

# TEMPE STREETCAR PROJECT



Written for the Tempe Community

Compiled by HIP<sup>2</sup>

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# TABLE OF CONTENTS

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<b>Section</b>	<b>Page Number</b>
Overview of Health Impact Assessment	2
Screening	5
Health Determinants	8
Scoping	14
Assessment: Air Pollution	18
Assessment: Physical Activity Opportunities	25
Assessment: Accessibility	40
Safe Accessibility	40
Food Accessibility	46
Assessment: Neighborhood Environment	55
Assessment: Livelihood	59
Conclusion	66
Appendix 1: Walkability Maps	67
Appendix 2: Healthy Eating Policies	72
Appendix 3: Sustainable Urban Design	74
Works Cited	76

# OVERVIEW of HEALTH IMPACT ASSESSMENT

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## Introduction

Health Impact Assessments are used to understand correlations between structured social and cultural interaction and determinants of health, and as mechanisms to reduce and redress health inequities. The health impact assessment (HIA) originates from environmental impact assessment. In the 1960's through 1970's, the main concerns within the United States were related to environmental health in correlation to the Clean Air Act. In the 1970's focused changed to not only environmental health and natural issues, but also the social view of health and the newly implemented Environmental Impact Statement (EIS) based on the National Environmental Protection Act (NEPA).

By the mid 1990's, HIAs were being used to shine light on health equity. The National Research Council defines HIA as “a systematic process that uses an array of data sources and analytic methods, and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA provides recommendations on monitoring and managing those effects.”<sup>1</sup>

The goal of HIA is to ensure that health and health disparities are considered in decision-making using an objective and scientific approach, and engaging stakeholders in the process. The purposes of HIA analysis and reporting are to judge the health effects of a proposed project, plan or policy. Explicit health impacts highlight health disparities, provide recommendations to improve decisions, and shape public decisions and discourse. The HIA process is to engage and empower communities, emphasize lay knowledge in decision-making, strengthen relationships and collaboration, and build consensus around decisions.

Three different types of HIAs exist; each has its own strengths. First, a prospective HIA offers the opportunity to consider potential health impacts before a policy, project or program is implemented. Its goals are to create adjustments that will maximize the beneficial effects and minimize any harmful effects on health. Second, a concurrent HIA is an approach to promptly counter any negative effects associated with implementation, and monitor the accuracy of predictions about potential health impacts. Third, a retrospective HIA is carried out after a program or project has been completed. It is used to inform the ongoing development of existing work.

## Methodology

There are six essential steps to complete a Health Impact Assessment.

1. **Screening** : Screening asks whether it is necessary to consider health in a policy, program or project. It answers the questions on whether the assessment should be prepared, is it going to provide sufficient benefits to install the vast amounts of time and resources needed, and are there opportunities to alter the decision making process.

2. **Scoping:** Scoping identifies the key health determinants and populations likely to be most affected; establishes the terms of reference and sets the boundaries for the assessment process.
3. **Assessment:** Assessment determines potential health impacts both positive and negative of the policy, program or project. It also considers how the impacts will be distributed through the different environmental and economic levels.
4. **Recommendation:** Recommendation involves making a series of informed judgments about possible actions for maximizing positive and minimizing negative impacts.
5. **Reporting:** Reporting formulates and presents evidence based recommendations to guide decisions for planning in relation to the policy, program, or project.
6. **Monitoring and Evaluation:** Monitoring and evaluation determines whether the impact assessment has influenced the decision making process or if it has altered some of the changes on health.

## Examples of Transportation HIAs

Three examples of HIAs prepared for transportation projects are: Eugene and Portland, Oregon and Pittsburg, California.

These three assessments correlate to the current transportation situations and address similar health issues within the Tempe Streetcar Project. These issues are related to transportation and connectivity between surrounding regions.

**Eugene, Oregon** - A HIA prepared for Eugene, Oregon addresses the health impacts of the land use and transportation objective from the Eugene Climate and Energy Action Plans. These principles were designed to reduce greenhouse gas emissions and analyze that effect on the community. Overall its usage was to thoroughly analyze the current action plan and ensure that it is successful at achieving sustainability within the city.

**Portland, Oregon** - The Lake Oswego to Portland Transit Projects HIA assesses transit services connecting Lake Oswego to Portland. The HIA aims to reserve transit right-of-way and to improve transit service in the corridor. The HIA has acted as a catalyst for improved land use, and increasing economic development and redevelopment. By altering and changing these aspects, the city can optimize the regional transit system and remain environmentally sensitive.

**Pittsburg, California** - The HIA prepared for Railroad Avenue Specific Plan in Pittsburg focuses on the principles of Transit-Oriented Design. The Plan proposes a new Bay Area Rapid Transit (BART) station with adjoining residential, commercial and retail developments. The HIA evaluates the impacts on the community. The HIA identifies positive and negative impacts on housing, livelihood, transportation, retail, public services, air quality, and environmental noise. An HIA's purpose is to evaluate the community, assess the current issues and identify impacts in health determinants. By combating ways to reduce the burning of fossil fuels and increasing pedestrian travel, cities can further achieve sustainable goals. The transportation sector of the HIA is prudent in solving multiple issues within small communities.



# SCREENING

## Overview of Tempe Streetcar Project

The Tempe Modern Streetcar will be a new segment of the regional transit system within the city of Tempe. The main focus of the streetcar is to provide a better and a more efficient mode of transportation for the residents in the city of Tempe. One of Tempe’s goals for the streetcar project is to reduce traffic congestion on the Mill Avenue corridor, to reduce Tempe’s carbon footprint, and to create a healthier and friendlier environment. The modern streetcar will encourage residents to use alternative modes of transportation, such as walking and biking. A higher prevalence in those who use alternative transportation will cause a decrease in the city’s environmental impact and will help create a healthier Tempe.

The streetcar will support the existing transit systems and its ability to attract new riders, increase mobility, strengthen existing neighborhoods and create sustainable development. The Streetcar Project received local and regional approval in 2010 to push for the 2.6-mile modern streetcar in central Tempe.

The Streetcar Project will consist of a one-way loop between Rio Salado Parkway and University Drive. The street car will go north on Mill Avenue and South on Ash Avenue. It will be a two-way system on Mill Avenue between University Drive and Southern Avenue.

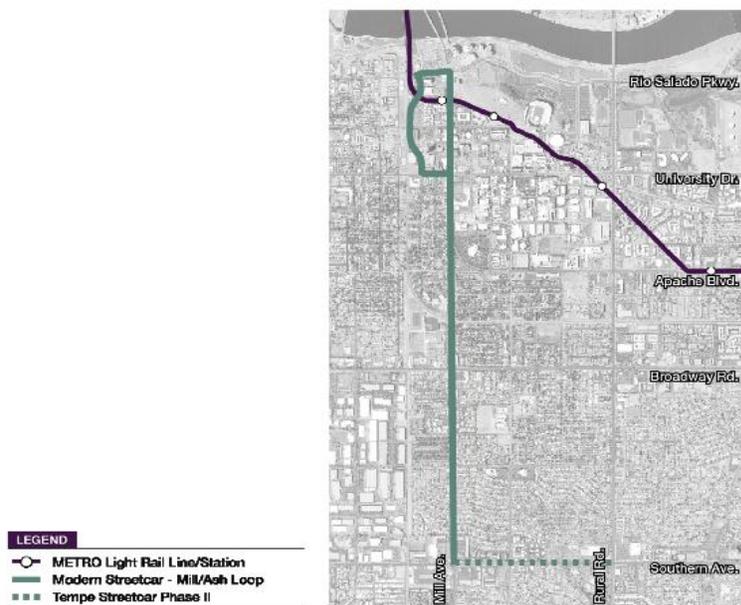


Figure 1 Map of the Tempe Modern Streetcar Project

Streetcar vehicles operate on tracks and share a traffic lane with vehicular traffic. The vehicles are powered by overhead power lines. The street car vehicles are 91 feet, compared to the typical light rail vehicle of 66 feet. As for the Streetcar stations, they will be more frequent than the light rail system. The Modern Streetcar Project will be ready for operation in 2016. The project will be built using a mix of regional Proposition 400 funds and federal grant dollars.<sup>2</sup>

A three-year study was conducted to evaluate high-capacity transit improvements for the City of Tempe and Chandler, as well as to enhance the existing regional transit network. Results indicated a need for the Tempe Streetcar. The goals for the Tempe South Streetcar Project study were to:

- Develop an efficient and affordable transportation system
- Improve mobility
- Support development goals and strategies
- Accommodate future demand
- Develop a transportation system that provides connectivity to/from neighborhoods, places of employment, and recreational facilities

The project is incorporated within the Maricopa Association of Governments' (MAG) Regional Transportation Plan, as part of the 57 miles of high-capacity transit corridors to be implemented by 2031. Also, the Streetcar Project is in concurrence with the requirements of the federal transit planning process needed in qualifying for federal funds that would support the construction of the Tempe Streetcar Project.<sup>2</sup>

## Economic Benefits of Streetcar Projects

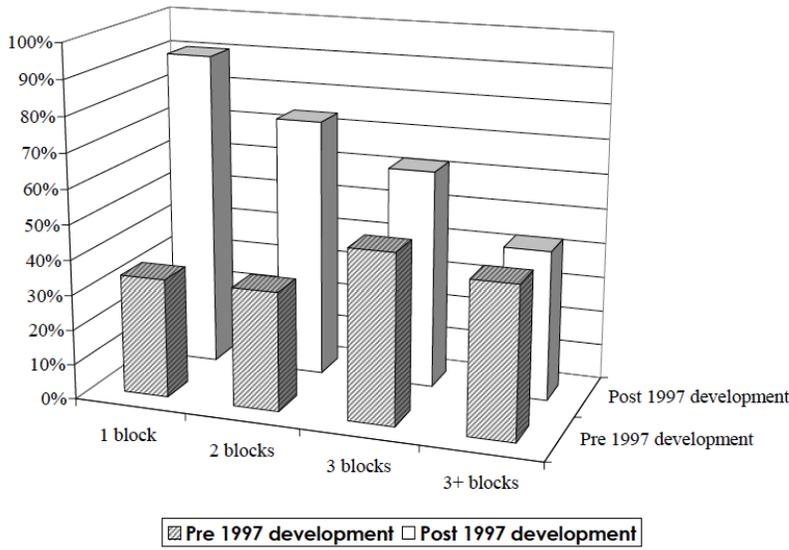
A streetcar project is very beneficial to the surrounding development. Both Portland, Oregon and Los Angeles, California have evaluated the economic development and benefits of their own streetcar projects.

According to the City of Portland Office of Transportation, "Tax assessor records indicate that post-streetcar development clustered near the alignment and achieved higher densities as proximity to the alignment increased."<sup>3</sup> Development around the streetcar alignment achieved 90% of the Floor Area Ratio allowed by the zoning, where development three blocks away and further only achieved 43% of the Floor Area Ratio allowed. The development near the streetcar alignment had approximately 137 houses per acre, while those in suburban areas of Portland only had about 7.8 per acre.<sup>3</sup>

Four specific criteria that helped determine whether proposed future investments in the Portland streetcar system are 'sound financial strategies.' These are important criteria for the City of Tempe to keep in mind as the Streetcar Project continues through its planning process. The four criteria are:

1. How does streetcar investment promote and expand employment centers;
2. Does the regulatory environment uniformly impel higher density development;
3. Do market conditions support higher density development;
4. What public incentives beyond transit are available to support high density development?<sup>3</sup>

**Figure 3. Density of Development by Distance to Streetcar**



Source: E. D. Hovee & Company, LLC.

Figure 2 This graph done by the E.D. Hovee & Company, LLC shows how much the density of development increased after the streetcar project, especially within one block of the rail line

Not only has the streetcar increased density in the Portland downtown area, but it has also helped improve how people think about development in the area. According to the report, "...the Portland Streetcar project has been recognized by the real estate and development community as a significant catalyst for redevelopment in Portland's extended downtown core area."<sup>3</sup> It has given Portland residents a strong confidence in the streetcar's ability to change the built environment surround the rail alignment.

Los Angeles analysis compared projections of the economic impact of the modern streetcar to the baseline economic development. Los Angeles concluded that their new streetcar would help create \$1.1 billion in new development, in addition to 9,300 new jobs.<sup>4</sup> In Tucson's U.S. Department of Transportation TIGER grant application, the city described that the streetcar would create over 1,500 long term jobs, and that about one-third of the jobs would be in industries which typically employ low-income workers.<sup>5</sup> The Washington, DC streetcar system is expected to add \$10-15 billion in additional property values, expand the housing market potential by 20%-50% as well as boost the percentage of citizens located on rail transit from 16% to 50%.<sup>6</sup>

## Need for HIA

The HIA for the Tempe Modern Streetcar will forward the concept of HIAs in Arizona. It is the first HIA developed in the state of Arizona and will help recognize the importance of considering health in the decision making process.

Initially, the HIA for the Tempe Modern Streetcar was developed as a learning tool. In 2010, a team of Arizona public health practitioners attended a Health Impact Assessment conference, where the team needed to present and expand on an idea for which an HIA could be developed. With two construction projects on streetcars occurring in Arizona (one in Tucson in addition to the one in Tempe), the public health practitioners felt an HIA about a streetcar would be a current topic of interest. The public health practitioners discussed the methodology of an HIA using the Tempe Modern Streetcar as an example.

The streetcar HIA document was developed as a class project for an Arizona State University course. During the spring 2011 semester, a professor and public health practitioner who had attended the HIA conference assigned his students to research and develop the Tempe modern streetcar HIA. This assignment was used to teach the importance viewing city projects from an ecological perspective and collaborative team work. Additionally, the professor emphasized considering the needs of a community when developing transportation projects.

The Tempe Modern Streetcar HIA is a milestone for Arizona. It recognizes the need for systematic review of the health impacts of urban planning and transportation. It recognizes Arizona's motivation to develop future HIA's and to use innovative strategies to better the health of communities.

## Health Determinants

The streetcar will address and impact a plethora of health determinants. The following pages describe all health determinants which the streetcar will impact, related health indicators and resources to evaluate the impact. The scoping phase will involve condensing the health determinants into five categories.

