate Action Plan were fully implemented, between 2010 and 2025, 129,000 new jobs would be created, savings of over \$10.20 per metric ton of carbon dioxide equivalent (MMT CO_2e) and a \$25 billion net gain in Gross State Product would be realized.¹⁴ Additionally, GHG emissions from Michigan sources would be reduced by 40 percent of business as usual levels or 121 MMT CO_2e and the price of residential energy would be reduced.¹⁵ However, as planning must be supported on all levels of government, the lack of local adaptation plans in Michigan cities will likely undermine state and regional initiatives.

Community redevelopment offers the opportunity to address how implementing sustainable practices can mitigate and reduce critical climate change impacts, such as flooding, the urban heat island effect, water resources, drought, and sea level rise.¹⁶

In response to the need to address adaptation and mitigation even at the site level, community leaders in Detroit's lower eastside can engage and educate residents and businesses about potential future climate-related issues and actions to prevent the exacerbation of climate change. Communities should seek local expertise and identify resources for citizens. Funding options such as FEMA, which has provided resources for climate action in cities, should be investigated.¹⁷ In addition, top-level political or departmental leadership should be sought out to generate support.

Attaining sustainability requires more than improvement of the status quo. Sustainable redevelopment is a process that requires more than the adoption of the best management practices identified in Chapter 2 and more than the implementation of the design recommendations provided in the *Articulate* phase. Despite the great need to mitigate the impact of human systems on environmental systems immediately, change will

Chapter 4.6: Revisit

not occur overnight. Rather, transition to a self-sufficient, closed loop society must occur incrementally over time. This goal can be approached through the process of management, diversification, and the assessment and adaptation of all systems over time.

Chapter 5: Key Findings & Next Steps

After extensive research on the six larger overarching topics in sustainable community redevelopment, in addition to several of the larger systemic roadblocks, we saw the emergence of an applicable model towards the formulation and implementation of design strategies. What follows is the summary of our key findings, both from our literature and case study review, as well as our application of the REPAIR model to the lower eastside. We hope these conclusions prove beneficial in helping JEBA direct the redevelopment of Detroit's lower eastside.

Part I: Thoughts on Sustainable Community Redevelopment

The literature gave us a broad overview of issues and innovations from which we were able to distill prevalent problems and our key findings regarding the creation of a sustainable redevelopment strategy. Through the course of this research, several concepts consistently became apparent.

First, in an area where resources are limited and disorganized there is often a lack of comprehensive data with which to analyze the state of affairs. Yet, it is precisely because resources are scarce that it is particularly important to follow a data-driven approach so that resources may be appropriately allocated towards the most pressing matters. Indicators and metrics provide clarity for targeted investment and prioritization of needs. Identification of existing assets shines light on core strengths that may have been forgotten, which can be used to jumpstart development.

Second, and possibly most tangible, is the issue of fragmentation of local organizations. In tough economic times, community leaders compete for resources and support, such as funding and volunteers. Multiple disjointed or isolated efforts rarely lead to cohesive solutions. Stakeholder engagement and collaborative design yield higher quality results and built-in community support. This means not only involving local residents in the process, but key businesses, non-profits, government agencies, and community development organizations as well. Through the compilation of assets and coordination of effort, goals can be achieved with increased aptitude, awareness, and likelihood of success. Furthermore, disparate stakeholders may find their seemingly unrelated problems addressed by a single creative solution. Partnership between existing community organizations accelerates transformation and implementation.

Finally, it is the continual process of improvement, in lessening environmental impact, recovering economic situation, and advancing the social equity and well-being of a community that fosters sustainability. Feedback loops that are built into the system allow for the progression of incremental change that establishes resilience in the face of

challenging circumstances. It is crucial to continually monitor for changes in critical data and incorporate feedback into the engagement and design processes. Ongoing education and discussion is a central facet in giving communities the capacity to improve local conditions and adapt to future change and crises.

These three key findings are simultaneously interrelated. A data driven approach is important both in terms of modern data capture and analysis, but also in the communication and sharing this knowledge between governments, CDCs, and community groups to aid in collaborative design. Further, these groups all share the vital task of continual monitoring, feedback, and improvement. From these three findings our REPAIR model for sustainable community redevelopment emerged.

Part II: The REPAIR Model and the Lower Eastside

Through the application of the REPAIR model to Detroit's lower eastside, we saw first hand the inherent challenges in fulfilling each step. The realities of community redevelopment involve immense complexities that cannot completely be addressed in an academic model. As such, we came away from this experience with three key findings.

First, while community engagement in local problem solving is vital, the reality often involves a highly charged political atmosphere. Groups may stand firm in their opposing positions rather than communicating openly about their perhaps common interests. The need for professional facilitation or mediation skills is clear when attempting to unite groups in mutually beneficial problem solving. During our participation in the rebranding charrette, we were made privy to the challenges of public participation. These challenges can be partially met through the adoption of a common process, which can be the key piece to unifying disparate stakeholder groups. With everyone speaking the same language, negotiations and goal-setting can occur more effectively.

Second, though a data-driven approach is critical to the success of community redevelopment, neighborhood data is often sparse and, in many cases, outdated. Given the related nature of all aspects of sustainable redevelopment, we found it incredibly challenging to constrain our scope. The amount of data needed to touch on a wide variety of aspects is massive and time consuming. There are also abundant interconnections between metrics that are important to prioritize but complex to analyze. We found that supplementary primary research in the form of surveys, interviews, and walking tours provided us with a more personal view of the neighborhood. This data, combined with our general knowledge of causal relationships, allowed us to target our design decisions.

Third, we found that situational perception is key to informing attitudes. Reputation and branding, though not always correct, can be detrimental to a neighborhood and result in a stagnating or reinforcing negative feedback loop. Negative perception is incredibly difficult to overcome; Detroit faced the beginnings of crisis in the 1960s and has yet to

recover. And yet, hidden gems remain, sometimes forgotten or as yet undiscovered within communities. When it is clear that no rescue is to be expected from either government or outside industry, turning to one's unrealized internal assets is necessary and can often only be done with perceptual reframing.

Overall, our findings confirmed our belief that a sustainable community redevelopment design cannot be drawn from an ivory tower. Design must be informed by not only research and innovation, but by continued interaction with a community, the incorporation of their local expertise, and an analysis of the complex interconnections that emerge as a result.

Next Steps:

Throughout this project, we have provided the first iteration of a design and recommendations for next steps to aid JEBA in the revitalization of the lower eastside. JEBA, along with their community partners, has an unparalleled opportunity to leverage neighborhood assets, in concert with the recent CDAD report and changes in civic leadership, to develop and implement a truly sustainable plan for the lower eastside. Specific next steps for JEBA are suggested as follows:

- 1) Move quickly to integrate the best practices outlined in Chapters 2 and 3 into JEBA's strategic plan. To that end, our research team looks forward to working with them in the future to aid the process.
- 2) Utilize the design concepts provided within to hold a community charrette or visioning workshop and begin the long process of creating a comprehensive vision for the neighborhood. We would encourage JEBA to leverage continued support from the University of Michigan School of Natural Resources & Environment, as well as engagements with other schools, to accelerate the transformation.
- 3) Review our list of community assets and neighborhood indicators outlined in Chapters 4.1 and 4.2. Supplement this data with emerging results from new sources such as the Data Driven Detroit project as well as Census 2010 results. Furthermore, we believe that there is tremendous opportunity for sharing the burden of data capture among community development organizations.
- 4) Lastly, and more tactically, we have designed this document for ease of navigation. Please utilize this reference to locate and apply for relevant grants and funding opportunities as outlined throughout the text.

It is often said that Detroit is a constantly moving target. Recent changes in civic leadership in combination with the recently released Neighborhood Revitalization Strategic Framework may just yield the perfect storm for positive change in the city. It is our hope that JEBA will use this report to garner political capital and solicit investment in the lower eastside. From our vantage point, with the right planning, collaboration, and strategic implementation, Detroit's lower eastside is poised for a dramatic revitalization.

Sources

Introduction

- ¹ Thompson, Heather Ann. *Whose Detroit?: Politics, Labor, and Race in a Modern American City*. Ithaca, New York: Cornell Univ., 2004. Print.
- ² Sugrue, Thomas J. *Origins of the urban crisis race and inequality in postwar Detroit: with a new preface by the author*. Princeton: Princeton UP, 2005. Print.
- ³ Sugrue, Thomas J. *Origins of the urban crisis race and inequality in postwar Detroit: with a new preface by the author*. Princeton: Princeton UP, 2005. Print.
- ⁴ Chafets, Ze'ev. *Devil's night and other true tales of Detroit*. New York: Vintage Books, 1991. Print.
- ⁵ Chafets, Ze'ev. *Devil's night and other true tales of Detroit*. New York: Vintage Books, 1991. Print.
- ⁶ "The Mischievous History of Devil's Night." *The Washington Post*. Oct. 30, 2007. Print.
- ⁷ Thompson, Heather Ann. *Whose Detroit?: Politics, Labor, and Race in a Modern American City*. Ithaca, New York: Cornell Univ., 2004. Print.
- ⁸ Walsh, David. "One-third of Detroit's Population Lives below Poverty Line." *World Socialist*. Sept. 2, 2005. Web. 03 Apr. 2010. <<http://www.wsws.org/articles/2005/sep2005/detr-s02.shtml>>.
- ⁹ Hackney, Suzette. "Bing: Demolition Project Begins April 1: Plans to Raze Homes in Stages." *Freep.com*. 25 Mar. 2010. Web. 08 Apr. 2010. <<http://www.freep.com/article/20100325/NEWS05/3250372/Bing--Demolition-project-begins-April-1>>.
- ¹⁰ MacDonald, Christine. "Detroit Mayor Bing Emphasizes Need to Shrink City." *The Detroit News*. 25 Feb. 2010. Web. 11 Apr. 2010. <<http://www.detnews.com/article/20100225/METRO01/2250391/1409/metro/Detroit-Mayor-Bing-emphasizes-need-to-shrink-city>>.
- ¹¹ Gallagher, John. "Acres of Barren Blocks Offer Chance to Reinvent Detroit." *City Farmer News*. Web. 03 Apr. 2010. <<http://www.cityfarmer.info/2008/12/23/acres-of-barren-blocks-offer-chance-to-reinvent-detroit/>>.
- ¹² "Downsizing Detroit." *Staten Island NY Local News*. 13 Mar. 2010. Web. 03 Apr. 2010. <http://www.silive.com/opinion/editorials/index.ssf/2010/03/downsizing_detroit.html>.
- ¹³ Earth Day Network. *Urban Environment Report (UER)*. 22 Feb. 2007. Web. 3 Mar. 2010.
- ¹⁴ "Detroit's Riverfront Redevelopment Project Riverwalk," About.com. Web. 3 Mar. 2010. <<http://detroit.about.com/od/neighborhoods/a/RiverWalk.htm>>
- ¹⁵ Sugrue, Thomas J. *Origins of the urban crisis race and inequality in postwar Detroit: with a new preface by the author*. Princeton: Princeton UP, 2005. Print.
- ¹⁶ Sugrue, Thomas J. *Origins of the urban crisis race and inequality in postwar Detroit: with a new preface by the author*. Princeton: Princeton UP, 2005. Print.
- ¹⁷ U. S. Census Bureau. *GIS population data by tract. U.S. Census 2000*.
- ¹⁸ Sinacori, Nicholas. Personal Interview. 15 Aug. 2009.
- ¹⁹ Craig, H.B. II. "*The Early History of Detroit Public Transit (1862 - 1895)*". 8 July 2006. Web. 13 Sept. 2009 <<http://www.detroittransithistory.info/LinksPage.html>>.
- ²⁰ Sinacori, Nicholas. Personal Interview. 15 Aug. 2009.
- ²¹ Brown, Karen. Personal Interview. 27 Aug. 2009.
- ²² Gerritt, Jeff. "For Bing, the bus doesn't stop here." *The Detroit Free Press*. 10 Sept 2009. Print.
- ²³ MacDonald, Christine. "Detroit axing 2 routes in bus cuts." *The Detroit News*. 11 Sept. 2009. Print.
- ²⁴ American Public Transportation Association. "Largest Bus Agencies Transit Ridership Report - First Quarter 2009." Washington DC. 2009. Print.
- ²⁵ Center for Housing Policy. "A Heavy Load: The Combined Housing and Transportation Burdens of Working Families." Washington DC: Brookings Institute, 2006. Print.
- ²⁶ Jefferson East Business Association. "Jefferson East Business Association 2009 Annual Report." 2009. Print.

Chapter 1: Sustainable Community Redevelopment

- ¹ Intergovernmental Panel on Climate Change (IPCC). *Climate Change 2007: Synthesis Report-Summary for Policymakers*. Institute for the Study of Society and Environment, National Center for Atmospheric Research (NCAR), and Population and Climate Change (PCC) Program, International Institute for Applied Systems Analysis (IIASA), 2007. Print.

- ² Markham, Victoria D. *U.S. Population, Energy, and Climate Change*. Center for Population and Environment (CEP), 2008. Web 3 Mar. 2010.
- ³ U.S. Climate Change Science Program. *Scientific Assessment of the Effects of Global Change on the U.S., Summary and Findings.*, and Met Office Hadley Center, 2008. Web. 3. Mar. 2010. <<http://www.globalchange.gov/>>
- ⁴ Frumkin, Howard, MD, DrPH, Jeremy Hess, MD, George Luber, PhD, Josephine Malilay, MD, MPH, and Michael McGeehin, PhD, MSPH. "Climate Change: The Public Health Response." *American Journal of Public Health* 3rd ser. 98 (2008): 435-45. Web. 12 Feb. 2010. <<http://ajph.aphapublications.org/cgi/content/full/98/3/435>>.
- ⁵ Intergovernmental Panel on Climate Change (IPCC). *Climate Change 2007: Synthesis Report-Summary for Policymakers*. Geneva: Institute for the Study of Society and Environment, National Center for Atmospheric Research (NCAR), and Population and Climate Change (PCC) Program, International Institute for Applied Systems Analysis (IIASA), 2007. Print.
- ⁶ United Nations Department of Economic and Social Affairs/Population Division 1. *World Urbanization Prospects: The 2007 Revision*. Web. 12 Dec. 2009. Print.
- ⁷ The Department of Economic and Social Affairs of the United Nations Secretariat. *World Urbanization Prospects The 2007 Revision*. Report. New York: United Nations, 2008. Print.
- ⁸ Markham, Victoria D. *U.S. Population, Energy, and Climate Change*. Center for Population and Environment (CEP), 2008. Web. 3 Mar. 2010.
- ⁹ United Nations General Assembly. Report of the World Commission on Environment and Development: Our Common Future. Transmitted to the General Assembly as an Annex to document A/42/427 - Development and International Co-operation: Environment, 1987. Print.
- ¹⁰ Accordino, J., and G.T. Johnson. "Addressing the Vacant and Abandoned Property Problem." *Journal of Urban Affairs* 22 (3) (2000): 301-15.
- ¹¹ Glaeser, E.L., and J. Gyourko. "Urban Decline and Durable Housing." *Journal of Political Economy* 113.2 (2005): 345-75. Print.
- ¹² Rybczynski, W., and P.D. Linneman. "How to save our shrinking cities". *Public Interest*, 735(Spring), (1999):30-44. Print.
- ¹³ Pagano, M.A., and A. Bowman. "Vacant Land as Opportunity and Challenge." *The Reuse of Urban Land*. Ed. R. Greenstein and Y. Sungu-Ermilyaz. Cambridge, MA: Lincoln Institute of Land and Policy, 2004. 15-32. Print.
- ¹⁴ PolicyLink and the California Endowment. "Why Place Matters: Building a movement for healthy communities." 2007.
- ¹⁵ Schilling, Joseph, and Jonathan Logan. "Greening the Rust Belt." *Journal of the American Planning Association* 74.4 (Autumn), (2008): 451-67.
- ¹⁶ Hoff, Marie D. *Sustainable Community Development: Studies in Economic, Environmental, and Cultural Revitalization*. Boca Raton, Fla.: Lewis, 1998. Print.
- ¹ U.S. Census Bureau, 2009. Map retrieved 6 Apr 2010, from SimplyMap database. Web.

Chapter 2.1: Economic Prosperity

- ² Tilly, Chris. *Short Hours, Short Shift: Causes and Consequences of Part-time Work*. Washington, DC: Economic Policy Institute, 1990. Print.
- ³ Greene, Jay. "Group OKs Health Care Proposal for Detroit's Lower East Side." *Crain's Detroit Business*. 21 July 2008. Web. 8 Apr. 2010. <<http://www.crainsdetroit.com/article/20080721/SUB/807210319#>>.
- ⁴ Sugrue, Thomas J. *Origins of the urban crisis race and inequality in postwar Detroit: with a new preface by the author*. Princeton: Princeton UP, 2005. Print.
- ⁵ Sugrue, Thomas J. *Origins of the urban crisis race and inequality in postwar Detroit: with a new preface by the author*. Princeton: Princeton UP, 2005. Print.
- ⁶ The Urban Institute. *The Impact of Community Development Corporations on Urban Neighborhoods*. Washington, DC: Metropolitan Housing and Communities Policy Center, 2005. Print.
- ⁷ Fitzgerald, Joan, and Nancy Green Leigh. *Economic Revitalization Cases and Strategies for City and Suburb*. Minneapolis: Sage Publications, Inc, 2002. Print.
- ⁸ "Chattanooga's Adventure in Revitalization." *The Co-Intelligence Institute*. Web. 13 Nov. 2009. <<http://www.co-intelligence.org/S-Chattanooga.html>>.
- ⁹ "Chattanooga's Adventure in Revitalization." *The Co-Intelligence Institute*. Web. 13 Nov. 2009. <<http://www.co-intelligence.org/S-Chattanooga.html>>.
- ¹⁰ Lyons, Thomas S. and Roger E. Hamlin. *Creating an Economic Development Action Plan : A Guide for Development Professionals Revised & Updated Edition*. Greenwood Publishing Group, Incorporated. 2001. Print.
- ¹¹ Ohio Department of Development. "Strategic Business Development," Web 23 Jan. 2010. <<http://www.odod.state.oh.us/EconomicDevelopment.htm>>

Sources

- ¹² "Cuyahoga County Profile Data." *Cleveland Plus Business*. Web. 11 Mar. 2010.
<<http://www.clevelandplusbusiness.com/Counties/CuyahogaCounty.aspx#Incent>>.
- ¹³ Michigan Economic Development Corporation. "The Michigan Advantage." Web. 11 Mar. 2010.
<<http://www.michiganadvantage.org/>>.
- ¹⁴ Detroit Economic Growth Corporation. "Detroit Maps, downtown, tax free zones, incentive zones" Web 10 Mar. 2010.
<<http://www.degc.org/maps.aspx>>
- ¹⁵ The Brookings Institution Metropolitan Policy Program, Restoring Prosperity: The State Role in Revitalizing America's Older Industrial Cities. 2007. Print
- ¹⁶ The Brookings Institution Metropolitan Policy Program, Restoring Prosperity: The State Role in Revitalizing America's Older Industrial Cities. 2007. Print
- ¹⁷ U.S. Census Bureau, 2009. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
- ¹⁸ U.S. Census Bureau, 2009. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
- ¹⁹ "Big Plans for the Future Detroit." *Freep.com*. 4 Apr. 2010. Web. 6 Apr. 2010.
<<http://www.freep.com/article/20100404/NEWS01/4040517/Big-plans-for-the-future-Detroit>>
- ²⁰ U.S. Census Bureau, 2009. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
- ²¹ U.S. Census Bureau, 2009. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
- ²² "Green jobs expand Michigan worker retraining." *Great Lakes IT Report*. 25 July 2008. Web. 4 April 2010.
- ²³ Community Food Security Coalition's North American Urban Agriculture Committee. "Urban Agriculture and Community Food Security in the United States: Farming from the City Center to the Urban Fringe." 2003. Print.
- ²⁴ Community Food Security Coalition's North American Urban Agriculture Committee. "Urban Agriculture and Community Food Security in the United States: Farming from the City Center to the Urban Fringe." 2003. Print.
- ²⁵ USDA National Agricultural Library. Alternative Farming Systems Information Center. "Farms and Community." Web. Dec. 16, 2009.
<http://afsic.nal.usda.gov/nal_display/index.php?info_center=2&tax_level=2&tax_subject=301&topic_id=1444>.
- ²⁶ Food and Agriculture Organization of the United Nations. "Profitability and Sustainability of Urban and Peri-Urban Agriculture." 2007. Print
- ²⁷ Redwood, M. *Agriculture in Urban Planning; Generating Livelihoods and Food Security*. International Development Research Centre (IDRC). UK and USA: 2009. Print.
- ²⁸ Community Food Security Coalition's North American Urban Agriculture Committee. "Urban Agriculture and Community Food Security in the United States: Farming from the City Center to the Urban Fringe." 2003. Print.
- ²⁹ "About Us." *Detroit Black Community Food Security Network*. Web. 16 Nov. 2009.
- ³⁰ Resource Center Chicago. "City Farm." Web. 20 November 2008.
<<http://www.resourcecenterchicago.org/70thfarm.html>>.
- ³¹ Resource Center Chicago. "City Farm." Web. 20 November 2008.
<<http://www.resourcecenterchicago.org/70thfarm.html>>.
- ³² Greater Lansing Food Bank. Web. Dec. 18, 2009. <<http://www.greaterlansingfoodbank.org/index.php/featured-programs>>.
- ³³ Community Food Security Coalition's North American Urban Agriculture Committee. "Urban Agriculture and Community Food Security in the United States: Farming from the City Center to the Urban Fringe." 2003. Print.
- ³⁴ Community Food Security Coalition's North American Urban Agriculture Committee. "Urban Agriculture and Community Food Security in the United States: Farming from the City Center to the Urban Fringe." 2003. Print.
- ³⁵ Community Food Security Coalition's North American Urban Agriculture Committee. "Urban Agriculture and Community Food Security in the United States: Farming from the City Center to the Urban Fringe." 2003. Print.
- ³⁶ Buck, K., et al. "Southeastern Michigan Community Food Profile." Food System Economic Partnership. Print.
- ³⁷ Hansel, Mark. "Las Vegas Sands Opens Bethlehem, Pa., Casino." *Las Vegas Sun*. 23 May 2009. Web. 1 Apr. 2010.
<<http://www.lasvegassun.com/news/2009/may/23/las-vegas-sands-opens-bethlehem-pa-casino/>>.
- ³⁸ Lotke, Eric. "Pittsburgh: The Rest of the Story." Institute for America's Future. Washington D.C. Print.
- ³⁹ Lotke, Eric. "Pittsburgh: The Rest of the Story." Institute for America's Future. Washington D.C. Print.
- ⁴⁰ "Cityscapes – Cleveland." Web. 20 Mar. 2010.
<<http://ucso.indiana.edu/cgi-bin/Students/CareerResources/CityScapes/Cleveland.pdf>>
- ⁴¹ Mechling, Jerry. "Innovation Clues from Cleveland." *GOVERNING*. E.Republic Inc., 1 Aug. 2007. Web. 10 Apr. 2010.
<<http://www.governing.com/column/innovation-clues-cleveland>>.
- ⁴² "Detroit Shoreway...Making A Scene." *Gordon Square Arts District*. Web. 10 Apr. 2010.
<<http://gordonsquare.org/shoreway.html>>.
- ⁴³ "The Art of Economic Development." *Gordon Square Arts District*. Web. 6 Mar. 2010. <<http://www.gordonsquare.org>>.
- ⁴⁴ Shane, Scott. "Startup Failure Rates — The REAL Numbers." *Small Business Trends*. 28 Apr. 2008. Web. 10 Apr. 2010.
<<http://smallbiztrends.com/2008/04/startup-failure-rates.html>>.
-

-
- ⁴⁵ "Upside/Downside: Youngstown Business Incubator a Bright Spot in Region." *WCPN.org*. 12 Feb. 2009. Podcast. 12 Feb. 2010. <<http://www.wcpn.org/index.php/WCPN/news/24955/>>.
- ⁴⁶ "Bank of America Announces \$25 Billion Community Development Strategic Plan for Michigan." Web. 30 Mar. 2010. <<http://newsroom.bankofamerica.com/index.php?s=43&item=7887>>
- ⁴⁷ Feehan, David, and Martin D. Feit. *Making Business Districts Work*. Binghamton, NY: The Hawthorne Press, Inc, 2006. Print.
- ⁴⁸ Feehan, David, and Martin D. Feit. *Making Business Districts Work*. Binghamton, NY: The Hawthorne Press, Inc, 2006. Print.
- ⁴⁹ Southwest Detroit Business Association. *Clean & Safe*. 1 Jan. 2004. Web. 1 Oct. 2009. <<http://www.southwestdetroit.com/Business/Clean%20&%20Safe.htm>>
- ⁵⁰ Capitol Riverfront Business Improvement District. Web. 10 Feb 2010. <<http://www.capitolriverfront.org/>>
- ⁵¹ Li Mandri, Marco. "Interview with New City America." E-mail interview. 12 Mar. 2009.
- ⁵² "Programs." *Downtown DC Business Improvement District*. Web. 12 Apr. 2010. <<http://www.downtowndc.org/programs>>.
- ⁵³ "Who We Are." *Little Italy San Diego*. Web. 12 Mar. 2010. <<http://www.littleitalysd.com/whoweare.asp>>.

Chapter 2.2: Human Health

- ¹ "Health & Community Design." *Project for Public Spaces (PPS)*. 2010. Web. 21 Mar. 2010.
- ² PolicyLink and the California Endowment. "Why Place Matters: Building a movement for healthy communities." 2007. Print.
- ³ Bryant, Bunyan I. *Environmental Justice: Issues, Policies, and Solutions*. Washington, D.C.: Island, 1995. Print.
- ⁴ The Sustainable Sites Initiative. *Guidelines and Performance Benchmarks Draft 2008*. Working paper. 2008. Print.
- ⁵ Wolf, Kathleen, "Urban nature benefits: psycho-social dimensions of people and plants," Fact sheet from course in Human Dimensions of the Urban Forest, University of Washington, College of Forest Resources, Center for Urban Horticulture. 1998.
- ⁶ Faber Taylor, A., F.E. Kuo & W.C. Sullivan. "Coping with ADD: The surprising connection to green play settings." *Environment and Behavior*, 33(1), (2001): 54-77. Print.
- ⁷ Faber Taylor, Andrea, Frances E. Kuo, and William C. Sullivan. "Views of Nature and Self-Discipline: Evidence from Inner City Children." *Journal of Environmental Psychology* 22.1-2 (2002): 49-63. Print.
- ⁸ Takano, T, K. Nakamura, M. Watanabe. Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable green spaces. *J. Epidemiol. Community Health* 56. (2002):913-918. Print.
- ⁹ University of Washington. "Humans May Be Losers If Technological Nature Replaces The Real Thing, Psychologists Warn." *ScienceDaily*. 5 April 2009. Web. 30 January 2010. <<http://www.sciencedaily.com/releases/2009/04/090401181445.htm>>
- ¹⁰ Heerwagen, J. "The Psychological Aspects of Windows and Window Design." *Proceedings of 21st Annual Conference of the Environmental Design Research Association*. Ed. K.H. Anthony, J. Choi, and B. Orland. Oklahoma City: EDRA, 1990. 269-89. Print.
- ¹¹ US Census Bureau, 2009. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
- ¹² US Census Bureau, 2009. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
- ¹³ Greene, Jay. "Group OKs Health Care Proposal for Detroit's Lower East Side." *Crain's Detroit Business* 21 July 2008. *Crain Communications, Inc*. Web. 8 Apr. 2010.
- ¹⁴ Greene, Jay. "Group OKs Health Care Proposal for Detroit's Lower East Side." *Crain's Detroit Business* 21 July 2008. *Crain Communications, Inc*. Web. 8 Apr. 2010. <<http://www.crainsdetroit.com/article/20080721/SUB/807210319#>>.
- ¹⁵ Centers for Disease Control and Prevention. *Prevalence of overweight and obesity among adults: United States, 1999–2000*. (2005). Print.
- ¹⁶ Day, Kristen. "Active Living and Social Justice: Planning for Physical Activity in Low Income, Black, and Latino Communities." *Journal of the American Planning Association*. 72 (2006): 88-99. Print.
- ¹⁷ "The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity." *Office of the Surgeon General (OSG)*. 11 Jan. 2007. Web. 21 Mar. 2010.
- ¹⁸ Schoenborn, C. A., P.F. Adams, and P.M. Barnes. "Body weight status of adults: United States, 1997–98." *Advance Data*, 330 (2002): 1–15. Print.
- ¹⁹ Kumanyika, S. K. "Understanding ethnic differences in energy balance: Can we get there from here?" *American Journal of Clinical Nutrition*, 70, (1990):1–2. Print.
- ²⁰ Diex-Rouz, A.V., M.E. Northridge, A. Morabia, M.T. Bassett, and S. Shea. "Prevalence and social correlates of cardiovascular disease risk factors in Harlem." *American Journal of Public Health* 89, (1999):302–307. Print.
- ²¹ US Census Bureau, 2009. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
- ²² US Census Bureau, 2009. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
-

Sources

- ²³ Cossrow, N., and B. Falkner. "Race/ethnic issues in obesity and obesity-related comorbidities." *Journal of Clinical Endocrinology & Metabolism*. 89 (6), (2004): 2590–2594. Print.
- ²⁴ Cossrow, N., and B. Falkner. "Race/ethnic issues in obesity and obesity-related comorbidities." *Journal of Clinical Endocrinology & Metabolism*. 89 (6), (2004): 2590–2594. Print.
- ²⁵ Bhattacharya, Jay. "Who Pays for Obesity." *The National Bureau of Economic Research*. 2008. Web. 26 Oct. 2009.
- ²⁶ Trust for America's Health, and Robert Wood Johnson Foundation. "F as in Fat 2009 Michigan Press Release." *Trust for America's Health - Preventing Epidemics. Protecting People*. 1 July 2009. Web. 14 Mar. 2010.
- ²⁷ Gordy, Cynthia. "Curing Detroit's Obesity Crisis: Oasis in a Food Desert - Essence.com." *Essence Magazine*. 11 Dec. 2009. Web. 14 Mar. 2010. Print
- ²⁸ U.S. Census Bureau, 2009. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
- ²⁹ "Obesity: a curable epidemic." *World Socialist Web Site*. Web. 26 Oct. 2009.
- ³⁰ Alaimo, Katherine, et al and the Michigan Dept. of Community Health. "Design Guidelines for Active Michigan Communities: Imagining, Creating, And Improving Communities for Physical Activity, Active Living, And Recreation." 2006. Print.
- ³¹ Active Living Research. *What is active living?* 2004. Print.
- ³² Day, Kristen. "Active Living and Social Justice: Planning for Physical Activity in Low Income, Black, and Latino Communities." *Journal of the American Planning Association*. 72 (2006): 88-99. Print.
- ³³ U.S. Department of Transportation and the Federal Highway Administration. "A Review of Pedestrian Safety Research in the United States and Abroad." Washington, DC: FHWA. 2004. Print.
- ³⁴ U.S. Census Bureau, 2009. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
- ³⁵ Michigan Land Use Institute. "Fact Sheet #3. Ten Percent for People: Effective Investment in Public Transportation." Beulah, MI: MLUI. 2000. Print.
- ³⁶ Surface Transportation Policy Project. "Mean Streets: How Far Have We Come?" Washington, DC: Surface Transportation Policy Project. 2004. Print.
- ³⁷ Wallace, M., and B.M. Milroy. "Intersecting Claims: Possibilities for Planning in Canada's Multicultural Cities." *Gender, Planning, and Human Rights*. Ed. Tovi Fenster. London: Routledge, 1999. 55-73. Print.
- ³⁸ Baskin, M. L., H.K. Ahluwalia, and K. Resnicow. "Obesity intervention among African-American children and adolescents." *Pediatric Clinics of North America*, 48 (4), (2001):1027–1039. Print.
- ³⁹ Booth, M. L., N. Owen, A. Bauman, O. Calvisi, and E. Leslie. "Social-cognitive and perceived environment influences associated with physical activity in older Australians." *Preventive Medicine*, 31 (2000):15–22. Print.
- ⁴⁰ Epstein LH, S. Raja, S. Gold, R. Paluch, Y. Pak, and J.N. Roenmich. "Reducing sedentary behavior: the relationship between park area and the physical activity of youth". *Psychol Sci*. 17 (8) (2006):654 –659 Print
- ⁴¹ J.N. Roemmich, L.H. Epstein, S. Raja, L. Yin, J. Robinson, and D. Winiewicz. "Association of access to parks and recreational facilities with the physical activity of young children." *Prev Med*. 43 (6). (2006):437 –441. Print.
- ⁴² J.N. Roemmich, L.H. Epstein, S. Raja, and L. Yin. "The neighborhood and home environments: disparate effects on physical activity and sedentary behaviors in youth". *Ann Behav Med*. 33 (1) (2007):29 –38. Print.
- ⁴³ Gordon-Larsen P., M.C. Nelson, P. Page, B. Popkin. "Inequality in the built environment underlies key health disparities in physical activity and obesity." *Pediatrics*. 117 (2) (2006):417 –424. Print.
- ⁴⁴ Humbert M.L., K.E. Chad, K.S. Spink, et al. "Factors that influence physical activity participation among high- and low-SES youth." *Qual Health Res*. 16 (4) (2006):467 –483. Print.
- ⁴⁵ Blocker, D. E., and N. Freudenberg. "Developing comprehensive approaches to prevention and control of obesity among low-income, urban, African American women." *Journal of the American Medical Women's Association*, 56 (2) (2001):59–64. Print.
- ⁴⁶ *Community Greens*. Ashoka. Web. 25 Mar. 2010.
- ⁴⁷ Antsey, Geoffrey, and Ellen Przepasniak. "Retakes by the Lakes: Experts Gather at Buff State to Re-imagine the Rust Belt." Interview. Weblog post. *Artvoice.com*. 25 June 2009. Web. 25 Mar. 2010.
- ⁴⁸ "Greening of Detroit Gets Greenways Project Backing." *Crain's Detroit Business* 3 Feb. 2010. Web. 7 Feb. 2010. <<http://http://www.craindetroit.com/article/20100203/FREE/100209943#>>.
- ⁴⁹ Mokdad A.M., J.S. Marks, D.F. Stroup, and A. Gerberding. "Actual Causes of Death in the United States, 2000." *J.A.M.A.* (291:10) (2004):1238-1246. Print.
- ⁵⁰ "Urban Agriculture and Community Food Security in the United States: Farming from the City Center to the Urban Fringe." Community Food Security Coalition's North American Urban Agriculture Committee. 2003. Print.
- ⁵¹ "Urban Agriculture and Community Food Security in the United States: Farming from the City Center to the Urban Fringe." Community Food Security Coalition's North American Urban Agriculture Committee. 2003. Print.
- ⁵² "Urban Agriculture and Community Food Security in the United States: Farming from the City Center to the Urban Fringe." Community Food Security Coalition's North American Urban Agriculture Committee. 2003. Print.
-

-
- ⁵³ "Urban Agriculture and Community Food Security in the United States: Farming from the City Center to the Urban Fringe." Community Food Security Coalition's North American Urban Agriculture Committee. 2003. Print.
- ⁵⁴ Heller, M.C. and G.A. Keoleian. "Life Cycle-Based Sustainability Indicators for Assessment of the U.S. Food System." 2001.
- ⁵⁵ "Food Availability (Per Capita) Data System." USDA Economic Research Service. Web. 26 Mar. 2010.
- ⁵⁶ Hamm, Michael. "Linking Sustainable Agriculture and Public Health: Opportunities for Realizing Multiple Goals." *Journal of Hunger and Environmental Nutrition* (2008):169-184. Print.
- ⁵⁷ Kwate N.O., C.Y. Yau, J.M. Loh, and D. Williams. "Inequality in obesigenic environments: fast food density in New York City." *Health & Place* 15 (2001):364-373. Print.
- ⁵⁸ Larson N.I., M.T. Story, and M.C. Nelson. "Neighborhood Environments: Disparities in Access to Healthy Foods in the U.S." *American Journal of Preventive Medicine*, 36(1), (2009):74-81. Print.
- ⁵⁹ "Examining the Impact of Food Deserts on Public Health in Detroit." Mari Gallagher Research & Consulting Group. 2007. Print.
- ⁶⁰ "Examining the Impact of Food Deserts on Public Health in Detroit." Mari Gallagher Research & Consulting Group. 2007. Print.
- ⁶¹ "Examining the Impact of Food Deserts on Public Health in Detroit." Mari Gallagher Research & Consulting Group. 2007. Print.
- ⁶² Buck, K., et al. "Southeastern Michigan Community Food Profile." Food System Economic Partnership. Print.
- ⁶³ "Urban Agriculture and Community Food Security in the United States: Farming from the City Center to the Urban Fringe." Community Food Security Coalition's North American Urban Agriculture Committee. 2003. Print.
- ⁶⁴ "Profitability and Sustainability of Urban and Peri-Urban Agriculture." Food and Agriculture Organization of the United Nations, 2007.
- ⁶⁵ "Economic planning inspires food farm in Rouge Park." The Michigan Citizen. Web. 15 Nov. 2009.
- ⁶⁶ "Economic planning inspires food farm in Rouge Park." The Michigan Citizen. Web. 15 Nov. 2009.
- ⁶⁷ Detroit Black Community Food Security Network. Web. 15. Nov. 2009. <<http://detroitblackfoodsecurity.org/>>.
- ⁶⁸ Detroit Black Community Food Security Network. Web. 15. Nov. 2009. <<http://detroitblackfoodsecurity.org/>>.
- ⁶⁹ "Economic planning inspires food farm in Rouge Park." The Michigan Citizen. 15 Nov. 2009. Web. 24 Jan. 2010.
- ⁷⁰ "Healthy Eating Research - Schools/After School." *Healthy Eating Research*. Robert Wood Johnson Foundation. Web. 13 Nov. 2009.
- ⁷¹ Hecht K., M. Sharp, D. Beller, et al. "The Federal Child Nutrition Commodity Program: A Report on Nutritional Quality." California Food Policy Advocates. 2008. Print.
- ⁷² Finkelstein D.M., E.L. Hill, and R.C. Whitaker. "School Food Environments and Policies in U.S. Public Schools." *Pediatrics*. 122. (2008):251-259. Print.
- ⁷³ Hamm, Michael. "Linking Sustainable Agriculture and Public Health: Opportunities for Realizing Multiple Goals." *Journal of Hunger and Environmental Nutrition*. (2008): 169-184. Print.
- ⁷⁴ Twiss, J., J. Dickinson, S. Duma, T. Kleinman, H. Paulsen, and L. Rilveria. "Community gardens: Lessons learned from California Healthy Cities and Communities." *American Journal of Public Health*, (2003):1435-1438. Print.
- ⁷⁵ Ozer, Emily J. "The Effects of School Gardens on Students and Schools: Conceptualization and Considerations for Maximizing Healthy Development." *Health Education & Behavior*. (2007):846-863. Print.
- ⁷⁶ "What is Go! Gardening?" *Project Grow Community Gardens*. Web. 13 Nov. 2009.
- ⁷⁷ Pothukuchi, K. "Hortiliza: A Youth "Nutrition Garden" in Southwest Detroit." *Children, Youth and Environments*. 14(2), (2004):124-155. Print.
- ⁷⁸ World Health Organization. "The Effects of Air Pollution on Children's Health and Development: a review of the evidence." Rep. E86575. 2005. Print.
- ⁷⁹ Thurston G.D., D.V. Bates. "Air Pollution as an Underappreciated Cause of Asthma Symptoms". *JAMA* 290 (2003):1915-1917. Print.
- ⁸⁰ McConnell R., K. Berhane, F. Gilliland, S.J. London, T. Islam, W.J. Gauderman, E. Avol, H.G Margolis, and J.M. Peters. "Asthma in Exercising Children Exposed to Ozone". *Lancet* 359 (2002):386-391. Print.
- ⁸¹ "Business of Energy." *Greater Detroit Resource Recovery Authority*. Web. 25 Mar. 2010.
- ⁸² "Detroit Waste Incinerator: Dirty and Expensive." *Ecology Center - Working for a Safe and Healthy Environment Where People Live, Work and Play*. Web. 25 Mar. 2010.
- ⁸³ "State of the Air: 2009 Report -- Wayne County." *American Lung Association*. 2009. Web. 26 Mar. 2010.
- ⁸⁴ Christina, Margena A. "Detroit Research Investigator Works to Help Urban Communities Manage Asthma in Children." *Jet Magazine*. Johnson Publishing, 30 June 2008. Web. 4 Apr. 2010. <http://findarticles.com/p/articles/mi_m1355/is_25_113/ai_n27909782/>.
- ⁸⁵ U.S. Environmental Protection Agency. "A Decade of Children's Environmental Health Research: Highlights from EPA's Science to Achieve Results Program." Washington, DC: Office of Research and Development (8101R), 2007. Report.
-