## TEMPE STREET CAR HEALTH DETERMINANTS

HEALTH DETERMINANT	EXAMPLE	HEALTH INDICATOR	RESOURCES	DETAILED RESOURCES
<b>HEALTHY HOUSING</b>	<ul style="list-style-type: none"> <li>• Affordability</li> <li>• Accessibility</li> <li>• Quality, condition, cleanliness</li> <li>• Quality of exterior environment</li> <li>• UHI</li> <li>• available green space</li> <li>• materials used inside and shell of residence</li> <li>• indoor air quality</li> <li>• use of pesticides</li> <li>• childhood poverty</li> </ul>	<p>Lead paint poisoning – cases per 1,000</p> <p>Mental health cases</p> <p>Asthma - cases per 1,000</p> <p>Resident injuries - cases per 1,000</p> <p>Asbestos</p> <p>*See Nutrition</p> <p>Sick days – school, work</p> <p>Attention Deficit Disorder- ADD, ADHD</p> <p>Number of children below the poverty level</p> <p>Average cost of housing</p>	<p>AzDHS</p> <p>MC Public Health</p> <p>City of Tempe</p> <p>CDC</p> <p>HUD</p> <p>Az Housing</p> <p>USGBC – LEED for homes; USGBC general criteria for healthy buildings</p> <p>School statistics?</p> <p>Local non-profits</p> <p>Habitat for Humanity</p>	<p>AZDH-Arizona Department of Housing Arizona Housing Commission (AHC)</p> <p>HUD-Department of Housing and Urban Development Office of Sustainable Housing and Communities Fair Housing and Equal Opportunity Community Planning and Development Office of Healthy Homes and Lead Hazard Control (OHHLHC)</p> <p>City of Tempe</p> <p>Air Quality</p> <p>Housing Services</p>
	<b>AIR QUALITY</b>	<ul style="list-style-type: none"> <li>• Contaminants</li> <li>• UHI</li> <li>• Ozone alerts</li> <li>• Proximity – US 60, I-10</li> <li>• Street congestion</li> <li>• Vehicle exhaust</li> <li>• Delivery truck idling</li> </ul>	<p>Asthma - cases per 1,000</p> <p>Asthma hospitalization - visits per 1,000</p> <p>Respiratory diseases</p> <p>Lung cancer - deaths per 1,000</p>	<p>ADEQ</p> <p>EPA</p> <p>MAG</p> <p>MC Air Quality</p> <p>MC Public Health</p> <p>Az Lung Association</p> <p>City of Tempe</p>

<b>NOISE</b>	<ul style="list-style-type: none"> <li>• Sky Harbor</li> <li>• Railroad</li> <li>• Vehicles on arterial streets</li> <li>• Trucks servicing retail</li> </ul>	<p>Hypertension Cognitive functioning Sleep disruption Stress</p>	<p>Surveys/interviews City of Tempe Sky Harbor Airport</p>	<p>CNRP (?) City of Tempe Code Compliance</p>
<b>CRIME &amp; SAFETY</b>	<ul style="list-style-type: none"> <li>• Pedestrian crossings only at arterials</li> <li>• Lack of ped/bike safety – lighting &amp; conflict areas</li> </ul>	<p>Crimes per 1,000 residents Lack of street lights - fear of nighttime walking Risks of injury at uncontrolled crossings Pedestrian injuries - cases per 1,000 Bicyclist injuries - cases per 1,000</p>	<p>City of Tempe St. Luke’s Hospital Desert Banner Hospital ASU Elem./middle/high schools Bicycle Advocacy Groups (TBAG, etc.)</p>	<p>COT Code Compliance Police Street Maintenance TBAG</p>
<b>NUTRITION</b>	<ul style="list-style-type: none"> <li>• Food deserts</li> <li>• Lack of access to “real” food</li> <li>• Lack of community gardens</li> <li>• Obesity &amp; related diseases</li> </ul>	<p>Obesity - % of population Childhood obesity - % of population Overweight - % of population Type II Diabetes - % of population Children - % of population Heart disease – deaths/1,000 Related chronic diseases</p>	<p>Tempe Schools AzDHS Food Desert Maps FDA City of Tempe Valley Metro CDC MC Public Health ASU Meals on Wheels, etc.</p>	<p><b>Health status and vital statistics site</b> <a href="http://www.azdhs.gov/plan/index.htm">http://www.azdhs.gov/plan/index.htm</a> <b>Obesity %</b> <a href="http://www.azdhs.gov/phs/bnp/nupao/Obesity.html">http://www.azdhs.gov/phs/bnp/nupao/Obesity.html</a> <b>Diabetes %</b> <a href="http://www.azdhs.gov/plan/hip/for/diabetes/index.htm">http://www.azdhs.gov/plan/hip/for/diabetes/index.htm</a> <b>First-listed diagnosis-Table one County residence % only</b> <b>Heart Disease-deaths/100,000</b> <a href="http://azdhs.gov/plan/report/ahs/ahs2009/pdf/2b6.pdf">http://azdhs.gov/plan/report/ahs/ahs2009/pdf/2b6.pdf</a></p>
<b>SOCIAL COHESION</b>	<ul style="list-style-type: none"> <li>• Lack of neighborliness</li> <li>• Lack of activity nodes</li> <li>• Lack of neighborhood gathering spaces</li> <li>• Lack of community centers</li> <li>• high percentage of absentee landlords</li> </ul>	<p>Lack of social interaction Feeling of isolation Depression Quality of life assessment – Are you happy? “how many neighbors do you know?”</p>	<p>City of Tempe Google Maps MC Assessor Tempe Ctr for Arts Tempe Town Lake Calendar Local Realtor Meals on wheels</p>	<p><b>Depression</b> <a href="http://azdhs.gov/plan/hip/for/mental/">http://azdhs.gov/plan/hip/for/mental/</a> this is the only statistics we found related to depression; large amount of data. <b>Lack of social interaction</b> <a href="http://www.tempe.gov/calendar/">http://www.tempe.gov/calendar/</a> central website for available activities near the site</p>

<p><b>PARKS &amp; NATURAL SPACE</b></p>	<ul style="list-style-type: none"> <li>• Pedestrian access</li> <li>• Proximity/Service area</li> <li>• Lack of facilities – pools, playgrounds, dog parks</li> <li>• Lack of awareness of availability</li> <li>• lack of “green links” for peds/bikes</li> </ul>	<p>Within a ¼ walking radius - % of residents            Communication within community            Bus/Orbit routes – service radius            Obesity and other chronic health issues            Organized and random events in parks            - *See Nutrition</p>	<p>City of Tempe            Google maps            MC Assessor            Community Health Status Indicator            Valley Metro/busbook            Neighborhood surveys            Tempe brochures – bike and ped paths, park info,</p>	<p>-City of Tempe call Tempe Parks and Recreation and ask if there are plans to implement parks/dog parks.            -Community Health Status/Surveys ask individual neighborhoods if they would like more parks/spaces.</p>
<p><b>PRIVATE GOODS &amp; SERVICES</b></p>	<ul style="list-style-type: none"> <li>• Lack of local owned business</li> <li>• Lack of awareness of availability</li> <li>• disinterest in serving low/middle income areas?</li> </ul>	<p>Number of local businesses            Number of national chains            Local job availability            “churn” of businesses</p>	<p>Tempe business licenses            Local First AZ            Localbusinessguide.com            City of Tempe</p>	<p>1. Number of local businesses            Resources used for 1:            -City of Tempe            -Tempe business licenses            -Local First AZ            Resources delved further:            -searched Local First AZ site for registered local businesses within our site.            -City of Tempe Tax &amp; License            Phone: (480) 350-2955. We can possibly see how much the rent would go up if a streetcar is implemented.</p> <p>2. Local job availability            Resources used for 2:            -careerbuilder.com            -Local businesses            Resources delved further:            -search career builder to see if there are openings in business.            -ask local businesses if they are hiring.</p>
<p><b>PUBLIC SERVICES</b></p>	<ul style="list-style-type: none"> <li>• Public services generally available</li> <li>• Availability of day care centers</li> </ul>	<p>Access to hospitals, police, schools/education, transit (include dial-a-ride)            Affordability/location            Weed control, yard clean-up            Recycling</p>	<p>City of Tempe            Google Maps            Tempe School District            Valley Metro (bus &amp; rail)</p>	<p><b>Schools</b>            HS district (480) 839-0292            Elementary district (480) 730-7100  <b>Emergency Services</b>            Tempe Saint Lukes (877) 351-WELL            Fire Station (480) 858-7200            Police Department (480) 350-8306  <b>Community Public Services Administration</b>            Recreation, Library, Arts/Museum, Tempe Center for the Arts, Kid Zone, CARE 7 (480) 350-5000</p>
<p><b>TRANSPORTATION</b></p>	<ul style="list-style-type: none"> <li>• Congestion</li> <li>• Induced demand</li> <li>• Vehicles as dominant mode</li> <li>• Lacks human scale</li> </ul>	<p>Pedestrian injuries – cases per 1,000            Bicyclist injuries – cases per 1,000            Vehicle accidents – numbers and locations            *See other Health Determinants for: Stress &amp; tension            UHI Effect</p>	<p>City of Tempe            TBAG            Google Maps            Valley Metro            ADOT            ADEQ</p>	<p><b>ADOT (Arizona Department of Transportation)</b>            Multimodal Planning Division (602) 712 –7333            Bike/Ped (602) 712-8141            Research Center (602) 712-3130            For calls bring up: air quality, traffic data, lightrail safety  <b>ADEQ (Arizona Department of Environmental Quality)</b></p>

	<ul style="list-style-type: none"> <li>• Inadequate bike lanes</li> <li>• Lack of walkability</li> <li>• May reduce activity level for current peds &amp; bicyclists</li> <li>• Lack of ped &amp; bicyclist safety</li> <li>• Lack of mid-block crossings</li> <li>• Presence of sidewalks</li> <li>• Width of sidewalks</li> <li>• Stormwater runoff from parking lots</li> </ul>	<p>Air Quality Obesity &amp; other chronic diseases Auto-pedestrian accidents</p>		<p>(602) 771-2300 <b>TBAG (Tempe Bicycle Action Group)</b> biketempe.org (214) 444-TBAG <b>City of Tempe</b> Tempe in Motion/ Traffic Engineering (480) 858-2350 <b>Valley Metro</b> (602) 253-5000 (complaint phone number- could ask about complaints that may pertain to HIA study)</p>
<b>WATER QUALITY</b>	<ul style="list-style-type: none"> <li>• Streets, large paved areas</li> </ul>	<p>Areas subject to surface flooding</p>	<p>City of Tempe</p>	<p>COT Public Works COT Planning</p>
<b>EDUCATION</b>	<ul style="list-style-type: none"> <li>• Lack of education regarding community sustainability,</li> <li>• benefits of “green living” for individuals &amp; families</li> <li>• fear of using bus, rail</li> </ul>	<p>Sustainable Practices/ Influx of Residents (impact on sustainability knowledge) The practice of sustainable lifestyles Use of systems Availability of programs Outreach efforts – public &amp; private</p>	<p>City of Tempe Greenzona Community Gardens Organization ASU School of Sustainability Tempe High-new green education course of study Habitat for Humanity</p>	<p>Resident Survey City of Tempe Incentive Program Neighborhood Sustainability Program Tempe Community Gardens Any other local Community Gardens Tempe High and School District Sustainable Education programs ASU School of Sustainability Neighborhood work</p>

**INEQUITIES**

- Cost of street car use
- Schedule

Affordability (Estimated cost of running street car)  
Bus ridership surveys  
Bus routes in conjunction with street car lines/Bike Community

Neighborhood Groups  
ADOT  
City of Tempe  
Valley Metro  
Aaron Golub (ASU Prof.)

Valley Metro  
Where do people come from?  
How do they pay?  
Use of Bike Racks  
Aaron Golub  
Access to safe bike routes  
Transportation Inequities  
City of Tempe  
Access to parks and open spaces  
Income Levels - U.S. Census Data

Table 1 shows the connection between health determinants, examples, indicators, resources and scientific support for potential health concerns from the Tempe Streetcar Project.

# SCOPING

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Scoping, the second stage of HIA, involves creating a work plan and timeline for conducting an HIA that includes: priority issues; research questions and methods; and participants roles. The scoping phase for this HIA was coordinated by Arizona State University students. Through that process, Arizona State University students organized the HIA health determinants into six categories: **air pollution, physical activity opportunities, accessibility, neighborhood environment and livelihood**. For each topic, Arizona State University students researched the existing conditions and how the modern streetcar might impact that health determinant. Arizona State University students also proposed conducting a community survey to assess community needs for health.

## Defining the HIA study population

The HIA study population will represent residents of Tempe. The general demographics for Tempe align with general Arizona demographics. Unsurprisingly, the home ownership rate in Tempe is lower than in Arizona. A lower homeownership rate indicates that the city of Tempe has a high population of college students, who most likely rent housing. While the median household income level is not significantly higher than Arizona’s median, however, the median value of housing units is much greater. Additionally, Tempe has a higher percentage of persons living below the poverty line, than Arizona. The comparison between the expensive homes versus the large percentage of individuals living below poverty displays a huge gap in socio economic levels in Tempe. For the number of owner occupied and rent occupied households, 9.6% of occupants do not have access to a car. With a large gap in socio economic levels, it is extremely important that the Tempe Modern Streetcar reach residents who do not have the financial capabilities to afford a vehicle and connect those individuals to services and resources offered in the city.<sup>7</sup> Therefore, the streetcar will provide increased transportation equity for those who do not have access to a car, and it will decrease the gap between socio economic levels.

### Select demographics of Tempe vs. Arizona

	Tempe	Arizona
Homeownership rate, 2006-2010	46.7%	66%
Median value of owner-occupied housing units, 2006-2010	\$248,500	\$168,800
Persons per household, 2006-2010	2.42	2.63
Median household income 2006-2010	\$47,443	\$46,789
Persons below poverty level, percent, 2006-2010	20.6%	12.5%

Table 2 Displays select demographics in the city of Tempe vs. the state of Arizona; the largest differences are seen between the city and state for the median value of owner-occupied housing units and the poverty level.

For more in depth analysis, the HIA study population is broken down into the following subareas:

- Ash Ave-Farmer subarea (split into 5<sup>th</sup> Street and Mill Ave corridors)
- Mitchell Park
- ASU/Daley Park subarea
- RESCOM subarea
- Boradmor/McKemy subarea
- Southern/South subarea (split into East of Mill Ave, West of Mill Ave and Mill Ave corridor)

The chart below shows how the geographic region is categorized. These subareas were used to determine walkability improvements needed and food accessibility. The allowed the students to provide in depth analysis of the HIA study area and suggest recommendations tailored for each subarea.