Sources

- ⁸⁶ del Percio, Stephen. *Eco-Architecture Can Eliminate Sick Building Syndrome. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 46-51. Print.
- ⁸⁷ del Percio, Stephen. *Eco-Architecture Can Eliminate Sick Building Syndrome. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 46-51. Print.
- ⁸⁸ Roodman, David Malin and Nicholas Lenssen. *A Building Revolution: How Ecology and Health Concerns Are Transforming Construction*. Washington, DC: Worldwatch Institute, 1995. Print.
- ⁸⁹ U.S. Environmental Protection Agency. "Sick Building Syndrome." Web. 01 Nov. 2009. <<http://www.epa.gov/iaq/pubs/sbs.html>>
- ⁹⁰ del Percio, Stephen. *Eco-Architecture Can Eliminate Sick Building Syndrome. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 46-51. Print.
- ⁹¹ *Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. Print.
- ⁹² Roodman, David Malin and Nicholas Lenssen. *A Building Revolution: How Ecology and Health Concerns Are Transforming Construction*. Washington, DC: Worldwatch Institute, 1995. Print.
- ⁹³ *Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. Print.
- ⁹⁴ U.S. Environmental Protection Agency. "Ground-level Ozone." Web. 10 Oct. 2009.
- ⁹⁵ Detroit Department of Health and Wellness Promotion. Childhood Lead Poisoning Prevention and Control Program. "Strategic Lead Elimination Work Plan for the City of Detroit." 2005. Print.
- ⁹⁶ Detroit Department of Health and Wellness Promotion. Childhood Lead Poisoning Prevention and Control Program. "Strategic Lead Elimination Work Plan for the City of Detroit." 2005. Print.
- ⁹⁷ MacDonald, Christine. "Detroit Officials Probe Razing Halt." *The Detroit News*. 09 Apr. 2010. Web. 10 Apr. 2010. <<http://detnews.com/article/20100403/METRO01/4030339/Detroit-officials-probe-razing-halt>>.
- ⁹⁸ Lam. T. and W. Wendlandbowyer. "Potential of danger at 16 sites brings little action." *Detroit Free Press*. (2005).
- ⁹⁹ Milbrath, Lester W., and Barbara V. Fisher. *Environmentalists, Vanguard for a New Society*. Albany: State University of New York, 1984. Print.
- ¹⁰⁰ Hoff, Marie D. *Sustainable Community Development: Studies in Economic, Environmental, and Cultural Revitalization*. Boca Raton, Fla.: Lewis, 1998. Print.
- ¹⁰¹ D McKenzie-Mohr and W Smith, "Fostering Sustainable Behavior." Gabriola Island, BC: New Society Publishers, 1999. Print.
- ¹⁰² "Sustainable Sites Initiative: Guidelines and Performance Benchmarks for 2008." Sustainable Sites Initiative, 2008. Web. 21. Oct. 2009. <<http://www.sustainablesites.org/report/>>
- ¹⁰³ "What is PBE." Center for Place-based Learning and Community Engagement. Web. 06 Jan. 2010.
- ¹⁰⁴ East Michigan Environmental Action Council. "Achieving Academic Excellence Proposal." Rep. 2008. Print.
- ¹⁰⁵ "About Sustain Dane." *Sustain Dane*. Web. 09 Nov. 2009. <<http://www.sustaindane.org/Pages/AboutUs.htm>>.
- ¹⁰⁶ "Program and Initiatives." *Sustain Dane*. Web. 09 Nov. 2009. <<http://www.sustaindane.org/Pages/Programs&Initiatives.htm>>

Chapter 2.3: Vibrant Communities

- ¹ O'Loughlin, John., and Jurgen Friedrichs. *Social Polarization in Post-Industrial Metropolises*. New York NY: Walter de Gruyter, 1996. Print.
- ² Natural Resources Defense Council "Reducing Foreclosures and Environmental Impacts through Location-Efficient Neighborhood Design." 2010. Print,
- ³ University of Washington. "Humans May Be Losers If Technological Nature Replaces The Real Thing, Psychologists Warn." *ScienceDaily*. 2009. Print. Primary
- ⁴ University of Illinois at Urbana-Champaign. "Science Suggests Access To Nature Is Essential To Human Health." *ScienceDaily* 19 February 2009. Web. 30 January 2010. <<http://www.sciencedaily.com/releases/2009/02/090217092758.htm>>
- ⁵ University of Illinois at Urbana-Champaign. "Science Suggests Access To Nature Is Essential To Human Health." *ScienceDaily* 19 February 2009. Web. 30 January 2010. <<http://www.sciencedaily.com/releases/2009/02/090217092758.htm>>
- ⁶ Ward, Barbara. *The Home of Man*. New York: W.W. Norton and Company, 1976. Print.
- ⁷ Durning, A.B. "How much is enough: The consumer society and the future of the earth." New York: W.W. Norton & Co. 1992. Print.
- ⁸ Cash, Daniel. "Equity and Sustainability in Greater Kansas City." *One KC Voice*. 8 July 2009. Web. 06 Mar. 2010.
- ⁹ "Housing Conditions of Low-income Households." *Journal of Housing and the Built Environment* 16.1 (2001): 107-10. Print.
- ¹⁰ Girling, Cynthia L. *Skinny streets and green neighborhoods design for environment and community*. Washington DC: Island, 2005. Print.
-

-
- ¹¹ White-Kjoss, Andrea. "Building Multimodal Transit Facilities." *MassTransitMag.com*. Cygnus Business Media, July & Aug. 2009. Web. 15 Feb. 2010. <[http://www.masstransitmag.com/print/Mass-Transit/Building-Multimodal-Transit-Facilities/1\\$9217](http://www.masstransitmag.com/print/Mass-Transit/Building-Multimodal-Transit-Facilities/1$9217)>
- ¹² Girling, Cynthia L. *Skinny streets and green neighborhoods design for environment and community*. Washington DC: Island, 2005. Print.
- ¹³ Girling, Cynthia L. *Skinny streets and green neighborhoods design for environment and community*. Washington DC: Island, 2005. Print.
- ¹⁴ White-Kjoss, Andrea. "Building Multimodal Transit Facilities." *MassTransitMag.com*. Cygnus Business Media, July & Aug. 2009. Web. 15 Feb. 2010. <[http://www.masstransitmag.com/print/Mass-Transit/Building-Multimodal-Transit-Facilities/1\\$9217](http://www.masstransitmag.com/print/Mass-Transit/Building-Multimodal-Transit-Facilities/1$9217)>
- ¹⁵ White-Kjoss, Andrea. "Building Multimodal Transit Facilities." *MassTransitMag.com*. Cygnus Business Media, July & Aug. 2009. Web. 15 Feb. 2010. <[http://www.masstransitmag.com/print/Mass-Transit/Building-Multimodal-Transit-Facilities/1\\$9217](http://www.masstransitmag.com/print/Mass-Transit/Building-Multimodal-Transit-Facilities/1$9217)>
- ¹⁶ White-Kjoss, Andrea. "Building Multimodal Transit Facilities." *MassTransitMag.com*. Cygnus Business Media, July & Aug. 2009. Web. 15 Feb. 2010. <[http://www.masstransitmag.com/print/Mass-Transit/Building-Multimodal-Transit-Facilities/1\\$9217](http://www.masstransitmag.com/print/Mass-Transit/Building-Multimodal-Transit-Facilities/1$9217)>
- ¹⁷ "Fundamentals." *National Complete Streets Coalition*. 2009. Web. 21 Mar. 2010. <<http://www.completestreets.org/complete-streets-fundamentals/complete-streets-faq/>>
- ¹⁸ Guilbeault, Dan. "More Complete Streets Endorsements." *Complete Streets*. Web. 13 Sept. 2009. <<http://www.completestreets.org/resources/more-complete-streets-endorsements/>>
- ¹⁹ Committee on Environmental Health. "The Built Environment: Designing Communities to Promote Physical Activity in Children." *Pediatrics* 123.6 (2009): 1591-1598. Print.
- ²⁰ "GOOD's 'complete Street' Interactive Graphic." *CoolTown Studios*. 09 Apr. 2009. Web. 21 Mar. 2010. <<http://www.cooltownstudios.com/2009/04/09/good-features-a-complete-street-interactive-graphic>>
- ²¹ Chen, David W. "In the Future, the City's Streets Are to Behave." *The New York Times*. 19 May 2009. Web. 13 Sep. 2009. <<http://www.nytimes.com/2009/05/20/nyregion/20streets.html>>
- ²² Copeland, Larry. "Healthy alternative: Take mass transit." *USA Today*. 31 Jan. 2008. Web. 13 Sep 2009. <http://www.usatoday.com/news/nation/2008-01-31-masstransit_N.htm>
- ²³ Epigg, Marianne. "Progress since the Sustainable Cleveland 2019 Summit." 24 Sept. 2009. Web. 04 Apr. 2010. <<http://renovatingtherustbelt.wordpress.com/2009/09/24/progress-since-the-sustainable-cleveland-2019-summit/>>
- ²⁴ Fields, Reginald. "Gov. Ted Strickland Tells ODOT to Rethink Inner Belt Bridge Bike Lane." *The Plain Dealer*. Cleveland.com, 9 Mar. 2010. Web. 10 Apr. 2010. <http://www.cleveland.com/open/index.ssf/2010/03/at_governors_urging_odot_to_ag.html>
- ²⁵ National Complete Streets Coalition Steering Committee. "Common Features and Benefits Brochure." *Completestreets.org*. Web. 21 Mar. 2010. <<http://www.completestreets.org/webdocs/cs-brochure-features.pdf>>
- ²⁶ TransitCenter, Inc. "Stimulus Bill a Financial Victory for Nation's Mass Transit Riders, Reports TransitCenter, Inc." *PRNewswire*. New York: PRNewswire, 17 Feb. 2009. Web. <<http://www.transitcenter.com/AboutUs/PressRelease.aspx?id=1914>>
- ²⁷ Lewis, David et al. "Final Report of the Blue Ribbon Commission on Sustainability and the MTA." New York: Metropolitan Transit Authority, 2009. Print.
- ²⁸ "Cool Pavements." The Heat Island Group at the Lawrence Berkeley National Laboratory. Web. 8 Jan. 2010. <<http://eetd.lbl.gov/heatisland/pavements/>>
- ²⁹ US Department of Transportation. "The Value of Mobility Improvements in Fixed Guideway Transit." Washington DC: Federal Transit Administration, 2002. Print.
- ³⁰ Lewis, David et al. "Final Report of the Blue Ribbon Commission on Sustainability and the MTA." New York: Metropolitan Transit Authority, 2009. Print.
- ³¹ Alaimo, Katherine, et al and the Michigan Dept. of Community Health. "Design Guidelines for Active Michigan Communities: Imagining, Creating, And Improving Communities for Physical Activity, Active Living, And Recreation." 2006. Print.
- ³² US Department of Transportation. Federal Highway Administration. *United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations*. USDOT. 15 Mar. 2010. Web. 21 Mar. 2010. <http://www.fhwa.dot.gov/environment/bikeped/policy_accom.htm>
- ³³ "Greenway FAQ." *Greenways Inc*. Web. 26 Mar. 2010. <<http://www.greenways.com/>>
- ³⁴ Gill, S.E., J.F. Handley, A.R. Ennos, and S. Pauleit. "Adapting Cities for Climate Change: The Role of Green Infrastructure." *Built Environment*. 33(1), (2007):115-133. Print.
- ³⁵ Benedict, M.A. and E.T. McMahon. Green infrastructure: smart conservation for the 21st century. *Renewable Resources Journal*, 20(3), (2002):12-17. Print.
-

Sources

- ³⁶ "Greenway: What Is a Greenway?" *SEDA-COG Susquehanna Greenway Partnership*. 11 Sept. 2003. Web. 27 Sept. 2009. <<http://www.seda-cog.org/greenway/cwp/view.asp?A=3&Q=414242>>
- ³⁷ Kuo, Frances E., William C. Sullivan, and Rebekah Levine Coley. "Fertile Ground for Community: Inner-City Neighborhood Common Spaces." *American Journal of Community Psychology* 26.6 (1998): 823-51.
- ³⁸ Lisa Fernandez, Consulting. "Making the Economic Case for Greenways in New Haven." 02 Jan. 2004. Web. 21 Mar. 2010.
- ³⁹ Lisa Fernandez, Consulting. "Making the Economic Case for Greenways in New Haven." 02 Jan. 2004. Web. 21 Mar. 2010.
- ⁴⁰ "The Greenway 15 Acres of New Public Parkland." *Rose Fitzgerald Kennedy Greenway Conservancy*. Web. 28 Sept. 2009. <<http://www.rosekennedygreenway.org/about-the-greenway/index.htm>>
- ⁴¹ Doolittle, Thomas. "Project Budgets and Sustainability: Thinking Like a Client in a Difficult Economy." *ALSA Conference 2009*. Web. Nov. 4, 2009. <http://www.asla.org/uploadedFiles/CMS/Resources/22416_DoolittleThomas.pdf>
- ⁴² Doolittle, Thomas. "Project Budgets and Sustainability: Thinking Like a Client in a Difficult Economy." *ALSA Conference 2009*. Web. Nov. 4, 2009. <http://www.asla.org/uploadedFiles/CMS/Resources/22416_DoolittleThomas.pdf>
- ⁴³ Litman, Todd. *Community Cohesion As A Transport Planning Objective*. Rep. Victoria: Victoria Transport Policy Institute, 2009. Print.
- ⁴⁴ Communities and Local Government. *Guidance on meaningful interaction How encouraging positive relationships between people can help build community cohesion*. Publication no. 978-1-4098-0961-6. UK: National Community Forum, 2009. Print.
- ⁴⁵ Communities and Local Government. *Guidance on meaningful interaction How encouraging positive relationships between people can help build community cohesion*. Publication no. 978-1-4098-0961-6. UK: National Community Forum, 2009. Print.
- ⁴⁶ Communities and Local Government. *Guidance on meaningful interaction How encouraging positive relationships between people can help build community cohesion*. Publication no. 978-1-4098-0961-6. UK: National Community Forum, 2009. Print.
- ⁴⁷ Communities and Local Government. *Guidance on meaningful interaction How encouraging positive relationships between people can help build community cohesion*. Publication no. 978-1-4098-0961-6. UK: National Community Forum, 2009. Print.
- ⁴⁸ Kuo, Frances E., William C. Sullivan, and Rebekah Levine Coley. "Fertile Ground for Community: Inner-City Neighborhood Common Spaces." *American Journal of Community Psychology* 26.6 (1998): 823-51. Print.
- ⁴⁹ PolicyLink and the California Endowment. "Why Place Matters: Building a movement for healthy communities." 2007. Web. 15 Nov. 2009. <http://www.policylink.org/atf/cf/%7B97c6d565-bb43-406d-a6d5-eca3bbf35af0%7D/WHYPLACEMATTERS_FINAL.PDF>
- ⁵⁰ PolicyLink and the California Endowment. "Why Place Matters: Building a movement for healthy communities." 2007. Web. 15 Nov. 2009. <http://www.policylink.org/atf/cf/%7B97c6d565-bb43-406d-a6d5-eca3bbf35af0%7D/WHYPLACEMATTERS_FINAL.PDF>
- ⁵¹ Coley, Rebekah, Frances E. Kuo and William C. Sullivan. "Where Does Community Grow? The social context created by nature in urban public housing." *Environment and Behavior* (1997): 468-494. Print.
- ⁵² "Sociofugal Vs Sociopetal Space." *Design for Service*. Web. 26 Mar. 2010. <<http://designforservice.wordpress.com/2008/02/09/sociofugal-and-sociopetal-space/>>
- ⁵³ Coley, Rebekah, Frances E. Kuo and William C. Sullivan. "Where Does Community Grow? The social context created by nature in urban public housing." *Environment and Behavior* (1997): 468-494. Print.
- ⁵⁴ Fisher, J.D., P.A. Bell, and A. Baum. *Environmental Psychology*. New York: Holt, Rinehart & Winston (1984):259-260. Print.
- ⁵⁵ Oldenburg, Ray. "The Great Good Place: Cafes, Coffee Shops, Community Centers, Beauty Parlors, General Stores, Bars, Hangouts, and How They Get You Through the Day." New York: Paragon House, 1989. Print.
- ⁵⁶ "Top 12 Public Squares in the U.S. and Canada." *Placemaking for Communities*. Dec. 2005. Web. 22 Mar. 2010. <http://www.pps.org/info/newsletter/december2005/us_canada_squares>
- ⁵⁷ "Washington Square, New York City." *A View On Cities*. Web. 22 Mar. 2010. <<http://www.aviewoncities.com/nyc/washingtonsquare.htm>>
- ⁵⁸ Munsell K.D. "Third Places Form the Backbone of Community Life." Rev. of *The Great Good Place*, by R. Oldenburg (1989). *Small Town* Sept.-Oct. 1991: 30. Print.
- ⁵⁹ American Community Gardening Association. "What is a Community Garden?" 20 Nov 2008. Web. 20 Oct. 2009. <<http://www.communitygarden.org/learn/>>
- ⁶⁰ Chaplowe, Scott G. "Havana's Popular Gardens: Sustainable Urban Agriculture." *World Sustainable Agricultural Association* 5, (22), (1996). Print.
-

- ⁶¹ Twiss, Joan, et al. "Community Gardens: Lessons Learned From California Healthy Cities and Communities." *American Journal of Public Health* 93(9) (2003). Print.
- ⁶² Armstrong, Donna. "A Survey of Community Gardens in Upstate New York: Implications for Health promotion and Community Development." *Health and Place* 6.4 (2000): 319-327. Print.
- ⁶³ Chaplowe, Scott G. "Havana's Popular Gardens: Sustainable Urban Agriculture." *World Sustainable Agricultural Association* 5, (22), (1996). Print.
- ⁶⁴ Milgrim, S. "The experience of living in cities." *Science*, 1970, 167, (1970):1461-1468. Print.
- ⁶⁵ Napier, John. "Violence and Overcrowding." *Humanscape: Environments for People*. Ann Arbor: Ulrich's, (1982):202. Print.
- ⁶⁶ McClelland, Lou. "Crowding and Territoriality." *Humanscape: Environments for People*. Ann Arbor: Ulrich's, (1982):202-11. Print.
- ⁶⁷ Kuo, Frances E., William C. Sullivan, and Rebekah Levine Coley. "Fertile Ground for Community: Inner-City Neighborhood Common Spaces." *American Journal of Community Psychology* 26.6 (1998): 823-51. Print.
- ⁶⁸ Kuo, Frances E. The role of arboriculture in a healthy social ecology. *Journal of Arboriculture*. 29(3), (2003): 149-155. Print.
- ⁶⁹ Coley, Rebekah, Frances E. Kuo and William C. Sullivan. "Where Does Community Grow? The social context created by nature in urban public housing." *Environment and Behavior* (1997): 468-494. Print.
- ⁷⁰ Kuo, Frances E. The role of arboriculture in a healthy social ecology. *Journal of Arboriculture*. 29(3), (2003): 149-155. Print.
- ⁷¹ Kuo, F.E., & Sullivan, W.C. "Environment and crime in the inner city: Does vegetation reduce crime? *Environment & Behavior*, 33(3), (2001):343-367. Print.
- ⁷² Jacobs, Jane. *The Death and Life of Great American Cities*. New York: Vintage, 1992. Print.
- ⁷³ Kelling, James Q. Wilson and George L. "The police and neighborhood safety: Broken Windows." *Atlantic Monthly* (1982): 29-38. Print.
- ⁷⁴ Kelling, James Q. Wilson and George L. "The police and neighborhood safety: Broken Windows." *Atlantic Monthly* (1982): 29-38. Print.
- ⁷⁵ Newman, Oscar. *Creating Defensible Space, written by Newman*. Rep. HUD's Office of Policy Development and Research, 1996. Print.
- ⁷⁶ Coley, Rebekah, Frances E. Kuo and William C. Sullivan. "Where Does Community Grow? The social context created by nature in urban public housing." *Environment and Behavior* (1997): 468-494. Print.
- ⁷⁷ Photo Credit: Newman, Oscar. *Creating Defensible Space, written by Newman*. Rep. HUD's Office of Policy Development and Research, 1996. Print.
- ⁷⁸ Nassauer, Joan. "The Natural Assets Approach: Managing Vacant Property." Samuel T. Dana Building, Ann Arbor, MI. 22 Sept. 2009. Lecture.
- ⁷⁹ Nassauer, Joan. "The Natural Assets Approach: Managing Vacant Property." Samuel T. Dana Building, Ann Arbor, MI. 22 Sept. 2009. Lecture.
- ⁸⁰ Nassauer, Joan. "The Natural Assets Approach: Managing Vacant Property." Samuel T. Dana Building, Ann Arbor, MI. 22 Sept. 2009. Lecture.
- ⁸¹ Crime Prevention Unit, London, Stephen Atkins, Sohail Husain, and Angele Storey. *The Influence of Street Lighting On Crime and Fear of Crime*. Ed. Gloria Laycock. Paper No. 28. 1991. Print.
- ⁸² Clark, Ronald V. Clark for the US Department of Justice and the Office of Community Oriented Policing Services. *Improving Street Lighting to Reduce Crime in Residential Areas. Problem-Oriented Guides for Police Series No 8*. 2008. Print.
- ⁸³ Pease, Ken. *A Review of Street Lighting Evaluations: Crime Reduction Effects*. University of Huddersfield, 1999. Print.
- ⁸⁴ Pease, Ken. *A Review of Street Lighting Evaluations: Crime Reduction Effects*. University of Huddersfield, 1999. Print.
- ⁸⁵ Pease, Ken. *A Review of Street Lighting Evaluations: Crime Reduction Effects*. University of Huddersfield, 1999. Print.
- ⁸⁶ LeDuff, Charlie LeDuff, and Santiago Esparza. "Detroit Police Routinely Underreport Homicides Actual '08 Total Gives City Worst Rate in Nation." *The Detroit News* 18 June 2009. Print.
- ⁸⁷ Easy Analytic Software Inc. Market Segment Data. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
- ⁸⁸ Easy Analytic Software Inc. Market Segment Data. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
- ⁸⁹ Easy Analytic Software Inc. Market Segment Data. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
- ⁹⁰ Easy Analytic Software Inc. Market Segment Data. Map retrieved 6 Apr 2010, from SimplyMap database. Web.

Chapter 2.4: Energy Systems

- ¹ Solar Energy International. "Energy Facts." Web. 5 April 2009.
<<http://www.solarenergy.org/resources/energyfacts.html>>

Sources

- ² United Nations Development Programme. "World Energy Assessment: Energy and the Challenge of Sustainability." 2000. Print.
- ³ del Percio, Stephen. *Eco-Architecture Can Eliminate Sick Building Syndrome. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 46-51. Print.
- ⁴ Roodman, David Malin, and Nicholas Lenssen. *A Building Revolution: How Ecology and Health Concerns Are Transforming Construction*. Washington, DC: Worldwatch Institute, 1995. Print.
- ⁵ Cox, Stan. *Large Houses Cannot be Eco-Friendly. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 89-96. Print.
- ⁶ Wille, Rod F. *Eco-Architecture is Good for Business. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 33-39. Print.
- ⁷ Wille, Rod F. *Eco-Architecture is Good for Business. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 33-39. Print.
- ⁸ del Percio, Stephen. *Eco-Architecture Can Eliminate Sick Building Syndrome. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 46-51. Print.
- ⁹ Wille, Rod F. *Eco-Architecture is Good for Business. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 33-39. Print.
- ¹⁰ "NAHB: Annual Housing Starts (1978-2008)." National Association of Home Builders. Web. 27 Nov. 2009. <<http://www.nahb.org/generic.aspx?sectionID=130&genericContentID=554>>
- ¹¹ "U.S. Housing Starts Forecast." Financial Forecast Center Home Page. Web. 27 Nov. 2009. <<http://forecasts.org/house.htm>>
- ¹² Tuna, Cari. "Putting 'Green' Technology Into Bricks." *The Wall Street Journal*, 04 Nov. 2009. Web. 04 Nov. 2009. <<http://online.wsj.com/article/SB10001424052748704746304574506030258504644.html>>
- ¹³ *Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. Print.
- ¹⁴ Tuna, Cari. "Putting 'Green' Technology Into Bricks." *The Wall Street Journal*, 04 Nov. 2009. Web. 04 Nov. 2009. <<http://online.wsj.com/article/SB10001424052748704746304574506030258504644.html>>.
- ¹⁵ The Green Building Institute. "Resources." Web. 08 June 2009. <<http://www.greenbuildinginstitute.org/pages/resources.html>>.
- ¹⁶ The Green Building Institute. "Resources." Web. 08 June 2009. <<http://www.greenbuildinginstitute.org/pages/resources.html>>.
- ¹⁷ The Green Building Institute. "Resources." Web. 08 June 2009. <<http://www.greenbuildinginstitute.org/pages/resources.html>>.
- ¹⁸ Mardell, Mark. "Europe diary: Energy revolution." *BBC Europe*. 11 Jan. 2007. Web. 26 Jan. 2010. <<http://news.bbc.co.uk/2/hi/europe/6249079.stm>>.
- ¹⁹ Mardell, Mark. "Europe diary: Energy revolution." *BBC Europe*. 11 Jan. 2007. Web. 26 Jan. 2010. <<http://news.bbc.co.uk/2/hi/europe/6249079.stm>>.
- ²⁰ Photo Credit, Figure 4 - The Heliotrope: Mardell, Mark. "Europe diary: Energy revolution." *BBC Europe*. 11 Jan. 2007. Web. 26 Jan. 2010. <<http://news.bbc.co.uk/2/hi/europe/6249079.stm>>.
- ²¹ Miller, Charlie. *Extensive Green Roofs Whole Building Design Guide*. 2009. Web. 2 October 2009 <<http://www.wbdg.org/resources/greenroofs.php>>
- ²² Photo credit, Figure 5 - Green Roof on the City Hall of Chicago: Green Roof, City Hall, Chicago. Personal photograph by author Elizabeth Durfree. 2009.
- ²³ Clark, C., Adrianes, P, Talbot, B. "Green Roof Valuation: A Probalistic Economic Analysis of Environmenal Benefits." *Environment, Science, and Technology* 42 (2008): 2155-2161. Print.
- ²⁴ "City of Chicago - City Hall Rooftop Garden Pilot Project." *ICLEI - Local Governments for Sustainability*. Web. 26 Jan. 2010. <<http://www.iclei.org/index.php?id=2743>>
- ²⁵ Miller, Charlie. *Extensive Green Roofs Whole Building Design Guide*. 2009. Web. 2 October 2009 <<http://www.wbdg.org/resources/greenroofs.php>>
- ²⁶ Clark, C., Adrianes, P, Talbot, B. "Green Roof Valuation: A Probalistic Economic Analysis of Environmenal Benefits." *Environment, Science, and Technology* 42 (2008): 2155-2161. Print.
- ²⁷ Energy Information Administration. "Table 5. U.S. Average Monthly Bill by Sector, Census Division, and State 2007." Web. 13 April 2009. <<http://www.eia.doe.gov/cneaf/electricity/esr/table5.html>>
- ²⁸ US Department of Energy. "DOE to Fund up to \$454 Million for Retrofit Ramp-Ups in Energy Efficiency." 14 Sept. 2009. Web. 12 Dec. 2001. <<http://www.energy.gov/news2009/8005.htm>>
- ²⁹ US Department of Energy. "DOE to Fund up to \$454 Million for Retrofit Ramp-Ups in Energy Efficiency." 14 Sept. 2009. Web. 12 Dec. 2001. <<http://www.energy.gov/news2009/8005.htm>>
-

-
- ³⁰ Missouri Department of Natural Resources. "Gov. Nixon Announces \$4.6 Million in Recovery Act Funds Awarded for Energize Missouri Communities in St. Louis Area and Northeast Missouri." Mo.gov. 26 Mar. 2010. Web. 12 Apr. 2010. <<http://www.dnr.mo.gov/newsrel/nr10-156.htm>>
- ³¹ Superville, Darlene. "Cash For Caulkers Rebates: Obama Announces \$6 Billion For Homestar Program." *The Huffington Post* 2 Mar. 2010. Web. 25 Mar. 2010. <http://www.huffingtonpost.com/2010/03/02/cash-for-caulkers-rebates_n_482269.html>
- ³² Superville, Darlene. "Cash For Caulkers Rebates: Obama Announces \$6 Billion For Homestar Program." *The Huffington Post* 2 Mar. 2010. Web. 25 Mar. 2010. <http://www.huffingtonpost.com/2010/03/02/cash-for-caulkers-rebates_n_482269.html>
- ³³ US Department of Energy. "Windows." *Energy Savers Tips*. Web. 08 Nov. 2009. <<http://www1.eere.energy.gov/consumer/tips/windows.html>>
- ³⁴ US Department of Energy. *DSIRE: Database of State Incentives for Renewables and Efficiency*. Web. 17 Mar. 2010. <<http://www.dsireusa.org/>>
- ³⁵ US Department of Energy. "Insulation." *Energy Savers Tips*. Web. 08 Nov. 2009. <<http://www1.eere.energy.gov/consumer/tips/insulation.html>>
- ³⁶ US Department of Energy. "Insulation." *Energy Savers Tips*. Web. 08 Nov. 2009. <<http://www1.eere.energy.gov/consumer/tips/insulation.html>>
- ³⁷ US Department of Energy. "Insulation." *Energy Savers Tips*. Web. 08 Nov. 2009. <<http://www1.eere.energy.gov/consumer/tips/insulation.html>>
- ³⁸ US Department of Energy. *DSIRE: Database of State Incentives for Renewables and Efficiency*. Web. 17 Mar. 2010. <<http://www.dsireusa.org/>>
- ³⁹ US Environmental Protection Agency and US Department of Energy. "About Energy Star." *Energy Star*. Web. 08 July 2009. <http://www.energystar.gov/index.cfm?c=about.ab_index>
- ⁴⁰ US Department of Energy. *DSIRE: Database of State Incentives for Renewables and Efficiency*. Web. 17 Mar. 2010. <<http://www.dsireusa.org/>>
- ⁴¹ US Department of Energy. *DSIRE: Database of State Incentives for Renewables and Efficiency*. Web. 17 Mar. 2010. <<http://www.dsireusa.org/>>
- ⁴² US Department of Energy. *DSIRE: Database of State Incentives for Renewables and Efficiency*. Web. 17 Mar. 2010. <<http://www.dsireusa.org/>>
- ⁴³ US Department of Energy. *DSIRE: Database of State Incentives for Renewables and Efficiency*. Web. 17 Mar. 2010. <<http://www.dsireusa.org/>>
- ⁴⁴ US Department of Energy, Energy Efficiency and Renewable Energy. "Energy Savers: Lighting." *Lighting Principles and Types of Lighting*. Web. 19 Feb. 2010. <http://www.energysavers.gov/your_home/lighting_daylighting/index.cfm/mytopic=11980>
- ⁴⁵ US Department of Energy, and Energy Efficiency and Renewable Energy. "Energy Savers: Lighting." *Lighting Principles and Types of Lighting*. Web. 19 Feb. 2010. <http://www.energysavers.gov/your_home/lighting_daylighting/index.cfm/mytopic=11980>
- ⁴⁶ Biello, David. "LED There Be Light." *Scientific American*. 18 Mar. 2009. Web. 18 Nov. 2009. <<http://www.scientificamerican.com/article.cfm?id=led-there-be-light>>
- ⁴⁷ Biello, David. "LED There Be Light." *Scientific American*. 18 Mar. 2009. Web. 18 Nov. 2009. <<http://www.scientificamerican.com/article.cfm?id=led-there-be-light>>
- ⁴⁸ Biello, David. "LED There Be Light." *Scientific American*. 18 Mar. 2009. Web. 18 Nov. 2009. <<http://www.scientificamerican.com/article.cfm?id=led-there-be-light>>
- ⁴⁹ Rife, Daniel. "Ross School of Business Energy and Environmental Discussion." NRE 605: Green Construction. Ross School of Business, Ann Arbor. 19 Feb. 2010. Lecture.
- ⁵⁰ US Department of Energy. *DSIRE: Database of State Incentives for Renewables and Efficiency*. Web. 17 Mar. 2010. <<http://www.dsireusa.org/>>
- ⁵¹ Pease, Ken. *A Review of Street Lighting Evaluations: Crime Reduction Effects*. University of Huddersfield, 1999. Print.
- ⁵² *LEDcity - Lighting Cities with Light Emitting Diodes (LED)*. Web. 04 Nov. 2009. <<http://www.ledcity.org/>>
- ⁵³ Biello, David. "LED There Be Light." *Scientific American*. 18 Mar. 2009. Web. 18 Nov. 2009. <<http://www.scientificamerican.com/article.cfm?id=led-there-be-light>>
- ⁵⁴ Biello, David. "LED There Be Light." *Scientific American*. 18 Mar. 2009. Web. 18 Nov. 2009. <<http://www.scientificamerican.com/article.cfm?id=led-there-be-light>>
- ⁵⁵ LEDguy Blog. "Streetlights: A Real Example: The Prairie School in Racine Wisconsin." *LED Lights At Home*. 21 Aug. 2009. Web. 24 Nov. 2009. <<http://ledlightsathome.com/>>
- ⁵⁶ *LED Street Lighting*. Web. 24 Nov. 2009. <<http://www.joliet-led-streetlight.com/>>
-

Sources

- ⁵⁷ Biello, David. "LED There Be Light." *Scientific American*. 18 Mar. 2009. Web. 18 Nov. 2009. <<http://www.scientificamerican.com/article.cfm?id=led-there-be-light>>.
- ⁵⁸ *LEDcity - Lighting Cities with Light Emitting Diodes (LED)*. Web. 04 Nov. 2009. <<http://www.ledcity.org/>>
- ⁵⁹ *Ann Arbor's LED Streetlight Program Summary*. Ann Arbor: Energy Office. 2008. Print.
- ⁶⁰ *Ann Arbor's LED Streetlight Program Summary*. Ann Arbor: Energy Office. 2008. Print.
- ⁶¹ U.S. Department of Energy, Stacy C. Davis, Susan W. Diegel, and Robert G. Boundy. *Transportation Energy Data Book*. Rep. no. ORNL-6984. 28th ed. 2009. Print.
- ⁶² U.S. Department of Energy, Stacy C. Davis, Susan W. Diegel, and Robert G. Boundy. *Transportation Energy Data Book*. Rep. no. ORNL-6984. 28th ed. 2009. Print.
- ⁶³ "The Impact of the Automobile on the 20th Century." *Center for LifeLong Learning and Design--University of Colorado at Boulder*. Web. 07 Feb. 2010. <<http://l3d.cs.colorado.edu/systems/agentsheets/New-Vista/automobile/history.html>>
- ⁶⁴ U.S. Department of Energy, Stacy C. Davis, Susan W. Diegel, and Robert G. Boundy. *Transportation Energy Data Book*. Rep. no. ORNL-6984. 28th ed. 2009. Print.
- ⁶⁵ Alaimo, Katherine, et al and the Michigan Dept. of Community Health. "Design Guidelines for Active Michigan Communities: Imagining, Creating, And Improving Communities for Physical Activity, Active Living, And Recreation." 2006. Print.
- ⁶⁶ US Department of Labor, Bureau of Labor Statistics, "Consumer Expenditure Survey," Web. 12 Mar. 2010. <<http://www.bls.gov/cex/>>
- ⁶⁷ American Automobile Association. "Your Driving Costs 2006." Web 15 Mar. 2010. <www.aapublicaffairs.com/Main/Default.asp?SectionID=&CategoryID=3&SubCategoryID=9&ContentID=23&>
- ⁶⁸ Leinberger, Christopher B. *The Option of Urbanism: Investing in a New American Dream*. Washington, DC: Island, 2008. Print.
- ⁶⁹ "The United States of Transit Cutbacks." *Transportation For America*. Web. 21 Mar. 2010. <<http://t4america.org/transitcuts/>>
- ⁷⁰ U.S. Census Bureau, 2009. Map retrieved 6 Apr 2010, from SimplyMap database. Web.
- ⁷¹ Keoleian, Greg. "Alternative Fuel Technology." NRE 574: Sustainable Energy Systems. Samuel T. Dana Building, Ann Arbor. 9 Nov. 2009. Lecture.
- ⁷² Keoleian, Greg. "Alternative Fuel Technology." NRE 574: Sustainable Energy Systems. Samuel T. Dana Building, Ann Arbor. 9 Nov. 2009. Lecture.
- ⁷³ Copeland, Michale V. "The hydrogen car fights back." *Fortune Magazine/CNNmoney.com*. 14. Oct. 2009. Web. 21 Mar. 2001. <http://money.cnn.com/2009/10/13/technology/hydrogen_car.fortune/index.htm>
- ⁷⁴ Copeland, Michale V. "The hydrogen car fights back." *Fortune Magazine/CNNmoney.com*. 14. Oct. 2009. Web. 21 Mar. 2001. <http://money.cnn.com/2009/10/13/technology/hydrogen_car.fortune/index.htm>
- ⁷⁵ Copeland, Michale V. "The hydrogen car fights back." *Fortune Magazine/CNNmoney.com*. 14. Oct. 2009. Web. 21 Mar. 2001. <http://money.cnn.com/2009/10/13/technology/hydrogen_car.fortune/index.htm>
- ⁷⁶ Keoleian, Greg. "Biomass." NRE 574: Sustainable Energy Systems. Samuel T. Dana Building, Ann Arbor. 4 Nov. 2009. Lecture.
- ⁷⁷ Keoleian, Greg. "Biomass." NRE 574: Sustainable Energy Systems. Samuel T. Dana Building, Ann Arbor. 4 Nov. 2009. Lecture.
- ⁷⁸ Keoleian, Greg. "Biomass." NRE 574: Sustainable Energy Systems. Samuel T. Dana Building, Ann Arbor. 4 Nov. 2009. Lecture.
- ⁷⁹ "New Energy Tax Credits for Alternative Fuel Vehicles." *Fuel Economy.gov*. Web. 17 Feb. 2010. <http://www.fueleconomy.gov/feg/tax_afv.shtml>
- ⁸⁰ Boardman, Chris. "RI Steps Up Efforts to Add Plug-In Electric Vehicles to Road." *ABC Channel 6*. 29 Jan. 2010. Web. 15 Feb. 2010. <<http://www.abc6.com/news/webextra/83040137.html>>
- ⁸¹ "About Re-Amp." Web. Mar 22. 2010. <www.reamp.org/about>
- ⁸² The New Rules Project, The Institute for Local Self-Reliance., and John Bailey. *Electric Vehicle Policy For the Midwest – A Scoping Document*. Rep. 2009. Web. Mar 22 2010. <<http://www.newrules.org/energy/publications/electric-vehicle-policy-midwest-scoping-document>>
- ⁸³ "Green Alert on Special Michigan Incentives for Electric Car Battery Production." *Group for a Renewable Energy Efficient Nation: Michigan GREEN*. Web. 17 Feb. 2010. <<http://www.michigangreen.org/article-469-thread-0-0.html>>
- ⁸⁴ Keen, Judy. "Midwest farms reap benefits of ethanol boom." *USA Today*. 02 Oct. 2006. Web. 1 Mar. 2010. <http://www.usatoday.com/news/nation/2006-10-01-ethanol_x.htm>.
- ⁸⁵ Keen, Judy. "Midwest farms reap benefits of ethanol boom." *USA Today*. 02 Oct. 2006. Web. 1 Mar. 2010. <http://www.usatoday.com/news/nation/2006-10-01-ethanol_x.htm>.
- ⁸⁶ The Council of State Governments, Midwestern Office, and Carolyn Orr. "The 'other' biofuel: In the shadow of ethanol, biodiesel making inroads." Print.
-

-
- ⁸⁷ The Council of State Governments, Midwestern Office, and Carolyn Orr. "The 'other' biofuel: In the shadow of ethanol, biodiesel making inroads." Print.
- ⁸⁸ Moresco, Justin. "California: \$6.8M for Hydrogen Fueling." *Red Herring: The Business of Technology*. 08 Apr. 2009. Web. 10 Apr. 2010. <<http://www.redherring.com/Home/25996>>
- ⁸⁹ Moresco, Justin. "California: \$6.8M for Hydrogen Fueling." *Red Herring: The Business of Technology*. 08 Apr. 2009. Web. 10 Apr. 2010. <<http://www.redherring.com/Home/25996>>
- ⁹⁰ Yvkoff, Liane. "California to get 46 retail hydrogen stations by 2014." *Cartech Blog*. Web. 17 Feb. 2010. <http://reviews.cnet.com/8301-13746_7-10204075-48.html>
- ⁹¹ Oosting, Jonathan. "From Rust Belt to Green Belt: Gov. Jennifer Granholm Calls Chevy Volt Battery Production 'beginning of New Michigan'" 7 Jan. 2010 *Mlive.com*. Web. 15 Mar 2010. <http://www.mlive.com/auto/index.ssf/2010/01/from_rust_belt_to_green_belt_g.html>
- ⁹² *Detroit Biodiesel Firm Options Wayne State Technology*. Rep. Great Lakes Innovation and Technology Report, 1 Apr. 2010. Web. 5 Apr. 2010. <<http://www.wwj.com/Detroit-Biodiesel-Firm-Options-Wayne-State-Technol/6710179>>
- ⁹³ American Public Transportation Association. *Public Transportation Reduces Greenhouse Gases and Conserves Energy*. American Public Transportation Association, 2006. Print.
- ⁹⁴ American Public Transportation Association. *Public Transportation Reduces Greenhouse Gases and Conserves Energy*. American Public Transportation Association, 2006. Print.
- ⁹⁵ American Public Transportation Association. *Public Transportation Reduces Greenhouse Gases and Conserves Energy*. American Public Transportation Association, 2006. Print.
- ⁹⁶ "Nine Detroit Projects to Watch in 2010." *Detroit Michigan Biking: M-bike.org*. Web. 06 Apr. 2010. <<http://www.m-bike.org/blog/2010/01/04/nine-detroit-projects-to-watch-in-2010>>
- ⁹⁷ "Nine Detroit Projects to Watch in 2010." *Detroit Michigan Biking: M-bike.org*. Web. 06 Apr. 2010. <<http://www.m-bike.org/blog/2010/01/04/nine-detroit-projects-to-watch-in-2010>>
- ⁹⁸ U.S. Department of Energy, Stacy C. Davis, Susan W. Diegel, and Robert G. Boundy. *Transportation Energy Data Book*. Rep. no. ORNL-6984. 28th ed. 2009. Print.
- ⁹⁹ Rood, R. "Intro and Past Conservation." 15 Jan. 2009. Room 1028, Samuel T. Dana Building, University of Michigan, Ann Arbor, MI. Lecture.
- ¹⁰⁰ Rood, R. "Intro and Past Conservation." 15 Jan. 2009. Room 1028, Samuel T. Dana Building, University of Michigan, Ann Arbor, MI. Lecture.
- ¹⁰¹ Rood, R. "Conservation Balance." 12 Jan. 2009. Room 1028, Samuel T. Dana Building, University of Michigan, Ann Arbor, MI. Lecture.
- ¹⁰² Rood, R. "Feedbacks Abrupt." 12 Feb. 2009. Room 1028, Samuel T. Dana Building, University of Michigan, Ann Arbor, MI. Lecture.
- ¹⁰³ U.S. Environmental Protection Agency. "Carbon Dioxide" Climate Change – Green House Gas Emissions. 2009. Web Feb 1 2010. <<http://www.epa.gov/climatechange/emissions/co2.html>>
- ¹⁰⁴ U.S. Environmental Protection Agency. "Atmosphere Changes" Climate Change – Science. 2009. Web. Feb 1 2010. <<http://www.epa.gov/climatechange/science/recentac.html>>
- ¹⁰⁵ 350. "350 Science" 2009. Web 3 Mar 2010. <<http://www.350.org/about/science>>
- ¹⁰⁶ U.S. Energy Information Association. "Renewable Energy Consumption" 2007. Web Mar 3 2010. <http://www.eia.doe.gov/cneaf/solar.renewables/page/prelim_trends/rea_prereport.html#_ftnref20>
- ¹⁰⁷ U.S. Energy Information Administration. "Monthly Energy Review Energy Overview." U.S. Department of Energy. Web 10 April 2010. <<http://www.eia.doe.gov/emeu/mer/overview.html>>
- ¹⁰⁸ Rohn, Christina. "Hydroelectricity Provides Michigan with 35-40 Percent of Its Renewable Energy." *Petoskey News-Review*. 23 Oct. 2009. Web. 7 Nov. 2010. <http://www.petoskeynews.com/news/article_42d40d3c-a893-5335-a4ae-72f3d74e7970.html>
- ¹⁰⁹ Michigan Department of Environmental Quality and Michigan Department of Natural Resources. "Ambient Levels of Criteria Air Pollutants" State of Michigan's Environment 2008. Web. 23 Feb. 2010 <http://www.michigan.gov/documents/deq/2deq-exe-deqdnrei08_266980_7.pdf>
- ¹¹⁰ US Department of Energy. *DSIRE: Database of State Incentives for Renewables and Efficiency*. Web. 17 Mar. 2010. <<http://www.dsireusa.org/>>
- ¹¹¹ US Department of Energy. *DSIRE: Database of State Incentives for Renewables and Efficiency*. Web. 17 Mar. 2010. <<http://www.dsireusa.org/>>
- ¹¹² US Department of Energy. *DSIRE: Database of State Incentives for Renewables and Efficiency*. Web. 17 Mar. 2010. <<http://www.dsireusa.org/>>
- ¹¹³ U.S. Department of Energy. "Energy Efficiency and Conservation Block Grant Program" Energy Efficiency & Renewable Energy 2010. Web. 10 Apr. 2010. <<http://www.eecbg.energy.gov/>>
-

Sources

- ¹¹⁴ U.S. Department of Energy "Photovoltaic Basics" Energy Efficiency and Renewable Energy: Solar Energy Technologies Program. Web. Dec 2. 2009. <http://www1.eere.energy.gov/solar/pv_basics.html>
- ¹¹⁵ U.S. DOE. Energy Information Administration. *Annual Energy Review 2008*. 2009. Print.
- ¹¹⁶ Center for Sustainable Systems. "PV Factsheet: How much land will PV need to supply our electricity?" Print.
- ¹¹⁷ U.S. Department of Energy "So you want to put PV on your roof..." Energy Efficiency and Renewable Energy: Solar Energy Technologies Program. Web. 15 Dec. 2009. <http://www1.eere.energy.gov/solar/want_pv.html>
- ¹¹⁸ U.S. Department of Energy "So you want to put PV on your roof..." Energy Efficiency and Renewable Energy: Solar Energy Technologies Program. Web. 15 Dec. 2009. <http://www1.eere.energy.gov/solar/want_pv.html>
- ¹¹⁹ Southface. "Residential Photovoltaic Options" 2008. Web. 14 Feb. 2010. <http://www.southface.org/solar/solar-roadmap/residential/residential_pv_options.htm>
- ¹²⁰ "Solar Maps." *National Renewable Energy Laboratory (NREL)*. Web. 06 Apr. 2010. <<http://www.nrel.gov/gis/solar.html>>
- ¹²¹ "EIA Renewable Energy-Wind Data and Information." *Energy Information Administration*. Web. 14 Apr. 2010. <<http://www.eia.doe.gov/cneaf/solar.renewables/page/wind/wind.html>>
- ¹²² "Wind Industry Statistics" American Wind Energy Association. Web 26 Mar. 2010 <http://www.awea.org/faq/wwt_statistics.html>
- ¹²³ Thames Valley Energy. "Small Scale Wind Energy" 2004. Web. 26. Mar 2010. <<http://www.tvenergy.org/sources-windturbine.htm>>
- ¹²⁴ U.S. Department of Energy. "How Wind Turbines Work" Energy Efficiency & Renewable Energy: Wind & Hydropower Technologies Program. 2006. Web 25 Mar. 2010. <http://www1.eere.energy.gov/windandhydro/wind_how.html>
- ¹²⁵ American Wind Energy Association. Wind Energy Basics. "How much electricity can one wind turbine generate?" 2009. Web. 14 Apr. 2010. <http://www.awea.org/faq/wwt_basics.html>
- ¹²⁶ "Geothermal Heat Pumps." *Energy Efficiency and Renewable Energy*. US Department of Energy. Web. 1 Apr 2010. <<http://www1.eere.energy.gov/geothermal/heatpumps.html>>
- ¹²⁷ Bertani, Ruggero (2009), "Geothermal Energy: An Overview on Resources and Potential", Proceedings of the International Conference on National Development of Geothermal Energy Use, Slovakia. Print.
- ¹²⁸ Bertani, Ruggero (2009), "Geothermal Energy: An Overview on Resources and Potential", Proceedings of the International Conference on National Development of Geothermal Energy Use, Slovakia. Print.
- ¹²⁹ Tester, Jefferson W. et al. *The Future of Geothermal Energy, Impact of Enhanced Geothermal Systems on the United States in the 21st Century: An Assessment*. Idaho Falls: Idaho National Laboratory 2006. Print.
- ¹³⁰ Tester, Jefferson W. et al. *The Future of Geothermal Energy, Impact of Enhanced Geothermal Systems on the United States in the 21st Century: An Assessment*. Idaho Falls: Idaho National Laboratory 2006. Print.
- ¹³¹ "Geothermal Potential Resource Map." *National Renewable Energy Laboratory (NREL) Home Page*. Web. 06 Apr. 2010. <<http://www.nrel.gov/gis/geothermal.html>>
- ¹³² "Water Use: Hydroelectric Power." *USGS Georgia Water Science Center*. Web. 06 Apr. 2010. <<http://ga.water.usgs.gov/edu/wuhy.html>>
- ¹³³ "Water Use: Hydroelectric Power." *USGS Georgia Water Science Center*. Web. 06 Apr. 2010. <<http://ga.water.usgs.gov/edu/wuhy.html>>
- ¹³⁴ "Water Use: Hydroelectric Power." *USGS Georgia Water Science Center*. Web. 06 Apr. 2010. <<http://ga.water.usgs.gov/edu/wuhy.html>>
- ¹³⁵ Rohn, Christina. "Hydroelectricity Provides Michigan with 35-40 Percent of Its Renewable Energy." *Petoskey News-Review*. 23 Oct. 2009. Web. 06 Apr. 2010 <http://www.petoskeynews.com/news/article_42d40d3c-a893-5335-a4ae-72f3d74e7970.html>
- ¹³⁶ Rohn, Christina. "Hydroelectricity Provides Michigan with 35-40 Percent of Its Renewable Energy." *Petoskey News-Review*. 23 Oct. 2009. Web. 06 Apr. 2010 <http://www.petoskeynews.com/news/article_42d40d3c-a893-5335-a4ae-72f3d74e7970.html>
- ¹³⁷ "UMich VIVACE Hydropower System Makes Energy From Slow Currents." *Gizmodo*. 26 Nov. 2008. Web. 06 Apr. 2010 <<http://gizmodo.com/5099080/umich-vivace-hydropower-system-makes-energy-from-slow-currents>>

Chapter 2.5: Material & Resource Flows

- ¹ "Law of Conservation of Matter and Energy." *Cartage.org*. Web. 15 Mar. 2010. <<http://www.cartage.org.lb/en/themes/Sciences/Chemistry/Generalchemistry/Energy/LawofConservation/LawofConservation.htm>>
- ² McDonough, William, and Michael Braungart. *Cradle to Cradle: Remaking the Way We Make Things*. New York: North Point, 2002. Print.
- ³ USGS. "Materials Flow and Sustainability." Web. Feb. 15, 2010. <<http://pubs.usgs.gov/fs/fs-0068-98/fs-0068-98.pdf>>
- ⁴ Gutberlet, Jutta. *Recovering Resources - Recycling Citizenship: Urban Poverty Reduction in Latin America*. Aldershot: Ashgate, 2008. Print.
-

-
- ⁵ Yollin, Patricia. "Berkeley Author Knows Toxic, Throwaway Culture." *SFGate*. 3 Apr. 2010. Web. 06 Apr. 2010. <<http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2010/04/02/MNV41CP5M9.DTL>>
- ⁶ "Detroit Waste Incinerator: Dirty and Expensive." *Ecology Center*. Web. 3 Apr. 2010. <<http://www.ecocenter.org/recycling/detroit.php>>
- ⁷ Agriculture and Consumer Protection Department. "Issues in Urban Agriculture." *Food and Agriculture Organization of the United States*. 1999. Web. 20 Nov. 2009. <<http://www.fao.org/ag/magazine/9901sp2.htm>>
- ⁸ Ecomii: Guide to waste and recycling. "What makes up our waste stream?" 2008. Web. Oct 2 2009. <<http://www.ecomii.com/waste/sources>>
- ⁹ Ecomii: Guide to waste and recycling. "What makes up our waste stream?" 2008. Web. Oct 2 2009. <<http://www.ecomii.com/waste/sources>>
- ¹⁰ U.S. Environmental Protection Agency "Wastes- Resource Conservation: Reduce & Reuse." Web. 17 Aug. 2009. <<http://www.epa.gov/epawaste/conserve/rrr/reduce.htm>>
- ¹¹ Container Recycling Institute. "Beverage Container Facts & Statistics." Web. 12 June 2009. <<http://www.container-recycling.org/facts/all/?gclid=CMrU9baygZ0CFREhDQodwIDFbA>>
- ¹² U.S. Environmental Protection Agency "Wastes- Resource Conservation: Reduce & Reuse." Web. 17 Aug. 2009. <<http://www.epa.gov/epawaste/conserve/rrr/reduce.htm>>
- ¹³ Lucius, Ann. "Recycling Program Creates Jobs, Alleviates Poverty." *Waste Age Magazine*. Web. 17 Aug. 2009 <http://wasteage.com/mag/waste_recycling_recycling_program/>
- ¹⁴ Container Recycling Institute. "Beverage Container Facts & Statistics." Web. 12 June 2009. <<http://www.container-recycling.org/facts/all/?gclid=CMrU9baygZ0CFREhDQodwIDFbA>>
- ¹⁵ Container Recycling Institute. "About Bottle Bills" Bottle Bill Resource Guide. 2009. Web. 12 June 2009. <<http://www.bottlebill.org/>>
- ¹⁶ Container Recycling Institute. "Recycling Rates by Material and Class, 2006" Web. 12 June 2009. <<http://container-recycling.org/facts/all/data/recrates-depnon-3mats.htm>>
- ¹⁷ Colorado Curbside. "Recycling Options: Drop Off and Curbside" Colorado Municipal League 2006. Web. 12 June 2009. <<http://www.coloradocurbside.com/discussionpapers/recyclingoptions.html>>
- ¹⁸ The Heidelberg Project. "FAQ." Web. 4 Apr. 2010. <<http://www.heidelberg.org/FAQ.html>>
- ¹⁹ "Recycling Program Map." *City of Detroit*. Web. 07 Apr. 2010. <<http://www.detroitmi.gov/Departments/DepartmentofPublicWorks/SolidWasteYardWaste/DetroitRecyclesBeginsJuly2009/RecyclingProgramMap/tabid/2496/Default.aspx>>
- ²⁰ City of Detroit: Department of Public Works. "Where Do I Take My Recycling?" Web. 12 June 2009. <<http://www.detroitmi.gov/Departments/DepartmentofPublicWorks/SolidWasteYardWaste/DetroitRecyclesBeginsJuly2009/WhereDoITakeMyRecycling/tabid/2495/Default.aspx>>
- ²¹ "RecycleHere! Services/About." *RecycleHere!* Web. 06 Apr. 2010. <<http://www.recyclehere.net/service.html>>
- ²² "Detroit Recycles." *City of Detroit Department of Public Works*. Web. 06 Apr. 2010. <<http://www.detroitmi.gov/>>
- ²³ U.S. Environmental Protection Agency "Wastes- Resource Conservation: Reduce & Reuse." Web. 17 Aug. 2009. <<http://www.epa.gov/epawaste/conserve/rrr/reduce.htm>>
- ²⁴ Sanitation Statistics, Detroit Department of Public Works. Phone Interview. 3 Mar. 2010.
- ²⁵ Redwood, M. "Agriculture in Urban Planning; Generating Livelihoods and Food Security." International Development Research Centre (IDRC). UK and USA: 2009. Print.
- ²⁶ US Global Change Research Program. *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change*. Rep. 2000/2001. Web. 1 Mar. 2009. <<http://www.usgcrp.gov/usgcrp/Library/nationalassessment/14C.pdf>>
- ²⁷ U.S. Geological Survey. "Estimated Water Use in the United States." 1995. Web. 1 Mar. 2009. <<http://water.usgs.gov/watuse/pdf1995/html/>>
- ²⁸ Kloss, C. "Managing Wet Weather with Green Infrastructure Municipal Handbook; Rainwater Harvesting Policies." Low Impact Development Center. EPA-833-F-08-010. 2008. Print.
- ²⁹ Pie chart data: United States General Accounting Office. Water-Efficient Plumbing Fixtures Reduce Water Consumption and Wastewater Flows. Report to Congress: GAO/RCED-00-232. October 2007. Print.
- ³⁰ Lawrence, Katrine, and Phil McManus. "Towards Household Sustainability in Sydney? Impacts of Two Sustainable Lifestyle Workshop Programs on Water Consumption in Existing Homes." *Geographical Research* 46(3) (2008):314-332. Print.
- ³¹ United States General Accounting Office. "Water-Efficient Plumbing Fixtures Reduce Water Consumption and Wastewater Flows." Report to Congress: GAO/RCED-00-232. October 2007. Print.
- ³² United States General Accounting Office. "Water-Efficient Plumbing Fixtures Reduce Water Consumption and Wastewater Flows." Report to Congress: GAO/RCED-00-232. October 2007. Print.
-

Sources

- ³³ U.S. Environmental Protection Agency. "WaterSense." Web. 10 Mar. 2009 <<http://www.epa.gov/watersense/>>
- ³⁴ U.S. Environmental Protection Agency. "WaterSense." Web. 10 Mar. 2009 <<http://www.epa.gov/watersense/>>
- ³⁵ Detroit Water and Sewage Department. "A New Regional Paradigm: Working Together to Manage Water Rates." Detroit: Detroit Water and Sewage Department, 2009. Print.
- ³⁶ Detroit Water and Sewage Department. "A New Regional Paradigm: Working Together to Manage Water Rates." Detroit: Detroit Water and Sewage Department, 2009. Print.
- ³⁷ Detroit Water and Sewage Department. "A New Regional Paradigm: Working Together to Manage Water Rates." Detroit: Detroit Water and Sewage Department, 2009. Print.
- ³⁸ United States General Accounting Office. "Water-Efficient Plumbing Fixtures Reduce Water Consumption and Wastewater Flows." Report to Congress: GAO/RCED-00-232. October 2007. Print.
- ³⁹ "City of Austin - Residential Toilet Replacement Program." *Austin City Connection*. Web. 13 Apr. 2009 <<http://www.ci.austin.tx.us/watercon/sftoilet.htm>>
- ⁴⁰ "Texas Water Matters." Web. 13 Apr. 2009 <http://www.texaswatermatters.org/pdfs/news_511.pdf>
- ⁴¹ Roulo, Candace. "Free toilets and rebate programs save Austin water and money." *Contractormag.com*. 1 Feb. 2009. Web. 20 Feb. 2009. <http://contractormag.com/bathkitchen/free_toilets_rebate/>
- ⁴² Roulo, Candace. "Free toilets and rebate programs save Austin water and money." *Contractormag.com*. 1 Feb. 2009. Web. 20 Feb. 2009. <http://contractormag.com/bathkitchen/free_toilets_rebate/>
- ⁴³ Rife, Daniel. "Ross School of Business Energy and Environmental Discussion." NRE 605: Green Construction. Ross School of Business, Ann Arbor. 19 Feb. 2010. Lecture.
- ⁴⁴ Rife, Daniel. "Ross School of Business Energy and Environmental Discussion." NRE 605: Green Construction. Ross School of Business, Ann Arbor. 19 Feb. 2010. Lecture.
- ⁴⁵ Texas A&M. "Rainwater Harvesting: Collection and Storage." Web. 11 Nov. 2009. <<http://rainwaterharvesting.tamu.edu/collection.html>>.
- ⁴⁶ Kloss, C. "Managing Wet Weather with Green Infrastructure Municipal Handbook; Rainwater Harvesting Policies." Low Impact Development Center. EPA-833-F-08-010. 2008. Print.
- ⁴⁷ Oklahoma Department of Environmental Quality. "Rain Barrels." *Catching the Rain*. Web. Nov. 4, 2009. <<http://www.deq.state.ok.us/pubs/lpd/edibleappends/RainBarrels.pdf>>
- ⁴⁸ Kloss, C. "Managing Wet Weather with Green Infrastructure Municipal Handbook; Rainwater Harvesting Policies." Low Impact Development Center. EPA-833-F-08-010. 2008. Print.
- ⁴⁹ Kloss, C. "Managing Wet Weather with Green Infrastructure Municipal Handbook; Rainwater Harvesting Policies." Low Impact Development Center. EPA-833-F-08-010. 2008. Print.
- ⁵⁰ Oklahoma Department of Environmental Quality. "Rain Barrels." *Catching the Rain*. Web. Nov. 4, 2009. <<http://www.deq.state.ok.us/pubs/lpd/edibleappends/RainBarrels.pdf>>
- ⁵¹ Rain barrel. Digital Image. *Inner City Farmer*. Web. 12 Nov. 2009. <<http://innercityfarmer.com/wp-content/uploads/2008/10/rain-barrel.>>
- ⁵² Rainwater Cistern. Digital image. *Young Sierrans*. Web. 12 Nov. 2009. <<http://youngsierrans.files.wordpress.com/2008/12/rainwater-cistern.jpg>>
- ⁵³ Sands, Karen, Thomas Chapman, and Milwaukee Metropolitan Sewerage District. *Rain Barrels: Truth or Consequences*. Print.
- ⁵⁴ Broadkill Tributary Action Team. "Rain Barrel Program." *Broadkill Tributary Action Team - DE*. Web. 14 Apr. 2010. <<http://broadkill.ocean.udel.edu/RainBarrelProgram.html>>
- ⁵⁵ Drukas, Alexander J. "Landscaping: Eco-friendly Can Be a Goal." *MLive.com*. 27 Mar. 2008. Web. 2 Nov. 2009. <http://blog.mlive.com/ann_arbor_business_review/2008/03/landscaping_ecofriendly_can_be.html>
- ⁵⁶ Wood, Pamela. "The Tax Credit They're Not Telling You about." *Maryland Gazette*. 12 Nov. 2008. Web. 25 Nov. 2009. <<http://www.hometownnglenburnie.com/news/mdgazette/2008/11/12-14/The+tax+credit+they%92re+not+telling+you+about.html>>
- ⁵⁷ "Rebates - Outdoor." *Albuquerque Bernalillo County Water Utility Authority - Home*. Web. 12 Mar. 2010. <<http://www.abcwua.org/content/view/123/199/>>
- ⁵⁸ Drukas, Alexander J. "Landscaping: Eco-friendly Can Be a Goal." *MLive.com*. 27 Mar. 2008. Web. 2 Nov. 2009. <http://blog.mlive.com/ann_arbor_business_review/2008/03/landscaping_ecofriendly_can_be.html>
- ⁵⁹ U.S. Environmental Protection Agency. "Outdoor Water in the US." 2008. Web. Oct. 12, 2009. <<http://www.epa.gov/OW-OWM.html/water-efficiency/pubs/outdoor.htm>>.
- ⁶⁰ Southern Nevada Water Authority. "Water Use Facts." 2009. Web. Oct. 12, 2009. <http://www.snwa.com/html/cons_waterfacts.html>.
- ⁶¹ Oklahoma Department of Environmental Quality. "Rain Barrels." *Catching the Rain*. Web. Nov. 4, 2009. <<http://www.deq.state.ok.us/pubs/lpd/edibleappends/RainBarrels.pdf>>
-

- ⁶² Oklahoma Department of Environmental Quality. "Rain Barrels." *Catching the Rain*. Web. Nov. 4, 2009. <<http://www.deq.state.ok.us/pubs/lpd/edibleappends/RainBarrels.pdf>>
- ⁶³ Oklahoma Department of Environmental Quality. "Rain Barrels." *Catching the Rain*. Web. Nov. 4, 2009. <<http://www.deq.state.ok.us/pubs/lpd/edibleappends/RainBarrels.pdf>>
- ⁶⁴ Detroit River Canadian Cleanup. "Stormwater and Rainbarrel Project." Web. Nov 13, 2009. <<http://www.detroitriver.ca/stormwater-and-rainbarrel-project.html>>.
- ⁶⁵ NC State University and A&T State University Cooperative Extension "Urban Waterways; Rainwater Harvesting: Guidance for Homeowners." 2008. Print.
- ⁶⁶ "Rainwater hog." Web. 4 Nov. 2009. <<http://rainwaterhog.com>>
- ⁶⁷ Oklahoma Department of Environmental Quality. "Rain Barrels." *Catching the Rain*. Web. 4 Nov. 2009. <<http://www.deq.state.ok.us/pubs/lpd/edibleappends/RainBarrels.pdf>>
- ⁶⁸ Roodman, David Malin and Nicholas Lenssen. *A Building Revolution: How Ecology and Health Concerns Are Transforming Construction*. Washington, DC: Worldwatch Institute, 1995. Print.
- ⁶⁹ Howard, Bion. *The Basics of Green Homes and Communities. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 21-32. Print.
- ⁷⁰ Cox, Stan. *Large Houses Cannot be Eco-Friendly. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 89-96. Print.
- ⁷¹ Cox, Stan. *Large Houses Cannot be Eco-Friendly. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 89-96. Print.
- ⁷² Cox, Stan. *Large Houses Cannot be Eco-Friendly. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 89-96. Print.
- ⁷³ Pope, Carl. *Urban Sprawl Is Not Beneficial. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008. 104-110. Print.
- ⁷⁴ National Institute of Building Sciences "Construction Waste Management" Whole Building Design Guide. 2010. Web. 12 Apr. 2010. <<http://www.wbdg.org/resources/cwmgmt.php>>
- ⁷⁵ EcologyAction. "Recycled Content Building Materials" Green Building Materials Guide. 2010. Web. 1 Apr. 2010. <http://www.ecoact.org/Programs/Green_Building/green_Materials/recycled_content.htm>
- ⁷⁶ Building Materials Reuse Association (BMRA) "About BMRA" 2008. Web. 10 Apr. 2010. <<http://www.bmra.org/about-bmra>>
- ⁷⁷ Wills, Amanda. "'De-urbanizing' Could Be Detroit's Survival Plan." *Earth911.com*. Web. 10 Apr. 2010. <<http://earth911.com/news/2010/03/10/de-urbanizing-could-be-detroits-survival-plan/>>
- ⁷⁸ "Architectural Salvage Warehouse of Detroit." Web. 10 Apr. 2010. <<http://www.aswdetroit.org/about.htm>>.
- ⁷⁹ "Architectural Salvage Warehouse of Detroit." Web. 10 Apr. 2010. <<http://www.aswdetroit.org/about.htm>>.
- ⁸⁰ "Young Detroit Builders." Web. 10 Apr. 2010. <<http://www.youngdetroitbuilders.com/>>
- ⁸¹ U.S. Environmental Protection Agency. "Wastes – Construction & Demolition Materials" 2009. Web. 10 Apr. 2010. <<http://www.epa.gov/osw/conserves/rrr/imr/cdm/index.htm>>
- ⁸² ToolBase Services. "Construction Waste Management" 2008. Web 30 Mar. 2010. <<http://www.toolbase.org/Best-Practices/Construction-Waste/construction-waste-management>>
- ⁸³ MacDonald, Christine. "Detroit Officials Probe Razing Halt." *The Detroit News*. 09 Apr. 2010. Web. 10 Apr. 2010. <<http://detnews.com/article/20100403/METRO01/4030339/Detroit-officials-probe-razing-halt>>.
- ⁸⁴ Collison, Kevin. "KC School District to Develop Strategies for Repurposing Closed Buildings." *The Kansas City Star*. KansasCity.com, 19 Mar. 2010. Web. 12 Apr. 2010. <<http://www.kansascity.com/2010/03/19/1825460/kc-school-district-to-develop.html>>.

Chapter 2.6: Ecosystem Services

- ¹ Bolund, P. and Hunhammar, S. "Ecosystem services in urban areas." *Ecological Economics* 29 (1999); 293-301. Print.
- ² Bolund, P. and Hunhammar, S. "Ecosystem services in urban areas." *Ecological Economics* 29 (1999); 293-301. Print.
- ³ U.S. Environmental Protection Agency. "Valuing the Protection of Ecological Systems and Services, A Report of the EPA Science Advisory Board." EPA-SAB-09-012. 2009. Web. 10 Dec 2009.
- ⁴ Heal, G. "Valuing Ecosystem Services." *Ecosystems* 3 (2000): 24-30. Print.
- ⁵ "Tree and Ecosystem Services." *American Forests*. Web. 14 Feb 2010. <<http://www.americanforests.org/resources/urbanforests/naturevalue.php>>
- ⁶ Costanza, R. et al. "The value of the world's ecosystem services and natural capital." *Nature* 387 (1997): 253-260. Print.
- ⁷ Natural Academies. "Valuing Ecosystem Services Toward Better Environmental Decision-Making." The Natural Academies Report in Brief. 2004. Print.
- ⁸ BenDor, Todd, K. and Doyle, Martin W. "Planning for Ecosystem Service Markets." *Journal of the American Planning Association* 76.1 (2010). Print.

Sources

- ⁹ Rosenfeld, A.H. et al. "Mitigation of urban heat islands: materials, utility programs, updates." *Energy and Buildings* (1995): 225-265. Print.
- ¹⁰ Cleveland, C. "Heat Island." The Encyclopedia of Earth. Web. 4 Oct 2009.
<http://www.eoearth.org/article/Heat_island#Causes_of_heat_islands>
- ¹¹ Harlan, Sharon et al. "Neighborhood microclimates and vulnerability to heat stress." *Social Science & Medicine*. 63 (2006):2847-2863. Print.
- ¹² Heynen, Nik, Perkins, Harold A., and Roy, Parama. "The Political Ecology of Uneven Urban Green Space: The Impact of Political Economy on Race and Ethnicity in Producing Environmental Inequity in Milwaukee." *Urban Affairs Review* 42 (2006). 3-25. Print.
- ¹³ U. S. Environmental Protection Agency. "Green Infrastructure; Types, Applications, and Design Approaches to Manage Wet Weather." Managing Wet Weather with Green Infrastructure. Web. 11 Nov 2009.
<<http://cfpub.epa.gov/npdes/greeninfrastructure/technology.cfm>>
- ¹⁴ Nowak, David J. "The Effects of Urban Trees on Air Quality." USDA Forest Service, Syracuse, NY. Web. 10 Dec 2009.
<<http://www.coloradotrees.org/benefits/Effects%20of%20Urban%20Trees%20on%20Air%20Quality.pdf>>
- ¹⁵ Maryland Department of Natural Resources Forest Service "The Benefits of Urban Trees Urban and Community Forestry: Improving our Quality of Life." Maryland Department of Natural Resources Forest Service. *The Greenway*. 28 Sept. 2009. Print.
- ¹⁶ Cleveland, C. "Heat Island." The Encyclopaedia of Earth. Web. 4 Oct 2009.
<http://www.eoearth.org/article/Heat_island#Causes_of_heat_islands>
- ¹⁷ Nowak, David J. "The Effects of Urban Trees on Air Quality." USDA Forest Service, Syracuse, NY. Web. 10 Dec 2009.
<<http://www.coloradotrees.org/benefits/Effects%20of%20Urban%20Trees%20on%20Air%20Quality.pdf>>
- ¹⁸ Maryland Department of Natural Resources Forest Service "The Benefits of Urban Trees Urban and Community Forestry: Improving our Quality of Life." Maryland Department of Natural Resources Forest Service. *The Greenway*. 28 Sept. 2009. Print.
- ¹⁹ Maryland Department of Natural Resources Forest Service "The Benefits of Urban Trees Urban and Community Forestry: Improving our Quality of Life." Maryland Department of Natural Resources Forest Service. *The Greenway*. 28 Sept. 2009. Print.
- ²⁰ Nowak, David J. "The Effects of Urban Trees on Air Quality." USDA Forest Service, Syracuse, NY. Web. 10 Dec 2009.
<<http://www.coloradotrees.org/benefits/Effects%20of%20Urban%20Trees%20on%20Air%20Quality.pdf>>
- ²¹ Rowntree, Rowan, and Nowak, David. "Quantifying the Role of Urban Forest in Removing Atmospheric Carbon." *Journal of Arboriculture*. 17.10 (1991). Print.
- ²² U.S. Environmental Protection Agency. "Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2006." U.S. Environmental Protection Agency. 2006. Web. 10 Dec 2009.
<<http://www.epa.gov/osw/nonhaz/municipal/msw99.htm>>
- ²³ U.S. Environmental Protection Agency. "A Decade of Children's Environmental Health Research: Highlights from EPA's Science to Achieve Results Program." Washington, DC: Office of Research and Development (8101R), 2007. Print.
- ²⁴ Nowak, D.J., Crane, D.E. and Stevens, J.C. "Air Pollution removal by urban trees and shrubs in the United States." *Urban Forestry & Urban Greening* 4 (2006): 115-123. Print.
- ²⁵ Fuller, R. A., K. N. Irvine, P. Devine-Wright, P. H. Warren, and K. J. Gaston. "Psychological benefits of greenspace increase with biodiversity." *Biology Letters* 3.4 (2007): 390-94. Print.
- ²⁶ Maryland Department of Natural Resources Forest Service "The Benefits of Urban Trees Urban and Community Forestry: Improving our Quality of Life." Maryland Department of Natural Resources Forest Service. *The Greenway*. 28 Sept. 2009. Print.
- ²⁷ Ellis, C.D., et al. "Retail land use, neighborhood satisfaction and the urban forest: an investigation into the moderating and mediating effects of trees and shrubs." *Landscape and Urban Planning* 74 (2006): 70-78. Print.
- ²⁸ Benedict, M.A. and McMahon, E.T. "Green infrastructure: smart conservation for the 21st century." *Renewable Resources Journal* 20.3 (2002):12-17. Print.
- ²⁹ Susquahanna Greenway Partnership. "Greenway: What is a greenway?" Web. 10 Dec 2009.
<<http://www.seda-cog.org/greenway/cwp/view.asp?A=3&Q=414242>>
- ³⁰ Gill, S.E., Handley, J.F, Ennos, A.R., and S. Pauleit. "Adapting Cities for Climate Change: The Role of Green Infrastructure." *Built Environment* 33.1 (2007)115-133. Print.
- ³¹ Hamilton, Katherine, Chokkalingam, Unna, and Bendana, Maria. "State of the Forest Carbon Markets 2009, Taking Root and Branching Out." Ecosystem Marketplace. 2010. Print.
- ³² Hamilton, Katherine, Chokkalingam, Unna, and Bendana, Maria. "State of the Forest Carbon Markets 2009, Taking Root and Branching Out." Ecosystem Marketplace. 2010. Print.
-