# Tempe Modern Streetcar Project HIA

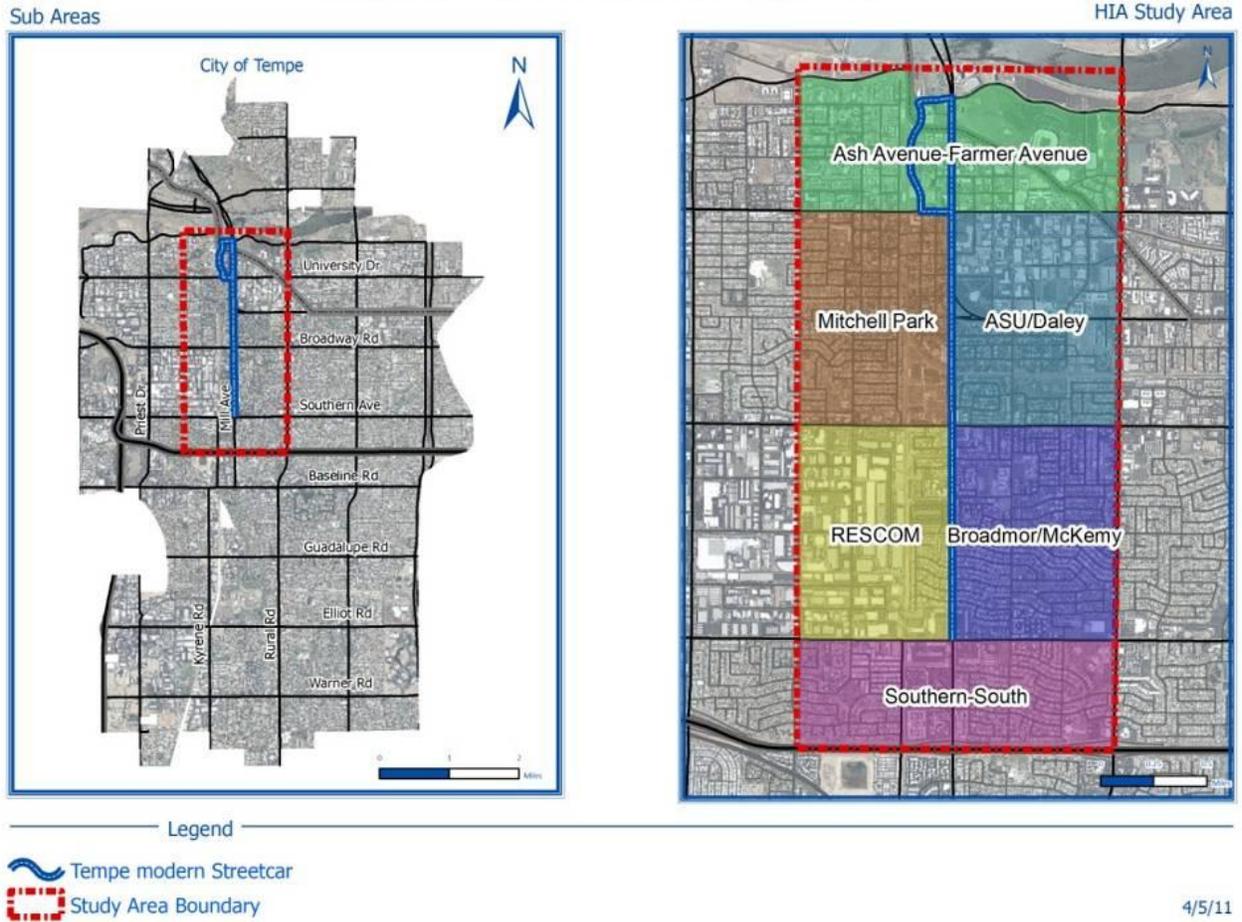


Figure 3 Shows the subareas of the HIA study population used throughout the assessment section

## Need for Streetcar

The purpose of the Tempe Modern Streetcar is to help develop and strengthen Tempe’s downtown area. According to the Tempe Streetcar Environmental Assessment, the streetcar will:

- Increase transit ridership in the Mill Avenue corridor;
- Connect neighborhoods to downtown Tempe;
- Connect downtown residents to neighborhood services;
- Encourage redevelopment of underutilized parcels;
- Encourage reinvestment in neighborhoods;

- Promote livable city and green; sustainability initiatives;
- Provide seamless connection to LRT;
- Support ASU travel demand;
- Improve service for special events.

The streetcar will help make Tempe more vibrant by attracting new and diverse riders, enhancing Tempe's unique character, and by creating opportunities for high mixed high density development.

The streetcar will also help satisfy a demand for public transit and reduce traffic congestion in Tempe. Predicted ridership estimates are in 2016, the streetcar will reach a ridership capacity of 2,000 individuals per day. The current local bus ridership for Tempe is 2,000 individuals per day. This number includes ridership on Routes 65 and 66. The streetcar will double the public transit ridership capabilities, for the city of Tempe. Additionally, the streetcar project plans encompass a bus route between Rural Road and Chandler. This will better connect Tempe and Chandler, and will take shape as funds become available.<sup>2</sup>

# ASSESSMENT: AIR POLLUTION

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## Air Pollutants and health

According to the Center for Diseases Control and Prevention (CDC), outdoor air pollutants are one of the important asthma triggers. Asthma is one of the most common chronic conditions of adults and children. An attack occurs when the sides of airways and surrounding tissue swell, leading to a decrease in airway passage size. Less oxygen is able to get into the body. If the asthma attack is severe enough and not treated, it can be fatal (CDC). The prevalence of asthma in Arizona is much greater than the rest of the country. In 2009, 8.4% of the US adult population self-reported as having been diagnosed with asthma, while 10.4% of the Arizona population self-reported the same outcome. When comparing differences in age groups, and differences in genders, Arizona boasts a higher prevalence in almost every category:<sup>8</sup>

<b>Adult Self-Reported Current Asthma Prevalence Rate by Age, 2009</b>		
	AZ %	U.S. %
18-24	16.2%	11.2%
25-34	12.5%	8.4%
35-44	8.9%	7.7%
45-54	9.9%	8.4%
55-64	11.9%	8.7%
65 and older	7.7%	7.5%

Table 3: Describes the prevalence of asthma, stratified by age groups.<sup>9</sup>

<b>Adult Self-Reported Current Asthma Prevalence Race/Ethnicity, 2009</b>		
	AZ %	U.S. %
Non-Hispanic White	11.8%	8.7%
Non-Hispanic Black	21.2%	9.6%
Non-Hispanic Other	5.7%	7.2%
Non-Hispanic Multiracial	36.7%	14.6%
Hispanic	6.4%	6.3%

Table 4: Shows prevalence of asthma, stratified by race and ethnicity<sup>9</sup>

<b>Adult Self-Reported Current Asthma Prevalence Rate by Gender, 2009</b>		
	AZ %	U.S. %
Male	10.1%	6.4%
Female	11.5%	10.3%

Table 5: Shows prevalence of asthma, stratified by gender.<sup>9</sup>

A rise in outdoor air pollution needs to be taken into consideration with the building of the Tempe Streetcar Project.

## Existing Conditions

Current conditions for air quality are determined largely by vehicle emissions. The following bar graph displays Tempe pollutants in 2009 highlighting excessive carbon monoxide emissions from vehicles. The Tempe Street Car will reduce CO<sub>2</sub> emissions caused by vehicle traffic which contributes to Ozone Alerts.<sup>10</sup>

### Air Quality Index

Air Quality Index (AQI) level in 2010 was 35.1. This is about average.

City:  35.1

U.S.:  32.0

Carbon Monoxide (CO) [ppm] level in 2010 was 0.449. This is worse than average. There were 11 monitors within city limits.

City:  0.449

U.S.:  0.334

Sulfur Dioxide (SO<sub>2</sub>) [ppb] level in 2010 was 1.29. This is significantly better than average. Closest monitor was 6.3 miles away from the city center.

City:  1.29

U.S.:  2.43

Nitrogen Dioxide (NO<sub>2</sub>) [ppb] level in 2010 was 18.5. This is significantly worse than average. There were 4 monitors within city limits.

City:  18.5

U.S.:  9.4

Ozone [ppb] level in 2010 was 31.2. This is about average. There were 11 monitors within city limits.

City:  31.2

U.S.:  28.3

Particulate Matter (PM<sub>10</sub>) [ $\mu\text{m}^3$ ] level in 2010 was 33.7. This is significantly worse than average. Closest monitor was 4.0 miles away from the city center.

City:  33.7

U.S.:  22.1

Particulate Matter (PM<sub>2.5</sub>) [ $\mu\text{m}^3$ ] level in 2010 was 8.28. This is about average. There were 6 monitors within city limits.

City:  8.28

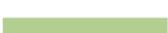
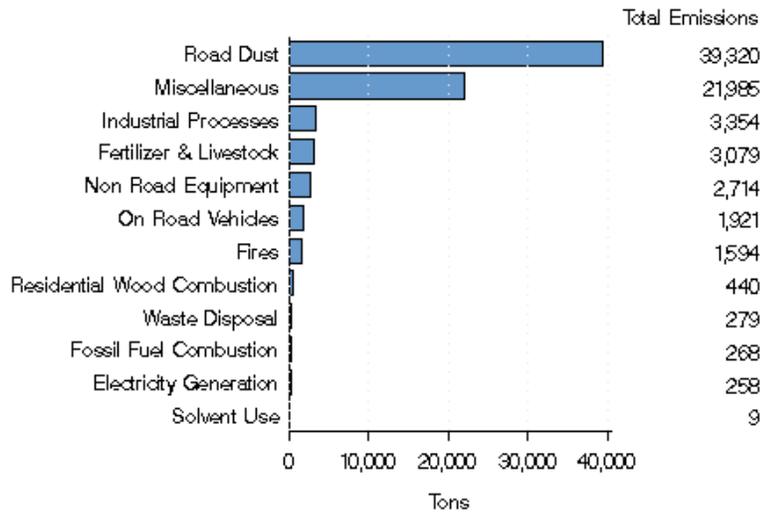
U.S.:  9.59

Figure 4: Displays the major pollutants in Tempe in 2009. Carbon monoxide, nitrogen dioxide and particulate matter were worse than the national average.<sup>10</sup>

The two following charts display the sources in which the majority of air pollution in Maricopa County is emitted. <sup>11</sup>

### PM10 Emissions by Source Sector

in Maricopa County, Arizona in 2005



### PM2.5 Emissions by Source Sector

in Maricopa County, Arizona in 2005

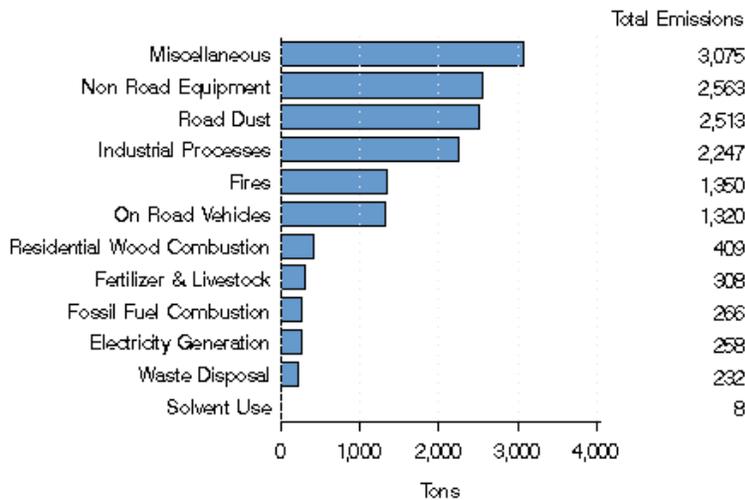


Figure 5: Display the source of PM10 and PM2.5 emissions. On road vehicles are sources for both of these emissions, along with road dust and non-road equipment <sup>11</sup>

To reduce the frequency of vehicular accidents and decrease the health impacts associated with congestion, the city of Tempe's transportation department, Tempe in Motion, increased the use of traffic calming. These projects have successfully reduced the volume of vehicles on Tempe's residential and collector streets. These traffic calming projects have also slowed the speed of traffic in residential communities, making communities safer for pedestrians and cyclists.

TIM has also created encouragement focused on increasing residents' reliance on walking, cycling and public transit as practical forms of transportation. These forms of transportation will not only decrease congestion, but will increase the amount of physical activity which residents participate in. The Streetscape and Transportation Enhancement Program (STEP) and the Orbit bus system are examples of solutions to decrease congestion, and increase the health of residents.

One of Tempe's most congested areas is Mill Ave. During peak hours, lots of vehicles flood the transportation network to get to and leave ASU and nearby businesses. This is a health concern because vehicles create emissions which negatively impact air quality. Thus, congestion keeps more vehicles on the road longer so more emissions are created in total. Decreased traffic counts on residential, collector and, to some extent, arterial streets show the success of TIM's encouragement programs. Traffic counts are included in the Traffic Counts Map included below.<sup>12</sup>

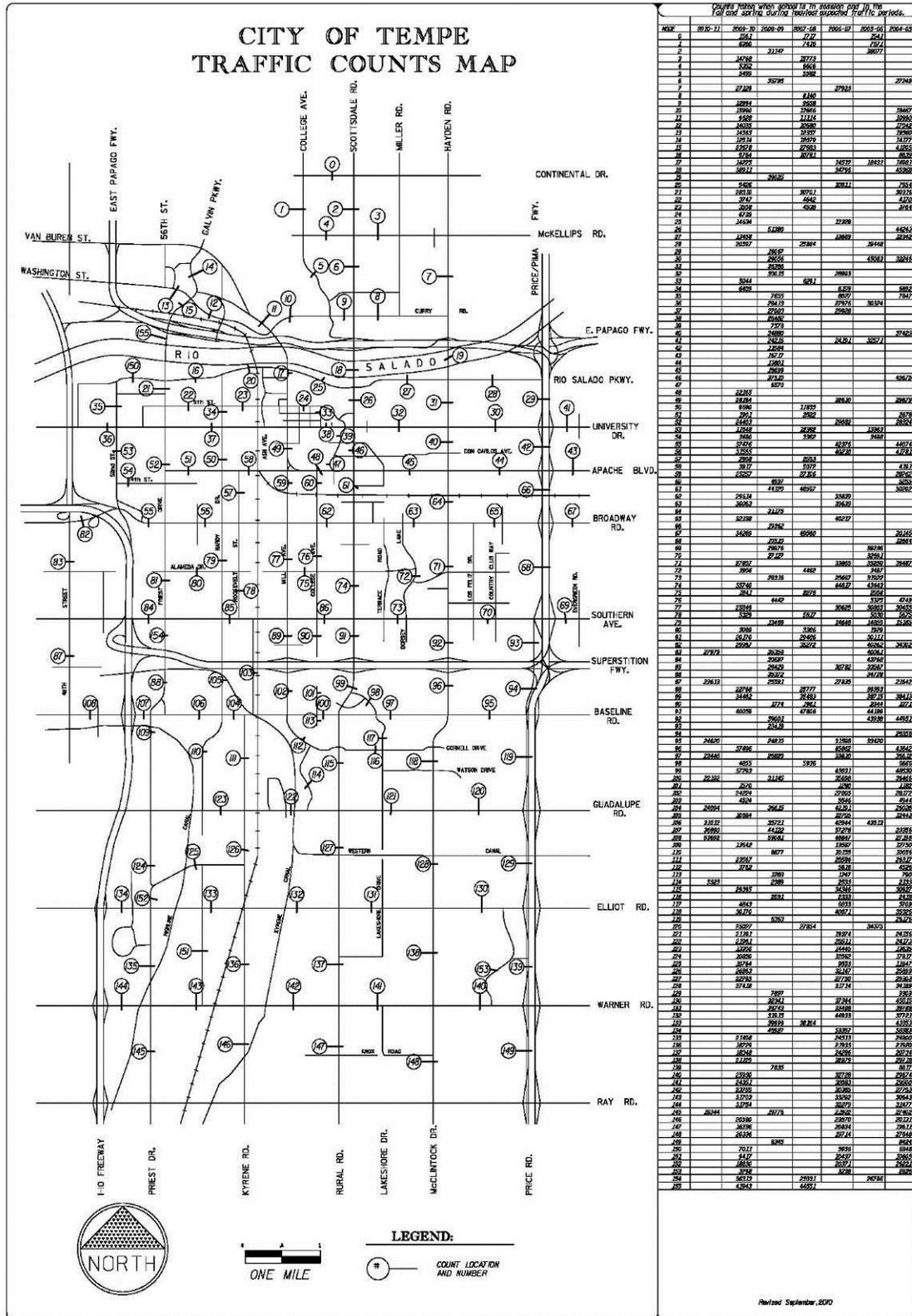


Figure 6: Shows the traffic count for the city of Tempe and areas of high congestion. The streetcar will reduce congestion along the Mill Ave sector.<sup>12</sup>

## Impact on Air Pollution

The streetcar will provide Tempe residents with convenient and reliable public transportation, which will encourage people to abandon their private vehicles. The streetcar will decrease air pollution and asthma triggers by reducing congestion and vehicle emissions.<sup>13</sup> A decrease in traffic counts and increase in public transportation ridership is associated with a reduction in the number of child asthma acute care events. Therefore, Tempe will likely experience a decrease in the number of asthma events with the implementation of the streetcar. If citizens are provided with consistent and effective public transportation, they will more likely take public transportation.

## Recommendations

Recommendations which the city of Tempe should consider to help decrease air pollution include:

1. Partnering with a private entity to provide a bike rental system.

**Rational-***The bike rental areas would be placed at park and ride locations to encourage commuters to ride bikes instead of drive. The rental system would also be beneficial for tourists. It would allow tourists to explore the city without relying on a car for transportation.*

2. Continuing to implement the Tempe Transportation Plan to enhance the pedestrian and bicycle pathway networks.

**Rationale-***In compliance with its transportation plan, the city of Tempe continues to improve and expand pedestrian and bicycle amenities. This improves citizens' overall quality of life by providing opportunities for physical activity and increasing social connectedness. As long as pedestrian and bicycle infrastructure links exists between desirable destinations, then citizens will be inclined to use these modes of transportation rather than the automobile.*

3. Considering a partnership with private businesses to provide incentives to encourage citizens to use alternative modes of transportation.

**Rationale-***Citizens are more likely to use a different mode of transportation if there is and incentive to encourage behavior change. For example, for employees who commute to work via alternative transportation, employers could provide subsidized transit passes or dining vouchers for Mill Ave restaurants.*

4. Creating preferential parking for people who travel to an area via low carbon vehicles.

**Rationale-***Incentives, such as preferential parking, enhance the appeal of driving a low emissions vehicle (citation). Using more low carbon emitting vehicles can improve air quality.*

5. The city of Tempe should work with local businesses to install additional electric vehicle charging stations throughout the city.

**Rationale-***The installation of electric vehicle charging stations would encourage residents to drive electric vehicles.*

6. Incorporating a “Carbon Reduction Plan” into the General Plan that states specific goals to achieve carbon reduction and specific action steps to obtain these goals.

**Rationale-***Local government has a major role to play in establishing policies, programs and projects that contribute to reducing the carbon footprint for the community.*

7. Increasing awareness of LEED building certifications for the residential and commercial markets, and offer government incentives on the city level.

**Rationale-***With development projects in the vicinity of the streetcar achieving a LEED certification, a standard will be set that encourages new projects to be built according to those standards. Environmentally conscious construction projects promote health in a community by only using materials that do not degrade the health of people or the local environment. The streetcar line can further enhance the rating of LEED projects by reducing or eliminating the need for automobile usage among users of LEED facilities.*

# ASSESSMENT: PHYSICAL ACTIVITY OPPORTUNITIES

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## Physical Activity and Health

Exercise, along with a healthy diet, is key for individuals to be both physically and mentally healthy. Certain diseases, such as obesity, diabetes, cardiovascular disease and depression can be prevented by participating in 30 minutes of physical activity per day or 150 minutes per week.<sup>14</sup> When the recommendations are not reached, individuals are more susceptible to disease and a lower quality of life. For a community, chronic diseases associated with sedentary lifestyles. Public health services for these diseases cost the city, healthcare industry and taxpayers. Having access to recreational opportunities will allow residents to easily incorporate physical activity into their every-day routine.

Urban planners and public health can join forces to create environments which encourage physical activity. Neighborhoods can be built within walking distances to goods and services; bike and pedestrian infrastructure can be enhanced. Transit stations situated next to parks will encourage residents to utilize park amenities and space. Currently, Arizona and the Tempe community have a high prevalence of chronic disease. Incorporating modes of transportation which will encourage physical activity is essential to improving the health of the Tempe community.

## Existing Conditions

### Obesity

Obesity rates in the United States and in Arizona are increasing. In 1991, every state's obesity rate was lower than 20% and Arizona was ranked the 29th most obese state.<sup>15</sup> Today, however, every state's obesity rate is above 20% and Arizona's obesity rate has increased to 25.8%. Childhood obesity is also a growing concern. The prevalence of childhood obesity in Arizona in 2003 was 12.2%, but by 2007 the prevalence had increased to 17.8%.<sup>15</sup> Communities must find ways to lower these statistics through work, life, and play, to lead healthier and happier lives.

### Diabetes

Diabetes is a disease which needs to be managed properly in order to avoid detrimental complications. Diet and exercise are recommended to not only manage, but prevent the onset

of diabetes. Ninety percent of diabetic diagnoses are of type II diabetes, while only 10% are of type I diabetes. While type I diabetes is not preventable, and largely depends on genetic factors, individuals can prevent type II diabetes by participating in physical activity.<sup>16</sup>

The differences in Type I and Type II Diabetes are identified in Table 1.

TABLE 1 Characteristics of the Common Types of Diabetes		
	Type 1	Type 2
Age	Childhood	Pubertal
Onset	Acute; severe	Mild-severe; often insidious
Insulin secretion	Very low	Variable
Insulin sensitivity	Normal	Decreased
Insulin dependence	Permanent	Temporary; may occur later
Racial/ethnic groups at increased risk	All (low in Asians)	African Americans, Hispanics, Native Americans, Asian/Pacific Islanders
Genetics	Polygenic	Polygenic
Proportion of those with diabetes	80%	10%-20%
Association: obesity	No	Strong
Acanthosis nigricans	No	Yes
Autoimmune etiology	Yes	No

Source: Adapted from Orr, DP. Contemporary management of adolescents with diabetes mellitus. Part 1: Type 1 diabetes. Adolescent Health Update 2000;12(2), Table 2, p 3.

Table 6: Shows the differences between type 1 and type II diabetes.

In 2005 there were 55,919 diabetes hospital discharges in Arizona. This number increased drastically 8% from the previous year.<sup>17</sup>

### Cardiovascular Disease

Table 5 identifies the causes of death in Tempe in 2009. Cardiovascular disease, a disease preventable by leading a healthy lifestyle and participating in physical activity, was the number one cause of death. Increasing opportunities to participate in physical activity throughout the city will help curtail cardiovascular disease.<sup>18</sup>

Causes of Death in Tempe 2009	Total Deaths
All causes	803
Cardiovascular diseases	236
Lung Cancer	36
Breast Cancer	11
Motor Vehicle Accident	7
Homicide	1
Suicide	17
Injury by firearms	8
Drug-induced deaths	27
Alcohol-induced deaths	22

Table 7 Shows causes of death in Tempe, 2009<sup>18</sup>

## Depression

Depression is a mental illness that that drastically decreases an individual's quality of life. Engaging in physical activity will help combat the symptoms of depression and even prevent the onset. In 2009, 40,000 patients were admitted into hospitals and were characterized as being depressed in Arizona.<sup>17</sup> Providing opportunities to easily engage in physical activity will help Tempe community members regulate their mental health.

The matrix below summarizes the prevalence of chronic diseases and health conditions in Arizona.

### Existing Conditions: Physical Activity Opportunities

HEALTH DETERMINANT	PRIMARY RESOURCE	SECONDARY RESOURCE	MEASURE
<b>Obesity - Adults</b>	<a href="http://www.azdhs.gov">www.azdhs.gov</a>	<a href="http://www.cdc.gov">www.cdc.gov</a>	<ul style="list-style-type: none"> <li>In 1991 obesity rates for all of U.S. was below 20%</li> <li>By 2008, Arizona had a 25.8% obesity rate.</li> </ul>
<b>Obesity - Children</b>	<a href="http://www.azdhs.gov">www.azdhs.gov</a>	<a href="http://www.cdc.gov">www.cdc.gov</a>	<ul style="list-style-type: none"> <li>In 2003, Arizona had a 12.2% child obesity rate.</li> <li>In 2007, Arizona had a 17.8% child obesity rate</li> </ul>

<b>Diabetes</b>	<a href="http://www.azdiabetes.gov">www.azdiabetes.gov</a>	<a href="http://www.cdc.gov">www.cdc.gov</a>	<ul style="list-style-type: none"> <li>• In 2005, there were 55,919 diabetes hospital discharges.</li> <li>• This was an 8% increase from 2004.</li> <li>• There are 265,000 residents in Maricopa County who are diabetic.</li> <li>• The adjusted death rate for diabetes is 18.0 deaths per 100,000 people in 2005. Compared to 20.1 death rates per 100,000 for all of Arizona.</li> </ul>
<b>Heart Disease</b>	<a href="http://www.cdc.gov">www.cdc.gov</a>	<a href="http://www.azdhs.gov">www.azdhs.gov</a>	<ul style="list-style-type: none"> <li>• Causes of death itemized by totals per specific cause (table).</li> </ul>
<b>Depression</b>	<a href="http://www.azdhs.gov">www.azdhs.gov</a>	<a href="http://www.usatoday.com">www.usatoday.com</a>	<ul style="list-style-type: none"> <li>• Arizona ranked 25<sup>th</sup> in the nation for depression.</li> <li>• Arizona has 15.6 suicides per 100,000 people.</li> <li>• In 2009, 40,000 patients were emitted into hospitals per depression.</li> </ul>

Table 8 Summarizes the existing conditions for diseases which can be prevented by participating in physical activity

### Physical Activity Opportunities

As a part of the HIA, Walkability Assessments were conducted in six subareas in the HIA study area. Walkability assessments were performed to rate these subareas on pedestrian and bicycle friendliness, general walkability of the area, and overall attractiveness. Important for the health, wealth and growth of a community, walkability has the ability to impact neighborhood economics, community involvement, and opportunities for physical activity. The walkability assessments used are included in Appendix 1. The six subareas are:

- Ash Ave-Farmer subarea (split into 5<sup>th</sup> Street and Mill Ave corridors)
- Mitchell Park
- ASU/Daley Park subarea
- RESCOM subarea
- Boradmor/McKemy subarea
- Southern/South subarea (split into East of Mill Ave, West of Mill Ave and Mill Ave corridor)

#### *Physical Activity Opportunities in Ash Ave-Farmer subarea*

The Ash Ave-Farmer Ave subarea was further divided into:

1. 5<sup>th</sup> Street corridor
2. Mill Ave corridor

## 5<sup>th</sup> street corridor

The area between Hardy Drive and Farmer Avenue has been the focus of redevelopment in recent years. This area contains a large student and large family population. A diverse family population of Hispanic and white families foster a need for a diverse availability of housing, transportation and community opportunities. The pedestrian and bicycling environment in this area is successfully designated along 5<sup>th</sup> Street with signage and numerous mitigation designs to provide safety. Overall, the area showcases 5th Street as a corridor that has stimulated the development of numerous revitalization constructions, park rehabilitation, and sidewalk enhancements in its proximity. The future of the neighborhood and community between University Drive and the Rio Salado Parkway (i.e. South to North) and Farmer Avenue to Hardy Drive (i.e. East to West) depends on the future success of these perimeter roads and the recently revitalized 5<sup>th</sup> Street.

The walkability on 5<sup>th</sup> Street illustrates positive characteristics often associated with a ‘complete street’, including safe and separate functions for alternative forms of transportation. A significant planning and streetscape initiative of 5<sup>th</sup> Street is evident from Roosevelt Road to Hardy Drive. The revitalized corridor is based on student transportation needs, such as walking and cycling, and provides a safe environment for alternative transportation. This table provides examples of physical elements that either encourage or discourage walkability in this study subarea.

<b><i>Physical Elements that Encourage Walkability in 5<sup>th</sup> Street</i></b>	<b><i>Physical Elements that Discourage Walkability in 5<sup>th</sup> Street</i></b>
<ul style="list-style-type: none"><li>• Safe environment for all modes of transportation</li><li>• Elements of ‘complete street’</li><li>• Active pedestrian community that fosters walkability</li><li>• Aesthetically pleasing environment; diverse architecture, landscape and foliage.</li><li>• High connectivity to support development on cross streets and perimeter roads.</li><li>• Adequate shade on streets; adequate shade in public spaces including Jaycee Park.</li></ul>	<ul style="list-style-type: none"><li>• Homeless population gathers in Jaycee Park; may increase residents perception of fear and perception of lack of safety</li><li>• Slow revitalization measures in surrounding neighborhoods</li><li>• Cross streets need maintenance, such as Roosevelt and Farmer</li><li>• Shade not evenly dispersed thought the study area; need for equitable development plan for shade along cross streets</li><li>• Need for allocated pathways for all modes of transportation, on cross streets (e.g. signage, designations and curbs).</li></ul>

## Mill Ave corridor

The area between Ash and Rural, in downtown Tempe, has both an energetic day and night life. Housing in this area consists of dorms located near campus, and high priced condos. Large and small local businesses provide many restaurants and boutiques for the daytime crowd. Bars and other venues enhance the area’s night life. Additionally, The Mill Ave-University Drive’s physical

environment encourages alternative transportation, especially walking. Numerous design strategies have been installed throughout to provide pedestrians a safe but mobile atmosphere for all modes of transportation. Vegetation and shade structures provide pedestrians with an attractive and comfortable environment. Green and open spaces, like the Town Lake Park, promote and foster pedestrian activity, healthy recreation, and walkability. Overall, Mill Ave is a good example of a vibrant downtown. This table provides examples of physical elements that either encourage or discourage walkability in this study subarea.