-
- ³³ Hamilton, Katherine, Chokkalingam, Unna, and Bendana, Maria. "State of the Forest Carbon Markets 2009, Taking Root and Branching Out." Ecosystem Marketplace. 2010. Print.
- ³⁴ McHale, M.R., PcPherson, E.G., Burke, I.C. "The potential of urban tree plantings to be cost-effective credit markets." *Urban Forestry & Urban Greening* 6(2007) 49-60. Print.
- ³⁵ McHale, M.R., PcPherson, E.G., Burke, I.C. "The potential of urban tree plantings to be cost-effective credit markets." *Urban Forestry & Urban Greening* 6(2007) 49-60. Print.
- ³⁶ Michigan Department of Natural Resources. "Carbon Sequestration." Michigan Department of Natural Resources. Web. 10 Jan 2010. <http://www.michigan.gov/documents/dnr/CarbonSequestrationInMi_275110_7.pdf>
- ³⁷ American Forests. "Urban Ecosystems Analysis SE Michigan and City of Detroit, Calculating the Value of Nature." 2006. Print.
- ³⁸ Nowak, David, J. and Greenfield, Eric J. "Urban and community forests of the North Central East region: Illinois, Indiana, Michigan, Ohio, Wisconsin." U.S. Department of Agriculture Forest Service. 2010. Web. March 15, 2010. <<http://nrs.fs.fed.us/pubs/34693>>
- ³⁹ Nowak, David, J. and Greenfield, Eric J. "Urban and community forests of the North Central East region: Illinois, Indiana, Michigan, Ohio, Wisconsin." U.S. Department of Agriculture Forest Service. 2010. Web. March 15, 2010. <<http://nrs.fs.fed.us/pubs/34693>>. Print.
- ⁴⁰ Nowak, David, J. and Greenfield, Eric J. "Urban and community forests of the North Central East region: Illinois, Indiana, Michigan, Ohio, Wisconsin." U.S. Department of Agriculture Forest Service. 2010. Web. March 15, 2010. <<http://nrs.fs.fed.us/pubs/34693>>. Print.
- ⁴¹ American Forests. "Urban Ecosystems Analysis SE Michigan and City of Detroit, Calculating the Value of Nature." 2006. Print.
- ⁴² American Forests. "Urban Ecosystems Analysis SE Michigan and City of Detroit, Calculating the Value of Nature." 2006. Print.
- ⁴³ American Forests. "Urban Ecosystems Analysis SE Michigan and City of Detroit, Calculating the Value of Nature." 2006. Print.
- ⁴⁴ American Forests. "Urban Ecosystems Analysis SE Michigan and City of Detroit, Calculating the Value of Nature." 2006. Print.
- ⁴⁵ Trees in the lower eastside, Detroit, MI. Personal photograph by author Elizabeth Durfee. 2009.
- ⁴⁶ American Forests. "Urban Ecosystems Analysis SE Michigan and City of Detroit, Calculating the Value of Nature." 2006. Print.
- ⁴⁷ The Greening of Detroit. Web. 9 Nov 2009. <<http://www.greeningofdetroit.com/index.php>>
- ⁴⁸ Michigan State University Department of Horticulture. Green Roof Research Program. Web. 2 Oct 2009 <<http://www.hrt.msu.edu/greenroof/#What%20is%20a%20green%20roof>>
- ⁴⁹ Clark, C., P. Adrianes, and B. Talbot. "Green Roof Valuation: A Probabilistic Economic Analysis of Environmental Benefits." *Environment, Science, and Technology* 42 (2008): 2155-2161. Print.
- ⁵⁰ Kibert, Charles J. *Sustainable Construction Green Building Design and Delivery*. New York: Wiley, 2007. Print.
- ⁵¹ Getter, K.L. et al. "Carbon Sequestration Potential of Extensive Green Roofs." *Environmental Science and Technology*. 43 (2009): 7564-7570. Print.
- ⁵² Getter, K.L. et al. "Carbon Sequestration Potential of Extensive Green Roofs." *Environmental Science and Technology*. 43 (2009): 7564-7570. Print.
- ⁵³ Greenroofs.com. "The greenroof projects database: Detroit Performing Arts High School." Web. 15 Nov 2009. <<http://www.greenroofs.com/projects/pview.php?id=321>>.
- ⁵⁴ The Detroit People Mover. "Joe Louis Arena Station Gets Green Roof." 2008. Web. 15 Nov 2009. <<http://www.thepeoplemover.com/Joe-Louis-Arena-Station-Gets---Green---Roof.id.1325.htm>>.
- ⁵⁵ Green Roof at the River Rouge Plant, Dearborn, MI. Digital image. *Greenroofs.com*. Web. 12 Mar. 2009. <http://www.greenroofs.com/projects/ford_mi/ford_mi01.jpg>
- ⁵⁶ "Greening Rooftops for Sustainable Communities." *Green Roofs for Healthy Cities*. Web. 10 Feb. 2010. <<http://www.greenroofs.org/boston/index.php?page=awards>>
- ⁵⁷ Getter, K.L. et al. "Carbon Sequestration Potential of Extensive Green Roofs." *Environmental Science and Technology*. 43 (2009): 7564-7570. Print.
- ⁵⁸ Getter, K.L. et al. "Carbon Sequestration Potential of Extensive Green Roofs." *Environmental Science and Technology*. 43 (2009): 7564-7570. Print.
- ⁵⁹ Kloss, C. "Managing Wet Weather with Green Infrastructure Municipal Handbook; Rainwater Harvesting Policies." Low Impact Development Center. EPA-833-F-08-010. 2008. Print.
-

Sources

- ⁶⁰ MI Department of Environmental Quality. "Combined Sewer Overflow (CSO), Sanitary Sewer Overflow (SSO) and Retention Treatment Basic (RTB) Discharge 2008 Annual Report." MI Department of Environmental Quality. Web. 10 Jan 2010. <http://www.michigan.gov/documents/deq/deq-wb-csossoreport08_299566_7.pdf>
- ⁶¹ MI Department of Environmental Quality. "Combined Sewer Overflow (CSO), Sanitary Sewer Overflow (SSO) and Retention Treatment Basic (RTB) Discharge 2008 Annual Report." MI Department of Environmental Quality. Web. 10 Jan 2010. <http://www.michigan.gov/documents/deq/deq-wb-csossoreport08_299566_7.pdf>
- ⁶² National Research Council of the National Academies. *Urban Stormwater Management in the United States*. The National Academies Press. Washington, DC: 2008. Print.
- ⁶³ U.S. Environmental Protection Agency. "Polluted Runoff (Nonpoint Source Pollution)." U.S. Environmental Protection Agency. Web. 12 March 2010. <<http://www.epa.gov/nps/whatis.html>>
- ⁶⁴ U.S. Environmental Protection Agency. "Reducing Stormwater Costs through Low Impact Development Strategies and Practices." EPA 841-F-07-006. 2007. Web. 10 Sept 2009. <<http://www.epa.gov/owow/nps/lid/costs07/>>
- ⁶⁵ Minnesota Pollution Control Agency. "Protecting Water Quality in Urban Areas; Best Management Practices for Dealing with Stormwater Runoff from Urban, Suburban and Developing Areas of Minnesota." 2000. Print.
- ⁶⁶ "Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices." Environmental Protection Agency, 2007. Print.
- ⁶⁷ Walsh C.J. et al. "The urban stream syndrome: Current knowledge and the search for a cure." *J. N. Benthological Society*. North American Benthological Society. 24.3 (2005):706–723. Print.
- ⁶⁸ National Research Council of the National Academies. *Urban Stormwater Management in the United States*. The National Academies Press. Washington, DC: 2008. Print.
- ⁶⁹ Natural Resources Defense Council. "Stormwater Series: Community Responses to Stormwater Runoff." May 1999. Web. 10 Sept 2010. <<http://www.nrdc.org/water/pollution/storm/stoinx.asp>>
- ⁷⁰ U.S. Environmental Protection Agency "Redevelopment." National Pollutant Discharge Elimination System. Web. 13 Nov 2009. <http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=127&minmeasure=5>.
- ⁷¹ Stormwater Authority. "Stormwater Detention." Stormwater Authority.org. Web. 24 March 2010. <http://www.stormwaterauthority.org/stormwater_detention/detention_retention.aspx>.
- ⁷² Stormwater Authority. "Stormwater Detention." Stormwater Authority.org. Web. 24 March 2010. <http://www.stormwaterauthority.org/stormwater_detention/detention_retention.aspx>.
- ⁷³ U.S. Environmental Protection Agency. "Stormwater Technology Fact Sheet." September 1999. EPA 832-F-99-048. Web. 24 March 2010. <<http://www.epa.gov/owm/mtb/wetdtnpn.pdf>>
- ⁷⁴ U.S. Environmental Protection Agency. "Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices." Environmental Protection Agency. 2007. Web. 10 Sept 2010. <<http://www.epa.gov/owow/nps/lid/costs07/documents/reducingstormwatercosts.pdf>>
- ⁷⁵ Hager, Mary Catherine. "Low-Impact Development, Lot Level Approaches to stormwater management are gaining ground." *The Journal for Surface Water Quality*. 2003. Web. 10 Sept 2009. <<http://transportation.ky.gov/ms4/MCM1/documents/LID%20Article.pdf>>.
- ⁷⁶ U.S. Environmental Protection Agency. "Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices." Environmental Protection Agency. 2007. Web. 10 Sept 2010. <<http://www.epa.gov/owow/nps/lid/costs07/documents/reducingstormwatercosts.pdf>>
- ⁷⁷ Michigan Department of Transportation. "Rain Gardens." Web. 10 Dec 2010. <http://www.michigan.gov/images/stormwatermgt/mich_ave_3_247387_7.jpg>
- ⁷⁸ Low Impact Development Center "Rain Garden Design Templates." 2007. Web. 13 Nov 2009. <http://www.lowimpactdevelopment.org/raingarden_design/whatisaraingarden.htm>
- ⁷⁹ The Groundwater Foundation. "Raingardens 101." The Groundwater Foundation. 2010. Web. 10 Jan 2010. <<http://www.groundwater.org/ta/raingardens.html>>
- ⁸⁰ Dods, David and Rusty Schmidt. "Rain Gardens: Integrating Stormwater Management into Attractive Landscaping." *World Environmental and Water Resources Congress 2007: Restoring our Natural Habitat*. ASCE Conf. Proc. 243(43). 2007. Print.
- ⁸¹ Low Impact Development Center "Rain Garden Design Templates." 2007. Web. 13 Nov 2009. <http://www.lowimpactdevelopment.org/raingarden_design/whatisaraingarden.htm>
- ⁸² Woodward, Mitch, Hunt, William, and Hartup, Wendi. "Lessons Learned: The North Carolina Backyard Rain Garden Program." 2008 CSREES National Water Conference. 2008. Print.
-

-
- ⁸³ Low Impact Development Center "Rain Garden Design Templates." 2007. Web. 13 Nov 2009. <http://www.lowimpactdevelopment.org/raingarden_design/whatisaraingarden.htm>
- ⁸⁴ Low Impact Development Center "Rain Garden Design Templates." 2007. Web. 13 Nov 2009. <http://www.lowimpactdevelopment.org/raingarden_design/whatisaraingarden.htm>
- ⁸⁵ Low Impact Development Center "Rain Garden Design Templates." 2007. Web. 13 Nov 2009. <http://www.lowimpactdevelopment.org/raingarden_design/whatisaraingarden.htm>
- ⁸⁶ U.S. Environmental Protection Agency. "Green Landscaping: Greenacres, Landscaping with Native Plants." Web. 10 Jan 2010. <<http://www.epa.gov/greenacres/index.html#Benefits>>
- ⁸⁷ U.S. Environmental Protection Agency. "Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices." December 2007. Web. 20 Dec 2010. <<http://www.epa.gov/owow/nps/lid/costs07/documents/reducingstormwatercosts.pdf>>
- ⁸⁸ Metropolitan Area Planning Council. "Fact Sheet: Infiltration Trenches and Dry Wells." Web. 25 March 2010. <<http://www.mapc.org/resources/low-impact-dev-toolkit/trenches-drywells>>
- ⁸⁹ The Stormwater Manager's Resource Center. "Design of Infiltration Practices." 2007. Web. 25 March 2010. <<http://www.stormwatercenter.net/Slideshows/infiltration-rac/sld001.htm>>
- ⁹⁰ The Stormwater Manager's Resource Center. "Design of Infiltration Practices." 2007. Web. 25 March 2010. <<http://www.stormwatercenter.net/Slideshows/infiltration-rac/sld001.htm>>
- ⁹¹ Hillsdale County Community Center. "Impervious Surfaces." Web. 13 Nov 2009. <<http://www.hillsdalecounty.info/planningeduc0004.asp>>
- ⁹² U.S. Environmental Protection Agency. "Low Impact Development (LID), A Literative Review." Low Impact Development Center. 2000. Web. 10 Jan 2010. <<http://www.epa.gov/owow/nps/lid/lid.pdf>>
- ⁹³ "Runoff Volume Minimization; Pervious Pavement." 2005 Minnesota Stormwater Manual, Version 1.0 Volume 2. Web. 13 Nov 2009. <<http://lakesuperiorstreams.org/stormwater/media/PervPavementMPCAManualFactSheet2005.pdf>>
- ⁹⁴ U.S. Environmental Protection Agency. "Low Impact Development (LID), A Literative Review." Low Impact Development Center. 2000. Web. 10 Jan 2010. <<http://www.epa.gov/owow/nps/lid/lid.pdf>>
- ⁹⁵ U.S. Environmental Protection Agency. "Low Impact Development (LID), A Literative Review." Low Impact Development Center. 2000. Web. 10 Jan 2010. <<http://www.epa.gov/owow/nps/lid/lid.pdf>>
- ⁹⁶ Scholz, M., and P. Grabowiecki. "Review of permeable pavement systems." *Building and Environment*. 42 9 (2007): 3830-3836. Print.
- ⁹⁷ U.S. Environmental Protection Agency. "Low Impact Development (LID), A Literative Review." Low Impact Development Center. 2000. Web. 10 Jan 2010. <<http://www.epa.gov/owow/nps/lid/lid.pdf>>
- ⁹⁸ Scholz, M., and Grabowiecki, P. "Review of permeable pavement systems." *Building and Environment*. 42 9 (2007): 3830-3836. Print.
- ⁹⁹ Hopper, L. J. *Landscape Architectural Graphic Standards*. Hoboken, NJ: John Wiley & Sons. 2007. Print.
- ¹⁰⁰ Gibbons, J. *Pavements and Surface Materials*. Haddam, CT: University of Connecticut. 1999. Print.
- ¹⁰¹ University of Cambridge. (2002, 2 25). *Brick*. Retrieved 11 26, 2009, from Materials Information: http://www-materials.eng.cam.ac.uk/mpsite/materialsdb/IE_main.html
- ¹⁰² Kirby, R. "Potential Energy Savings From The Use Of Recycled Glass In Brick Manufacturing." Arcata, CA: Center for Environmental Economic Development. 2006. Print.
- ¹⁰³ U.S. Environmental Protection Agency. "Stormwater Management Techniques." Greening EPA. Web. 13 Nov 2009. <http://www.epa.gov/oaintrnt/stormwater/stormwater_techniques.htm>
- ¹⁰⁴ U.S. Environmental Protection Agency. "Stormwater Technology Fact Sheet Porous Pavement." EPA 832-F-99-023. 1999. <<http://www.epa.gov/npdes/pubs/porouspa.pdf>>
- ¹⁰⁵ U.S. Environmental Protection Agency. "Stormwater Management Techniques." Greening EPA. Web. 13 Nov 2009. <http://www.epa.gov/oaintrnt/stormwater/stormwater_techniques.htm>
- ¹⁰⁶ U.S. Environmental Protection Agency. "Stormwater Technology Fact Sheet Porous Pavement." EPA 832-F-99-023. 1999. <<http://www.epa.gov/npdes/pubs/porouspa.pdf>>
- ¹⁰⁷ U.S. Environmental Protection Agency. "Stormwater Technology Fact Sheet Porous Pavement." EPA 832-F-99-023. 1999. <<http://www.epa.gov/npdes/pubs/porouspa.pdf>>
- ¹⁰⁸ Portland Bureau of Environmental Services. "Portland Green Streets Program." Web. 29 Dec 2009. <<http://www.portlandonline.com/BES/index.cfm?c=44407>>
- ¹⁰⁹ Metro. "Green Streets: Innovative Solutions for Stormwater and Stream Crossings." Metro. 2002. Print.
- ¹¹⁰ Metro. "Green Streets: Innovative Solutions for Stormwater and Stream Crossings." Metro. 2002. Print.
- ¹¹¹ Esman, Laura A. "The Michigan Department of Environmental Quality Biennial Remedial Action Plan Update for the Detroit River Area of Concern." MI Department of Environmental Quality Water Bureau. January 2, 2008. Print.
-

Sources

- ¹¹² Detroit Water and Sewage Department. "Stormwater management Plan." City of Detroit. April, 2007. Web. 12 March 2010. <http://www.dwsd.org/about/storm_water_plan.pdf>
- ¹¹³ Detroit Water and Sewage Department. "Stormwater management Plan." City of Detroit. April, 2007. Web. 12 March 2010. <http://www.dwsd.org/about/storm_water_plan.pdf>
- ¹¹⁴ Detroit Water and Sewage Department. "Stormwater management Plan." City of Detroit. April, 2007. Web. 12 March 2010. <http://www.dwsd.org/about/storm_water_plan.pdf>
- ¹¹⁵ Detroit Water and Sewage Department. "Stormwater management Plan." City of Detroit. April, 2007. Web. 12 March 2010. <http://www.dwsd.org/about/storm_water_plan.pdf>
- ¹¹⁶ Detroit Water and Sewage Department. "Stormwater management Plan." City of Detroit. April, 2007. Web. 12 March 2010. <http://www.dwsd.org/about/storm_water_plan.pdf>
- ¹¹⁷ American Forests. "Urban Ecosystem Analysis SE Michigan and City of Detroit." *American Forests*. 2006. Web. 10 Jan 2010. <http://www.americanforests.org/downloads/rea/AF_Detroit.pdf>
- ¹¹⁸ U.S. Environmental Protection Agency. "Wetlands Research." Ecosystem Services Research Program. Web. 12 March 2010. <<http://www.epa.gov/ecology/quick-finder/wetlands-research.htm>>
- ¹¹⁹ Russ, Thomas. H. *Site Planning and Design Handbook*. Second Edition. McGraw Hill. New York: 2009. Print.
- ¹²⁰ Russ, Thomas. H. *Site Planning and Design Handbook*. Second Edition. McGraw Hill. New York: 2009. Print.
- ¹²¹ Millennium Ecosystem Assessment. "Ecosystems and Human Well-Being: Wetlands and Water." World Resources Institute. Washington, DC. 2005. Web. 12 March 2010. <<http://www.millenniumassessment.org/documents/document.358.aspx.pdf>>
- ¹²² Millennium Ecosystem Assessment. "Ecosystems and Human Well-Being: Wetlands and Water." World Resources Institute. Washington, DC. 2005. Web. 12 March 2010. <<http://www.millenniumassessment.org/documents/document.358.aspx.pdf>>
- ¹²³ Millennium Ecosystem Assessment. "Ecosystems and Human Well-Being: Wetlands and Water." World Resources Institute. Washington, DC. 2005. Web. 12 March 2010. <<http://www.millenniumassessment.org/documents/document.358.aspx.pdf>>
- ¹²⁴ U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. "Wetlands Compensatory Mitigation Rule." Web. 13 March 2010. <<http://www.epa.gov/owow/wetlands/pdf/MitigationRule.pdf>>
- ¹²⁵ BenDor, Todd, K. and Doyle, Martin W. "Planning for Ecosystem Service Markets." *Journal of the American Planning Association*. 76,1 (2010). Print.
- ¹²⁶ BenDor, Todd, K. and Doyle, Martin W. "Planning for Ecosystem Service Markets." *Journal of the American Planning Association*. 76,1. (2010). Print.
- ¹²⁷ Bralich, John. "Developing Methods to Establish An Urban Wetland Mitigation Bank On Youngstown's East Side." Youngstown State University Center for Urban and Regional Studies. Web. 12 March 2010. <<http://cfweb.cc.yzu.edu/psi/pdf%20files/publications/curs.uep.r.332.jb.12.09.pdf>>
- ¹²⁸ Bralich, John. "Developing Methods to Establish An Urban Wetland Mitigation Bank On Youngstown's East Side." Youngstown State University Center for Urban and Regional Studies. Web. 12 March 2010. <<http://cfweb.cc.yzu.edu/psi/pdf%20files/publications/curs.uep.r.332.jb.12.09.pdf>>
- ¹²⁹ Bralich, John. "Developing Methods to Establish An Urban Wetland Mitigation Bank On Youngstown's East Side." Youngstown State University Center for Urban and Regional Studies. Web. 12 March 2010. <<http://cfweb.cc.yzu.edu/psi/pdf%20files/publications/curs.uep.r.332.jb.12.09.pdf>>
- ¹³⁰ BenDor, Todd, K. and Doyle, Martin W. "Planning for Ecosystem Service Markets." *Journal of the American Planning Association*. 76(1), (2010). Print.

Chapter 3: Laying the Foundation for Sustainable Development

- ¹ United Nations Department of Economic and Social Affairs/Population Division 1 "World Urbanization Prospects: The 2007 Revision." United Nations. Web. 12 Dec 2009. <<http://www.un.org/esa/population/publications/wup2007/2007wup.htm>>
- ² U.S. Census Bureau. "U.S. Population Projections, 2009." Web. 12 Dec 2009. <<http://www.census.gov/population/www/projections/2009projections.html>>
- ³ Williams, D.E. *Sustainable Design; Ecology, Architecture, and Planning*. New Jersey: John Wiley & Sons, 2007. Print.
- ⁴ Jabareen, Yosef Rafeq. "Sustainable Urban Forms: Their Typologies, Models, and Concepts." *Journal of Planning Education and Research*. 26 (2006): 38-52. Print.

Chapter 3.1: Regional Planning

- ¹ Williams, D.E. *Sustainable Design; Ecology, Architecture, and Planning*. New Jersey: John Wiley & Sons, 2007.
-

-
- ² Agenda 360. "Agenda 360 A Regional Action Plan." Feb. 2009. Web. 3 March 2010. <<http://cincinnati360.com/report/default.asp>>
- ³ Agenda 360. "Agenda 360 A Regional Action Plan." Feb. 2009. Web. 3 March 2010. <<http://cincinnati360.com/report/default.asp>>
- ⁴ Agenda 360. "Agenda 360 A Regional Action Plan." Feb. 2009. Web. 3 March 2010. <<http://cincinnati360.com/report/default.asp>>
- ⁵ Agenda 360. "Agenda 360 A Regional Action Plan." Feb. 2009. Web. 3 March 2010. <<http://cincinnati360.com/report/default.asp>>
- ⁶ Agenda 360. "Agenda 360 A Regional Action Plan." Feb. 2009. Web. 3 March 2010. <<http://cincinnati360.com/report/default.asp>>
- ⁷ Southeast Michigan Council of Governments. "About." SEMCOG. Web. 4 March 2010. <<http://www.semco.org/>>
- ⁸ Southeast Michigan Council of Governments. "About." SEMCOG. Web. 4 March 2010. <<http://www.semco.org/>>
- ⁹ "Welcome to Metro." *Metro: People Places. Open Spaces*. Metro Regional Government. Web. 15 Apr. 2010. <<http://www.metro-region.org/>>
- ¹⁰ Juergensmeyer, J.C. and Roberts. *Land Use Planning and Development Regulation Law (2nd Ed.)*. St. Paul, MN: Thompson West, 2007. Print.
- ¹¹ Environmental Working Group National Tap Water Quality Database. "Pollution Summary." Web. 1 Sept 2009. <<http://www.ewg.org/tap-water/home>>
- ¹² Environmental Working Group National Tap Water Quality Database. "Pollution Summary." Web. 1 Sept 2009. <<http://www.ewg.org/tap-water/home>>
- ¹³ Norman J., et al. "Comparing High and Low Residential Density: Life-Cycle Analysis of Energy Use and Greenhouse Gas Emissions." *Journal of Urban Planning and Development*. 132,1 (2006): 10-21. Print.
- ¹⁴ Scott, Todd. Detroit Greenways Coordinator and Web Developer, Personal interview. 2 Oct 2009.
- ¹⁵ Pope, Carl. "Urban Sprawl Is Not Beneficial." *Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, (2008): 104-110. Print.
- ¹⁶ City of Ann Arbor "Greenbelt Application." Web. 14 Feb 2010. <<http://www.a2gov.org/greenbelt/Pages/greenbelthome.aspx>>
- ¹⁷ City of Ann Arbor. "City of Ann Arbor Added 709 Acres to Greenbelt in 2009." Press Release. 2010. <<http://www.a2gov.org/greenbelt/Pages/greenbelthome.aspx>>
- ¹⁸ City of Ann Arbor "Greenbelt Application." Web. 14 Feb 2010. <<http://www.a2gov.org/greenbelt/Pages/greenbelthome.aspx>>
- ¹⁹ City of Ann Arbor "Greenbelt Application." Web. 14 Feb 2010. <<http://www.a2gov.org/greenbelt/Pages/greenbelthome.aspx>>
- ²⁰ Jabareen, Yosef Rafeq. "Sustainable Urban Forms: Their Typologies, Models, and Concepts." *Journal of Planning Education and Research*. 26 (2006): 38-52. Print.
- ²¹ Jabareen, Yosef Rafeq. "Sustainable Urban Forms: Their Typologies, Models, and Concepts." *Journal of Planning Education and Research*. 26 (2006): 38-52. Print.
- ²² Norman J., et al. "Comparing High and Low Residential Density: Life-Cycle Analysis of Energy Use and Greenhouse Gas Emissions." *Journal of Urban Planning and Development*. 132,1 (2006): 10-21. Print.
- ²³ Juergensmeyer, J.C. and Roberts. *Land Use Planning and Development Regulation Law (2nd Ed.)*. St. Paul, MN: Thompson West, 2007. Print.
- ²⁴ Georgia Quality Growth Partnership. "Toolkit of Best Practices." Web. 6 Jan 2010. <<http://www.dca.state.ga.us/toolkit/ToolDetail.asp?GetTool=40>>
- ²⁵ Juergensmeyer, J.C. and Roberts. *Land Use Planning and Development Regulation Law (2nd Ed.)*. St. Paul, MN: Thompson West, 2007. Print.
- ²⁶ City of Detroit. "Planning Commission Zoning and Land Use." Web. 20 March 2010. <<http://www.detroitmi.gov/legislative/BoardsCommissions/CityPlanningCommission/docs%20for%20posting/zoning%20maps/ZoningMapIndex.htm>>
- ²⁷ Lusher, Lindsey, Seaman, Mark, Tsay, Shin-pei. "Streets to Live By: How livable street design can bring economic, health and quality-of-life benefits to New York City." New York: Transportation Alternatives, 2008. Web. 10 Jan 2010. <http://www.transalt.org/files/newsroom/reports/streets_to_live_by.pdf>
- ²⁸ Form-Based Codes Institute. Web. 9 Jan 2010. <<http://www.formbasedcodes.org/index.html>>
- ²⁹ Form-Based Codes Institute. Web. 9 Jan 2010. <<http://www.formbasedcodes.org/index.html>>
- ³⁰ Walters, David. *Designing Community: Charrettes, Master Plans And Form-based Codes*. Amsterdam: Architectural Press, 2007. Print.
- ³¹ Gehl, Jan. "Life Between Buildings" from *Life Between Buildings; Using Public Space*. 1987. In Larice, Michael, and Macdonald, Elizabeth (editors). *The Urban Design Reader*. London and New York: Routledge, 2007. Print.
-

Sources

³² Walters, David. *Designing Community: Charrettes, Master Plans And Form-based Codes*. Amsterdam: Architectural Press, 2007. Print.

³³ Walters, David. *Designing Community: Charrettes, Master Plans And Form-based Codes*. Amsterdam: Architectural Press, 2007. Print.

³⁴ Smart Growth America. Home page. Web. 9 Jan, 2010. <<http://www.smartgrowth.org/about/default.asp>>

³⁵ American Planning Association. "Smart Growth Codes." Web. Jan. 9, 2010.

<<http://www.planning.org/research/smartgrowth/>>

³⁶ Juergensmeyer, J.C. and Roberts. *Land Use Planning and Development Regulation Law (2nd Ed.)*. St. Paul, MN: Thompson West, 2007. Print.

³⁷ Maryland Department of Natural Resources. "Maryland Smart Codes." Web. 10 Jan 2010.

<<http://www.dnr.state.md.us/education/growfromhere/lesson15/MDP/SMARTCODE/SMARTCODE00.htm>>

³⁸ Maryland Department of Natural Resources. "Maryland Smart Codes." Web. 10 Jan 2010.

<<http://www.dnr.state.md.us/education/growfromhere/lesson15/MDP/SMARTCODE/SMARTCODE00.htm>>

³⁹ Kentlands. "History." Web. 10 Jan 2010.

<http://www.kentlandsusa.com/sub_category_list.asp?category=19&title=History>

⁴⁰ Deitrick, Sabina, and Ellis, Cliff. "New Urbanism in the Inner City: A Case Study of Pittsburgh." *Journal of the American Planning Association*. Chicago. 70,4 (2004): 426-442. Print.

⁴¹ Deitrick, Sabina, and Ellis, Cliff. "New Urbanism in the Inner City: A Case Study of Pittsburgh." *Journal of the American Planning Association*. Chicago. 70,4 (2004): 426-442. Print.

⁴² Deitrick, Sabina, and Ellis, Cliff. "New Urbanism in the Inner City: A Case Study of Pittsburgh." *Journal of the American Planning Association*. Chicago. 70,4 (2004): 426-442. Print.

⁴³ Deitrick, Sabina, and Ellis, Cliff. "New Urbanism in the Inner City: A Case Study of Pittsburgh." *Journal of the American Planning Association*. Chicago. 70,4 (2004): 426-442. Print.

⁴⁴ Deitrick, Sabina, and Ellis, Cliff. "New Urbanism in the Inner City: A Case Study of Pittsburgh." *Journal of the American Planning Association*. Chicago. 70,4 (2004): 426-442. Print.

⁴⁵ Deitrick, Sabina, and Ellis, Cliff. "New Urbanism in the Inner City: A Case Study of Pittsburgh." *Journal of the American Planning Association*. Chicago. 70,4 (2004): 426-442. Print.

⁴⁶ Deitrick, Sabina, and Ellis, Cliff. "New Urbanism in the Inner City: A Case Study of Pittsburgh." *Journal of the American Planning Association*. Chicago. 70,4 (2004): 426-442. Print.

Chapter 3.2: Vacant Land and Brownfields

¹ Mallach, A. *Bringing Building Back, From Abandoned Properties to Community Assets*. Montclair, NJ: National Housing Institute, 2006. Print.

² U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. *Ecological Revitalization: Turning Contaminated Properties into Community Assets*. Publication No. EPA 542-R-08-003. 2009. Print.

³ Rasher, Bruce. "Real Estate Finance for Brownfield Redevelopment." Guest Lecture for NRE 576: Ecological Approaches to Brownfield Redevelopment. Samuel T. Dana Building, Ann Arbor, MI. 15 Oct. 2009. Lecture.

⁴ Rasher, Bruce. "Real Estate Finance for Brownfield Redevelopment." Guest Lecture for NRE 576: Ecological Approaches to Brownfield Redevelopment. Samuel T. Dana Building, Ann Arbor, MI. 15 Oct. 2009. Lecture.

⁵ Bauer and Probst. "Long-Term Stewardship of Contaminated Sites; Trust Funds as Mechanisms for Financing and Oversight." Paper 00-54. Washington, DC: 2000. Web. 10 Jan 2010. <<http://www.rff.org/RFF/Documents/RFF-DP-00-54.pdf>>

⁶ Rasher, B. "Real Estate Finance for Brownfield Redevelopment." Manager, Asset Repositioning. CB Richard Ellis. *Ecological Approaches to Brownfield Redevelopment*. Course Lecture, Slide 13. 15 Oct 2009.

⁷ Nassauer, J. Lecture for NRE 576: Ecological Approaches to Brownfield Redevelopment. Samuel T. Dana Building, Ann Arbor, MI. Sept 2009. Lecture.

⁸ U.S. Environmental Protection Agency. *State Brownfields and Voluntary response Program: An Update from the States*. Publication No. EPA-560-R-08-004. 2008. Print.

⁹ Alexander, Frank S. *Land Banking as Metropolitan Policy*. Washington, DC: Metropolitan Policy Program, Brookings Institution, 2008. Print.

¹⁰ Rasher, Bruce. "Real Estate Finance for Brownfield Redevelopment." Guest Lecture for NRE 576: Ecological Approaches to Brownfield Redevelopment. Samuel T. Dana Building, Ann Arbor, MI. 15 Oct. 2009. Lecture.

¹¹ Rasher, Bruce. "Real Estate Finance for Brownfield Redevelopment." Guest Lecture for NRE 576: Ecological Approaches to Brownfield Redevelopment. Samuel T. Dana Building, Ann Arbor, MI. 15 Oct. 2009. Lecture.

¹² Bauer and Probst. "Long-Term Stewardship of Contaminated Sites; Trust Funds as Mechanisms for Financing and Oversight." Paper 00-54. Washington, DC: 2000. Web. 10 Jan 2010. <<http://www.rff.org/RFF/Documents/RFF-DP-00-54.pdf>>

-
- ¹³ MI Department of Environmental Quality. "Summary of the Brownfield Redevelopment Financing Act (Act 381)." MI Department of Environmental Quality. Web. 31 Oct. 2009. <http://www.michigan.gov/deq/0,1607,7-135-3311_4110_23246-63519--,00.html>
- ¹⁴ Alexander, Frank S. *Land Banking as Metropolitan Policy*. Washington, DC: Metropolitan Policy Program, Brookings Institution, 2008. Print.
- ¹⁵ Nassauer, J. Lecture for NRE 576: Ecological Approaches to Brownfield Redevelopment. Samuel T. Dana Building, Ann Arbor, MI. Sept 2009. Lecture.
- ¹⁶ U.S. Environmental Protection Agency. *Ecological Revitalization: Turning Contaminated Properties into Community Assets*. Office of Solid Waste and Emergency Response. Publication No. EPA 542-R-08-003. 2009. Print.
- ¹⁷ Mallach, A. *Bringing Building Back, From Abandoned Properties to Community Assets*. Montclair, NJ: National Housing Institute, 2006. Print.
- ¹⁸ Nassauer, J. Lecture for NRE 576: Ecological Approaches to Brownfield Redevelopment. Samuel T. Dana Building, Ann Arbor, MI. Sept 2009. Lecture.
- ¹⁹ Alexander, Frank S. *Land Banking as Metropolitan Policy*. Washington, DC: Metropolitan Policy Program, Brookings Institution, 2008. Print.
- ²⁰ Alexander, Frank S. *Land Banking as Metropolitan Policy*. Washington, DC: Metropolitan Policy Program, Brookings Institution, 2008. Print.
- ²¹ Genesee County Land Bank. "About Us." Web. 17 Jan 2010. 2004. <<http://www.thelandbank.org/aboutus.asp>>
- ²² Genesee County Land Bank. "About Us." Web. 17 Jan 2010. 2004. <<http://www.thelandbank.org/aboutus.asp>>
- ²³ Griswold, N.G., and Norris, P.E. "Economic Impacts of Residential Property Abandonment and the Genesee County Land Bank In Flint, MI." Land Policy Institute. 2007. Web. 4 March, 2010. <http://www.vacantproperties.org/resources/LPI_Genesee.pdf>
- ²⁴ Dewar, Margaret. "Selling Tax Reverted Properties Lessons from Cleveland and Detroit." *Journal of the American Planning Association*. 72, 2(2006): 167-180.
- ²⁵ Dewar, Margaret. "Selling Tax Reverted Properties Lessons from Cleveland and Detroit." *Journal of the American Planning Association*. 72, 2(2006): 167-180.
- ²⁶ Dewar, Margaret. "Selling Tax Reverted Properties Lessons from Cleveland and Detroit." *Journal of the American Planning Association*. 72, 2(2006): 167-180. Print.
- ²⁷ Dewar, Margaret. "Selling Tax Reverted Properties Lessons from Cleveland and Detroit." *Journal of the American Planning Association*. 72, 2(2006): 167-180. Print.
- ²⁸ Detroit Vacant Property Campaign. Web. 20 March 2010. <<http://officemanager.law.officelive.com/default.htm>>
- ²⁹ Schilling, Joseph, and Logan, Jonathan. "Greening the Rust Belt." *Journal of the American Planning Association*. 74,4 (2008): 451-457. Print.
- ³⁰ Schilling, Joseph, and Logan, Jonathan. "Greening the Rust Belt." *Journal of the American Planning Association*. 74,4 (2008): 451-457. Print.
- ³¹ Rethink Detroit. "How Kresge plans to reconfigure Detroit." 30 Jan. 2010. Web. 5 March 2010. <<http://www.rethinkdetroit.org/2010/01/30/how-kresge-plans-to-reconfigure-detroit/>>
- ³² McGraw, Bill. "Make the Motor City Smaller." *Newsweek*. Sept. 12, 2009. Web. 5 March 2010. <<http://www.newsweek.com/id/215316>>
- ³³ Schilling, Joseph, and Logan, Jonathan. "Greening the Rust Belt." *Journal of the American Planning Association*. 74,4 (2008): 451-457. Print.
- ³⁴ Schilling, Joseph, and Logan, Jonathan. "Greening the Rust Belt." *Journal of the American Planning Association*. 74,4 (2008): 451-457. Print.
- ³⁵ Schilling, Joseph, and Logan, Jonathan. "Greening the Rust Belt." *Journal of the American Planning Association*. 74,4 (2008): 451-457. Print.
- ³⁶ Schilling, Joseph, and Logan, Jonathan. "Greening the Rust Belt." *Journal of the American Planning Association*. 74,4 (2008): 451-457. Print.
- ³⁷ Schilling, Joseph, and Logan, Jonathan. "Greening the Rust Belt." *Journal of the American Planning Association*. 74,4 (2008): 451-457. Print.
- ³⁸ Data Driven Detroit. "Detroit Residential Parcel Survey." Web 10 March 2010. Presentation. <http://www.detroitparcelsurvey.org/pdf/Detroit_Residential_Parcel_Survey_Presentation.pdf>
- ³⁹ Data Driven Detroit. "Detroit Residential Parcel Survey." Web 10 March 2010. Presentation. <http://www.detroitparcelsurvey.org/pdf/Detroit_Residential_Parcel_Survey_Presentation.pdf>
- ⁴⁰ Data Driven Detroit. "Detroit Residential Parcel Survey." Web 10 March 2010. Presentation. <http://www.detroitparcelsurvey.org/pdf/Detroit_Residential_Parcel_Survey_Presentation.pdf>
- ⁴¹ Hollander, Justin B. "Planning Shrinking Cities." Tufts University. Urban and Environmental Policy and Planning Department. Web. 12 March 2010. <<http://policy.rutgers.edu/faculty/popper/ShrinkingCities.pdf>>
-

Sources

- ⁴² Hansen, Sal, Greening of Detroit Community Forester. Personal Interview. 29 March 2010.
- ⁴³ Community Food Security Coalition's North American Urban Agriculture Committee. "Urban Agriculture and Community Food Security in the United States: Farming from the City Center to the Urban Fringe." 2003. Web. 30 Sept 2009. <<http://www.foodsecurity.org/PrimerCFSCUAC.pdf>>
- ⁴⁴ Sustain Lane. "Cleveland, OH." SustainableCircles Corp. 2009. Web. 2 Oct 2009. <<http://www.sustainlane.com/us-city-rankings/cities/cleveland>>
- ⁴⁵ Nassauer, Joan, I. "Messy Ecosystems, Orderly Frames." *Landscape Journal*. 14, 2 (1995): 161-170. Print.