<b><i>Physical Elements that Encourage Walkability in Mill Ave-University Drive</i></b>	<b><i>Physical Elements that Discourage Walkability in Mill Ave- University Drive</i></b>
<ul style="list-style-type: none"> <li>• 6-8 foot wide pedestrian paths separated with 2-4 foot spacing, with foliage, between curb and sidewalk;</li> <li>• Street signs provide vital instructions for all means of transport;</li> <li>• Crosswalks, roundabouts, and curb ‘islands’ provide functionality and preventive safety measures;</li> <li>• Visible foliage and architecture make environment aesthetically pleasing;</li> <li>• Public spaces include plazas, green spaces, and a waterfront park provides opportunities for recreation and community activity.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in homeless population; may increase residents’ perception of fear and deter walking;</li> <li>• Majority of community events cost money, and may deter Low-income families from some activities.</li> </ul>

*Physical Activity Opportunities in Mitchell Park subarea*

The West Mitchell Park Neighborhood is located on the Northeast corner of Hardy Street and University Drive. This area combines niche retail accommodations with a mature and established neighborhood. The major advantage of the Mitchell Park subarea is that it is within walking distance to Arizona State University campus and downtown Mill Ave.

This table provides examples of physical elements that either encourage or discourage walkability in this study subarea.

<b><i>Physical Elements that Encourage Walkability in Mitchell Park</i></b>	<b><i>Physical Elements that Discourage Walkability in Mitchell Park</i></b>
<ul style="list-style-type: none"> <li>• Close proximity to different land uses;</li> <li>• Local stores and businesses surround residential hubs;</li> <li>• Walkable to major employers such as the Chase Manhattan Company and the Phoenix Coca-Cola Bottling Company.</li> </ul>	<ul style="list-style-type: none"> <li>• Two lanes travels right through residential neighborhoods;</li> <li>• Lack of traffic calming elements, even surrounding local elementary school;</li> <li>• Crosswalks too simplistic in their design; fail to provide safety features to pedestrians with vision and physical disabilities;</li> </ul>

- Condition of walking areas in the residential neighborhood lack protection for pedestrians from the environment;
- Traffic congestion from route Highway US60, and from local commuters over utilizing side streets as travel alternatives;
- Sidewalks worn and cracked;
- Lack of shading;
- Very little open green space.

*Physical Activity Opportunities in ASU/Daley Park subarea*

The sub-area ASU/Daley consists of the ASU campus and the adjacent historical neighborhoods south of Apache. The streets that border that area are Mill Ave east of Rural Road and from University Drive to Broadway Road. Half of the area is the campus and the other half is aging neighborhoods.

Excluding the campus, the existing development is the University Park Historic District, which is undergoing several single family dwelling remodels. This neighborhood is walking distance to the streetcar line and therefore has the potential for an increased home value. South of this area, towards Broadway, are primarily single family residences that appear run down and unattractive. In addition, these residences have a large amount of overgrown vegetation that has spilled over onto the sidewalks.

Overall, the area does not cater to the pedestrian, and is designed primarily for vehicles. Especially in the area surrounding the campus, the sidewalks are narrow, lack shade and have no buffer between the street and the pedestrian. The neighborhoods have slower traffic, but the sidewalks are poorly maintained. Cracks, overgrown vegetation and parking on the sidewalk force pedestrians to walk in the streets. Table X provides examples of physical elements that either encourage or discourage walkability in this study subarea.

<b><i>Physical Elements that Encourage Walkability in ASU/Daley subarea</i></b>	<b><i>Physical Elements that Discourage Walkability in ASU/Daley subarea</i></b>
<ul style="list-style-type: none"> <li>• Vegetation buffers on University and Terrace;</li> <li>• Trash kept at minimum;</li> <li>• Wide/comfortable sidewalks in newly-designed areas;</li> <li>• Daley Park is well-kept.</li> </ul>	<ul style="list-style-type: none"> <li>• Over-grown vegetation throughout neighborhood sidewalks restrict visibility of signage;</li> <li>• Poor lighting in neighborhoods;</li> <li>• Sidewalks are consumed with on-street parking;</li> <li>• Lack of shade;</li> <li>• Lack of clear signage;</li> </ul>

- 
- Incomplete/missing sidewalks;
  - Insufficient street buffers between pedestrians and vehicles on Apache;
  - Uninteresting streets;
  - Unsafe drivers around dorms;
  - Lack of wheelchair accessibility;
  - Lack of median islands;
  - Main arterial streets have too many lanes which can be intimidating to cross;
  - No existing complete streets.
- 

### *Physical Activity Opportunities in RESCOM subarea*

The RESCOM (Residential/Commercial) subarea consists of neighborhoods with retail services and an employment district. The two land-use types are divided by the railroad. On the southeast corner of Mill and Southern Ave there is a shopping center dominated by a Fry's Food Grocer.

Along the west side of Mill Ave is the residential neighborhood. On the west side of the railroad tracks is the employment district. The existing development in the subarea is single-family homes and two multi-family communities. There is also a retail development located in the southeast corner, which includes a grocery store. Land uses on the west side of the subject area are businesses and warehouses.

In terms of walkability and pedestrian friendliness, the section has both assets and shortcomings.

***Physical Elements that Encourage Walkability in Rescom Subarea***

***Physical Elements that Discourage Walkability in Rescom Subarea***

- Sidewalks have a width of at least 5ft;
- 2+ ft zone between street and sidewalk along Mill Ave and south of Alameda;
- Retail developments with aesthetically pleasing landscaping;
- 3 ft. buffer zone along Southern and Broadway in front of businesses.

- Many sidewalks with insufficient width;
- Many sidewalks lack buffer zone from the street
- Lack of shade throughout the area;
- Lack of connectivity between neighborhoods;
- Excessive setbacks of retail from sidewalk;
- Lack of lighting for pedestrian activity at night;
- Heavy vehicle traffic along both north-south, and east-west pedestrian sidewalks in RESCOM

***Physical Activity Opportunities in Broadmor/McKemy subarea***

Broadmor/McKemy is one square block located on the southeast corner of Broadway Road and Mill Avenue. The area mainly consists of housing for single and multi family usage. Throughout the area there are several food related facilities. In the sub-area there are two educational centers.

Apartments and houses make up the majority of the sub-area. The area has several apartment complexes for single-families, to meet the needs of the university. Neighborhood housings are on a grid system to maximize land usage for multi-families houses. Unlike suburban houses, houses in the sub-area are individually designed, making it aesthetically pleasing for passerby's.

There are a variety of food choices in the sub-area from conventional restaurants to fast-food places. The diversity represents the diverse needs of the university setting.

In addition, there are two public schools located in the sub-area, and are a walkable distance from the residential housing.

While the subarea is walkable, there are not many destinations. Sidewalks throughout the sub-area measure 5 feet in width. In many locations, over grown vegetation blocks the sidewalk. Table X provides further examples of physical elements that either encourage or discourage walkability in this study subarea.

***Physical Elements that Encourage Walkability in Broadmor-McKemy subarea***

***Physical Elements that Discourage Walkability in Broadmor-McKemy subarea***

- Shade throughout subarea;
- Aesthetically pleasing with natural vegetation that is appropriate for the region (xeriscaping), and Garden Art;
- Variety of housing styles;
- High connectivity for pedestrians.

- Cracked sidewalks/streets;
- Some curbs not ADA accessible;
- Overgrown vegetation blocks part of sidewalks;
- High-speed traffic
- Lack of pedestrian amenities

### *Physical Activity Opportunities in Southern/South subarea*

The boundaries of Southern-South subarea are Southern Avenue to U.S. 60, and from Rural Road to Hardy. The subarea was further divided into three sections, each with a different built environment. These sections are:

1. East of Mill Avenue
2. West of Mill Avenue Rural Rd. along La Jolla Dr
3. Mill Avenue Corridor

Overall, Southern-South subarea offers single family and multi-family residential housing. Retail and businesses are commonly found in strip mall settings.

#### **East of Mill Ave corridor**

The area east of Mill Ave has diverse characteristics. East of Mill Ave to Rural Road and Southern to the U.S. 60 provides a mix of commercial, public, and residential land uses. The Tempe Community complex has designated pedestrian paths, shade, and resting places. However, the only pedestrian exit is on Rural Road.

Rural Road to La Jolla Drive has single-family housing that is predominantly around the downtown Tempe area. The most notable characteristics observed along La Jolla were the use of traffic calming devices. These devices include speed humps and no curb cuts at intersections. Most vehicles appeared to be traveling at safe speeds for residential streets. Sidewalk conditions in this area are good; there are few cracks and buckles in the sidewalks. Shade, however, does not exist for pedestrians.

The city of Tempe is in the process of reconstructing College Avenue by narrowing the roadway to reduce speed, widening the bike lane and creating separation of a buffer between the sidewalk and roadway. The changes will improve the walkability of the area.

South on Grandview Avenue, a row of vacant homes for sale was observed. General improvement to the overall walkability of the neighborhood may add to the general appeal of these homes.

On Mill Ave south of Hermosa Drive to Southern, there are several townhome-style developments. Welcoming features include front porches which face the street, shaded sidewalks, buffers separating the sidewalk and road, and parking behind the townhomes. At the southeastern corner of Mill Ave and Southern Avenue, there is a strip mall with a large parking lot in front. This strip mall has limited pedestrian access; pedestrians must use the same main driveway as vehicles.

#### **West of Mill Ave Corridor**

The area west of Mill Ave has single family and multi-family residential areas, as well as a

community park, local schools and a library.

The built environment of this area supports walkability. The sidewalks are well maintained, litter free, and are a uniform height. The majority of the corners are ADA accessible. The overall neighborhood feeling is safe; neighborhood watch signs are posted throughout the neighborhood. At the time of our survey, people were walking and interacting in the street as well as the community park. Residents can easily reach the park by walking.

**Mill Ave Corridor**

The Central sub-section lies on Mill Ave south from Southern Ave to the U.S. 60. This section has multi-family housing, as well as commercial businesses. Analysis of this corridor proved to be very different from the other sub-sections on the eastern and western portions in the sub-area.

Heavy traffic between U.S. 60 north on Mill Ave to Southern Ave act as a barrier for pedestrians. However, multi-family apartment complex on the west side of Mill Ave and single-family residential housing on the east side provide a potentially high number of pedestrians. The apartment complex, Solera, is a gated community, which does not encourage walking. The units of this complex are set back far from the road and the units are buffered by large parking lots. The gates of the community are taken nearly to the property line. Shade bearing trees and other types of vegetation are sparse, and the sidewalks are narrow.

The driveways of the commercial centers along this corridor cut into the sidewalk. This will increase residents’ perception of fear, and make them feel less safe walking on the sidewalk. A nearby commercial corridor appears run down and vacant, also increasing residents’ perception of fear. The general feel is that this is an unsafe and unfriendly area. Table X provides examples of physical elements that either encourage or discourage walkability in this study subarea.

<i>Physical Elements that Encourage Walkability in Southern-South Subarea</i>	<i>Physical Elements that Discourage Walkability in Southern-South Subarea</i>
<ul style="list-style-type: none"> <li>• High walkability;</li> <li>• Clean, well maintained sidewalks;</li> <li>• Pedestrians paths;</li> <li>• Buffer between sidewalks and traffic;</li> <li>• Shade and vegetation;</li> <li>• High connectivity between residential housing, parks and arterial streets;</li> <li>• Commercial businesses and public services close by.</li> </ul>	<ul style="list-style-type: none"> <li>• Narrow sidewalks;</li> <li>• Commercial areas are not pedestrian friendly;</li> <li>• Storefronts set back far from road.</li> </ul>

**Impacts on Physical Activity**

The Tempe Modern Streetcar will make engaging in physical activity an easier choice for Tempe residents. The streetcar will connect directly to several parks along Mill Ave, while an additional

six are located in the HIA study area (not directly along the route). The streetcar will connect residents directly to Tempe Beach Park, Hayden Butte Preserve Park and Rio Salado park. In addition, it will connect residents closer to Papago Preserve and park, which includes a golf course, archery range, exercise course, fishing lagoons and orienteering course. The majority of residents in the HIA study area are located within a half-mile to at least one, if not more, of the nine parks.

### Tempe Park Area Map

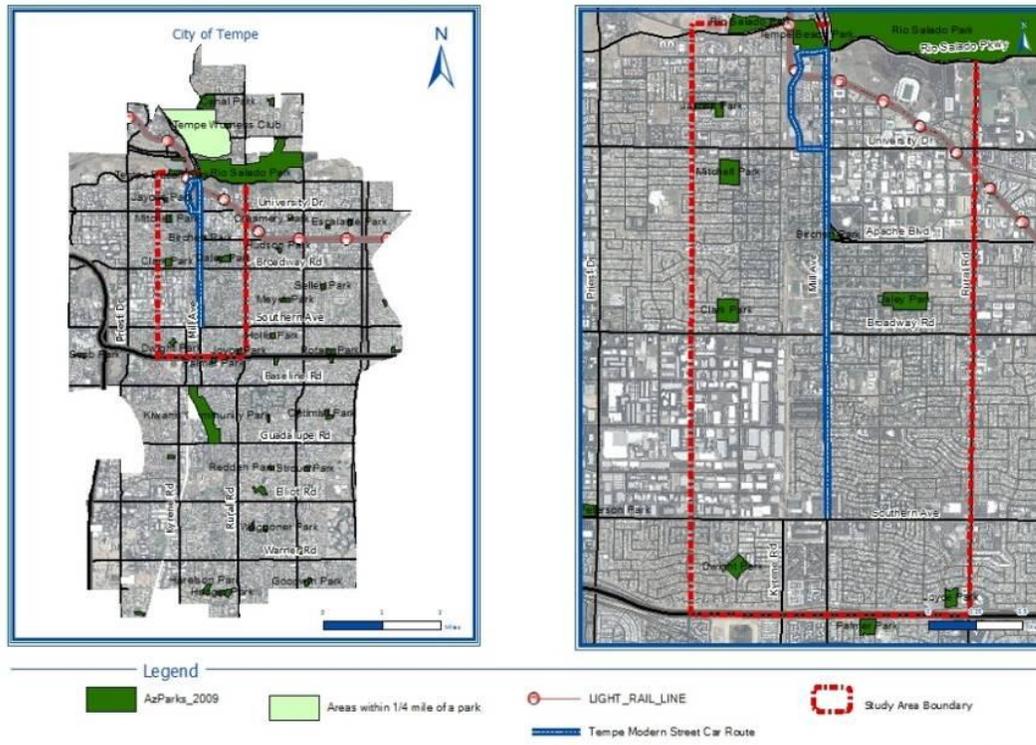


Figure 7 Shows the location of parks and green space in the HIA study area

Construction work on the streetcar will impact the current design of Tempe streets to increase opportunities for community members to walk or bike to destinations. The Urban Planning Design Guide for the Tempe streetcar includes specific efforts which will increase bicycle circulation. These include:<sup>20</sup>

#### LINKING BICYCLES TO TRANSIT

1. Work with the City and the biking community to link transit stations to existing and future bike facilities.
2. Site bike racks and lockers in “eyes on the bikes” conditions.

3. Provide sufficient and attractive bicycle parking and storage facilities to prevent ad hoc attachment of bicycles to trees, poles, etc.
4. Implement improvements on designated Transit Streets and Green Streets to increase use by pedestrians, bicyclists and public transit.
5. Improve the bikeway system in Tempe to ensure that the travel network and facilities will accommodate all types of bicyclists.
6. Improve the bikeways network by including bike lanes on all arterial streets and street crossing improvements.
7. Ensure that bicycles are welcomed into the streetcar vehicles in small numbers as long as they do not conflict with other riders.

Providing bicycle facilities will increase the ridership in Tempe. Adding bike lanes onto streets increases bike ridership by 57% . Additionally, proper facilities will increase the safety of bicycle riding. Painting bike lanes increased bicyclists riding in the correct direction by 73% to 82%.<sup>20</sup> The streetcar will also improve and enhance pedestrian infrastructure:

#### **CROSSWALKS**

1. Maintain all existing full and mid-block crosswalks.
2. Clearly identify crosswalks that legally define the zone of pedestrian use.
4. Trackway paving treatment shall be pre-eminent within all crosswalks.
5. Accommodate linkages to existing community amenities and activity spaces.
6. Preserve-in-place 4' x 4' sections of concrete sidewalk in which a WPA stamp is found.

Providing safe pedestrian and bicycle infrastructure will help Tempe residents easily participate in physical activity. The Tempe streetcar will help individuals incorporate physical activity into their daily routines. Americans who use public transportation, such as a streetcar, will walk to and from transit for at least 20 minutes per day. Twenty-nine percent of Americans who take public transit will walk to and from transit for 30 minutes per day, reaching the recommended 30 minute minimum.<sup>21</sup> With the predicted ridership estimated to be 2,000 individuals per day, the streetcar will increase physical activity levels in a large percentage of the Tempe population.

The Tempe streetcar will take a holistic perspective on increasing physical activity opportunities for Tempe residents. In addition to physically connecting residents to parks and recreational opportunities, it will also provide improved pedestrian and bicycle infrastructure to encourage

active transportation to destinations. The Tempe streetcar will improve connectivity of nearby neighborhoods, which will increase physical opportunities to commute by foot, bike, or walking to a transit stop.

## Recommendations

The city of Tempe can expand upon the impact which the streetcar will have on increasing physical activity, by following the proceeding recommendations:

1. Identifying new public spaces

**Rationale-** *With the expected increase in residential and commercial units along the streetcar line, more public spaces are needed to accommodate the increase of residents and commuters in the corridor.*

2. Working with neighborhood groups to make existing public spaces more “user friendly”

**Rationale-** *This is a cost-effective way of enhancing public spaces so that they attract people into using them, in comparison to the cost of constructing new spaces outright. For example, parks are more frequently used if lighting is provided at night.*

3. Installing a pedestrian signal (HAWK Light) at McAllister Avenue and Southern Avenue to provide better park accessibility for the residents of Broadmor and Brentwood-Cavalier neighborhoods.

**Rationale-** *Constructing a HAWK light at this location will offer a safe place to cross busy Southern Avenue. The HAWK light will allow residents to safely access Joyce Park and the City of Tempe public library, and increase the internal connectivity in their neighborhoods.*

4. Converting alleys into urban multi-use trails for recreation and commuting.

**Rationale-** *Giving bike riders a place to safely ride their bicycles and walk to work, school and the store would increase external connectivity between neighborhoods. An urban multi-use trail system will also serve to encourage the active transportation, such as biking and walking.*

5. Establishing a Safe Routes to School program.

**Rationale-** *The Safe Routes to School program would improve infrastructure and education to make areas around schools more pedestrian and bike friendly for students. In addition, all residents would benefit from these improvements. An increase in residents walking and cycling will promote use of the streetcar as more people will be moving around by foot and alternative modes of transportation.*

6. Identifying populations at higher risk for obesity and chronic diseases, and initiate outdoor activity programs directed at these populations.

**Rationale-** *This categorization could be used to direct funds in support of educational programs and multi-use trail development to get at risk groups more active.*

7. Installing traffic calming measures on streets, such as Hardy Road, Apache Blvd. and College Avenue.

**Rationale-** Collector streets like Hardy Road and College Avenue provide opportunities for active commuting. Traffic may already move slower on these streets, but the addition of traffic calming measures will guarantee that drivers comply with posted speed limits, and decrease pedestrians perception of fear.

8. Widening sidewalks and installing buffers around centers of pedestrian activity such as schools, parks and commercial centers.

**Rationale-** Widening the sidewalk and installing buffers around areas of high pedestrian activity will make these areas safer for pedestrians. The sidewalks become safer by creating space between the pedestrian and the cars on the street.

# ASSESSMENT: ACCESSIBILITY

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Accessibility determines the types of resources, goods and services individuals can incorporate into their lifestyle. Individuals need to be able to safely and conveniently access resources by different types of transportation. This will create equal opportunities amongst socio economic groups to make healthy choices.

Accessibility is divided into Safe Accessibility and Food Accessibility. Individuals need to perceive that they can reach their destinations safely using a variety of modes of transportation. Also, individuals need to have easy access to healthful foods to have the power to make knowledgeable decisions.

## Safe Accessibility and health

Safety is one of the most important health determinants related to transportation. A large volume of high speed traffic, along with different modes of transportation, will increase the risk for injuries and fatalities on the roadways. Tempe citizens utilize diverse modes of transportation. Pedestrians, cyclists, automobile drivers, and transit users interact in complicated traffic relationships. The risk for accidents and other transportation hazards exists.

## Existing Conditions

The predominant mode of transportation used in Tempe is the automobile. The table below, from the Tempe Comprehensive Transportation Plan (CTP), gives an overview of what percentages of transportation modes Tempe citizens used in the year 2000. Approximately 85% of participants used a personal vehicle as their primary mode of transportation.<sup>22</sup>

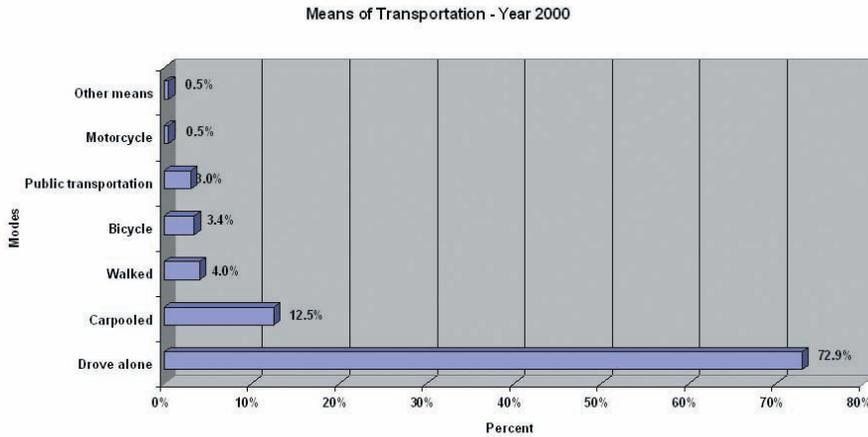


Figure 8 Shows the main modes of transportation in Tempe, in 2000<sup>22</sup>

### Pedestrian Accidents

In order for pedestrians to share the street with vehicles, buses, bikes, and parked cars, they require safe and comfortable walking environments. Pedestrian facilities are an integral part of transportation systems. Enhanced facilities will encourage and increase pedestrian travel, and will decrease the number of pedestrian accidents.

According to the 2008 updated version of the CTP, 42% of pedestrian accidents occurred at intersections, while 58% of accidents occurred at mid-block locations. The number of pedestrian related accidents in Tempe increased slightly from 2000 – 2004. Reported pedestrian accidents were aggregated for Tempe, but not the specific HIA study area.<sup>22</sup>

In Maricopa County, the majority of pedestrian accidents involve children and young adults. In 2003, 27% of the pedestrian accidents in Maricopa County involved children between the ages of 0-15. In addition, 20% of all pedestrian related crashes involved young adults between the ages of 16-25 years. Children and young adults are therefore the targeted audience to increase awareness of pedestrian safety, in an effort to decrease pedestrian accidents.<sup>23</sup>

### Bike Accidents

Residents participating in another healthy form of transportation, bicycling, need a safe environment to decrease the risk of accidents and fatalities. The Tempe Police Department’s Traffic Bureau released data for 2009-2010 showing that overall traffic collisions decreased by 3.9%, but there was still a total of nine fatal accidents. In 2009 alone, there were 4,649 collisions and in 2010 there were 4,471 collisions. Tempe Police’s analysis showed that four of the nine fatal collisions involved a traffic violation where one of the vehicles was travelling at speeds greater than “reasonable and prudent.” The most common fatal collision was between vehicles and bicycles. This accounted for three of the nine fatal collisions. The most common age group for those involved in the fatal collisions was young adults, ages 21 to 25.<sup>22</sup>

Data collected from the CTP provides an understanding of the location and number of bike accidents in Tempe. The CTP states that in 2002, 53% of the bike accidents during the year occurred at intersections, while 47% occurred at mid-block locations. The map below shows Tempe in relation to the density of bicycle accidents at certain intersections and roads.<sup>22</sup>

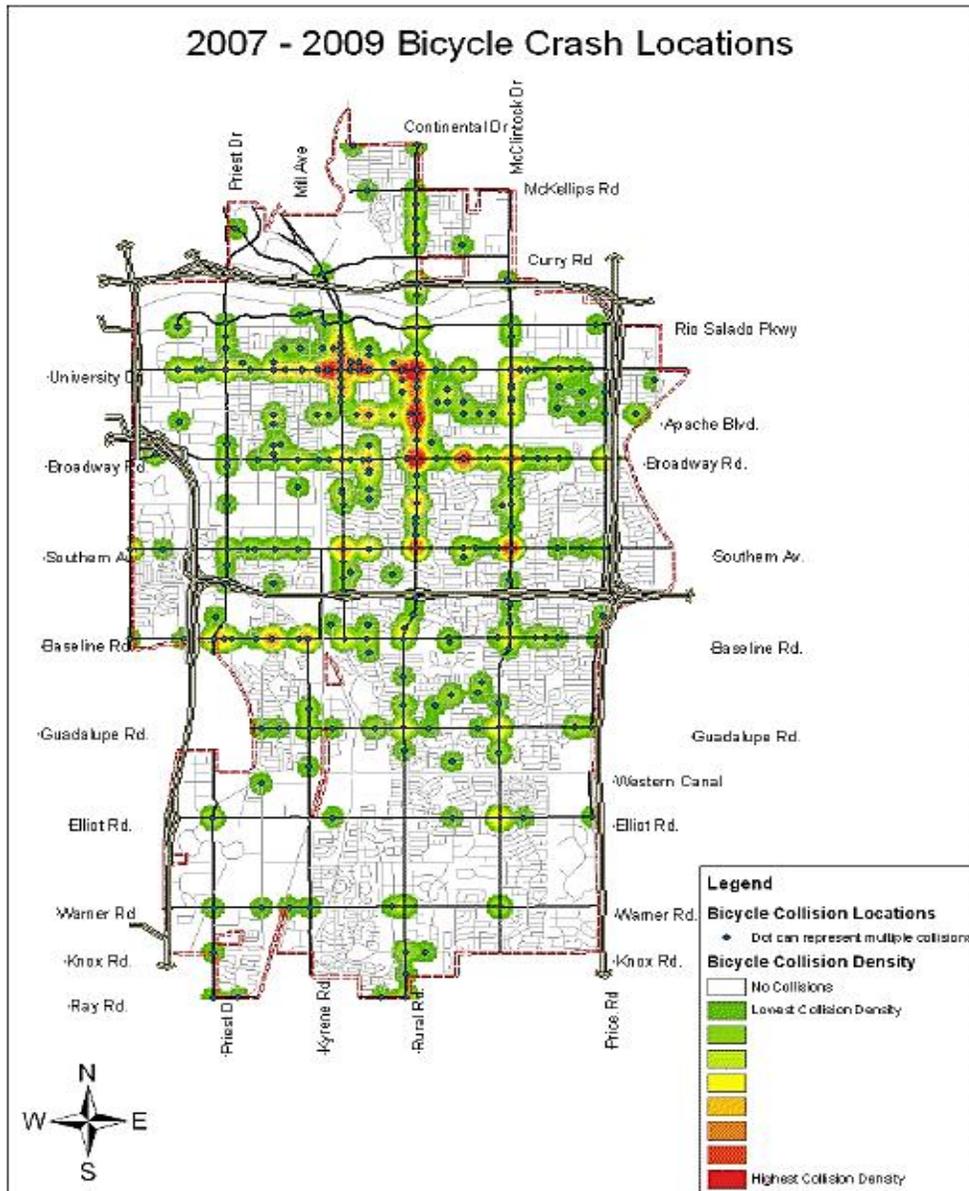


Figure 9 Bicycle Collision Location Map from Tempe Transportation Commission Public Meeting Agenda: March 8, 2011

According to the 2007 Phoenix Bicycle Collision Summary provides insights into accidents involving cyclists in the Phoenix region. Like most other types of vehicular crashes, bicycle accidents were most common on arterial streets and were most common in the afternoon between 3 - 6 PM. The majority of cyclists were hit while riding against traffic, either on the street or on the sidewalk. In 60% of collisions, the cyclist involved was not wearing a helmet. Only 11% of all bicyclists and less than 5% of all child bicyclists (less than 18 years of age) involved in collisions were wearing helmets.<sup>24</sup> While this data is for the entire region of Phoenix, collecting specific data for the city of Tempe would help understand trends in bicycle accidents. In the city of Tempe, three bicycle fatalities occurred recently in 2010, highlighting the need to take bicycle infrastructure into consideration with all transportation projects.<sup>22</sup>

As with all traffic crash data, the bicycle numbers reflect only part of the story regarding bicycle safety. The number of reports and injuries show the frequencies and causes for bicycle and vehicular collisions. However, unlike automobile crash data, there is no direct measure for the average number of cyclists on the road, and whether that number has increased over the years. Thus, it is impossible to measure the relative risk for being involved in a vehicular collision.