Chapter 4.1: Review

- ¹ Cowan, Jake, and G. T. Kingsley. *Stories: Using Information in Community Building and Local Policy*. 3rd ed. Urban Institute, 2007. Print.
- ² US Census Bureau, 2009. Map retrieved 6 April 2010, from SimplyMap database.
- ³ US Census Bureau, 2009. Map retrieved 6 April 2010, from SimplyMap database.
- ⁴ Greene, Jay. "Group OKs Health Care Proposal for Detroit's Lower East Side." *Crain's Detroit Business* 21 July 2008. Crain Communications, Inc. Web. 8 Apr. 2010. <<http://www.craindetroit.com/article/20080721/SUB/807210319#>>
- ⁵ US Census Bureau, 2009. Map retrieved 6 April 2010, from SimplyMap database.
- ⁶ U.S. Census Bureau. "Fact Sheet, Zip Code Tabulation Area 48215." Web. 9 April 2010.
- ⁷ Jefferson East Business Association. "Jefferson East Business Association 2009 Annual Report." 2009. Print.
- ⁸ Nordstrom, Christopher. Windshield Survey. Mar.-Apr. 2010. Raw data. Lower Eastside, Detroit, MI.
- ⁹ Sugrue, Thomas J. *Origins of the urban crisis race and inequality in postwar Detroit: with a new preface by the author*. Princeton: Princeton UP, 2005. Print.
- ¹⁰ US Census Bureau, 2009. Map retrieved 6 April 2010, from SimplyMap database.
- ¹¹ Nordstrom, Christopher. Windshield Survey. Mar.-Apr. 2010. Raw data. Lower Eastside, Detroit, MI.
- ¹² Mari Gallagher Research & Consulting Group. "Examining the Impact of Food Deserts on Public Health in Detroit." 2007.
- ¹³ Greene, Jay. "Group OKs Health Care Proposal for Detroit's Lower East Side." *Crain's Detroit Business* 21 July 2008. *Crain Communications, Inc.* Web. 8 Apr. 2010. <<http://www.craindetroit.com/article/20080721/SUB/807210319#>>
- ¹⁴ Greene, Jay. "Group OKs Health Care Proposal for Detroit's Lower East Side." *Crain's Detroit Business* 21 July 2008. *Crain Communications, Inc.* Web. 8 Apr. 2010. <<http://www.craindetroit.com/article/20080721/SUB/807210319#>>
- ¹⁵ US Census Bureau, 2009. Map retrieved 6 April 2010, from SimplyMap database.
- ¹⁶ Gregg, E.W., K.A. Kirtland, B.L. Cadwell, N.R. Burrows, L.E. Barker, T.J. Thompson, L. Geiss, L. Pan, "Estimated County-Level Prevalence of Diabetes and Obesity, United States 2007" Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion, CDC. . 20 Nov. 2009. <<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5845a2.htm>>
- ¹⁷ Centers for Disease Control and Prevention "Geographic Patterns Among Low-Income, Preschool-Aged Children 2006-2008" Division of Nutrition, Physical Activity and Obesity, National Center for Chronic Disease Prevention and Health Promotion: Overweight and Obesity. 16 Mar. 2010. <<http://www.cdc.gov/obesity/childhood/lowincome.html>>
- ¹⁸ Akinbami, L.J. "The State of Childhood Asthma, United States, 1980-2005" Advance Data from Vital and Health Statistics CDC. 29 Dec. 2006. Web. 10 April 2010. <<http://www.cdc.gov/nchs/data/ad/ad381.pdf>>
- ¹⁹ U.S. Environmental Protection Agency. "Indicator: Asthma Hospitalization Rates in Wayne County, Michigan." 28. Aug. 2009. Web. 10 April 2010. <http://www.epa.gov/med/grosseile_site/indicators/asthma-rates.html#status>
- ²⁰ Christina, Margena A. "Detroit Research Investigator Works to Help Urban Communities Manage Asthma in Children." *Jet Magazine*. Johnson Publishing, 30 June 2008. Web. 4 Apr. 2010. <http://findarticles.com/p/articles/mi_m1355/is_25_113/ai_n27909782/>
- ²¹ US Census Bureau, 2009. Map retrieved 6 April 2010, from SimplyMap database.
- ²² U.S. Environmental Protection Agency. Toxic Release Inventory Chemical Report for zip code 48215. 2008. Web. Raw data.
- ²³ Detroit Department of Health and Wellness Promotion. "Strategic Lead Elimination Work Plan for the City of Detroit." Childhood Lead Poisoning Prevention and Control Program. 2005. Print.
- ²⁴ Nordstrom, Christopher. Windshield Survey. Mar.-Apr. 2010. Raw data. Lower Eastside, Detroit, MI.
- ²⁵ U.S. Department of Energy, Energy Efficiency and Renewable Energy. "Michigan Energy Fact Sheet." Web. 10 April, 2010. <http://apps1.eere.energy.gov/states/energy_summary_print.cfm?state=MI>
- ²⁶ US Census Bureau, 2009. Map retrieved 6 April 2010, from SimplyMap database.
- ²⁷ Nordstrom, Christopher. Windshield Survey. Mar.-Apr. 2010. Raw data. Lower Eastside, Detroit, MI.
- ²⁸ "Big Plans for the City of Detroit." *Detroit Free Press*. 4 April 2010. Web. 6 April 2010. <<http://www.freep.com/article/20100404/NEWS01/4040517/Big-plans-for-the-future-Detroit>>
- ²⁹ Sanitation Statistics, Detroit Department of Public Works. Phone Interview. 3 Mar. 2010.
-

-
- ³⁰ City of Detroit: Department of Public Works. "Where Do I Take My Recycling?" Web. 12 June 2009. <<http://www.detroitmi.gov/Departments/DepartmentofPublicWorks/SolidWasteYardWaste/DetroitRecyclesBeginJuly2009/WhereDoITakeMyRecycling/tabid/2495/Default.aspx>>
- ³¹ "Business of Energy." *Greater Detroit Resource Recovery Authority*. Web. 25 Mar. 2010. <<http://gdrra.org/Facilities/The-Business-of-Energy.aspx>>
- ³² U.S. Department of Energy, Energy Efficiency and Renewable Energy. "Michigan Energy Fact Sheet." Web. 10 April, 2010. <http://apps1.eere.energy.gov/states/energy_summary_print.cfm?state=MI>
- ³³ DTE Energy. "Generation and Emissions" DTE Energy. Web. 10 April 2010. <<http://www.dteenergy.com/dteEnergyCompany/environment/generation/generation.html>>
- ³⁴ Great Lakes Law. "Detroit must consider the cost of greenhouse gas regulation in continuing to operate the country's largest garbage." Web. 10 April, 2010. <<http://www.greatlakeslaw.org/blog/2009/05/detroit-must-consider-the-cost-of-greenhouse-gas-regulation-in-continuing-to-operate-the-countrys-la.html>>
- ³⁵ Brown, M., F. Shouthworth and A. Sarzynski. "Shrinking the Carbon Footprint of Metropolitan America." Washington: Brookings Institute. 2008. Print.
- ³⁶ MI Department of Environmental Quality & MI Department of Natural Resources. "Greenhouse Gas Emissions Inventory" State of Michigan's Environment. 2008. Web. 12 Mar 2010. <http://www.michigan.gov/documents/deq/2deq-exe-deqdnrei08_266980_7.pdf>
- ³⁷ U.S. Environmental Protection Agency. Toxic Release Inventory Chemical Report for zip code 48215. 2008. Web. Raw data.
- ³⁸ Esman, Laura A. "The Michigan Department of Environmental Quality Biennial Remedial Action Plan Update for the Detroit River Area of Concern." MI Department of Environmental Quality Water Bureau. January 2, 2008. Print.
- ³⁹ American Forests. "Urban Ecosystems Analysis SE Michigan and City of Detroit, Calculating the Value of Nature." 2006. Print.
- ⁴⁰ American Forests. "Urban Ecosystems Analysis SE Michigan and City of Detroit, Calculating the Value of Nature." 2006. Print.
- ⁴¹ American Forests. "Urban Ecosystems Analysis SE Michigan and City of Detroit, Calculating the Value of Nature." 2006. Print.
- ⁴² ⁴² Nordstrom, Christopher. Windshield Survey. Mar.-Apr. 2010. Raw data. Lower Eastside, Detroit, MI.
- ⁴³ MacDonald, Christine. "Detroit Mayor Bing emphasized need to shrink city." *Detroit News*. 10 Feb 2010. Web. 10 April 2010. <<http://detnews.com/article/20100225/METRO01/2250391/Detroit-Mayor-#ixzz0h9DPOOk6>>

Chapter 4.2: Examine

- ¹ Beaulieu, L.J. "Mapping the Assets of Your Community: A Key Component for Building Local Capacity" Southern Rural Development Center. <http://srdc.msstate.edu/publications/227/227_asset_mapping.pdf>
- ² Beaulieu, L.J. "Mapping the Assets of Your Community: A Key Component for Building Local Capacity" Southern Rural Development Center. <http://srdc.msstate.edu/publications/227/227_asset_mapping.pdf>
- ³ National Park Service. "National Register Information System". *National Register of Historic Places*. 15 Apr 2008. Web. 15 Apr. 2010. <http://www.nr.nps.gov/>.
- ⁴ Detroitblogger John. "Street fightin' man." *Metro Times*. February 17, 2010. Web. 20 Feb. 2010. <<http://www.metrotimes.com/culture/story.asp?id=14795>>
- ⁵ Monts, Rodd. "An East Side Detroit Story: Remembering the Village of Fairview" *Model D*. 2 Dec. 2008. Web 3 Feb. 2010. <<http://www.modeldmedia.com/features/fairview17008.aspx>>
- ⁶ Crossroads of Michigan. *2009 Annual Report*. Rep. Web. 10 Apr. 2010. <<http://www.crossroadsofmichigan.org/pdf-files/cr-annualreport-2009.pdf>>
- ⁷ Crossroads of Michigan "Home" Web. 10 Apr. 2010. <<http://www.crossroadsofmichigan.org/index.html>>
- ⁸ Crossroads of Michigan "Who we are." Web. 10 Apr. 2010. <<http://www.crossroadsofmichigan.org/index.html>>
- ⁹ Crossroads of Michigan. "What we do Web." 10 Apr. 2010. <<http://www.crossroadsofmichigan.org/index.html>>
- ¹⁰ St. Columba Episcopal Church, Detroit, MI. Records, Bentley Historical Library, University of Michigan. Digital Image. 2010. Web. 10 Feb. 2010. <<http://quod.lib.umich.edu/cgi/f/findaid/findaid-idx?c=bhlead;cc=bhlead;view=text;rgn=main;didno=umich-bhl-04136>>
- ¹¹ "Vanity Ballroom." *Untitled Document*. Web. 18 Jan. 2010. <<http://detroit1701.org/VanityBallroom.htm>>
- ¹² "Vanity Ballroom." *Buildings of Detroit*. Web. 18 Jan. 2010. <<http://buildingsofdetroit.com/places/vanity>>
- ¹³ "Detroit: Jefferson East Business Association Entertainment." *Michigan's Cool Cities Neighborhoods*. Web. 23 Dec. 2009. <<http://www.coolcities.com/project14.html>>
- ¹⁴ "Golightly Career and Technical Center." *Detroit Public Schools*. Web. 3 Feb. 2010. <<http://www.detroit.k12.mi.us/schools/school/592>>
-

Sources

- ¹⁵ "Remus Robinson Academy." *Detroit Public Schools*. Web. 3 Feb. 2010.
<<http://www.detroit.k12.mi.us/schools/school/308>>
- ¹⁶ Bobb, R.C. *Detroit Public Schools Facility Consolidation and Reinvestment Plan*. 2009 Web. 12 Mar. 2010. Print.
- ¹⁷ Bobb, R.C. *Detroit Public Schools Facility Consolidation and Reinvestment Plan*. 2009 Web. 12 Mar. 2010. Print.
- ¹⁸ Greene, Jay. "Group OKs Health Care Proposal for Detroit's Lower East Side." *Crain's Detroit Business* 21 July 2008. *Crain Communications, Inc.* Web. 8 Apr. 2010. <<http://www.craindetroit.com/article/20080721/SUB/807210319#>>
- ¹⁹ American Forests. "Urban Ecosystems Analysis SE Michigan and City of Detroit, Calculating the Value of Nature." 2006. Print.
- ²⁰ Nordstrom, Christopher. Windshield Survey. Mar.-Apr. 2010. Raw data. Lower Eastside, Detroit, MI.
- ²¹ Jefferson East Business Association. "Home" 2007. Web. 10 Apr 2010. <<http://jeffersoneast.org/index1.php>>
- ²² Jefferson East Business Association. "About" 2007. Web. 10 Apr. 2010. <<http://jeffersoneast.org/index1.php>>
- ²³ "Detroit: Jefferson East Business Association Entertainment." *Michigan's Cool Cities Neighborhoods*. Web. 23 Dec. 2009. <<http://www.coolcities.com/project14.html>>
- ²⁴ "Detroit: Jefferson East Business Association Entertainment." *Michigan's Cool Cities Neighborhoods*. Web. 23 Dec. 2009. <<http://www.coolcities.com/project14.html>>
- ²⁵ Ankeny, Robert. "MEDC OKs \$277,270 Tax Break for Renovating Savarine Hotel." *Discuss Detroit*. 26 Oct. 2006. Web. 10 Apr. 2010. <<http://atdetroit.net/cgi-bin/foroum/discus.cgi?pg=next&topic=76017&page=85969>>
- ²⁶ Elling, Josh. "Call with Jefferson East Business Association." Telephone interview. 17 Mar. 2010.
- ²⁷ Elling, Josh. "Call with Jefferson East Business Association." Telephone interview. 17 Mar. 2010.
- ²⁸ "13200 Jefferson Avenue, Detroit, MI, 48215 - Community Center Property." *LoopNet*. Web. 2 Apr. 2010. <<http://www.loopnet.com/Listing/15252259/13200-Jefferson-Avenue-Detroit-MI/>>
- ²⁹ "Chrysler LLC: Jefferson North Assembly Plant." *Maps.google.com*. Web. 15 Mar. 2010.
- ³⁰ "Beaver's Return to Detroit River Hailed as Sign of Environmental Recovery." *CBC News*. 16 Feb. 2009. Web. 31 Mar. 2010. <<http://www.cbc.ca/technology/story/2009/02/16/beaver.html>>

Chapter 4.3: Participate

- ¹ Daly, H.E. and Cob, J.B., Jr. *For the common good: Redirecting the economy toward community, the environment and a sustainable future*. Boston: Beacon Press. 1989. Print.
- ² R Putnam, "The Prosperous Community: Social Capital and Public Life," *The American Prospect* 13 (Spring 1993): pp. 35-42. Print.
- ³ "Sustainable Sites Initiative: Guidelines and Performance Benchmarks for 2008." *Sustainable Sites Initiative*. 2008. Web. Sept.-Oct. 2009. Print.
- ⁴ Hoff, Marie D. *Sustainable Community Development: Studies in Economic, Environmental, and Cultural Revitalization*. Boca Raton, Fla.: Lewis, 1998. Print.
- ⁵ Schively, C. *Enhancing Transportation: The Effects of Public Involvement in Planning and Design Processes*. Minneapolis: Humphrey Institute of Public Affairs, University of Minnesota, 2007. Print.
- ⁶ "Sustainable Sites Initiative: Guidelines and Performance Benchmarks for 2008." *Sustainable Sites Initiative*. 2008. Web. Sept.-Oct. 2009. Print.
- ⁷ "Community Engagement How To Guide: Techniques." *Communities Scotland*. 2007. Web. 19 Feb. 2010.
- ⁸ "Resident opinion surveys technique." *Communities Scotland*. 2007. Web. 19 Feb. 2010.
- ⁹ *Design Charrettes: A public participation Tool for Integrating Community Values into Design*. Rep. Communities by Design and City of Redwood City, 3 Mar. 2004. Web. 20 Dec. 2009.
- ¹⁰ "The NCI Charrette System™." National Charrette Institute. Web. 20 Dec. 2009.
- ¹¹ "Aerials of Greensburg Tornado Damage." *Kansas news*. Web. 03 Oct. 2009. <<http://www.kansas.com/static/slides/050507tornadoaerials/>>
- ¹² "Greensburg GreenTown - History & Vision." *Greensburg GreenTown*. Web. 25 Sept. 2009. <<http://www.greensburggreentown.org/history/>>
- ¹³ Read, Sharla, Craig Wolfe, and Tom Thompson. "Greensburg Rebuilds." *Solar Today* (Nov. & Dec. 2008): 12. *Solartoday.org*. Web. 1 Apr. 2010. Print.
- ¹⁴ "Arlington Virginia Columbia Pike Initiative: Forums: Arlington, Virginia." *Official Site of Arlington County Virginia: General Information: Arlington, Virginia*. Web. 20 Dec. 2009. Print.
- ¹⁵ "The NCI Charrette System™." National Charrette Institute. Web. 20 Dec. 2009.
- ¹⁶ "The NCI Charrette System™." National Charrette Institute. Web. 20 Dec. 2009.
- ¹⁷ "The NCI Charrette System™." National Charrette Institute. Web. 20 Dec. 2009.
- ¹⁸ Sarkissian, Wendy. "Community Engagement." *Your Development - Creating Sustainable Neighbourhoods*. CSIRO Sustainable Ecosystems, 27 May 2008. Web. 05 Jan. 2010.
-

¹⁹ Sarkissian, Wendy. "Community Engagement." *Your Development - Creating Sustainable Neighbourhoods*. CSIRO Sustainable Ecosystems, 27 May 2008. Web. 05 Jan. 2010.

Chapter 4.4: Articulate

¹ City of Los Angeles Department of Public Works. *Griffith Park Composting Facility*. Digital image. *Solid Resources Processing and Construction Division*. City of Los Angeles, 16 Aug. 1999. Web. 11 Apr. 2010. <http://www.lacitysan.org/srpcd/images/gallery/mulch_compost/griffithPark/large/008_large.JPG>

² Forman, Minehaha. *Detroit Police Chief and Mayor 'open' Four Mini Police Stations*. *The Michigan Messenger*. 19 Oct. 2008. Web. 1 Mar. 2010. <<http://michiganmessenger.com/6487/detroit-police-chief-and-mayor-open-four-mini-police-stations>>.

³ Savarine Hotel. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

⁴ Michigan Economic Development Corporation. *Granholm Announces Redevelopment of Landmark Hotel into Apartments*. 26 Oct. 2006. Web. Mar. 2010.

⁵ Houston, D. and D. Eness, *Thinking Outside the Box*. The Urban Conservatory in partnership with Civic Economics. Austin, TX. 2009. Print.

⁶ Neumark, D., J. Zhang, and S. Ciccarella. "The Effects of Wal-Mart on Local Labor Markets." IZA Discussion Paper No. 2545. 2007. Print.

⁷ View south between Kitchener Street and Dickerson Street. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

⁸ Michigan.gov Center for Geographic Information, State Historic Preservation Objects. "Vanity Ballroom Building." Web. 02 Mar. 2010. <<http://www.mcgi.state.mi.us/hso/sites/16485.htm>>

⁹ Water Winter Wonderland: The Best of Michigan, Past and Present! Digital Image. Web. 8 Mar. 2010.

¹⁰ Vanity Ballroom. Digital Image. *Detroit Mon Amour: Web Tours to the Heart of Detroit*. @Detroit, LLC, 15 Aug. 2000. Web. 12 Mar. 2010. <<http://www.detroityes.com/webisodes/2000/13vanity/>>.

¹¹ "Vanity Ballroom." *Buildings of Detroit*. 2009. Web. 8 Mar. 2010. <<http://buildingsofdetroit.com/places/vanity>>

¹² "Vanity Ballroom." *Buildings of Detroit*. 2009. Web. 8 Mar. 2010. <<http://buildingsofdetroit.com/places/vanity>>

¹³ *The Detroit Driving Club Official Score Book*. Detroit: Detroit Driving Club, 1900. Print.

¹⁴ "First Way-Finding Signage Arrives." *Northfield Downtown Development Corporation*. Web. 8 May. 2009. <<http://nddc.org/i/f/2008/05/streetscapeinstallationswayfinding.jpg>>

¹⁵ Lakewood Street and Jefferson Avenue. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

¹⁶ Lakewood and Essex Street. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

¹⁷ Lakewood Street & Essex Drive. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

¹⁸ Alter Road. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

¹⁹ Defunct marina at Riverside Boulevard & Alter Road. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

²⁰ Bicyclinginfo.org: Pedestrian and Bicycle Information Center. "Bike Lanes." Web. 7 Apr. 2010.

<<http://www.bicyclinginfo.org/engineering/facilities-bikelanes.cfm>>

²¹ City of Portland Office of Transportation. "Portland's Blue Bike Lanes – Improved Safety through Enhanced Visibility." 1999. Web. 1 Apr 2010. <<http://www.portlandonline.com/shared/cfm/image.cfm?id=58842>>

²² Looking west from Ashland & Jefferson Map. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

²³ Anonymous. Saint Columba Episcopal Church. Digital Photograph. *Flickr.com*. 11 Aug. 2008. Web. 30 Mar. 2010. <<http://www.flickr.com/photos/71288712@N00/2753019692/>>

²⁴ 14635 East Jefferson Avenue. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

²⁵ 14400 to 14456 East Jefferson Avenue. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

²⁶ 14500 to 14554 East Jefferson Avenue. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

²⁷ 14401 to 14421 East Jefferson Avenue. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

²⁸ 14700 to 14742 East Jefferson Avenue. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

²⁹ Platte Motor Sales building. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010

³⁰ 14555 East Jefferson Avenue. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

³¹ Anonymous. Detroit Edison Conners Creek Power Plant. Digital Photograph. *Flickr*. Web. 20th Mar. 2010.

<http://farm4.static.flickr.com/3385/3594386302_a2b6b3475d.jpg>

³² "Beaver's Return to Detroit River Hailed as Sign of Environmental Recovery." *CBC News*, 16 Feb. 2009. Web. 31 Mar. 2010. <<http://www.cbc.ca/technology/story/2009/02/16/beaver.html>>

³³ Bösche, Jörg. Landschaftspark Duisburg-Nord. Digital image. *Szenefotograf*. 15 Mar. 2008. Web. 12 Apr. 2010. <<http://blog.joergboesche.de/>>.

³⁴ "Duisburg-Nord Landscape Park." *Landschaftspark Duisburg-Nord*. Web. 30 Mar. 2010. <<http://www.landschaftspark.de/en/home/index.php>>

Sources

- ³⁵ Giffels-Webster Engineers, Carter-Burgess, ArchiveDS, and Brogan & Partners. *City of Detroit Non-Motorized Path - Citywide Destinations & Paths Map*. Digital image. Jun. 2006. Web. 2 Oct. 2009. <<http://www.giffelswebster.com/resource/attach/40/masterplan.pdf>>
- ³⁶ Kercheval Street and Lakewood Street. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.
- ³⁷ "Big plans for the future Detroit – A challenging list of projects can reshape city in the next decade." *The Detroit Free Press*. 4 Apr 2010. Web. <<http://www.freep.com/article/20100404/NEWS01/4040517/1001/News/Big-plans-for-the-future-Detroit>>
- ³⁸ Figl, Joseph L., et al. "A Resource Guide: The Phytoremediation of Lead to Urban, Residential Soils". *Northwestern University*. Web. 15 Mar. 2010. <http://www.civil.northwestern.edu/EHE/HTML_KAG/Kimweb/MEOP/INDEX.HTM>
- ³⁹ Anonymous. Community Garden, Erie County. Digital Photograph. *Local Food Sandusky Blog*. 21 Feb. 2009. Web. 31 Mar. 2010. <<http://localfoodsandusky.wordpress.com/>>
- ⁴⁰ Anonymous. Constructed Wetland. Digital Photograph. *American Society of Landscape Architects*. 2009. Web. 31 Mar. 2010. <http://www.asla.org/2009awards/images/popup/300_06.gif>
- ⁴¹ "Economic Benefits of Runoff Controls". *United States Environmental Protection Agency*. Sep 1995. Web. 8 Apr 2010. <<http://www.epa.gov/nps/runoff.html>>
- ⁴² Continental Street near Freud Street. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.
- ⁴³ Piper Court in Victoria Estates. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.
- ⁴⁴ Eastlawn Street near Avondale Street. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.
- ⁴⁵ Anonymous. Purple Prairie Clover. Digital Image. Texas AgriLife Extension Service, Texas A&M University. Web. 8 Mar. 2010. <<http://aggie-horticulture.tamu.edu/wildseed/33/33.4.html>>
- ⁴⁶ Hilty, John. Partridge Pea. Digital Image. Illinois Wildflowers. Web. 8 Mar. 2010. <http://www.illinoiswildflowers.info/prairie/plantx/part_peax.htm>
- ⁴⁷ Anonymous. Rain garden. Digital Photograph. Web. 8 Mar. 2010. <http://api.ning.com/files/J3HCp-w15Y1NMyMmduK2XKh6TFjCqvYeLZYoER3PSYMM8FFXk7Eeq1MrYUKEBNqhut8F9b5U-7dDYGwajQ4SGnnMxN9*Oodg-/raingarden04.jpg>
- ⁴⁸ Anonymous. Rain Garden. Digital Photograph. *Live Green Twin Cities*. Web. 8 Mar. 2010. <<http://livegreentwincities.com/files/livinggreen/images/RainGarden.jpg>>
- ⁴⁹ Cooper. Brightmoor Community Garden in Detroit. 2009. Digital Image. *Think Detroit = RethinkDetroit.org*. 02 Sept. 2009. Web. 8 Mar. 2010. <http://4.bp.blogspot.com/_XCG1LtmK5FE/Sp7AdRV6Fel/AAAAAAAAAFE/vC4NoQmfSzc/>
- ⁵⁰ Guyton Elementary School. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.
- ⁵¹ Kavanaugh, Kelli B. "Urban Land Institute to Unveil Surplus School Properties to Developers on March 24." *Model D*. 23 Mar. 2010. Web. 27 Mar. 2010. <<http://www.modeldmedia.com/devnews/uli032310.aspx>>
- ⁵² Bobb, R.C. "Detroit Public Schools Facility Consolidation and Reinvestment Plan." 2009. Print.
- ⁵³ Collison, Kevin. "KC School District to Develop Strategies for Repurposing Closed Buildings." *The Kansas City Star*. KansasCity.com, 10 Mar. 2010. Web. 27 Mar. 2010. <<http://www.kansascity.com/2010/03/19/1825460/kc-school-district-to-develop.html>>.
- ⁵⁴ MacDonald, Christine. "Schools' History in Peril Architectural Gems in Detroit Slated to Close." *The Detroit News*. 1 Mar. 2007. Web. 31 Mar. 2010.
- ⁵⁵ The Heritage Townhouses. Digital image. *Maps.google.com*. 2009. Web. 12 Mar. 2010.

Chapter 4.5: Implement

- ¹ Bank of America. "Bank of America Announces \$25 Billion Community Development Strategic Plan for Michigan." Bank of America. Web. 30 Mar 2010. <<http://newsroom.bankofamerica.com/index.php?s=43&item=7887>>
- ² "Featured Projects - Streetscape Development." *The Greening of Detroit*. Web. 18 Jan. 2010. <http://www.greeningofdetroit.com/3_1_featured_projects.php?link_id=1194537257>
- ³ Michigan State Energy Program (SEP) American Recovery and Reinvestment Act (ARRA). Michigan State Energy Program. 2009. Web 30 Mar. 2010. <http://www.michigan.gov/documents/dleg/MI_SEP_Recovery_Plan_final_281425_7.pdf>
- ⁴ Michigan Department of Energy, Labor, and Economic Growth. "Michigan Energy Efficiency & Conservation Block Grant (EECBG)." Web. 20 Mar 2010. <http://www.michigan.gov/dleg/0,1607,7-154-25676_32825_33041-217419--,00.html>
- ⁵ "Cool Cities Grant Will Fund E. Jefferson Neighborhood Wayfinding Signage System." *Model D*. 25 Aug. 2009. Web. 10 Apr. 2010. <<http://www.modeldmedia.com/devnews/ejeffwayfinding20509.aspx>>
- ⁶ Shreck, Bill. "MDOT Announces \$55 Million in TIGER Grants Awarded for Woodward Avenue Light Rail and Port Huron Bridge." *SOM – State of Michigan*. Web. 25 Feb. 2010. <http://www.michigan.gov/mdot/0,1607,7-151-9621_53334-231842--,00.html>
- ⁷ Kavanaugh, Kelli B. "Community Foundation Awards Greening of Detroit Funds for Greenway Maintenance." *Model D*. 9 Feb. 2010. Web. 3 Mar. 2010. <<http://www.modeldmedia.com/devnews/greenways020910.aspx>>
-

Chapter 4.6: Revisit

- ¹ The Environmental Advisory Council to the Swedish Government, Carl Folke, and Et Al. *Resilience and Sustainable Development: Building Adaptive Capacity in a World of Transformations*. 2002. Print.
- ² National Oceanic and Atmospheric Administration Coastal Services Center. "Coastal Ecosystem Restoration." Web. 4 April 2010. <<http://www.csc.noaa.gov/coastal/assessment/assessment.htm>>
- ³ United States Department of Agriculture, George H. Stankey, Roger N. Clark, and Bernard T. Bormann. *Adaptive Management of Natural Resources: Theory, Concepts, and Management Institutions*. General Technical Report. PNW-GTR-654. 2005. Print.
- ⁴ United States Department of Agriculture, George H. Stankey, Roger N. Clark, and Bernard T. Bormann. *Adaptive Management of Natural Resources: Theory, Concepts, and Management Institutions*. General Technical Report. PNW-GTR-654. 2005. Print.
- ⁵ National Housing Institute. "Is Mixed-Income Housing the Key?" Web. 5 Apr. 2010. <<http://www.nhi.org/online/issues/80/mixhous.html>>
- ⁶ National Housing Institute. "Is Mixed-Income Housing the Key?" Web. 5 Apr. 2010. <<http://www.nhi.org/online/issues/80/mixhous.html>>
- ⁷ Cruce, Terri. L. "Adaptation Planning- What U.S. States and Localities are Doing." Pew Center on Global Climate Change. August 2009. Web. March 5, 2010. <<http://www.pewclimate.org/docUploads/state-adapation-planning-august-2009.pdf>>
- ⁸ "Climate Protection – Green Cincinnati Plan." City of Cincinnati Office of the City Manager. Web. March 7, 2010. <<http://www.cincinnati-oh.gov/cmgr/pages/-37339-/>>
- ⁹ Office of Environmental Quality City of Cleveland. "Climate Protection Action Plan The Green Cincinnati Plan." 19 Jun. 2008. Web. March 6, 2010. <http://www.cincinnati-oh.gov/cmgr/downloads/cmgr_pdf18280.pdf>
- ¹⁰ "Urban Leaders Adaptation Initiative, Building Resiliency to Climate Change Impacts through Community Action." Center for Clean Air Policy. Web. March 7, 2010. <<http://www.ccap.org/index.php?component=programs&id=6>>
- ¹¹ "Regional Initiatives." Pew Center on Global Climate Change. Web. 5 Mar. 2010. <http://www.pewclimate.org/what_s_being_done/in_the_states/regional_initiatives.cfm>
- ¹² "Michigan." Pew Center on Global Climate Change. Web. 5 Mar. 2010. <<http://www.pewclimate.org/states-regions/states/Michigan>>
- ¹³ "Michigan." Pew Center on Global Climate Change. Web. 5 Mar. 2010. <<http://www.pewclimate.org/states-regions/states/Michigan>>
- ¹⁴ "Macroeconomic Analysis: Michigan Climate Action Plan Final Report Summary." Center for Climate Strategies. 4 Jan. 2010. Print.
- ¹⁵ "Macroeconomic Analysis: Michigan Climate Action Plan Final Report Summary." Center for Climate Strategies. 4 Jan. 2010. Print.
- ¹⁶ Lowe, Ashley, Josh Foster, and Steve Winkelman. "Ask the Climate Question: Adapting to Climate Change Impacts in Urban Regions." Center for Clean Air Policy Urban Leaders Adaptation Initiative. June 2009. Print.
- ¹⁷ Lowe, Ashley, Josh Foster, and Steve Winkelman. "Ask the Climate Question: Adapting to Climate Change Impacts in Urban Regions." Center for Clean Air Policy Urban Leaders Adaptation Initiative. June 2009. Print.
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Appendices

Appendix 1: Emerging Standards & Certifications

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Appendix 1: Emerging Standards & Certifications

A number of organizations have developed certification programs and established standards that aim to assess the range of social, economic, or environmental impacts that are attributable to a wide range of human activity. These tools have been designed to evaluate, rank, and recognize products, single buildings, landscapes, or neighborhood developments that achieve or exceed the requirements laid out within established certifications and standards. Accreditation by these third party systems is a marketable achievement and an indication of effort to increase sustainability. Prominent systems that apply to community or neighborhood redevelopment are briefly described below.

Moving Past Standards

By increasing public awareness of the impact of the built environment on natural and anthropogenic systems, certification and standards systems are a step toward more sustainable redevelopment. While labeling aids in consumer education, recognition of achievement provides an incentive to developers. Ultimately, however, tools of certification attempt to implement and quantify components of sustainability in a rather reductionist manner. Further, while the better criteria and standards reflect the best current technology can achieve, the more typical criteria reflects a combination of what is technologically, economically, and politically feasible. Both necessarily place a limit on potential innovation and future progress. The piecemeal, often incomplete, approach that characterizes many of these systems fails to adequately address the complex interactions of the built, social, economic, and natural environments.

When characterizing sustainable redevelopment, we consider systems of certification, yet strive to identify and increase sustainability from a more holistic, inclusive perspective, incorporating the unquantifiable and qualitative, local and regional, visible and indivisible, and the cascading impacts of development.

Standards for Neighborhood Development

LEED for Neighborhood Design

Inspired by BREEAM, the United States Green Building Council (USGBC) created the LEED green building certification system in 1992 to provide third-party verification of sustainable building strategies in the U.S. New to the 2009 family of standards, the goal of the LEED for Neighborhood Development Rating System is to integrate “the principles of

smart growth, urbanism, and green building into the first national system for neighborhood design.”¹

Neighborhoods can earn points in three categories: Smart Location and Linkages, Neighborhood Pattern and Design, and Green Infrastructure and Buildings. Smart Location and Linkage focuses on the aspects of the site and connectivity including proximity to alternative modes of transportation, utilization of brownfields, and conservation of habitat.² The goal of the Neighborhood Pattern and Design section is to encourage aspects like density, walkability, and access to nature and social spaces.³ Finally, Green Infrastructure and Buildings encourages sustainable construction within the built environment.⁴ This rating system is currently in a Pilot phase with cities as diverse as Boston, MA, Santa Fe, NM, Portland, OR, and Racine, WI participating.

Standards for Building Development

Leadership in Energy Efficiency & Design (LEED) for Buildings

By awarding points to buildings for meeting specific criteria, LEED rates the achievement of environmentally friendly strategies, construction, and practices in six distinct categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Environmental Quality, and Innovation & Design Process. LEED provides an effective set of benchmarking criteria, and its checklist is conducive to measuring and reducing the environmental impacts of buildings. As more companies and individuals are recognizing the benefits of investing in green building, attaining LEED status becomes increasingly popular. As of May 2007, 851 buildings have earned LEED certification with some 6500 in progress. In addition, 12 federal agencies, 22 states, and 75 local governments have made commitments to use or encourage LEED.⁵

LEED is duly recognized as a leader in the field of sustainable building and a driving force behind the adoption of practices that reduce the environmental impact of buildings. However, along with celebrating this step in the right direction, it is necessary to acknowledge the weaknesses of this system. By requiring only marginal and incremental increases above a baseline, this checklist system tends to encourage only slight improvement of the status quo. While it is essentially impossible to implement truly sustainable building design given contemporary methods and strategies, a rating system should reflect a constant and strategic push towards this ultimate goal. Today's buildings are wasteful enablers of America's over-consumptive lifestyle. The buildings of tomorrow that achieve LEED status will be an improvement over today's buildings, however they will not demonstrate a drastic change in the way that energy is generated, and will continue to overly rely on non-renewable energy consumption. While a LEED certified project considers the impacts of construction over a building's lifetime, it does not typically require the assessment of the building beyond its second year of use, and does not consider the energy

and material inputs of the design elements' entire lifecycle. Finally, the point system does not adequately account for energy or material reduction and enables developers to rack up points and earn LEED status without significantly reducing energy or material reduction.⁶ For example, a bike rack and a constructed wetlands feature for water treatment are worth the same point value. For many developers the goal is certification, publicity, and tax credits, rather than pure green buildings. In fact, certification can be achieved even if a designer avoids the energy efficiency category all together.

BREEAM

The Building Research Establishment (BRE)'s Environmental Assessment Method (BREEAM) is the leading environmental assessment method for buildings: over 100,000 buildings have BREEAM certification.⁷ BRE is a research-based consultancy that provides expertise and services pertaining to all aspects of the built environment and construction industries.⁸ BRE is committed to increasing sustainability at a range of scales: from products to buildings to communities to businesses.⁹

BREEAM's comprehensive approach to evaluating sustainable performance of buildings has become a widely recognized and used tool. This is likely in part due to the ease with which with these sustainable design standards can be tailored to regional conditions, thus enabling performance to be assess on a site-specific basis. Performance is assessed based on a range of criteria including: management, health and well-being, pollution, transport, land use, ecology, materials, and water. In addition, BREEAM evaluates construction methods, products, and material, and local codes, and provides best management practice guides.¹⁰ Additionally, BREEAM has a set of In-Use standards to evaluate asset performance, building management performance, and organizational effectiveness.¹¹ BREEAM's user-friendly, credible scoring systems have acted as a model for subsequent systems.

Living Building Challenge

The International Living Building Institute's Living Building Challenge seeks to recognize the achievement of the "most advanced sustainability in the built environment possible today."¹² The Challenge, which emphasizes the need for fundamental and transformative change, is operated by the Cascadia Green Building Council in Seattle, WA. The Living Building Challenge is a design framework for optimizing the relationship between people and the built environment. The certification is based on actual, measured building performance, and on meeting all 16 prerequisites or steps of the program. These steps include: responsible site selection, limits to growth, habitat exchange, net zero energy, materials red list, construction carbon footprint, responsible industry, appropriate materials/services radius, leadership in construction waste, net zero water, sustainable water discharge, a civilized environment, healthy air, source control, healthy air, ventilation,

beauty and spirit, inspiration and education.¹³ As an effort to identify maximum attainable sustainable with current technology, the Living Building Challenge has a reputation for being difficult, but not impossible to achieve. The Challenge aims to push the boundaries of going green past achieving LEED standards to providing models to inspire the industry.

Sustainable Sites Initiative

The Sustainable Sites Initiative (SSI) was established in 2005 by the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center, and the U.S. Botanical Garden to promote sustainable land development and management practices. SSI is a voluntary program that builds on LEED's rating system to address the significance of site design. The LEED system contains provisions regarding landscapes and water management; however, it does not specifically inform developers how to implement more sustainable practices. SSI addresses and fills this gap in detail; it is likely that future renditions of LEED will include SSI's guidelines and standards. SSI emphasizes the importance of ecological function and ecosystem performance in response to the environmental impact of development.¹⁴ SSI guidelines target sites with buildings (industrial, retail, office parks, military complexes, airports, botanical gardens, streetscapes, residential and commercial developments and public and private campuses) but also to local, state, and national parks, conservation easements and buffer zones and transportation rights-of-ways.