### **Light Rail Accidents**

Light rails are one of the safest forms of transportation in the United States. All accidents involving the light rail in the United States were caused by illegal and improper turns by motorists. The Valley Metro has made efforts to educate the public, and reduce the risk of vehicular and light rail collisions. Valley Metro has educational information publicly available on their website ([www.valleymetro.org](http://www.valleymetro.org)), including an educational video on light rail safety. The city of Phoenix has signs clearly marked to indicate oncoming light rail traffic. As the public continues to be educated on safety and assimilate to driving alongside the light rail, the number of accidents should decrease.

## Existing Conditions Matrix: Safe Accessibility

Health Determinant	Primary Resource	Secondary Resource	Measure
Accidents: Biking	T.B.A.G. (Tempe Bike Action Group)	City of Tempe Comprehensive Transportation Plan	- 53% of accidents at intersections in Tempe - 47% of accidents at mid-block locations in Tempe
Accidents: Walking	City of Tempe Comprehensive Transportation Plan	N/A	- 42% of accidents at intersections in Tempe - 58% of accidents at mid-block locations in Tempe
Accidents: Motor Vehicles	Tempe Police Department- Sgt. Steven Caracal	Tempe in Motion	- 9 fatal collisions during 2010 in Tempe - 4,471 accidents during 2010 in Tempe - 4,649 accidents during 2009 in Tempe
Accidents: Light Rail	Valley Metro	City of Tempe Comprehensive Transportation Plan	- 18 fatal collisions in 2007 in U.S.

## Impacts on Safe Accessibility

The Tempe modern streetcar will provide a safe means of travel for the community. In 2007, 48,844 transport fatalities occurred. Of the total transport fatalities:<sup>25</sup>

- About 12,800 were car occupants;
- About 6,000 were pedestrians;
- 43 were bus occupants;
- Only two were streetcar occupants.<sup>25</sup>

While the lifetime odds for fatality in transport accident is 1:83, the lifetime odds for fatality as a streetcar occupant is only 1: 1,933,828. Therefore, passengers are much safer riding the streetcar to commute than they are driving a vehicle. The streetcar will provide an extremely safe form of transportation.<sup>25</sup>

## Recommendations

While the Tempe Modern Streetcar will increase both accessibility safety and accessibility to healthy food, the city of Tempe can improve these health determinants further, by:

1. Following the guidelines and suggestions established in the “Maricopa of Associated Government

Complete Streets Guide” as a component of the Comprehensive Transportation Plan. This will provide the city with a template on how to encourage active forms of transportation such as walking and bicycling.

**Rationale-** *Instituting a complete streets policy ensures that transportation planners and engineers consistently design and build the entire roadway with all modes of transportation in mind. Adopting the policy will help create a more livable community.*

2. Developing a pedestrian infrastructure plan. This plan should include aspects such as shade, water fountains, and other amenities which will create a pleasant walking environment in all seasons.

**Rationale-** *In Arizona the summer heat will influence the walking patterns of residents. In addition, health concerns influenced by heat include heat exhaustion and heat stroke. The older population is of particular concern because their bodies can not regulate their body temperature as efficiently as younger populations, and therefore are more at risk for heat related health conditions. Providing sufficient shade will make walking cooler, less exhausting, and will encourage more people to walk to their destinations.*

## Maricopa of Associated Government Complete Streets Guidelines

STREETS	SIDEWALKS	BIKE LANES	STREET CAR/ BUS LANES	ACCESSIBLE BUS STOPS	SAFE CROSSWALKS	SHADE	PED AMENITIES (Benches/ Drinking Fountains)
<b><u>STREETCAR</u></b> Mill Ave. Ash Ave. Rio Salado University Dr.	8'	3'6"- 3'10"	12'	Approximately every ¼ mile.	4'	Natural Shade/ Structural Shade	Approximately every ¼ mile.
<b><u>ARTERIAL</u></b> Broadway Rd. Southern Ave.	8'	3'6"	12'	Approximately every ¼ mile.	4'	Natural Shade/ Structural Shade	Approximately every ¼ mile.
<b><u>COLLECTOR</u></b> College Ave. Hardy Dr. Roosevelt St Alameda Dr.	6'-7'	3'6"	12'	Approximately every ¼ mile.	3'	Natural Shade/ Structural Shade	Approximately every ½ mile.
<b><u>RESIDENTIAL</u></b> Geneva Dr. Fairmont Dr. Erie Dr. Del Rio Dr. Cairo Dr. Broadmor Dr. Palmcroft Dr. Bonita Dr.	5'	3'6"	N/A	Approximately every ¼ mile.	3'	Natural Shade	Approximately every ½ mile.

## Food Accessibility and health

Another problem which the Tempe Streetcar will address is the inaccessibility of fresh and nutritious food. Tempe is home to several “food deserts” and “food imbalance,” which limit food accessibility in a specific area.

**Food desert-** is a geographic area that does not have groceries stores nor supermarkets thus limiting access to fresh, nutritious food

**Food imbalance-** occurs when nutritious food options are limited, but fast food and other convenient unhealthy diet choices are readily available

Obesity is a major issue for individuals living in low-income areas. Food deserts/imbalances often occur in low-income areas, and simultaneously. According to the Center for Disease Control (CDC), areas which have food deserts/imbalances also have higher rate of obesity. In addition, fast food places may be the only food resource for these residents in food deserts/imbalanced areas. Residents living in areas with a high prevalence of easily-accessible fast food places are at an increased risk for many health conditions, such as obesity. Obesity is a leading factor in the development of type II diabetes and other heart-related diseases.

While public transportation may seem the immediate solution for food deserts/imbalances, if the public transportation system is poorly planned it will be a large time commitment for residents. According to Restoring Nashville, an organization created to help with solutions to the food desert problem in the Nashville, Tennessee area, “...food desert residents relying on public transportation often spend 2-3 hours getting to and from a supermarket, not including shopping time.” This large time commitment will deter many residents in food deserts/imbalances away from traveling to grocery stores. Corner markets, convenience stores and fast food places will be their primary source of food. Therefore, the Tempe streetcar needs to be wisely planned to allow convenient access to healthy foods.

Food deserts/imbalances will increase the risk for chronic diseases. Healthy diets are essential to preventing chronic diseases, such as type II diabetes and obesity. According to the CDC, nutrition-related health issues cost the United States at least \$80 billion annually in medical costs and losses in productivity.<sup>26</sup> Food deserts/imbalances limit food options, limit choices and increase healthcare costs.

## Existing Conditions

As of April 28, 2011 the HIA Study area had a total of nine supermarkets/convenient stores and more than 50 fast food and conventional restaurants. This area includes the Mill Ave corridor between Rio Salado Parkway south to Southern Avenue and from Hardy drive east to Rural Road. The main focus is the neighborhoods along Mill Avenue.

The walksheds in the Study Area are 0.5 miles. Walksheds identify the generally accepted walking distance from a home in a neighborhood to a destination, such as a grocery store or restaurant. This tool is beneficial to planners in that it allows them to show the average person the accessibility of food sources in this example to them or their neighbors.

### **Ash Avenue – Farmer Market subarea**

The Ash Avenue – Farmer Avenue Subarea (depicted in Figure X below) is the area from University Drive north to Rio Salado Parkway and Hardy Drive east to Rural Road. Within this area there are over 30

restaurants. However, most of these restaurants are fast food places. Although there are three convenience stores, there are no grocery stores in the area.

## Tempe Modern Streetcar Project HIA

Food Accessibility: Ash - Farmer Ave

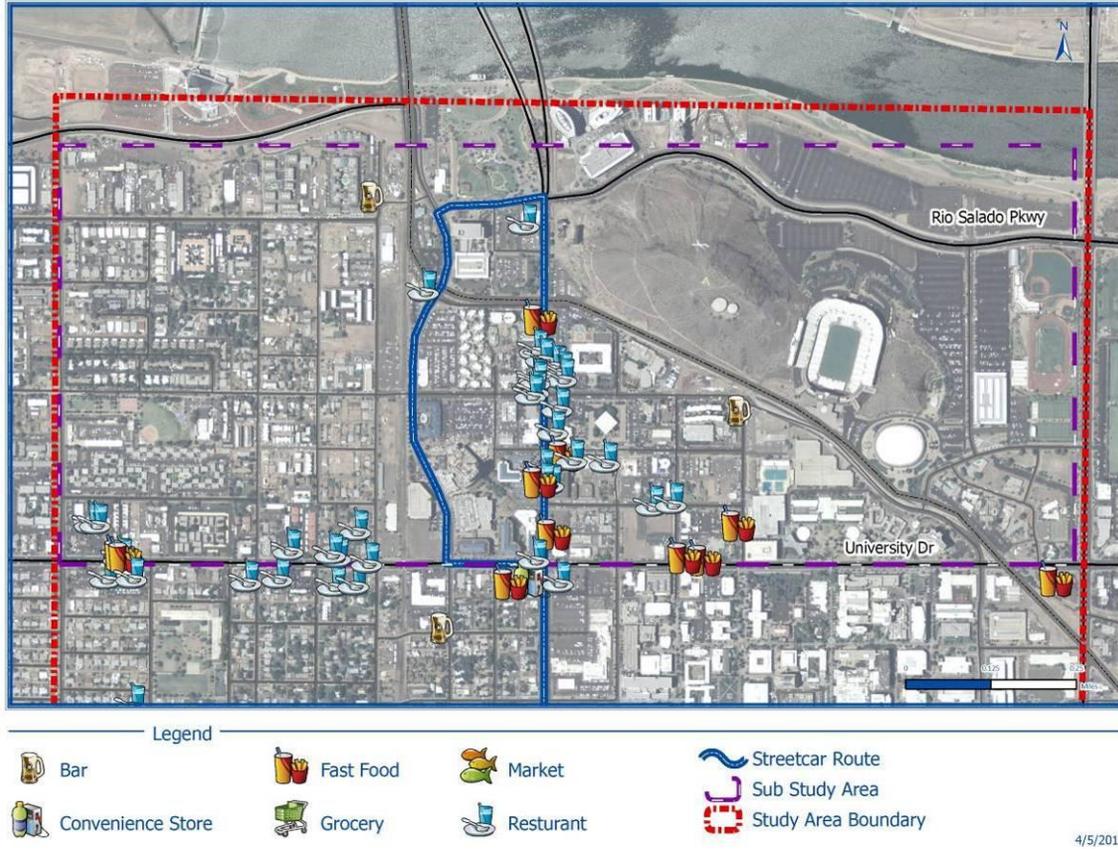


Figure 10 Identifies the fast food, restaurants and bars of Ash to Farmer Ave

### Mitchell Park subarea

The Mitchell Park Subarea (depicted in Figure X below) is from Mill Avenue west to Hardy Drive and from University Drive south to Broadway Road. In this Subarea there are three convenience stores, 10 conventional restaurants, and seven fast food restaurants. Access to healthy food sources are relatively easy because they are located along the outer edges of the neighborhood area along major transit routes. High connectivity throughout the neighborhood promotes movement from one end to the other.