Similar to LEED, SSI has developed guidelines for performance and benchmarking and awards credits to developments that achieve various standards. Among the criteria SSI considers in its evaluation include: Site Selection, Pre-Design Assessment and Planning, Water, Soil and Vegetation, Materials Selection, Human Health and Well-Being, Construction, Operations and Maintenance, and Monitoring and Innovation.¹⁵ Within each criterion, credit is earned through satisfying required components and earning extra points to take certain requirements further. For example, to earn credit within the Site Design of Water section, the applicant is required to determine that a created water feature will not have a negative effect on receiving water bodies; when addressing the origin of water used in water features, the applicant can utilize sustainable water sources for 50 percent (one point), 75 percent (two points), or 100 percent (three points) to meet the water feature's needs.¹⁶

Appendix 2: Acronyms & Abbreviations

AHA	American Heart Association
AIA	American Institute of Architecture
AOC	Area of Concern
APA	American Planning Association
AYP	Adequate Yearly Progress
BIDS	Business Improvement Districts
BMPs	Best Management Practices
BRCP	Building Rehabilitation Code Program
BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Method
CDC	Community Development Corporations
CDO	Community Development Organization
CFL	Compact Fluorescent Light bulb
CH ₄	Methane
CO ₂	Carbon Dioxide
CPTED	Crime Prevention Through Environmental Design
CSO	Combined Sewer Overflow
D3	Data Drive Detroit
DACIS	Detroit Area Community Information System
DBCFSN	Detroit Black Community Food Security Network
DC	Direct Current
DDOT	Detroit Department of Transportation
DEGC	Detroit Economic Growth Corporation
DPS	Detroit Public Schools
DWDD	Detroit Workforce Development Department
EDA	United States Economic Development Agency
EJCC	East Jefferson Corridor Collaborative
EMEAC	East Michigan Environmental Action Council
FEMA	Federal Emergency Management Agency
GCLB	Genesee County Land Bank
GHG	Greenhouse Gas
HPS	High Pressure Sodium
HVAC	Heating, Ventilation, and Air Conditioning
IAQ	Indoor Air Quality
IECC	International Energy Conservation Code
ISO	International Standards Organization
JEBA	Jefferson East Business Association
LCA	Life Cycle Analysis

LED	Light Emitting Diode (more energy efficient light)
LEED	Leadership in Energy and Environmental Design
LID	Low Impact Development
MDOT	Michigan Department of Transportation
MEDC	Michigan Economic Development Corporation
MLBFTA	Michigan Land Bank Fast Track Authority
NO ₂	Nitrous Dioxide
NOX	Nitrous Oxide
PAC	Promoting Active Communities
PAH	Polycyclic aromatic hydrocarbons
PBE	Place-Based Education
PDR	Purchase of Development Rights
PEVs	Plug-In Electric Vehicles
PHEVs	Plug-In Hybrid Electric Vehicles
PM	Particulate Matter
PUD	Planned Urban Development
RDF	Refuse Derived Fuel
REPAIR	Review, Examine, Participate, Articulate, Implement, Revisit
SEMCOG	Southeast Michigan Council of Government
SO ₂	Sulphur Dioxide
SR2S	Safe Routes To School
SBS	Sick Building Syndrome
TIF	Tax Increment Financing
TDR	Transfer of Development Rights
USCIS	U.S. Citizenship and Immigration Services
US EPA	United States Environmental Protection Agency
USGBC	US Green Building Council
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
YDB	Young Detroit Builders

Appendix 3: Survey Results

Informal Survey of lower eastside Residents

Hello, my name is <your name>. I am a student from the University of Michigan doing research on community development in Detroit. We are trying to get a picture of current concerns and what strategies could be used to improve the neighborhood. I would like to ask you a few questions about you and your community. It may take about five minutes. Is that all right with you? If you feel uncomfortable with any question, we can skip it, or stop at any time. May I begin asking the questions?

<If yes, continue>

I am going to ask some questions about your living situation. Is this all right? <If yes, continue>

What cross streets do you live at? (Possibly show map)	
How long have you lived there?	<input type="checkbox"/> Less than one year <input type="checkbox"/> One to five years <input type="checkbox"/> Five to ten years <input type="checkbox"/> Ten to twenty years <input type="checkbox"/> Greater than twenty years Notes
Are you the head of your household?	<input type="checkbox"/> yes <input type="checkbox"/> no Notes
Do you rent or own?	<input type="checkbox"/> Rent <input type="checkbox"/> Own Notes
Do you live with a significant other?	<input type="checkbox"/> Yes <input type="checkbox"/> No Notes

I am going to ask some questions about your economic situation. Is this all right? <If yes, continue>

If applicable (ie. living with significant other), are you or your significant other currently employed?(if no significant other, skip this question)	<input type="checkbox"/> yes <input type="checkbox"/> no Notes
<Continue only if yes>	
How far do you/they travel to work?	
In which industry/sector do you/they work?	<input type="checkbox"/> Service <input type="checkbox"/> Industry Notes
How do you/they get to work?	<input type="checkbox"/> Drive <input type="checkbox"/> Walk <input type="checkbox"/> Public Transportation <input type="checkbox"/> Bike

OK, great! I am going to ask you some questions about shopping. Is this all right? <If yes, continue>

Where do you do the majority of your grocery shopping?	
What type of stores do you wish were near your home?	
What mode of transportation do you use to get to the store?	<input type="checkbox"/> Drive <input type="checkbox"/> Walk <input type="checkbox"/> Public Transportation <input type="checkbox"/> Bike

Informal Survey of lower eastside Residents

I have three quick questions about gardening, may I continue? <If yes, continue>

Are you interested in gardening?	<input type="checkbox"/> yes	<input type="checkbox"/> no	Notes
Are there any gardens on your block or in your neighborhood?	<input type="checkbox"/> yes	<input type="checkbox"/> no	Notes
Do you or have you ever thought about growing your own food?	<input type="checkbox"/> yes	<input type="checkbox"/> no	Notes

OK great. I am now going to ask you a few questions about your surroundings. Is this all right? <If yes, continue>

How much time do you spend outdoors each week?	
Where do you hang out, when away from your home?	
Are there parks near your home?	
What are your favorite outdoor activities?	
Do you feel safe walking in your neighborhood during the day? If "no", what would make you feel safer?	<input type="checkbox"/> yes <input type="checkbox"/> no Notes
Do you feel safe walking in your neighborhood during at night? If "no", what would make you feel safer?	<input type="checkbox"/> yes <input type="checkbox"/> no Notes

OK, I am now going to ask you a few questions about your neighbors. Is this all right? <If yes, continue>

Does your street have a "block leader"?	<input type="checkbox"/> yes <input type="checkbox"/> no Notes
Would you share tools or supplies with your neighbors?	<input type="checkbox"/> yes <input type="checkbox"/> no Notes
Would you ever ask your neighbors to watch your home while you were away?	<input type="checkbox"/> yes <input type="checkbox"/> no Notes

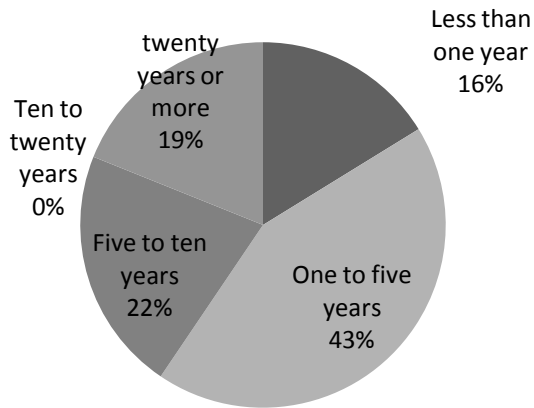
OK you've been great. Thank you so much. These are the last questions. May I continue?

What are your current concerns about your neighborhood?	
Are you concerned about pollution in your neighborhood?	<input type="checkbox"/> yes <input type="checkbox"/> no Notes
Can you name any groups that are active in your neighborhood? For example: Greening of Detroit, a church group, non-profits or Community Development Corporations, Neighborhood Watch, Creekside, etc.	
If you could see any one thing change in your neighborhood, what would it be?	
What's your favorite thing about living here? or What makes your neighborhood unique?	

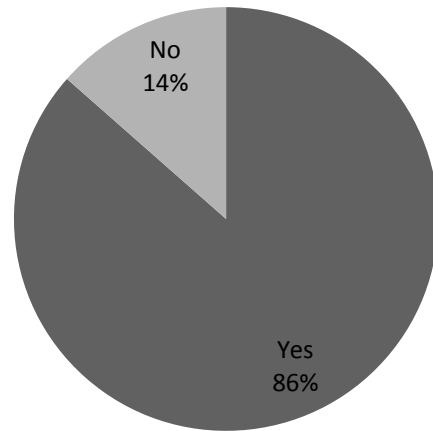
Thank you so much for your help! Have a nice day.

Living Situation Graphs

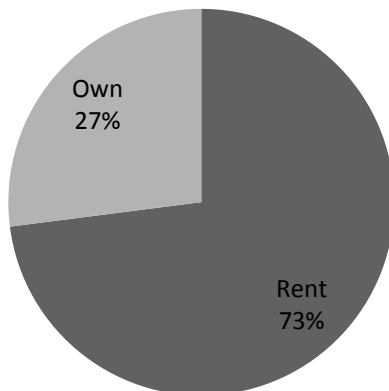
Resident's Time at Residence



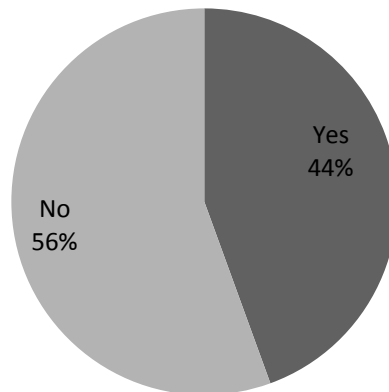
Head of Household



Rent or Own

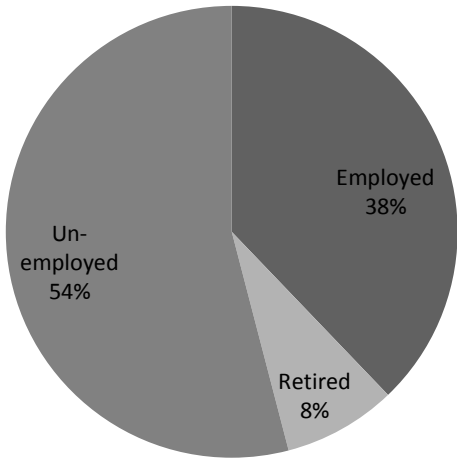


Lives with Significant Other

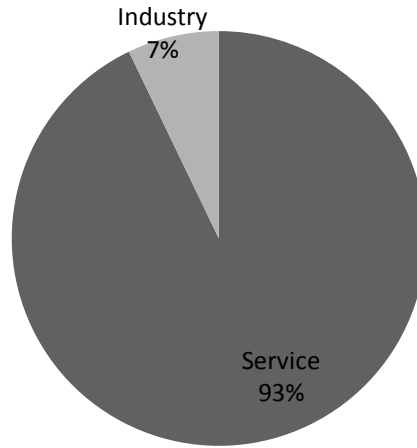


Economic Situation Graphs

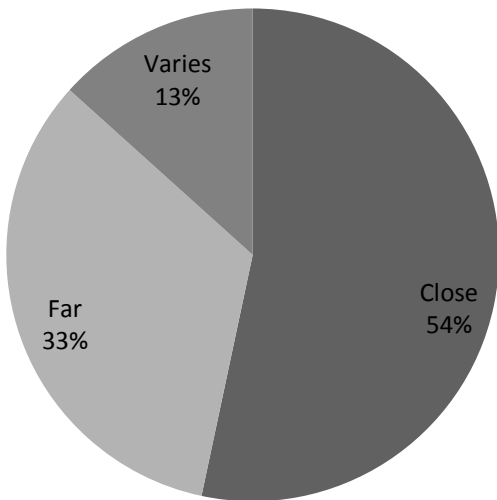
Employment Status



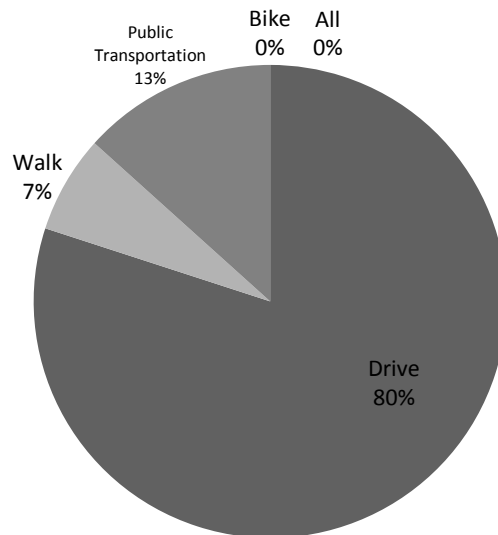
Employment Sector, Percent of Employed



Distance to Work

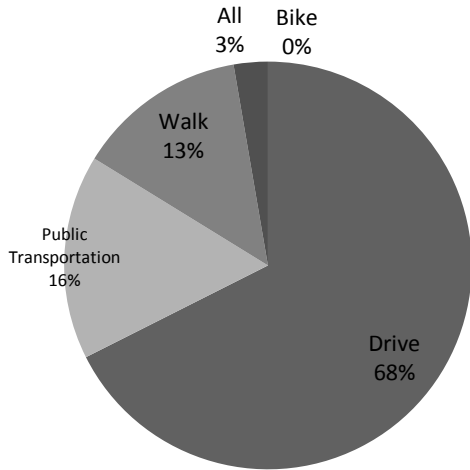


Transportation to Work

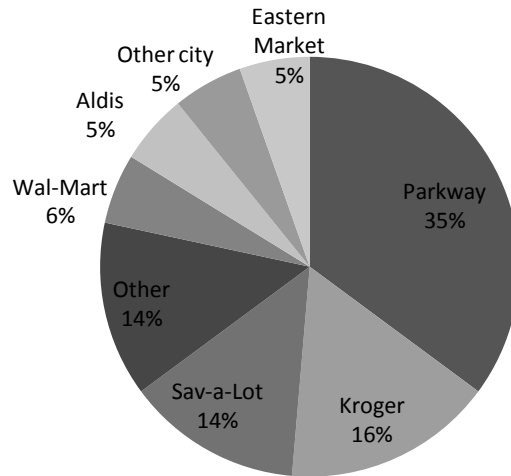


Shopping Preference Graphs

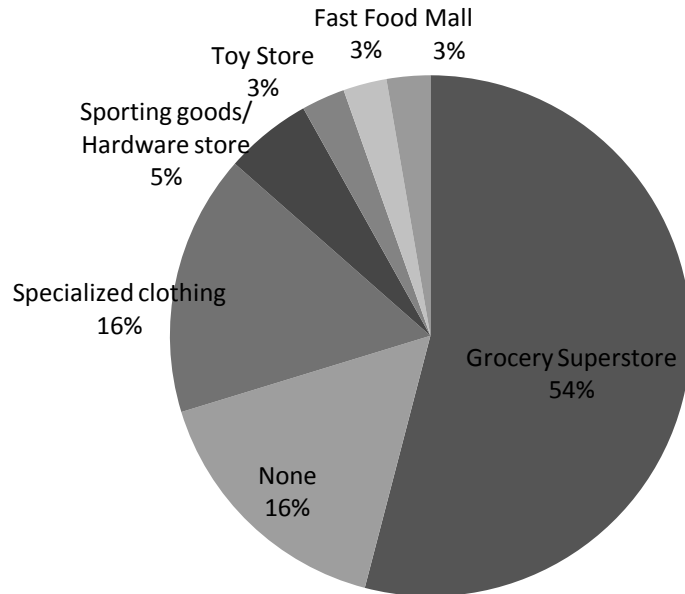
Transportation to Shopping



Grocery Shopping Destination

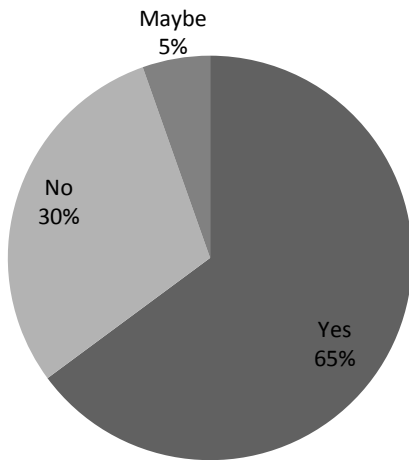


Desired Shopping Destination

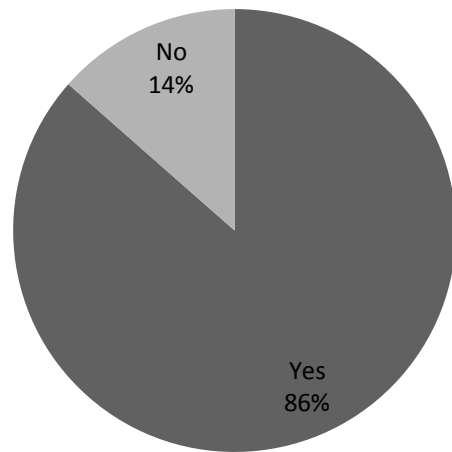


Gardening Preference Graphs

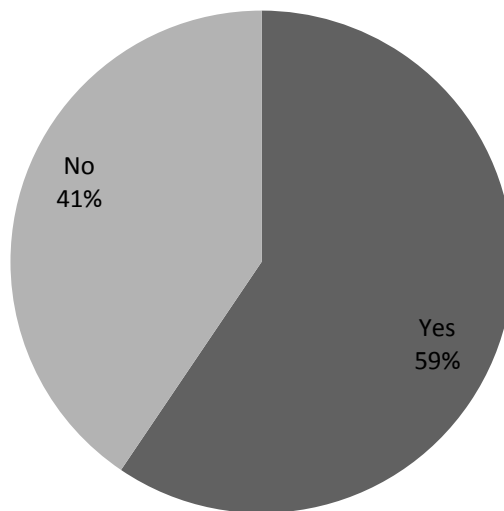
Interested in Gardening



Interested in Growing Food

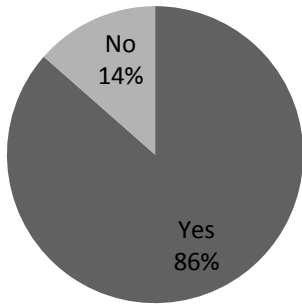


Gardens on block

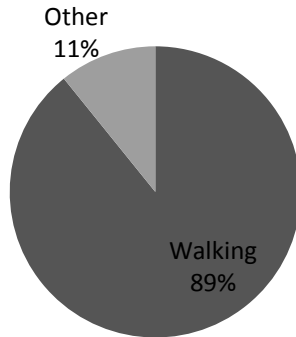


Activity Preference Graphs

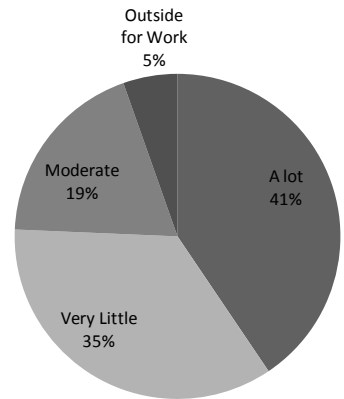
Park near Home



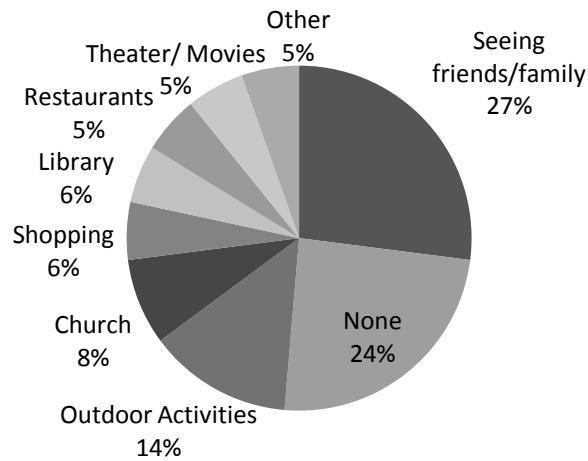
Favorite Outdoor Activity



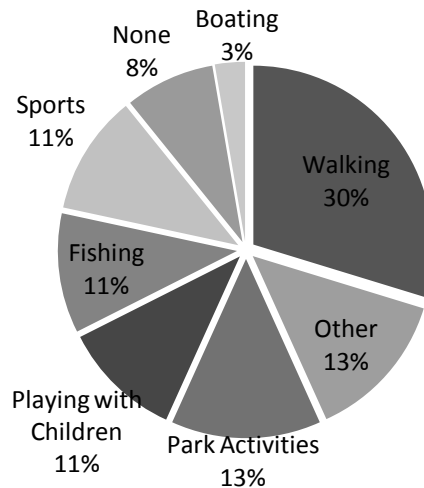
Time Outdoors



Favorite Activity

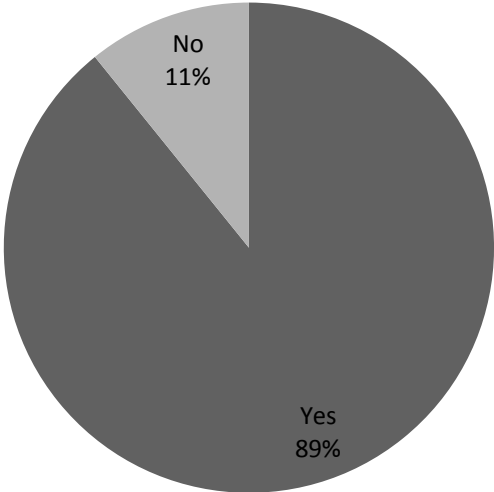


Favorite Outdoor Activity

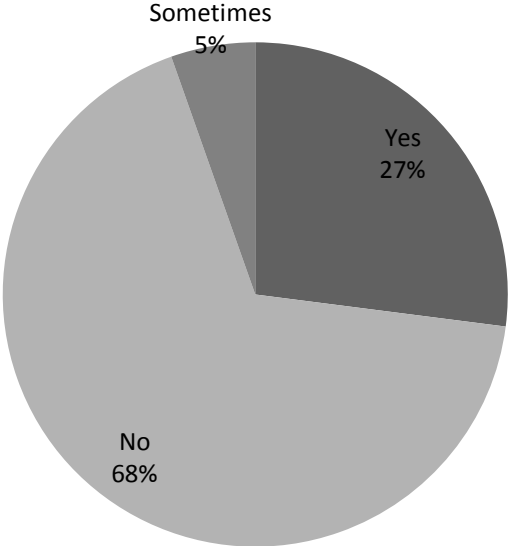


Safety Graphs

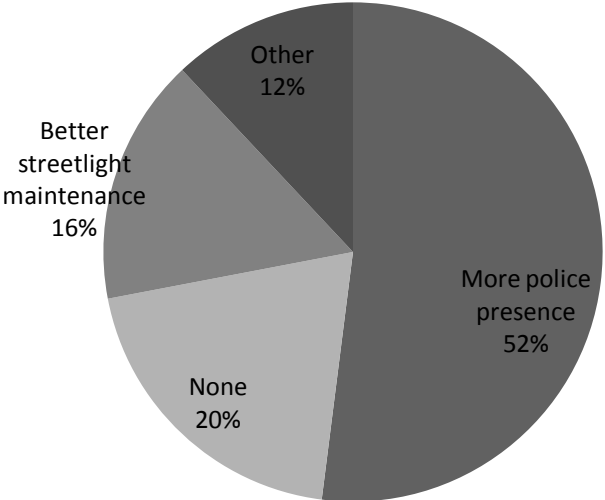
Feels Safe During Day



Feels Safe at Night

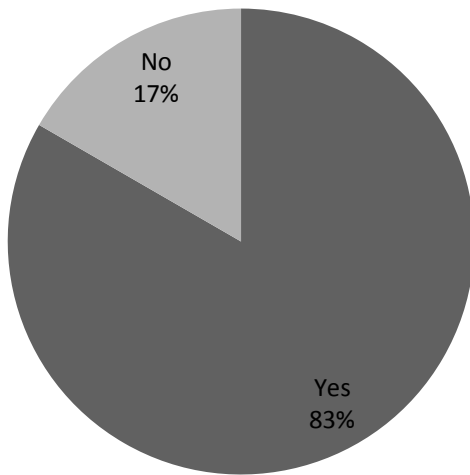


Would Feel More Safe at Night with...

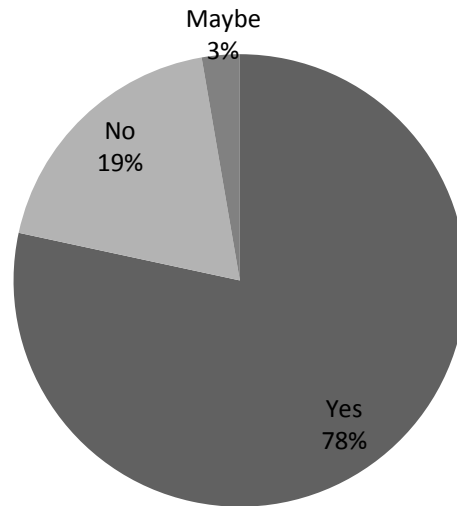


Community Collaboration and Sharing Graphs

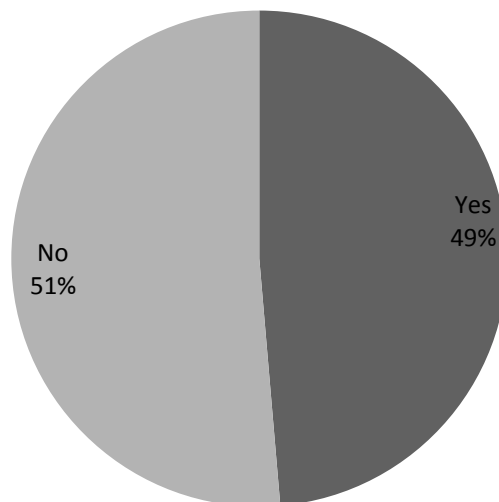
Would ask neighbors to watch home



Would Share Tools or Supplies with Neighbors

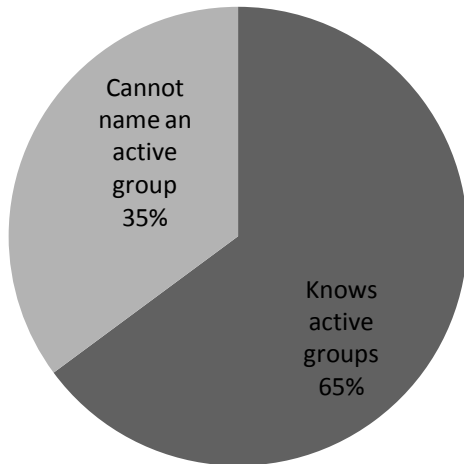


Aware of a block leader

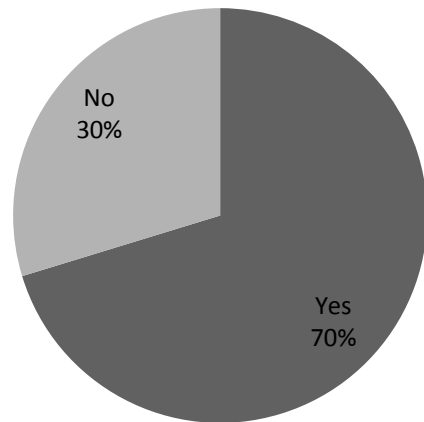


Final Questions

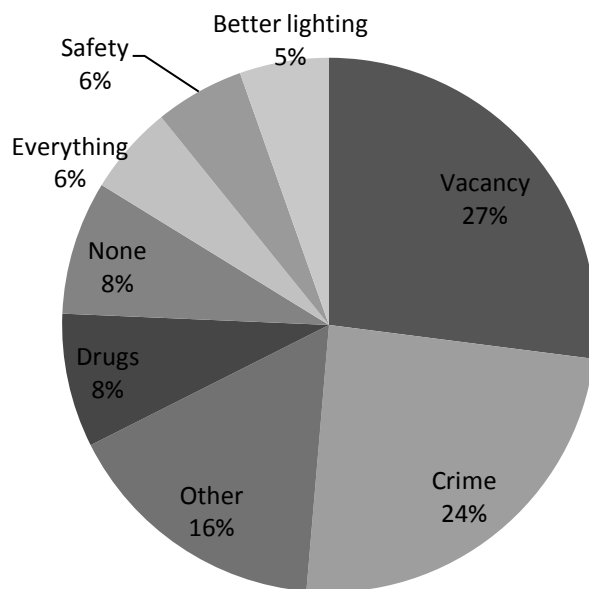
Active Community Groups



Concerned with Pollution

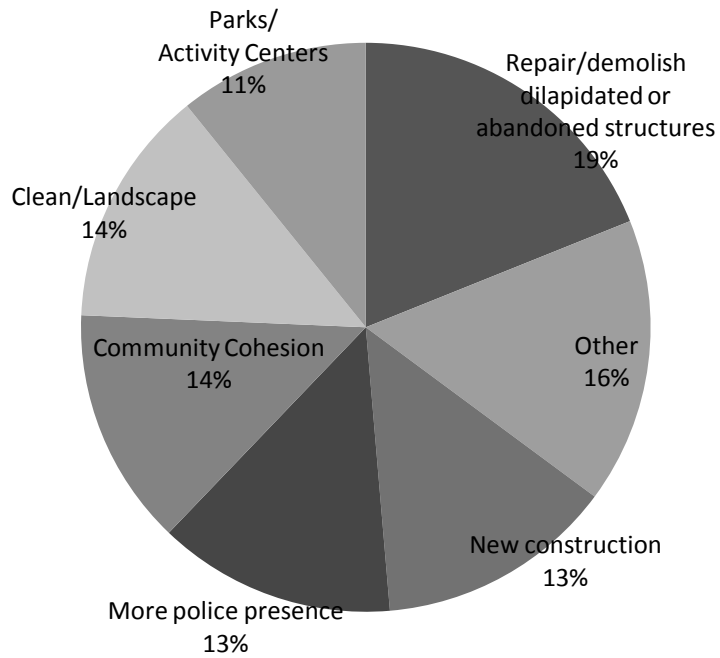


Largest Concern

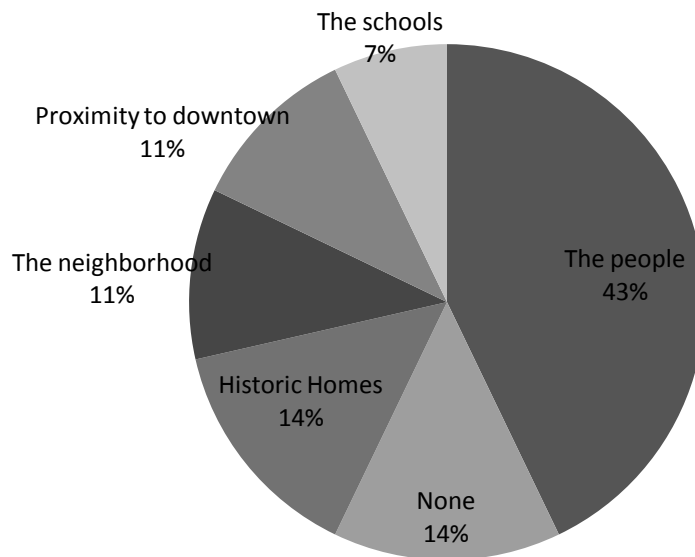


Final Questions

One Thing Resident would Change



Resident's Favorite Thing



Survey	Living Situation									
	Cross Streets		Time at Residence		Head of Household		Rent or Own		Lives with Significant Other	
	Street One	Street Two	Check Box	Years	Yes/No	Notes	Rent/Own	Notes	Yes/No	Notes
1	Jefferson	Conners	Five to ten years		Yes		Rent		No	w/ Mom
2	Jefferson	Lennox	twenty years or more	34	Yes		Rent		No	
3	Mack	Dickerson	One to five years		Yes		Own		No	
4	Chalmers	Jefferson	Five to ten years		No		Rent		Yes	
5	Fruit	Essex	Five to ten years		Yes		Rent		Yes	
6	Jefferson	Freud	One to five years		Yes		Own		No	
7	Dresel	Mack	twenty years or more		Yes		Rent		Yes	
8	6th	7 Mile	One to five years		Yes		Rent		No	
9	Jefferson	Kercheval	twenty years or more		Yes		Rent		No	
10	Marlborough	Jefferson	Five to ten years		No	Husband	Own		Yes	
11	Essex		twenty years or more	30	Yes		Own		Yes	
12	Mack	Gracier	Less than one year		Yes		Rent		Yes	
13	Conner	Jefferson	One to five years		Yes		Rent		No	
14	Jefferson	Chalmers	Five to ten years		Yes		Own		Yes	
15	Mack	Chalmers	One to five years		Yes		Rent		Yes	
16	Chalmers	Dickerson	Five to ten years		Yes		Rent		No	
17	Harper	Garland	One to five years		Yes		Rent		No	
18	Bewick	Kercheval	Less than one year		Yes		Rent		Yes	
19	Jefferson	Alter	One to five years		Yes		Own		Yes	
20	Lakewood	Jefferson	Less than one year		Yes		Rent		No	
21	E Outer Drive	Chalmers	twenty years or more	26	Yes		Own		No	
22	Mack	Warren	One to five years	1.25	Yes		Rent		No	
23	Mack	Alter	One to five years		Yes		Own		Yes	
24	Kercheval	St. Paul	twenty years or more	40-50	Yes		Own		No	
25	Conner	Mack	Less than one year		Yes		Rent		No	
26	Steele	W Man	One to five years		Yes		Rent			
27	Jefferson	Freud	One to five years		Yes		Rent		No	
28	Kercheval	Van Dyke	Five to ten years		Yes		Rent		No	
29	Manistique	Jefferson	One to five years		Yes		Rent		Yes	
30	Chalmers	S Street	twenty years or more	21	No	Visitor	Rent		Yes	Friend
31	Shane	Lafayette	One to five years		Yes		Rent		No	
32	Manistique	Jefferson	Five to ten years		No		Rent		Yes	Mother
33	Jefferson	Lakewood	One to five years		Yes		Rent		Yes	
34	Mack	Conners	Less than one year	0.25	No	Sister	Rent		No	Sister
35	Conners	Gras	One to five years		Yes		Rent		Yes	
36	E Jefferson	Chalmers	One to five years	4	Yes		Own		No	
37	Warren	Chalmers	Less than one year		Yes		Rent		No	

Shopping Preference

Survey	Grocery Shopping		Desired Stores		Transit to Shopping	
	Exact	Interpreted	Exact	Interpreted	Exact	Notes
	1	Parkway	Parkway	None	None	Walk
2	Parkway	Parkway	None	None	Walk	
3	Eastern Market/ Parkway	Eastern Market	Sporting Goods	Sporting goods	All	
4	Sav-a-lot	Sav-a-lot	Kid's clothing store, laundry mat	Specialized clothing	PT	
5	Parkway	Parkway	None	None	Walk	
6	Parkway	Parkway	Professional Clothing and attire for women	Specialized clothing	Drive	
7	Parkway, Mike's Market	Parkway	Hardware Store	Hardware store	Drive	
8	7 Mile Foods	Other	None	None	Drive	Gets a ride
9	Parkway	Parkway	Target	GS*	PT*	Rides bus and walks
10	Kroger	Kroger	Meijer, Kmart, Wal-Mart	GS	PT	
11	Parkway	Parkway	Target, Home Depot, Lowes	GS	Drive	
12	Neighbor grocery	Other	Cheaper Grocery	GS	Drive	
13	Parkway and (cheaper) Sav-a-lot	Parkway	Spartan, Kroger	GS	PT	Ride with relative to save-a-lot
14	Kroger	Kroger	Kroger, Wal-Mart	GS	PT	Sometimes bus, sometimes walk
15	Eastern Market	Eastern Market	Wal-Mart, Costco	GS	Drive	
16	Parkway and Wal-Mart	Parkway	Kroger, Wal-Mart	GS	Drive	
17	In the city	Other city	Clothing	Specialized clothing	Drive	Gets a ride
18	Sav-a-lot	Sav-a-lot	Kroger, Farmer Jacks, Wal-Mart	GS	Drive	
19	Wal-Mart	Wal-Mart	Wal-Mart, Target	GS	Drive	
20	Parkway	Parkway	Everything we need is here	None	Walk	
21	Kroger	Kroger	Wal-Mart superstore	GS	Drive	
22	Family Food	Other	Toys R Us, Macys	Toy store	Drive	
23	Kroger and Meijer	Kroger	Sonic, Meijer	Fast food	Drive	
24	Kroger (drive to suburbs)	Kroger	Clothing, better grocery	Specialized clothing	Drive	
25	Aldis	Aldis	Super Kmart, Target, Wal-Mart	GS	Drive	
26	Wal-Mart	Wal-Mart	Wal-Mart	GS	Drive	
27	Kroger	Kroger	Wal-Mart, Kmart, Target	GS	Drive	
28	Sav-a-lot	Sav-a-lot	Wal-Mart	GS	Drive	
29	Sav-a-lot, Parkway does not give back	Sav-a-lot	None	None	Drive	
30	Parkway	Parkway	Eastland Mall	Mall	Walk	
31	Clinton Township	Other city	Meijer	GS	Drive	
32	Parkway, Sav-a-Lot	Parkway	Target, Wal-Mart, Kmart	GS	PT	
33	Parkway, Kroger	Parkway	Meijer, Boston Market	GS	Drive	
34	Mazen	Other	Macys, Toys R Us, Kmart	Specialized clothing	Drive	
35	Sav-a-Lot	Sav-a-lot	Kroger, Meijer	GS	Drive	
36	Aldis at Mack and Alter	Aldis	Quality shoe or department store	Specialized clothing	Drive	
37	Big Bear Public Foods, Parkway	Other	Sav-a-lot, Aldis, more grocery	GS	Drive	

*GS = Grocery Superstore PT = Public Transportation

Gardening Preference

Survey	Gardening Preference					
	Interested in Gardening		Gardens on block		Desire to grow food	
	Yes/No	Notes	Yes/No	Notes	Yes/No	Notes
1	Yes		No		Yes	
2	Yes		Yes		Yes	Already does
3	Yes	A little	Yes	Adjacent	Yes	Very
4	No	Don't have own	Yes		Yes	
5	Yes		Yes		Yes	
6	Yes		Yes		Yes	Grew food at Grandparent's
7	No		Yes		Yes	
8	No		No		Yes	
9	No		No		Yes	
10	Yes		Yes	But far	Yes	
11	No	No time	No		No	
12	No	Not enough space	Yes	Near Mack and Maxwell	No	
13	Yes		Yes		Yes	Carrots from the school
14	No		Yes		No	
15	Yes		No		Yes	
16	Yes		Yes		Yes	
17	No	No time	Yes		Yes	No time
18	Yes		Yes		Yes	
19	Maybe	Iffy	Yes		Yes	
20	Yes		Yes		Yes	
21	Yes		No		Yes	
22	Yes	But don't know	No		No	
23	Yes		No		Yes	
24	Yes	Had one, this year didn't	No	Neighbor gardens	Yes	Got to do better flowers in front veggies in back
25	Yes		No		Yes	
26	Yes		Yes		Yes	
27	Maybe	Somewhat	Yes		Yes	
28	Yes		Yes	on Kercheval	Yes	
29	Yes		Yes	Community Garden	No	Too many squirrels and possums
30	Yes	Corn, little squash	No	Just you	Yes	
31	Yes		No		Yes	
32	Yes		Yes	Manistique Community Flowers and Food	Yes	
33	Yes		Yes		Yes	
34	No		No		Yes	
35	No		Yes		Yes	
36	No		No		Yes	
37	Yes		No		Yes	

Survey	Activity Preference							
	Time Outdoors		Favorite hang out		Park Near Home		Favorite Outdoor Activities	
	Exact	Interpreted	Exact	Interpreted	Yes/No	Notes	Exact	Interpreted
1	A lot/summer	A lot	Movies	Theater/ Movies	Yes	Harris Park	Playing w/ Kids	Playing with children
2	A lot/summer	A lot	Casino	Other	Yes	Belle Isle	Walking	Walking
3	4 hrs/day	Moderate	Fishing	Outdoor Activities	Yes		Fishing	Fishing
4	Couple hrs/day	Very little		None	Yes		Walking, Playing with kids	Walking
5	8 hours/day	A lot	Library	Library	Yes		Fishing	Fishing
6	60 hours/week	A lot	In community	Seeing friends/family	Yes	About 5	Tennis	Sports
7	10-12 hrs/day	A lot	Friends, bar, pool	Seeing friends/family	Yes	Lakewood, quite a few	Fishing	Fishing
8	Outside every day	A lot	With friends	Seeing friends/family	Yes		BBQ, hanging with friends	Other
9	8 hrs/summer	A lot	Shopping	Shopping	Yes	The school	Shopping	Other
10	8 hrs/summer 2 hrs/winter	a lot	None	None	Yes	School parks	Playing w/ Kids	Playing with children
11	40 hours/week	For Work	None	None	Yes	One Park	None	None
12	A lot	A lot	Family's House	Seeing friends/family	Yes	Lakewood Mansion Park	Hang with kids	Playing with children
13	1 hour	Very little	The school	Other	Yes	One Park	Walking	Walking
14	15 hours	Very little	Walking dog	Outdoor Activities	Yes	School parks	Walking dog, playing with kids	Walking
15	A lot in the summer, every day	A lot	Take the kids to the park	Outdoor Activities	Yes	5-10 minute drive	Everything, playing with kids	Playing with children
16	1-2 hrs	Very little	Theater	Theater/ Movies	Yes		Volleyball/skating	Sports
17	12 hours	Very little	Friends houses	Seeing friends/family	Yes	Belle Isle	Biking, walking	Park Activities
18	a lot when working	Outside for Work	None	None	No		Belle Isle, gardening	Walking
19	1 hr/day	Very little	Going out to eat	Restaurants	Yes		None	None
20	A lot	A lot	None	None	Yes	Four	Shows, taking kids to the park	Other
21	30 hours	Moderate	Restaurants	Restaurants	Yes	Chandler Park	Walking, jogging, water sports	Walking
22	3-4 hours while running errands	Moderate	None	None	Yes	Alter road park, GP park	Skating, playing at the park,	Park Activities
23	Winter- zero, summer- 40 hrs	Moderate	Library, parks, museum	Library	No		Jogging, walking	Other
24	Couple hrs/day	Very little	Front porch, back porch,	Seeing friends/family	Yes	One nice park on Jeff.	Bike riding, toboggan, roller skating	Park Activities
25	2 hrs/day	Very little	Church	Church	Yes		Walking	Walking
26	Not much	Very little	None	None	No		None	None
27	Like being outdoors	Moderate	Parks	Outdoor Activities	Yes	A few	Going to the park	Park Activities
28	5-6 hours	Moderate	The neighbors	Seeing friends/family	Yes		Walk around the park track	Walking
29	Always outside	A lot	Parks, library	Outdoor Activities	No		Fishing, Belle Isle	Fishing
30	6 hours	Moderate	Neighbors house	Seeing friends/family	Yes	Lakewood	Watch the ladies	Other
31	1-2 hours	Very little	Clinton Township	Seeing friends/family	Yes	1 park, school	Bell Isle	Park Activities
32	20 hrs/week	Very little	None	None	Yes	School parks	football/basketball	Sports
33	Quite a bit	A lot	Church, w/ family,	Church	Yes	Down by the river	Walking	Walking
34	Not often	Very little	None	None	Yes	Belle Isle	Basketball/jogging,	Sports
35	1-12 hrs	Very little	Church	Church	No		Boating	Boating
36	Summer 12 hrs	A lot	Mall	Shopping	Yes	Belle Isle	Walking, people watching	Walking
37	a lot, 4 year old twins	A lot	Play dates, friends	Seeing friends/family	Yes		Walking	Walking

Very little = less than 3 hours per day Moderate = 4-7 hours per day A lot = more than 8 hours per day

Assumptions "Time Outdoors": Without a clear time qualifier, "under 8 hours" was assumed to be a daily average, and over 8 hours referred to a weekly average.

Survey	Safety				
	Safe During Daytime		Safe at Night		
	Yes/No	Notes	Yes/No	Suggestions	Intrepreted
1	Yes		Yes		
2	Yes		No	Police	More police Presence
3	Yes		Yes		
4	Yes		No	Rapist	More police Presence
5	Yes		Yes		
6	Yes		No	More people walking, less loitering	Other
7	Yes		No		None
8	Yes		Sometimes	More Police	More police Presence
9	Yes		Yes		
10	No		No		None
11	Yes		No	Change burned out streetlight bulbs	Better streetlight maintenance
12	Yes	Kids don't play outside during day in her hood	No	Don't trust enough to walk at night	None
13	Yes		No	Security, police, guards, more streetlights	More police Presence
14	Yes		Yes		
15	No	Stray dogs	No	More police	More police Presence
16	Yes		No	More security	More police Presence
17	Yes		No	Lights	Better streetlight maintenance
18	Yes		Yes		
19	Yes		No	Get rid of vacant buildings	Other
20	Yes		No		None
21	Yes		Yes		
22	Yes		Yes		
23	Yes		Yes		
24	Yes		No	Better lighting, abandoned houses	Better streetlight maintenance
25	Yes		No	Security - patrol	More police Presence
26	Yes		No		None
27	No	More police	No	More police	More police Presence
28	Yes		No	Big dogs	Other
29	Yes		No	kind of safe, problems with street lights on Manistique	Better streetlight maintenance
30	No		No	Police, gun	More police Presence
31	Yes		Sometimes		
32	Yes	Sometimes	No		
33	Yes		No	More police presence	More police Presence
34	Yes	Notes	No	More police, neighborhood watch	More police Presence
35	Yes		Yes		
36	Yes		No	Police presence, less loitering in front of stores, less beggars	More police Presence
37	Yes		No	Cops, patrolling	More police Presence

Survey	Community Collaboration and Sharing					
	Block leader		Share tools or supplies?		Would ask neighbors to watch home?	
	Yes/No	Notes	Yes/No	Notes	Yes/No	Notes
1	No		Yes		Yes	
2	Yes		No		Yes	
3	No	Unknown	Yes		Yes	House broken into 3 times this year
4	No	Not aware of	Yes		Yes	
5	Yes		Yes		Yes	
6	Yes		Yes		Yes	
7	No		Yes		Yes	
8	No		Maybe		Yes	If trusted
9	Yes		Yes		Yes	
10	No	Supposed to have one but not sure	No		No	
11	No		Yes		Yes	
12	Yes	Don't know - not there long enough	No		No	
13	No		No	Maybe once	Yes	Has good neighbors
14	Yes	But they don't do anything	No		No	
15	No		Yes		Yes	
16	No		Yes		Yes	
17	No		Yes		Yes	
18	No		Yes		Yes	
19	Yes		Yes		Yes	
20	Yes		No		No	
21	Yes		Yes		Yes	
22	No		No		No	Know them but wouldn't ask, have alarm
23	Yes		Yes		Yes	
24	Yes	Mother- 90	Yes		Yes	Been there for years, relationship
25	No	Just moved, not sure	Yes		Yes	
26	No		Yes		Yes	
27	Yes	Person is president	Yes		Yes	
28	No		Yes		Yes	
29	Yes	Block leader + president	Yes		Yes	
30	Yes	Mr. Jack Rabbit	Yes	And they give them back	Yes	
31	No		Yes		Yes	
32	Yes	Just organized one this summer	Yes	Already do	Yes	
33	Yes	Person is VB of Block Club	Yes			
34	No		Yes		Yes	
35	Yes		Yes		Yes	Already does
36	Yes	Community Townhouse Association	Yes		Yes	
37	No		Yes		No	

Final Questions

Survey	Final Questions					Name any active groups
	Current Concerns			Concerned with pollution		
	Exact	Interpreted	Yes/No	Notes		
1	Empty houses	Vacancy		Yes		None
2	Neighborhood is going down	Everything		Yes		None
3	Vacant Lots, Dumping	Vacancy	Dumping	Yes		None
4	Safety, cleanup streets/sidewalks	Safety	Dumping	Yes		Hope Church Faith
5	None	None		Yes		Hope and Faith Church
6	The recreation center closed, no activities for kids, loitering	Other		Yes		JEBA, Creekside, SE Waterfront Coalition
7	Theft	Crime		Yes		None
8	Crime	Crime		Yes		Church/Community Group
9	Vacant houses	Vacancy		Yes		None
10	Crime and youth violence	Crime	Violence	Yes	Abandoned properties and dumping	Creekside, Hope Community Church
11	Break-Ins	Crime		No		Saint Vista, Church on Marl. and Philip
12	Not really crime, do not really communicate with neighborhood	Other		No		No JEBA
13	Safety, security	Safety		Yes		LSA, Baptist Church on Conner
14	Abandoned structures	Vacancy		No		Community church
15	Drugs, violence	Drugs	Violence	Yes		None
16	Stolen cars	Crime		Yes		Crossroads
17	Safety and abandoned homes	Crime	Vacancy	No		None
18	Crime	Crime		Yes		Church groups
19	Vacant Buildings (safety)	Vacancy		No		Church Groups
20	Abandoned buildings	Vacancy		Yes		None
21	Boarded up homes and real estate taxes	Vacancy		No		E Outer Drive Community Organization, NEAR
22	None	None		No	Swine flu	None
23	None	None		No	Don't have any	Warren Conner, Greening, Garden Group, group tours
24	Need lighting, abandoned buildings demolished, response from police	Better lighting		Yes	Water and air	None
25	Children, vacant houses	Vacancy		Yes		Church groups
26	Drugs	Drugs		Yes		Church groups
27	Educating, community safety, kids Activities	Other	Safety	Yes		Creekside, JEBA, CDC, Riverbend, "Need to get on one accord"
28	Dark at night	Better lighting		Yes		Detroit Peer Network, Butzel Family Center,
29	Too much litter, abandoned homes	Other	Vacancy	No	Recycling, need curbside	JEBA, Creekside, CDC
30	Crime, last 20 years slowed down	Crime		Yes	trash, air, water, vacant houses	None
31	Car theft	Crime		Yes		Community center
32	Abandoned homes, safety issues, people hanging around at the store	Vacancy	Safety	Yes		JEBA
33	Drugs, safety, need more police	Drugs	Crime	No		Church group, block clubs
34	Too much alley, opening, need more fence	Other		Yes	Water, trash	None
35	Good neighborhood	Everything		Yes		Church group
36	Value of home, bought at \$180,000 now worth \$50,000, field mice, abandoned lots	Other	Abandoned lots	No		JEBA
37	Vacant houses, not a lot of block clubs	Vacancy	More block clubs	Yes	A little	None

Survey	Final Questions			
	One thing to change		Favorite Thing	
	Exact	Interpreted	Exact	Interpreted
1	Get rid of empty houses	New construction	Quiet (Old People)	The People
2	Build more houses	New construction	Would love it if the neighborhood was better	The neighborhood
3	Home Construction	New construction	I own... it's mine!	Owning a home
4	Parks for kids	Parks/Activity Centers	People	The People
5	Less Empty Stores	Other	Friendly People	The People
6	More collaboration between neighbors and groups	Community cohesion	People	The People
7	Crime	More police presence	People	The People
8	People getting along, trash off yards and roads	Community cohesion	None	None
9	Clean up the streets	Clean/Landscape	Neighbors	The People
10	More new Homes	New construction	Historic Homes	Historic Homes
11	Vacant homes, fires	Repair/demolish dilapidated or abandoned structures	None	None
12	None	Other	Nothing - very community where used to live	None
13	Safety, Streetlights	More police presence	Close schools and stores,	The schools
14	Black on black crime	More police presence	My senior citizen neighbors	The People
15	More schools, closer	Other	Close community, of about 10 houses, grew up with the families	The People
16	More recreation centers	Parks/Activity centers	School system	The schools
17	Landscaping	Clean/Landscape	Neighbors	The People
18	Take down abandoned houses, cut grass	Repair/demolish dilapidated or abandoned structures	Used to think houses, but now there is too much crime and vacancy	Historic Homes
19	Get rid of liquor stores	Other	Close to a lot of stores	The stores
20	New houses	New construction	Big houses, shopping area	Historic Homes
21	More trees	Clean/Landscape	Beautiful brick homes/not boarded up	Historic Homes
22	People fixing up the neighborhood	Repair/demolish dilapidated or abandoned structures	Kids are safe to live and play on the street, there are no police on the street	Safe for kids
23	Street light has been out for a month	Other	Diversity	Diversity
24	Brought back to life, be a community again, more police	Community cohesion	Still community unity, can come together, don't have a leader	The People
25	Unity	Community cohesion	Downtown Detroit, Family gathering day	Proximity to downtown
26	Better houses	Repair/demolish dilapidated or abandoned structures	Nice neighbors	The People
27	More police	More police presence	Live on water, rivers	The water
28	Tore down abandoned buildings	Repair/demolish dilapidated or abandoned structures	Good neighbors	The People
29	Cleaning up, need new sidewalks, dead trees cut down	Clean/Landscape	Like living here	The neighborhood
30	Houses, abandoned	Repair/demolish dilapidated or abandoned structures	From Detroit, Casinos, GM, the city itself	Proximity to downtown
31	Activities for kids (more)	Parks/Activity Centers	Pretty	The neighborhood
32	Upkeep, sidewalks	Clean/Landscape	Not sure	None
33	More police presence	More police presence	Waterfront, parks, some of the people	The water
34	Neighbors	Other	Quiet, clean	Quiet
35	Park close to the house	Parks/Activity Centers	More things to do, places to go	Activities
36	Demolish vacant homes, need a community calendar with free advertising for non-profits in one place	Repair/demolish dilapidated or abandoned structures	Proximity to downtown, cultural events, community events (needs better advertising)	Proximity to downtown
37	More block clubs	Community cohesion	Easy access to a lot of stores	The stores

Appendix 4: Stakeholders & Opportunities for Collaboration

Numerous local, state, and national organizations are involved in making improvements within the City of Detroit. While the following list of organizations is far from comprehensive, it serves as an overview of the many entities already actively engaged in lower eastside redevelopment as well as shaping the future of Detroit.

American Institute of Architects (AIA)

The American Institute of Architects is the leading professional association for architects. With close to 300 state and local chapters, the AIA provides advocacy, education, and network and community building to emerging architects. In 2008, an American Institute of Architects Sustainable Design Assessment Team conducted a broad analysis that provided a variety of recommendations and opportunities for Detroit to help frame future policies or design solutions in sustainable manners. The team's recommendations were to focus on three overarching elements: increasing density, land reconfiguration, and connectivity.¹

Architectural Salvage Warehouse of Detroit

The Architectural Salvage Warehouse of Detroit is a 501(c)(3) nonprofit working in Southeast Michigan. The organization performs deconstruction projects on local building stock, salvaging reusable materials for repurposing. These materials are resold in the Salvage Warehouse, and profits are invested in historic preservation projects. Additionally, the organization trains members of the community in reconstruction, partnering with the Young Detroit Builders to give high school dropouts valuable, marketable skills.²

Community Development Advocates of Detroit (CDAD)

CDAD is Detroit's trade association of community development organizations. In August 2009 CDAD's Community Development Futures Task Force released eight essential principles for revitalizing the neighborhoods of Detroit. The Task Force, established in February 2009, is a unique multi-sector collaborative representing 76 community development organizations, government, educational and funding institutions, businesses and city-wide and regional non-profit organizations. The Task Force brings CDCs and professionals together to work with the community to create neighborhood revitalization recommendations.³ Their goals as community organizers are to resolve local problems, prevent crime and build cohesion among residents and businesses. They aim to act as a bridge between government and private market forces, working on issues such as vacant

land management and reuse as well as local housing and commercial development.⁴ CDAC envisions a “spacious, gracious, green and industrious” Detroit, and has developed a framework to match neighborhood visions and neighborhood classifications to reach this vision.⁵ CDAC’s proposed future directions include: traditional residential sectors, spacious residential transition zones, urban homestead sectors, naturescapes, green venture zones, green thoroughfares, industry zones, village hubs, shopping hubs, city hubs, and downtown.⁶ In February of 2010 they released a Neighborhood Revitalization Strategic Framework that focuses on a broad-based multi-sector process and thinking not just about current conditions, but towards “appropriate sustainable and realistic direction(s) for any given type of area in the city.”⁷ As the goals in their framework are highly aligned with those in this paper, their support and partnership in the future would be invaluable. Their plan also has the approval and support of Mayor Dave Bing.

Community Foundation for Southeast Michigan & Greenways Initiative

The Community Foundation for Southeast Michigan defines their mission as pursuing opportunities to help communities develop and implement strategies that will make them more sustainable, encouraging consideration of building stock, transportation systems, water and air quality, community connections and design. Towards these goals the Foundation has invested over \$100 million in greenways since 2001, for greenway design, planning, and construction that will create a linked system of non-motorized transport throughout the region. The Greenways Initiative also focuses on creating pedestrian opportunities in the community and hosts a series of educational programs about greenway benefits.⁸

Creekside Community Development Corporation

Established in 1992, the Creekside Community Development Corporation aims to create successful neighborhoods in Detroit’s lower eastside by addressing issues including affordable housing, environment, and education. Among Creekside’s concerns and interests promoting and strengthening neighborhood parks, improving safe pathways to schools and increasing wayfinding signage. Creekside would like to see more opportunities for community recreation and to increase the programming available at centers such as the Lennox Center. Creekside is currently working with JEBA, and they have expressed interest in more community collaboration between block clubs and CDCs.^{9,10} Though there is the possibility that Creekside will soon dissolve, their partnership with JEBA may provide useful transfer of knowledge and personnel in the future.

The Detroit Black Community Food Security Network (DBCFSN)

In order to build food security in Detroit’s Black community, this coalition of organizations and individuals work together to influence public policy, promote urban

agriculture, encourage cooperative buying and promote healthy eating habits. DBCFSN's efforts also include facilitating mutual support and collective action among members as well as encouraging young people to pursue careers in agriculture, aquaculture, animal husbandry, bee-keeping and other food related fields. Three main areas, urban agriculture, policy development and cooperative buying have been the focus since the group's inception.¹¹

Detroit Brownfield Redevelopment Authority (DBRA)

The Detroit Brownfield Redevelopment Authority provides incentives for revitalizing underdeveloped or under-utilized contaminated or abandoned properties. The DBRA supports many brownfield redevelopment projects in collaboration with the Detroit Economic Growth Corporation.¹² The brownfield tax incentives the DBRA provides support blighted, contaminated, or functionally obsolete property development. The DBRA significantly impacts vacant and historic property management in Detroit.¹³

Data Driven Detroit (D3)

Data Driven Detroit, formerly known as the Detroit Area Community Information System (DACIS), works to inform positive change in Detroit and the metropolitan area through community data collection, evaluation, and research. Their goal is to be the "one-stop-shop" for data about Detroit. D3's primary functions include collaborating with local governments and community agencies to develop easily accessible datasets and conducting original research in order to document a broad range of demographic, socioeconomic, and housing conditions and trends. D3 applies advanced technology for data gathering, performs analysis to improve local decision-making, and finally measures and reports results and outcomes. D3's work centers on the idea that better communities are the result of better information; communities are empowered by quality data and research.¹⁴ As they are still in the process of data gathering, their work has yet to be incorporated into our analysis.

Detroit Economic Growth Corporation (DEGC)

The Detroit Economic Growth Corporation is a non-profit organization founded in 1978 to provide technical, financial, and development assistance to the City of Detroit and business community. The DEGC works to guide investments in infrastructure, building renovations, parks, and streetscape. As a partner of the City and lead implementation agency, their initiatives include business retention, economic development, and merging public sector policy and with private sector leadership.¹⁵

Detroit Grosse Pointe Collaborative

The Detroit Grosse Pointe Collaborative works to build a stronger community and metropolitan area through the physical and social revitalization of the eastside of Detroit

and Grosse Pointe Park. They recognize that transforming the area will require collaboration with other organizations, and they are working towards physical improvements such as maintaining existing structures, improving facades for businesses, neighborhood organization, cleaning and greening activities as well as youth programming.¹⁶

Detroit Land Bank

In 2008, Detroit's City Council authorized the creation of a city land bank. The Land Bank serves to reduce barriers to vacant property clean up and redevelopment. The newly formed Land Bank will aid in turning over tax-reverted properties. By conferring these properties to the Land Bank, the City of Detroit and Wayne County will achieve financial savings through a reduced tax liability. This initiative is crucial as the latest inventory of city-owned property amounted to about 40,000 parcels, placing a huge burden on the city to pay county and state tax bills and maintenance costs.¹⁷

Detroit Local Initiatives Support Corporation

The Detroit Local Initiatives Support Corporation (LISC) is part of the National Local Initiatives Support Corporation, which was founded in 1980. The Detroit LISC is a local organization that works to help community-based organizations revitalize neighborhoods by combining corporate, government and philanthropic resources. LISC aggregates capital and invests it in neighborhood development projects and also provides technical and management assistance to community-based organizations. LISC aims to build sustainable communities and to support positive neighborhood environments, providing policy support at the local, state and national levels.¹⁸

Detroit Vacant Property Campaign (DVPC)

An initiative of the Detroit LISC led by Community Legal Resources, DVPC provides development and analysis, technical assistance, and legal support services.¹⁹ The Campaign aims to empower CDCs, neighborhood organizations, and works in collaboration with the Detroit Office of Foreclosure Prevention and Response to create an environment that supports vacant property efforts and goals and to turn vacant property into assets. DVPC's cross-sector collaboration of community leaders and advocates has aided in developing better vacant land management in Detroit.²⁰ Detroit is currently piloting vacant property plans in six Detroit neighborhoods; each plan is community driven, market-based, and focused on prioritization.²¹

Detroit Workforce Development Department (DWDD)

The Detroit Workforce Development Department is a Michigan Works! employment agency that promotes economic self-sufficiency for residents. DWDD works to match qualified workers with local employers and supports dislocated workers through

scholarships for training in expanding industry sectors. To accomplish this DWDD partners with businesses, community-based organizations, and government agencies.²²

Greening of Detroit

The Greening of Detroit is a 501(c)(3) nonprofit established to guide and inspire reforestation in Detroit. Their new vision includes creating a 'greener' Detroit through planting and educational programs, environmental leadership, and advocacy. By building community capacity the Greening of Detroit aims to increase Detroit's tree canopy cover. The organization's Planting Program reaches out to the community and mobilizes volunteers to green neighborhoods.

Over 1500 volunteers host planting projects to revitalize public spaces in Detroit, Hamtramck, and Highland Park each year. Working with a community partner to coordinate planting and volunteer recruitment and training, Greening staff, community members and volunteers spend Saturday mornings planting. Included in work days are procedural knowledge demonstrations that serve to educate residents about the types of trees going into the local ecosystem and how to properly plant. The Greening provides groups with follow-up directions on tree and site maintenance and volunteer assistance for the future. The Greening also runs youth and adult education programs, workshops and a neighborhood planting program. By working with the communities, the Greening of Detroit empowers citizens to take ownership over their land, fosters social interaction, and provides ecological and procedural knowledge regarding tree care.²³

Hamilton Anderson Associates

Hamilton Anderson is a Landscape Architecture firm that was founded in Detroit in 1994. The firm blends architecture, landscape architecture, urban design, interior design and graphic design in a unique, holistic approach to projects. Hamilton Anderson seeks, among other objectives, to pursue creative and innovative design, to design projects that have a positive impact on the environment, and to achieve quality design through collaboration with their clients. Hamilton Anderson designed the plan for Jefferson Avenue.²⁴

Jefferson-Chalmers Citizens District Council (JCCDC)

JCCDC is a neighborhood organization on the lower eastside of Detroit. JCCDC is concerned with high crime rates and would ultimately like to see more police presence in the neighborhood. They are also concerned with new business attraction, the preservation of the historical integrity of the community, and management of public parks. They work in frequent collaboration with JEBA.²⁵

Jefferson East Business Association (JEBA)

The Jefferson East Business Association is a 501(c)(3) organization that was established in 1994. Led by executive director Josh Elling, JEBA seeks to redevelop the east corridor of Jefferson Avenue with a vision to “maintain and improve existing businesses while encouraging redevelopment to create a viable and vibrant business district.” The many services JEBA offers include providing information about the potential commercial and industrial developments, attracting new business and promoting economic improvement within the community. Additionally, JEBA provides assistance to aspiring and current business owners and maintains an on-site Business Development Center which offers access to technical and professional services.^{26,27} They have also provided grants for façade improvements for businesses along East Jefferson Avenue.

Michigan Cool Cities Initiative

In 2003, Governor Granholm launched the Michigan Cool Cities Initiative to build vibrant cities that would attract jobs, people, and opportunities to Michigan. A survey of young, single, college-aged students and MI residents indicated the demand to reestablish MI communities as places where people can walk or bike more safely and frequently was high. Nearly 50 communities have already been designated as Cool Cities, an honor that gives them access to existing state grants, loans, tax credits, and services to help create mixed-use neighborhoods. Catalyst grants were also given to some to jump-start plans for improvement.^{28,29} JEBA has already received one grant for rebranding efforts from the Cool Cities campaign.

Messiah Housing Corporation (MHC)

Established in 1978, the Messiah Housing Corporation was one of the first Community Development Corporations in the U.S. Their housing services market and lease Low-Income Housing Tax Credit (LIHTC) properties that they manage and own. Their mission is to develop and maintain affordable housing for low and moderate-income families and individuals, as well as to improve the quality of life for all residents.^{30,31}

Michigan Land Bank Fast Track Authority (MLBFTA)

In 2003, under the authority of Public Act 258, the Michigan Land Bank Fast Track Authority was created to make productive and economically viable use of tax-reverted properties. The Fast Track Authority serves to increase the return of blighted properties that are currently owned by the state and local governments to productive use through redevelopment. Michigan’s economic development for urban centers uses this as a key strategy.³² They have a Neighborhood Stabilization Plan for 2009 that includes information about demolition contracting, and they run additional programs for land reuse such as the side lot disposition program, no cost affordable housing development transfers, and Garden

For Growth that helps individuals and communities lease parcels to garden and cultivate without paying taxes.

Michigan Trails and Greenways Alliance & Detroit Greenways Coalition

The Detroit Greenways Coalition is part of the Michigan Trails and Greenways Alliance, an organization that serves to guide coordination and collaboration among organizations working for greenways development throughout the state. Among the Alliances' organizations are the Midtown Loop Greenway, Southwest Detroit/Dearborn Greenway, Lyndon Avenue Greenway, Dequindre Cut, Detroit Riverwalk, Conner Creek Greenway, Corktown-Mexicantown Greenlink, Hamtramck Greenway, and Fort Street Greenway.³³ The Detroit Greenways Coalition plans and implements number of greenway projects using funds acquired from Community Foundation of Southeast Michigan and the Kresge Foundation. The Coalition's current projects include the Conner Creek Greenway, Midtown Loop, and the Dequindre Cut. In addition to building new greenways, the Coalition plans the development of bike paths throughout the City.³⁴

Michigan Urban and Community Forestry Council (MUCFC)

The Michigan Urban and Community Forestry Council (MUCFC) is a volunteer organization dedicated to improving the conservation and maintenance of urban forests. They partner with public, private, and non-profit sectors to address local forestry issues through stakeholder involvement. MUCFC is administered through the Michigan Department of Natural Resources.³⁵

United Streets Networking and Planning Building a Community (U-SNAP-BAC)

U-SNAP-BAC is a community-based organization that has worked to redevelop Detroit's lower eastside since 1985. U-SNAP-BAC's goals include using community organizing, citizen empowerment and housing development to enhance the quality of life for Detroit citizens. They strive to promote economic growth and neighborhood improvement through coalition building, resource development, joint planning and programming. U-SNAP-BAC employs a simple philosophy, "We collaborate to empower residential neighborhoods."^{36,37}

Village of Fairview Historic Society/Nick Sinacori

Nick Sinacori, a lifetime resident of the area and founder of the Village of Fairview Historic Society, documents significant past cultural aspects of the neighborhood over the course of its evolution. Nick's invaluable knowledge has been used to advocate for preservation and revitalization.³⁸ Nick lives in the same home his grandfather bought before he left to fight in World War I.

Warren-Conner Development Coalition (WCDC)/ Rebuilding Communities, Inc (RCI)

The Warren Conner Development Coalition is a 501(c)(3) that formed in the eastside of Detroit in 1984, as a coalition of community residents, neighborhood organizations, businesses, business associations and institutions. WCDC's goal is to utilize existing assets to shape the community into a safe and diverse neighborhood through collaboration, advocacy and education.³⁹ RCI is an affiliated project that uses a "Neighborhood Toolbox" to promote leadership training, technical assistance and funded projects, giving residents the hands-on-tools and capacity they need to rebuild their communities.⁴⁰

Young Detroit Builders (YDB)

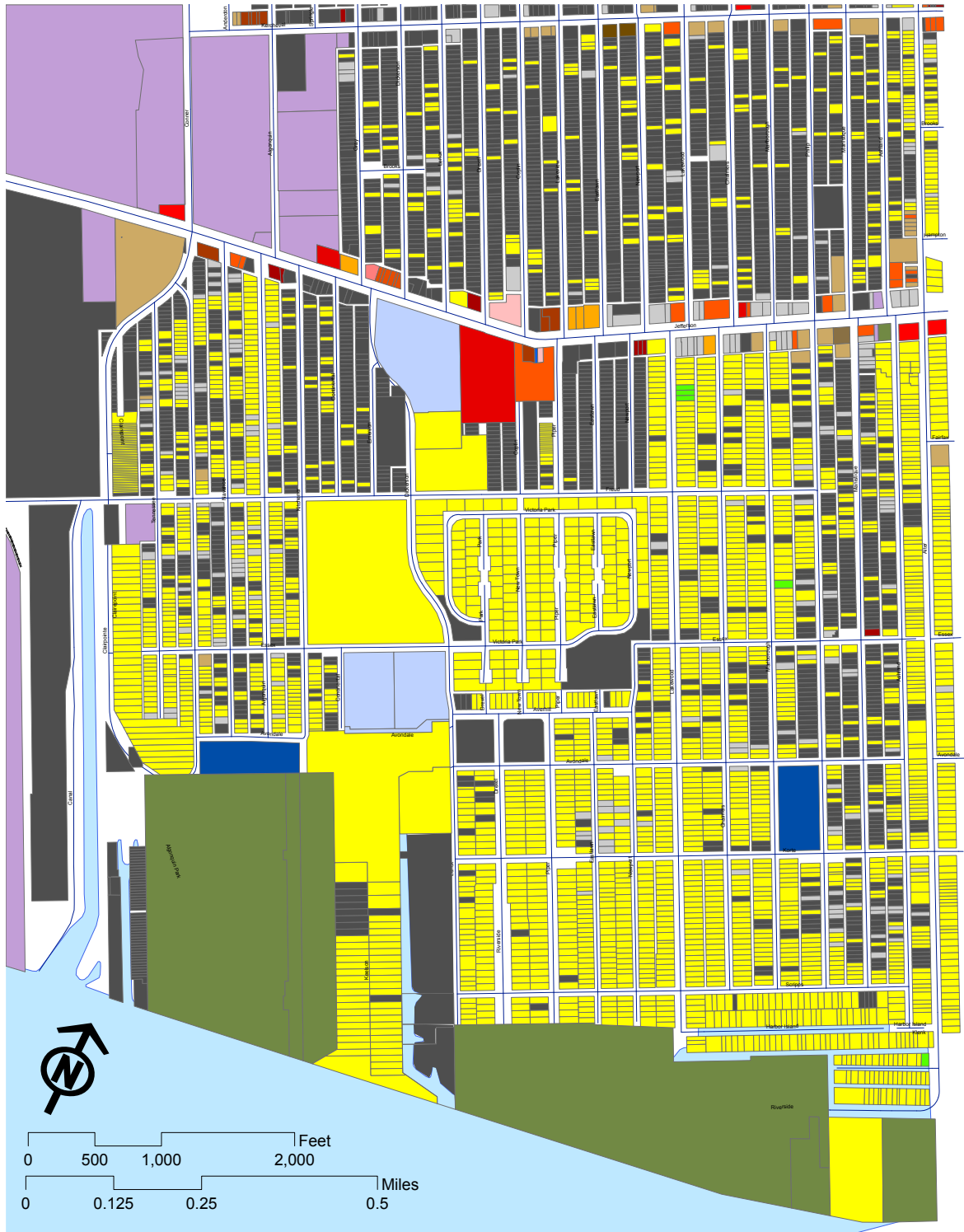
Young Detroit Builders is a 501(c)(3) which operates the YouthBuild Detroit program. This initiative promotes workforce development, training young adults and high school dropouts in construction skills as they perform deconstruction and affordable housing building projects. These youths also study for the GED exam as they train. YDB also offers assistance with supportive housing and additional career center tools.

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Appendix 6: Additional Maps & Figures



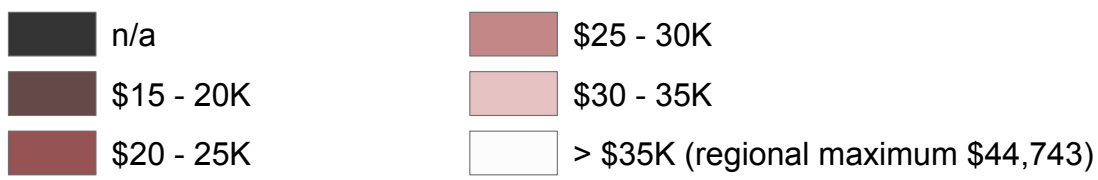
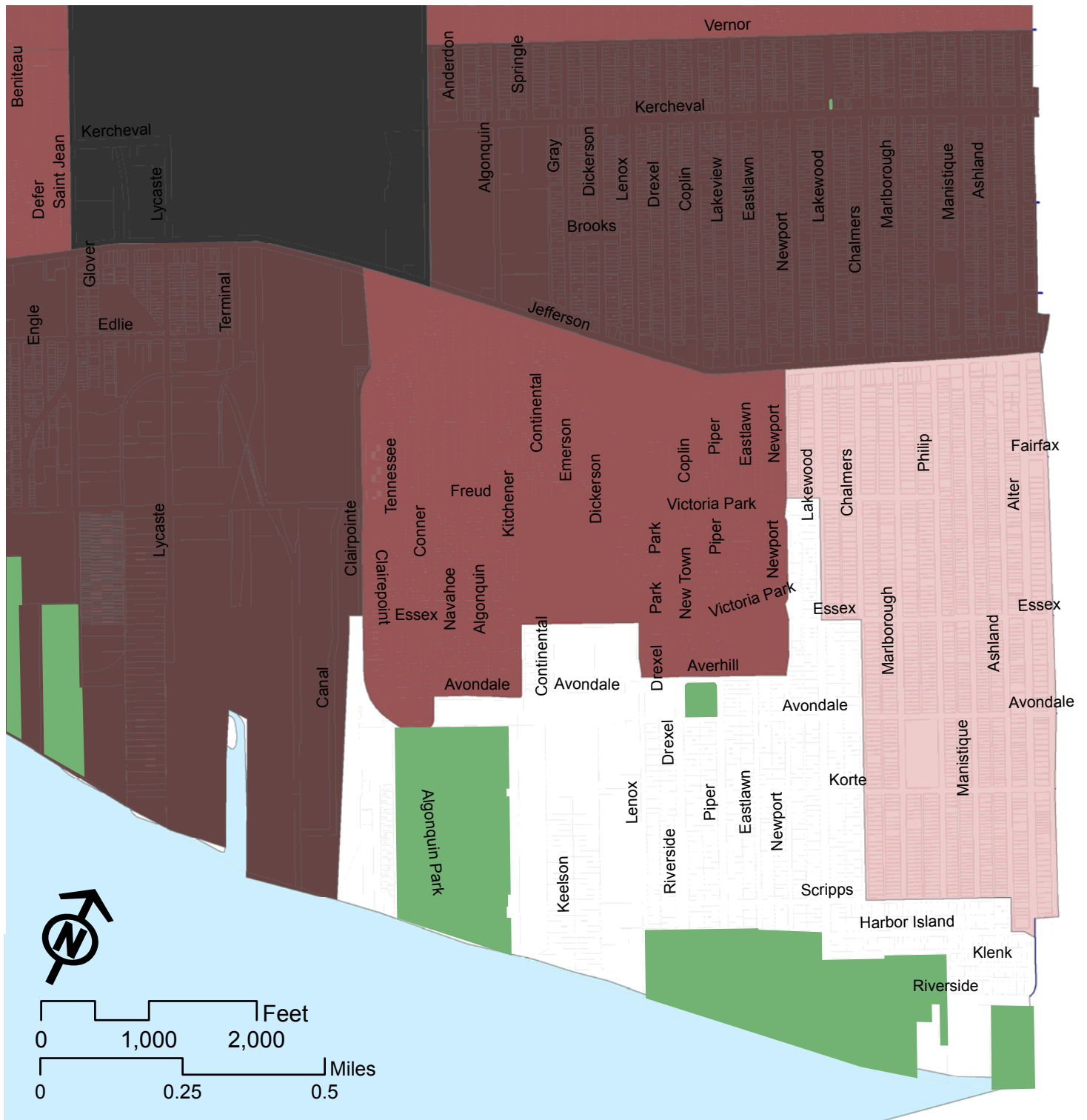
Vacancy & Property Use Patterns

Source: Nordstrom, Christopher. Windshield Survey. Mar.-April. 2010. Raw Data. Lower Eastside, Detroit, MI



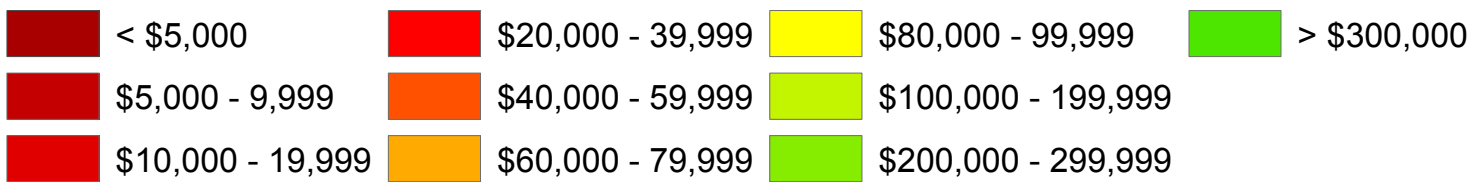
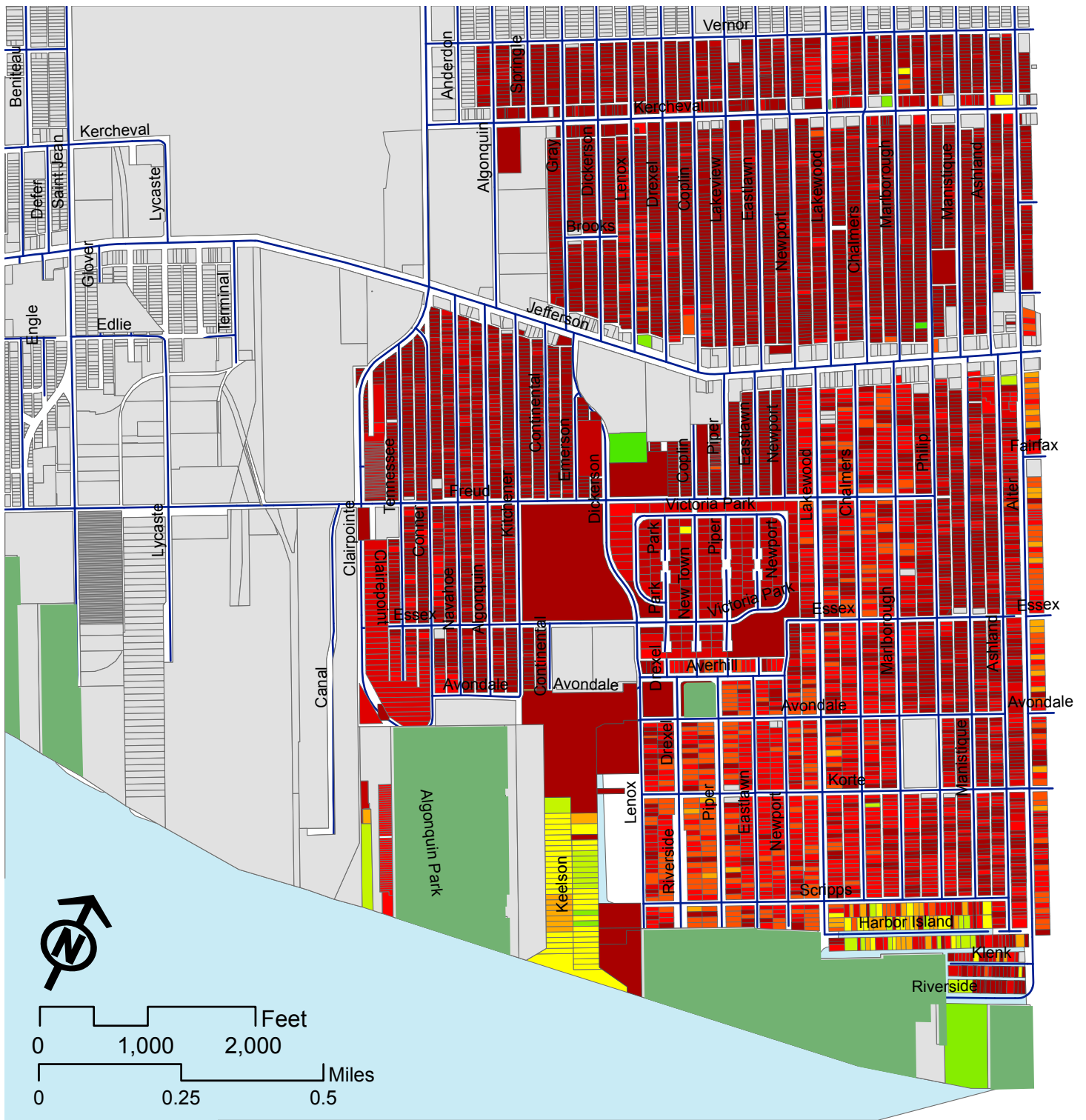
Unemployment Percentage

Source: U. S. Census Bureau. GIS population data by tract. U.S. Census 2000.



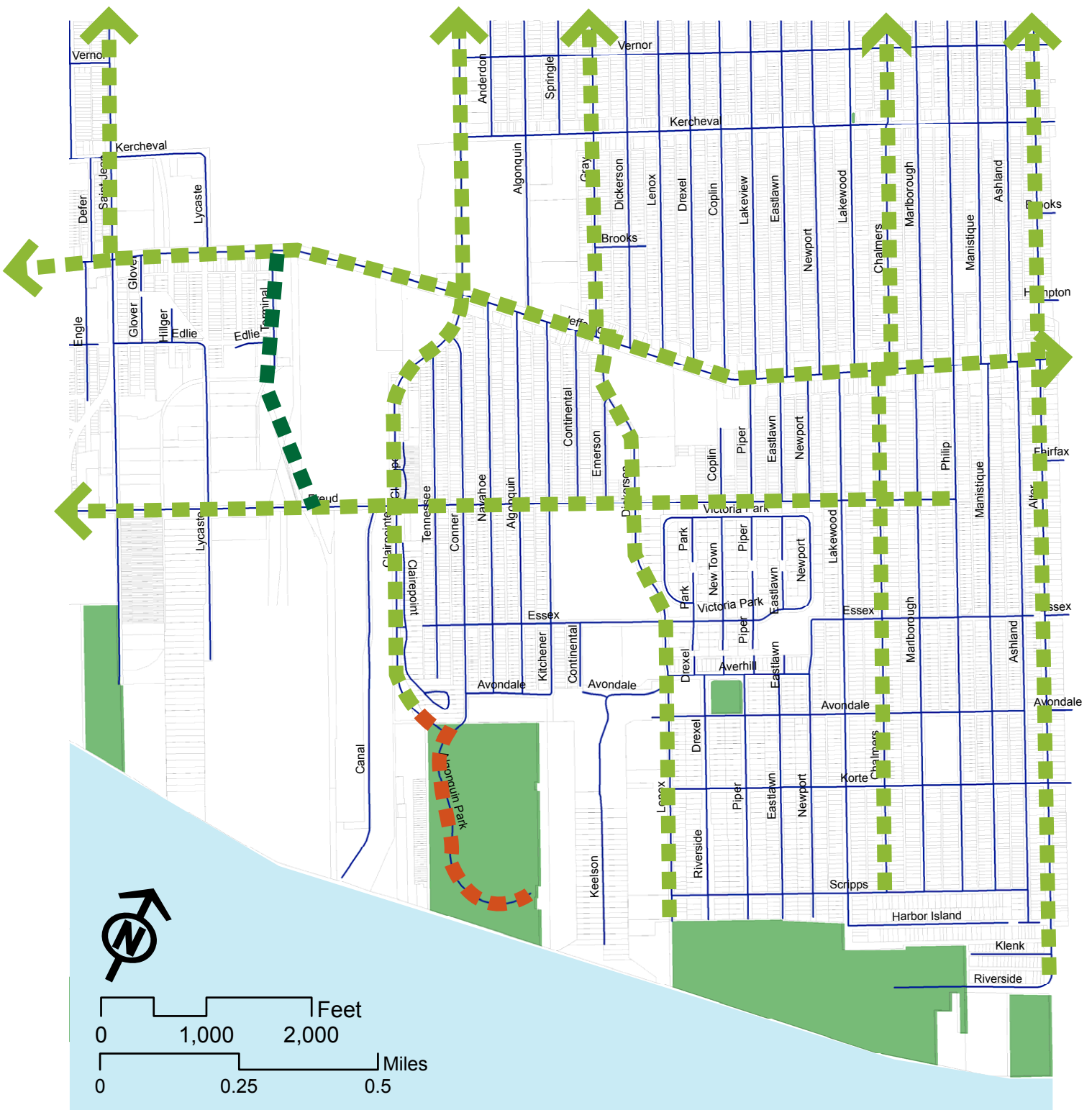
Median Income

Source: U. S. Census Bureau. GIS population data by tract.U.S. Census 2000.



Residential Assessed Value

Source: U. S. Census Bureau. GIS population data by tract. U.S. Census 2000.



Off-Street Greenway
(Conceptual)



On-Street Greenway
(Conceptual)

Greenways Approved by Detroit City Council

Source: Giffels-Webster Engineers, Carter-Burgess, ArchiveDS, and Brogan & Partners.
 Detroit Non-Motorized Pat - Citywide Destinations & Paths Map. Digital Image.
 City of Detroit Non-Motorized Urban Transportation Plan. Giffels-Webster Engineers, Jun 2005. Web. 11 Apr. 2010.



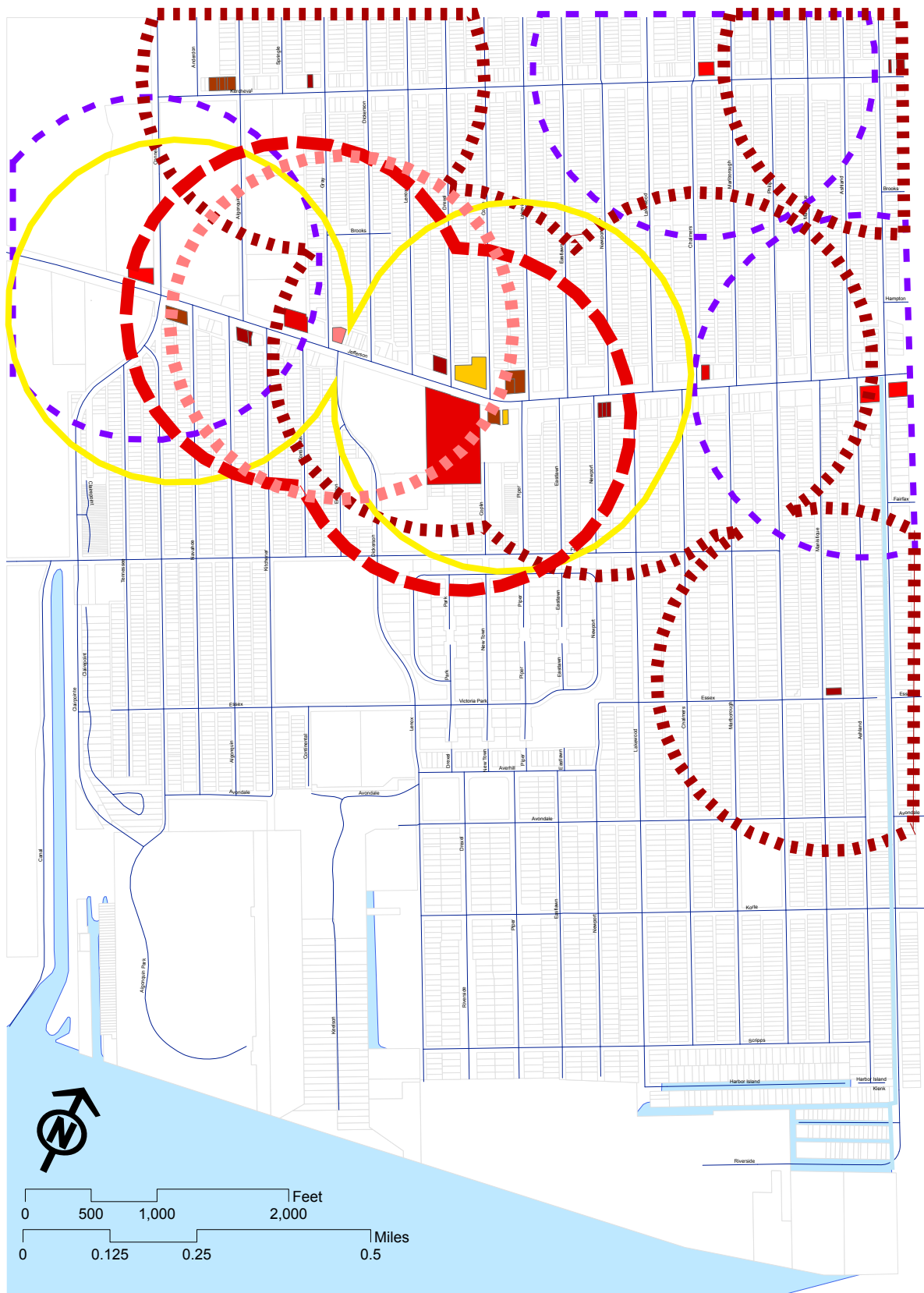
Community Garden
 Park
 School Playlot

1/4 mile walking radius from community garden

1/4 mile walking radius from park / playlot

Parks, Playgrounds & Community Gardens

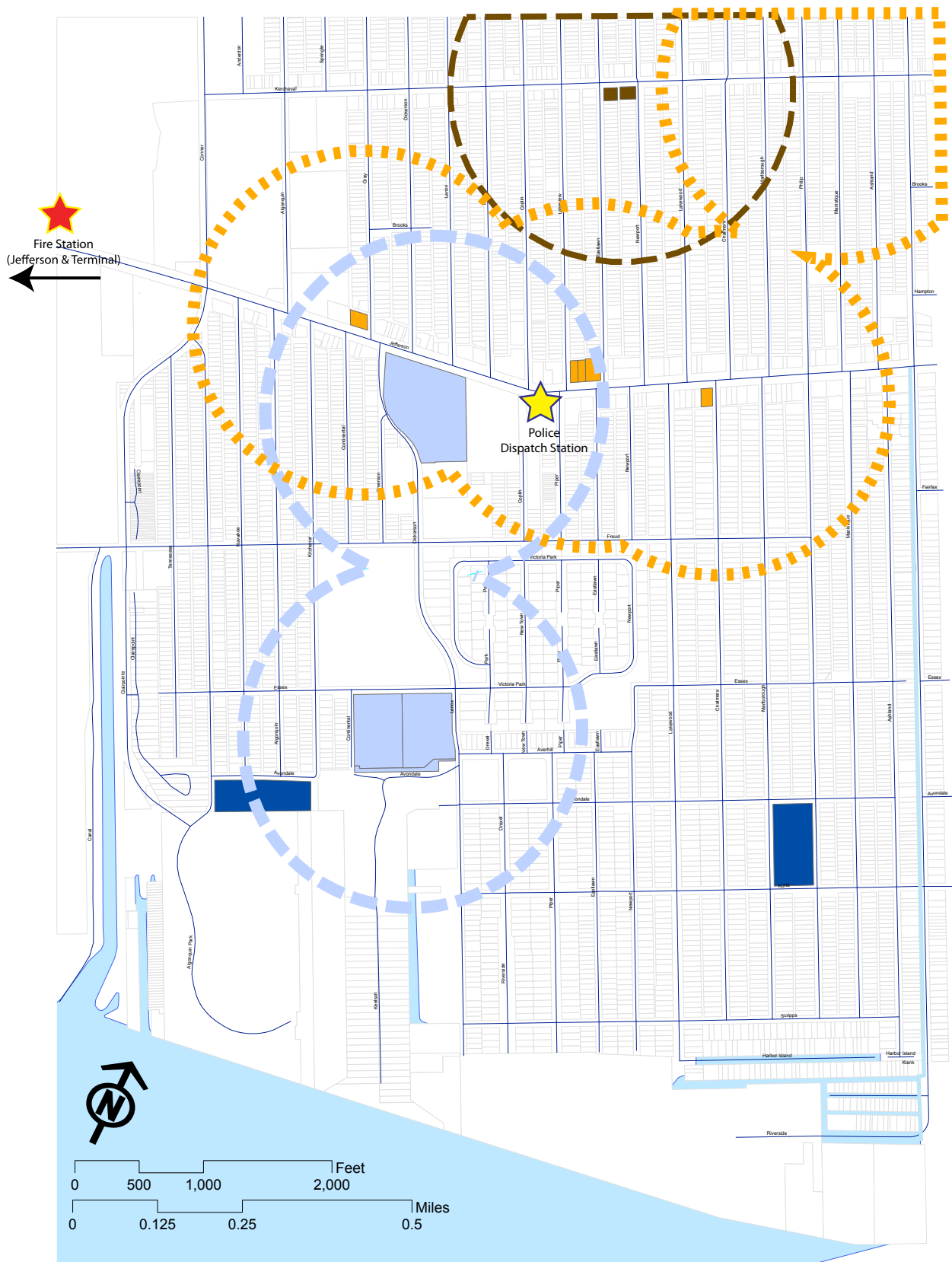
Source: Nordstrom, Christopher. Windshield Survey. Mar.-April. 2010. Raw Data. Lower Eastside, Detroit, MI



- Fast food restaurants
- 1/4 mile radius
- Retail - Grocery
- 1/4 mile radius
- Retail - Convenience Store
- 1/4 mile radius
- Retail - Gas / Convenience Store
- 1/4 mile radius
- Retail - Liquor / Convenience Store
- 1/4 mile radius

Grocery Detail & Fast Food Restaurants

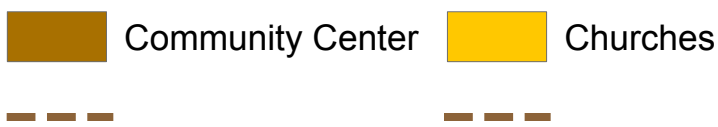
Source: Nordstrom, Christopher. Windshield Survey. Mar.-April. 2010. Raw Data. Lower Eastside, Detroit, MI



- School - Open
- 1/4 mile radius
- School - Closed
- Library
- 1/4 mile radius
- Doctor / Dentist
- 1/4 mile radius

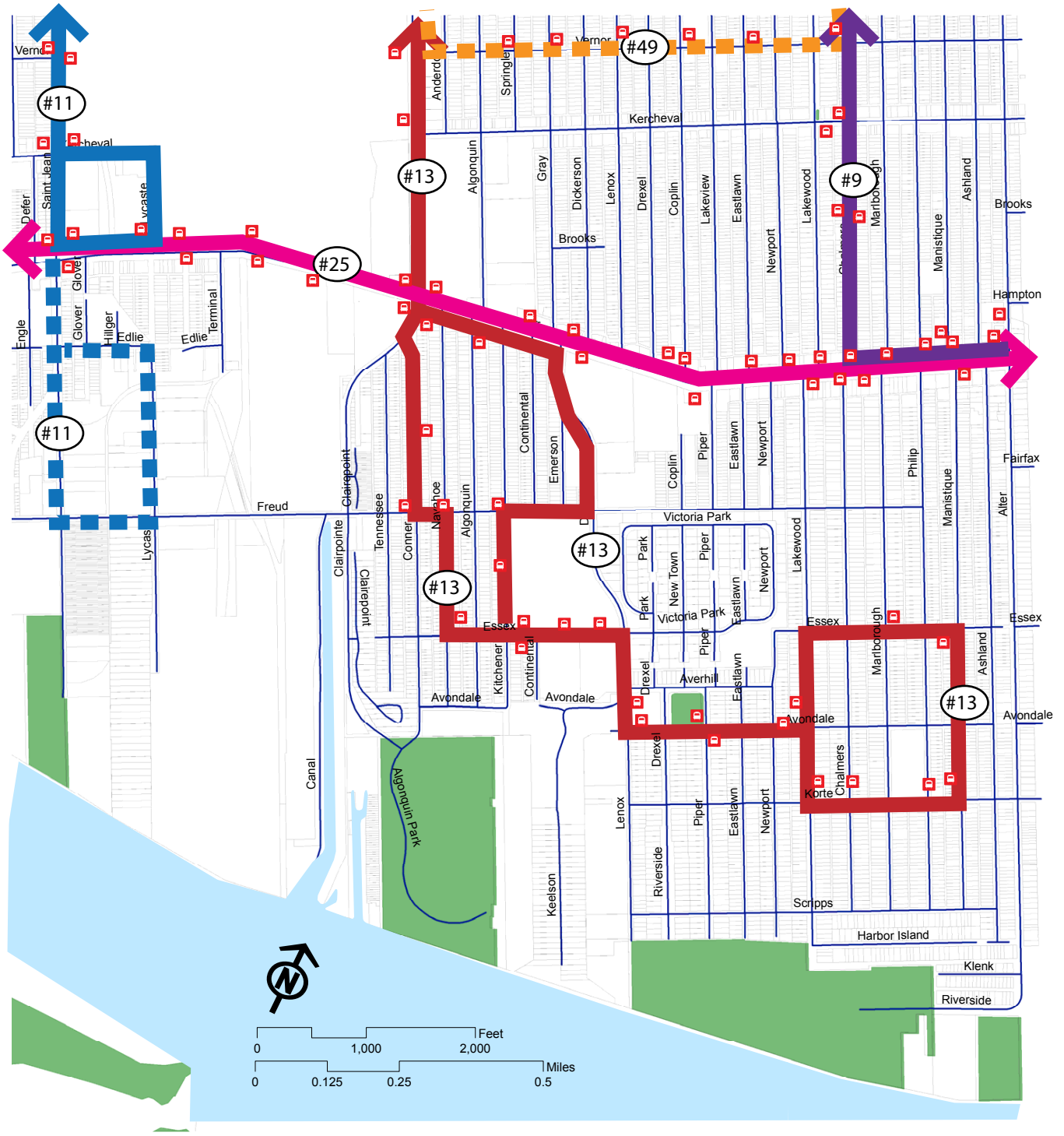
Schools, Medical, Fire, Police, & Library

Source: Nordstrom, Christopher. Windshield Survey. Mar.-April. 2010. Raw Data. Lower Eastside, Detroit, MI



Community Centers & Churches

Source: Nordstrom, Christopher. Windshield Survey. Mar.-April. 2010. Raw Data. Lower Eastside, Detroit, MI



- #9 Chalmers
- #11 St. Jean
- #25 Jefferson
- #11 St. Jean (peak hours only)
- #13 Conner
- #49 Express (peak hours only)
- bus stop (approximate)

Existing Bus Routes

Source: Schedules. Detroit Department of Transportation, 2010. Web. 20 Mar. 2010.

Appendix 7: Master Plan

Large Tract Strategy:
Constructed wetlands

Central Park

Large lot single family homes

Conner Creek Greenway

Recycling / Compost Facility

Lot strategy:
Raingardens

Dickerson Greenway

Proposed Park

Lakewood Corridor
& Greenway

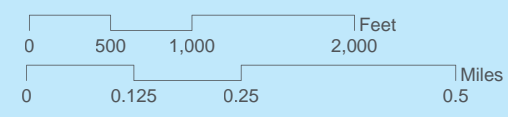
Victoria Park

Avondale Greenway

Maheras-Gentry Park

Riverwalk Extension

- Commercial / Retail
- Residential - Single Family / Duplex
- Residential - Multi-Family / Mixed Use
- Industrial
- Constructed Wetland
- Urban Agriculture
- Active School
- Deactivated School
- Church or Community Center
- Park Space
- Greenway / Bike Trail



Large Tract Strategy:
Urban agriculture

Kercheval Corridor

Monteith Library

Mixed Use Housing

Vanity Ballroom / Lakewood Square

Fox Creek Boat Access

Multimodal Transit Facility

Freud Greenway

Lot strategy:
Community Gardens

Essex Pedestrian Bridge

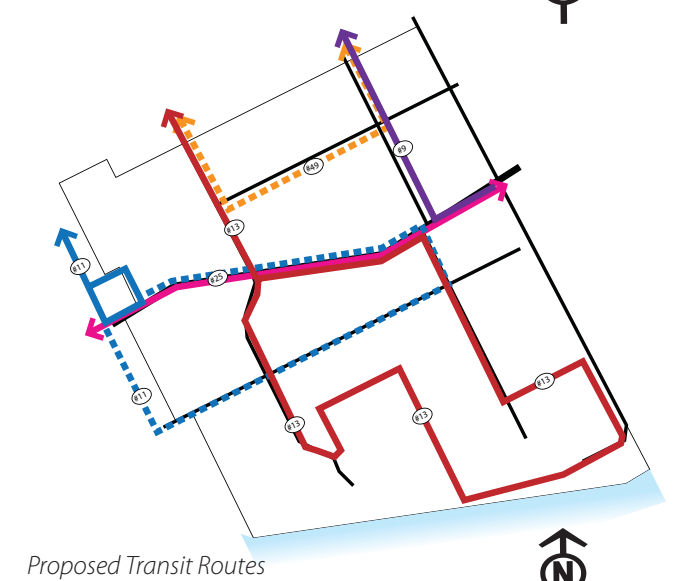
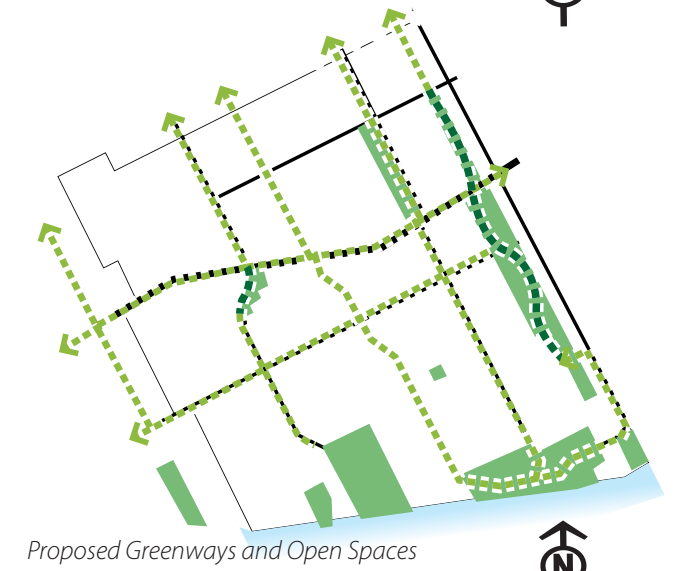
South Manistique Park

Guyton Elementary

Proposed Mariners' Park Extension

Mariners' Park

Brush-Ford /
Lakeside East Connector



Detroit's Lower Eastside - Conceptual Master Plan

Appendix 8: Metrics Matrix

	Education	Local Businesses	Local Access to Basic Needs	Access to Social Services	Unemployment	Access to Public Transportation	Food and Nutrition	Health	Poverty	Crime Rate	Access to Diverse & Affordable Housing	Desire to Stay in the Community	Perception of Safety	Community Centers & Organizations	Material Waste	% Material Recycled	Water Consumption	Energy Demand per Capita	Community Energy Consumption	% Renewable Energy Consumption	Air Quality	Water Quality	Vulnerability to Climate Events	Average Temperature	% impervious surfaces	Tree Canopy & Landscaping	Public Greenspace	GHG output/ Atmospheric Emissions	Vacant Land	Industry
Education	x	I	I	I	D	I	I	D			I	I		I	I					I			D							I
Local Businesses		x	I	I	D		I			D		I			I	I	I		I	I/D							I/D		D	
Local Access to Basic Needs		I	x				I	I	D		I	I		I																
Access to Social Services		I		x	D		I	I	D	D	I	I																		
Unemployment		D	D	D	x	D	D	D	I	I	D	D								D			I							
Access to Public Transportation		I	I	I	D	x	I	I	D		I	I					D	D		I								D		
Food and Nutrition			I				x	I	D	D		I																		
Health			I	I				x	D		I	I											D							
Poverty		D			I	D	D	D	x	I	D	D					D		D				I							
Crime Rate										x		D	D																	
Access to Diverse & Affordable Housing		I	I	I			I	D		x	I			I/D	I/D	I/D	I/D	I				D				I/D		D		
Desire to stay in the community									D		x		I																	
Perception of Safety		I					I		D			x																		
Community Centers & Organizations		I		I	I	D	I	I	D	D	I	I	I	x	I	I/D	I		I	I/D			D					D		
Material Waste							D				D	D		x	I/D	I	I	I			D	D				D	I		I	
% Material Recycled			I											D	x	I/D	D	I/D			I	I					I/D		I	
Water consumption							I	I								x						D	1							
Energy Demand per Capita			I				I	I	D					I	I		x	I	I/D	D	D	D	D	I			I			
Community Energy Consumption			I											I	I/D	I		x	I/D	D	D	D	D	I			I			
% Renewable Energy Consumption		I	I				I				I				I	D	D	D	x	I		D	D				D		I	
Air Quality							I				I										x		D	D				D		
Water Quality							I				I											x	D							
Vulnerability to Climate Events			D				D	I			D	D											x							
Average Temperature							D	D	I			I/D					I	I	I	I/D	D	D	I	x				I		
% impervious Surfaces						I	D				D										D	D	I	I	x	D	D	I	I/D	
Tree Canopy & Landscaping		I					I		D		I	I/D					D	D			I	I	D	D	D	x	I	D	D	
Public Greenspace			I				I		D		I	I									I	I	D	D	D	I	x	D	D	
GHG Output/Atmpspheric Emissions							D				D	D	D								D	D	I	I				x		
Vacant Land		D	D				D			I	D	D	D									I/D	I/D		I/D	I/D		x		
Industry		I			D			D	D	I	I/D			I	I/D	I		I	I/D	D	D	D		I	D	D	I	D	x	
Total Consequences	4	12	16	8	7	4	10	24	14	13	10	23	8	3	7	7	9	8	12	10	11	12	17	7	5	4	7	12	7	4
Total Causes	14	11	7	9	13	13	5	6	10	3	14	2	3	18	13	10	4	13	10	13	5	3	5	12	11	15	13	5	13	17
Total Connections	18	23	23	17	20	17	15	30	24	16	24	25	11	21	20	17	13	21	22	23	16	15	22	19	16	19	20	17	20	21

Appendix Sources

Appendix 1:

- ¹ US Green Building Council. LEED for Neighborhood Development. Web. 4 Nov. 2009/ <<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148>>
- ² LEED for Neighborhood Development. Version 2009. Created by the Congress for the New Urbanism, Natural Resources Defense Council, and the U.S. Green Building Council. 2009. Print.
- ³ LEED for Neighborhood Development. Version 2009. Created by the Congress for the New Urbanism, Natural Resources Defense Council, and the U.S. Green Building Council. 2009. Print.
- ⁴ LEED for Neighborhood Development. Version 2009. Created by the Congress for the New Urbanism, Natural Resources Defense Council, and the U.S. Green Building Council. 2009. Print.
- ⁵ Holowka, Taryn. *The LEED Rating System Helps Create Greener Buildings. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008:147-154. Print.
- ⁶ Bowen, Ted Smalley. *The LEED Rating System's Effectiveness is Dubious. Eco-Architecture (Opposing Viewpoints)*. New York: Greenhaven, 2008: 155-164. Print.
- ⁷ BREEAM. Web. 4 Feb. 2010. <<http://www.breeam.org/>>
- ⁸ Building Research Establishment. "About." Web. 4 Feb. 2010. <<http://www.bre.co.uk/index.jsp>>
- ⁹ Building Research Establishment. "About." Web. 4 Feb. 2010. <<http://www.bre.co.uk/index.jsp>>
- ¹⁰ BREEAM. Web. 4 Feb. 2010. <<http://www.breeam.org/>>
- ¹¹ BREEAM. Web. 4 Feb. 2010. <<http://www.breeam.org/>>
- ¹² *The Living Building Challenge; In Pursuit of True Sustainability in the Built Environment*. Version 1.3. August 2003. Cascadia Region Green Building Council. Print.
- ¹³ *The Living Building Challenge; In Pursuit of True Sustainability in the Built Environment*. Version 1.3. August 2003. Cascadia Region Green Building Council. Print.
- ¹⁴ *Sustainable Sites Initiative*. Web. 18 Jan. 2010.
- ¹⁵ "Guidelines and Performance Benchmarks." *Sustainable Sites Initiative*. 2009. Web. 26 Jan. 2010.
- ¹⁶ "Guidelines and Performance Benchmarks." *Sustainable Sites Initiative*. 2009. Web. 26 Jan. 2010.

Appendix 4:

- ¹ Mallach, Alan et. Al "Leaner, Greener Detroit" American Institute of Architecture Sustainable Design Assessment Team Report. Detroit, MI. 2008. <<http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab080216.pdf>>
- ² "Architectural Salvage Warehouse of Detroit." Web. 10 Apr. 2010. <<http://www.aswdetroit.org/about.htm>>
- ³ Community Development Advocates of Detroit (CDAD). *The Right Direction for Detroit: Community Development Advocates of Detroit Releases Statement on Future of the City of Detroit*. 7 Aug. 2009. Web. 16 Nov. 2009.
- ⁴ Community Development Advocates of Detroit (CDAD). *The Right Direction for Detroit: Community Development Advocates of Detroit Releases Statement on Future of the City of Detroit*. 7 Aug. 2009. Web. 16 Nov. 2009.
- ⁵ Community Development Advocates of Detroit. "Community Development Futures Task Force Neighborhood Revitalization Strategic Framework." Feb 2010. Web. 10 March 2010. <http://detroitcommunitydevelopment.org/CDAD_Revitalization_Framework_2010.pdf>
- ⁶ Community Development Advocates of Detroit. "Community Development Futures Task Force Neighborhood Revitalization Strategic Framework." Feb 2010. Web. 10 March 2010. <http://detroitcommunitydevelopment.org/CDAD_Revitalization_Framework_2010.pdf>.
- ⁷ Community Development Future Task Force. *Neighborhood Revitalization Strategic Framework*. Rep. CDAD, Feb. 2010. Web. 16 Apr. 2010.
- ⁸ Community Foundation. "About us." Web. 02 Nov. 2009. <<http://www.cfsem.org/>>
- ⁹ Pachota, Libby. Personal interview. 27 Aug. 2009.

-
- ¹⁰ Creekside Community Development Corporation. "Our Mission." Web. 2 April 2010. <<http://www.creeksidedetroit.org/pages/about.html>>
- ¹¹ Detroit Black Community Food Security Network. "About Us." Web. 16 Nov. 2009.
- ¹² Detroit Economic Growth Corporation. "Detroit Brownfield Redevelopment Authority." Web. 4 April 2010. <http://www.michigan.gov/documents/deq/deq-rrd-BRA-DetroitBrownfieldRedevelopmentAuthority_297365_7.pdf>
- ¹³ Paparnos, Art. "MEDC Gives Local Partner Award to Detroit Brownfield Redevelopment Authority." *Model D*. 15 Sep 2009. Web. 4 April 2010. <<http://www.modeldmedia.com/features/degcone0008.aspx>>
- ¹⁴ Data Driven Detroit. "Data Driven Detroit (D3)." Web. 4 April 2010. <<http://www.d-acis.org/>>
- ¹⁵ Detroit Economic Growth Corporation. "About Us." Web. 4 April 2010.
- ¹⁶ Detroit Grosse Point Collaborative: Connecting Communities "The Future" 2007. Web. 4 April 2010. <http://www.detroit-lisc.org/content/37/documents/dgpc_showcase.pdf>
- ¹⁷ The Detroit Regional Chamber. "Land Bank." Web. April 3 2010. <http://www.detroitchamber.com/index.php?option=com_content&view=article&id=196%3Aland-bank&catid=13%3Apolicy-and-legislation&Itemid=178>
- ¹⁸ LISC Detroit Neighborhoods Now. "About Us" 2010. Web. 4 April 2010. <<http://www.detroit-lisc.org/home.aspx?tab=5>>
- ¹⁹ Detroit Vacant Property Campaign. Home Page. Web. 20 March 2010. <<http://officemanager.law.officelive.com/default.htm>>
- ²⁰ Detroit Vacant Property Campaign. Home Page. Web. 20 March 2010. <<http://officemanager.law.officelive.com/default.htm>>
- ²¹ Detroit Vacant Property Campaign. Home Page. Web. 20 March 2010. <<http://officemanager.law.officelive.com/default.htm>>
- ²² City of Detroit. "Detroit Workforce Development Department." City of Detroit. Web 4 April 2010. <<http://www.detroitmi.gov/Departments/DetroitWorkforceDevelopmentDepartment/tabid/81/Default.aspx>>
- ²³ The Greening of Detroit. "Home Page." Web. 09 Nov. 2009. <<http://www.greeningofdetroit.com/index.php>>
- ²⁴ Hamilton Anderson Associates. "Home Page." Web. 4 April 2010. <<http://www.hamilton-anderson.com/es/day.html>>
- ²⁵ Josh Elling. Personal Interview. Detroit, MI. 2 Sept 2009.
- ²⁶ Jefferson East Business Association. "Home" 2007. Web. 4 April 2010. <<http://jeffersoneast.org/index1.php>>
- ²⁷ Jefferson East Business Association. "About" 2007. Web. 4 April 2010. <<http://jeffersoneast.org/index1.php>>
- ²⁸ Alaimo, Katherine, et al and the Michigan Dept. of Community Health. "Design Guidelines for Active Michigan Communities: Imagining, Creating, And Improving Communities for Physical Activity, Active Living, And Recreation." 2006. Print.
- ²⁹ Michigan Cool Cities Initiative. "Mission/Vision." Web. April 2 1020. <<http://www.coolcities.com/mission.html>>
- ³⁰ Messiah Housing Corporation. "Mission" Web 4 April 2010. <<http://www.messiahhousing.com/>>
- ³¹ Messiah Housing Corporation. "About Us." Web 4 April 2010. <<http://www.messiahhousing.com/>>
- ³² State of Michigan webpage: Department of Energy, Labor & Economic Growth. "State Land Bank Programs." Web. 4 April 2010. <<http://www.michigan.gov/dleg/0,1607,7-154-34176---,00.html>>
- ³³ Michigan Trails and Greenways Alliance. "Detroit Projects." Web. April 3 2010. <<http://www.michigantrails.org/projects/detroit-trails/#midtown-greenway>>
- ³⁴ Scott, Todd. Detroit Greenways Coordinator and Web Developer, Personal interview. 2 Oct 2009. Pachota, Libby. Personal interview. 27 Aug. 2009.
- ³⁵ Michigan Department of Natural Resources. "Urban & Community Forestry Council." Web. Accessed Nov. 4, 2009. <http://www.michigan.gov/dnr/0,1607,7-153-39002_38811---,00.html>
- ³⁶ U-SNAP-BAC "Home" 2009. Web. 4 April 2010. <<http://www.usnapbac.org/home>>
- ³⁷ U-SNAP-BAC. "About Us" 2009. Web. 4 April 2010. <<http://www.usnapbac.org/home>>
- ³⁸ Monts, Rodd. "An East Side Detroit Story: Remembering the Village of Fairview" *Model D*. 12 Feb. 2008. Web. 4 April 2010. <<http://www.modeldmedia.com/features/fairview17008.aspx>>
- ³⁹ Warren/Conner Development Coalition. "About the Warren/Conner Development Coalition." Web. 4 April 2010. <<http://www.warrenconner.org/wcdc.nsf/PAGE3?OpenView&Count=1000>>
- ⁴⁰ Wilson, Christine. "Rebuilding Communities, Inc/Warren-Conner Development Coalition (WCDC)." *Detroit Urban Research Center*. Web. 14 Apr. 2010.