# Tempe Modern Streetcar Project HIA

Food Accessibility: Mitchell Park

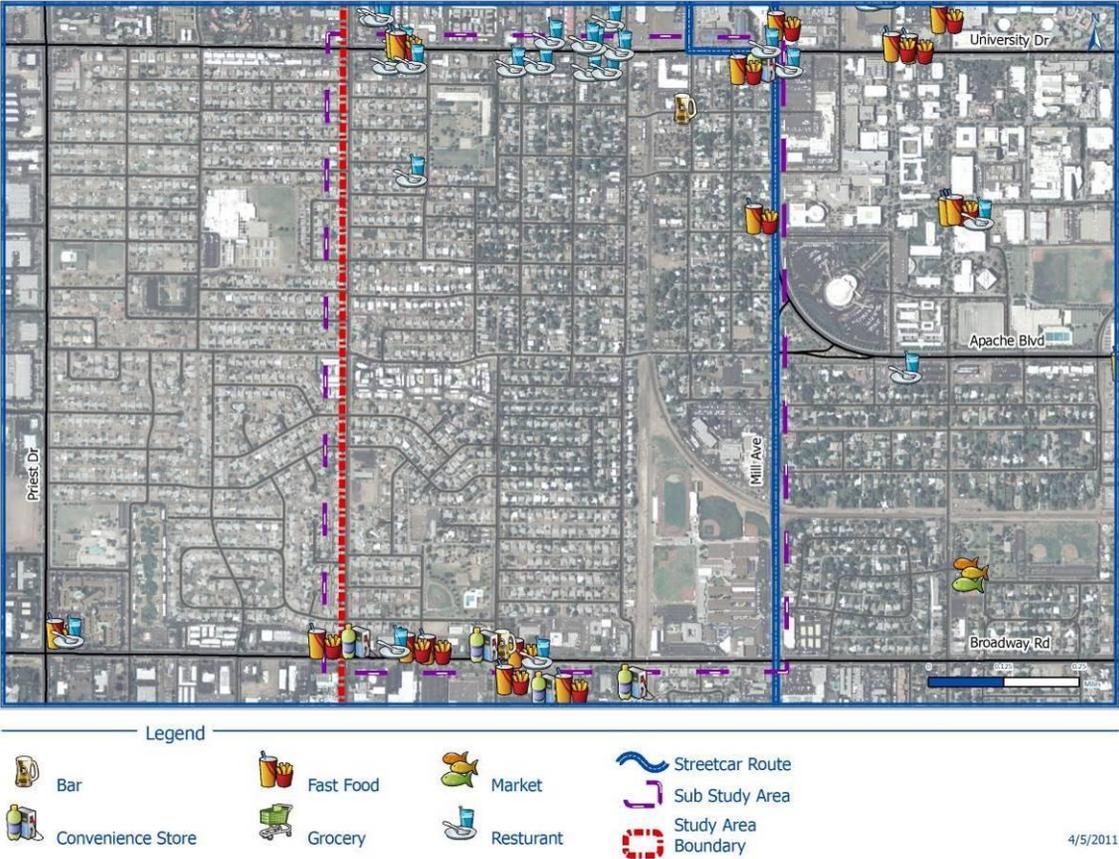


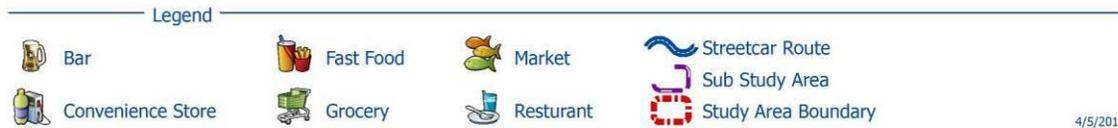
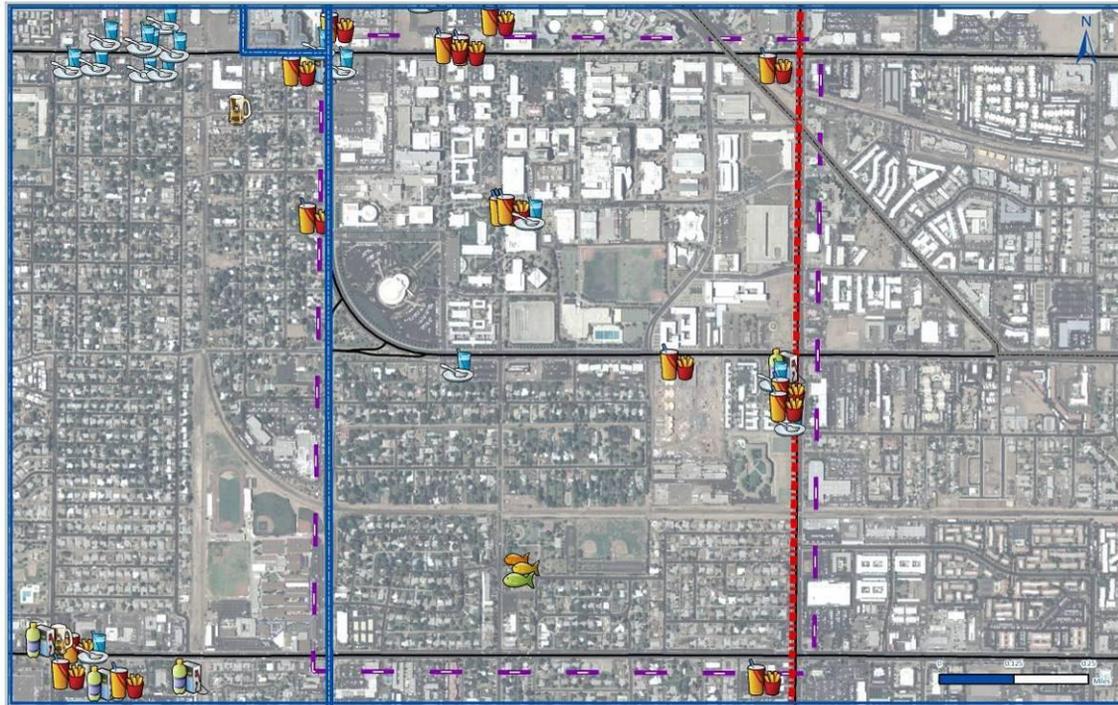
Figure 11 displays the convenience stores, fast food places, markets, and restaurants in the Mitchell Park subarea

## ASU/Daley subarea

The ASU/Daley Subarea is bordered by Mill Ave to Rural Road, and from University Drive to Broadway Road. This area has one convenience store, two restaurants, and four fast food places. These food sources are only easily accessible for local residents by crossing major transit routes.

# Tempe Modern Streetcar Project HIA

Food Accessibility: ASU - Daley



4/5/2011

Figure 12 Depicts where markets, convenience stores, restaurants and fast food places are located in the ASU-Daley area

## RESCOM subarea

The RESCOM Subarea (depicted in Figure X below) is bordered by Broadway Road to Southern Avenue and by Hardy Drive to Mill Ave. This area has one grocery store, two convenience stores, two conventional restaurants, and three fast food places. Even though this area has a grocery store, it is easier to access fast food places because the street layout of the subarea is divided. Almost all food sources are on the eastern half of the subarea.

## Tempe Modern Streetcar Project HIA

Food Accessibility: RESCOM

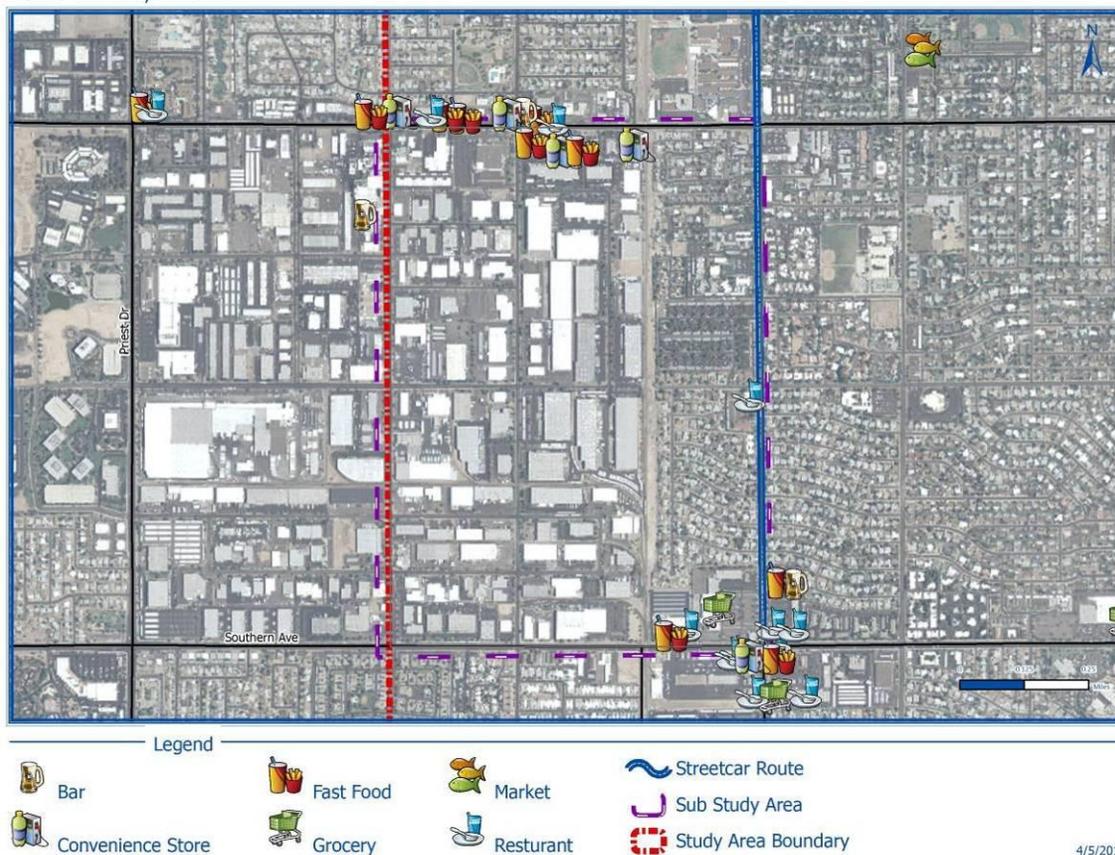


Figure 13 Depicts where fast food places, bars, grocery stores and restaurants are located in the RESCOM area

### Broadmor – McKemy subarea

The Broadmor - McKemy Subarea (depicted in Figure X below) is from Mill Ave west to Rural Road and from Southern Avenue north to Broadway Road. In this area there are two grocery stores, two restaurants, and four fast food places. While this area does provide two grocery stores, they are not easily accessible. Residents from nearby neighborhoods must walk to arterial streets in order to get to the grocery stores. While only a line of trees separates a Wal-Mart, and food source, from surrounding neighborhoods, trees act as a barrier which walkers must traverse around or through.

# Tempe Modern Streetcar Project HIA

Food Accessibility: Broadmor/McKemy

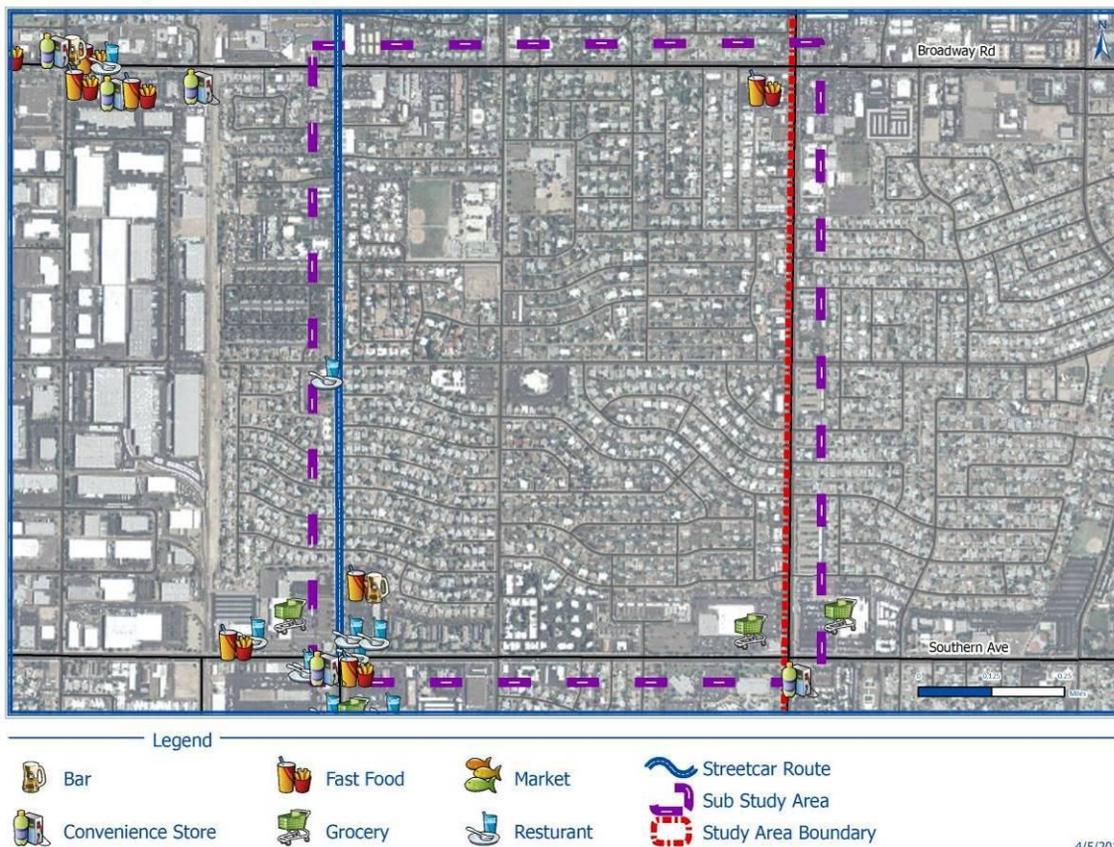


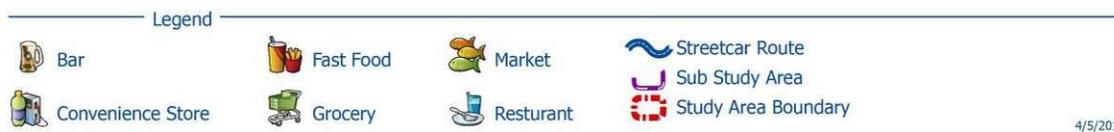
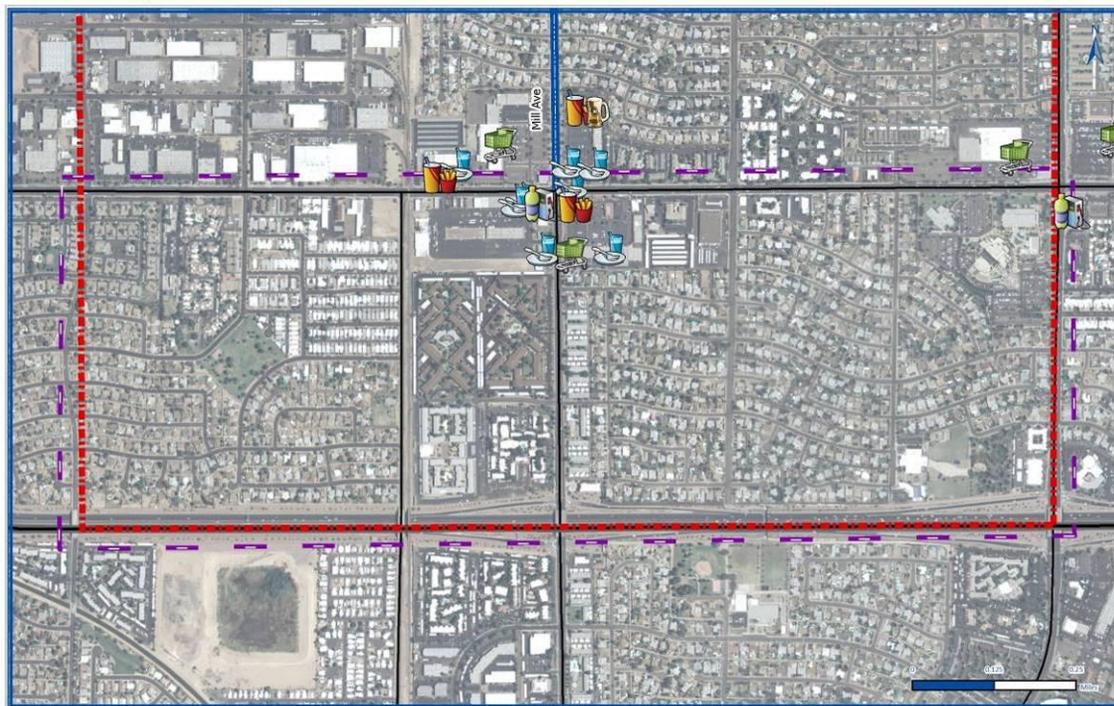
Figure 14 Depicts the locations of convenience stores, fast food places, and grocery stores in the Boradmor-Mckemy area

## Southern – South subarea

The Southern - South Subarea (depicted in Figure X below) is from Hardy Drive east to Rural Road and from Southern Avenue south to U.S. 60. One grocery store, one convenience store, and two restaurants are located in this area. These food resources are clustered together and are located at the corners of Mill Ave and Southern. Therefore, these resources are accessible for the neighborhood located on the east side of Mill Ave. For the neighborhoods located to the west of Mill Ave, north-south running railroad tracks force residents to travel to Southern Avenue to reach the closest food resource

# Tempe Modern Streetcar Project HIA

Food Accessibility: Southern - South



4/5/2011

Figure 15 Depicts where fast food places, restaurants, grocery stores and bars are located in the Southern-South region

Each subarea has unique food accessibility issues and each subarea has more fast food places than grocery stores. Consequently, these subareas will also see greater amounts of chronic health issues than in others. This is most predominant in the Subareas Ash Avenue-Farmer Avenue, RESCOM, and Southern-South.

A study done by Block et al. (date) looked at fast food places in New Orleans, Louisiana, in relation to population density and income levels. Block et al. discovered found that there are 2.4 fast food places in New Orleans, for every square mile in low income neighborhoods. The HIA study area follows the trend which Block et al. discovered. Downtown Tempe and the ASU Campus area have lower income levels versus the Tempe region south of U.S. 60, thus outside the study area. Looking at the HIA study area, which has a lower income than the surrounding area, the median household income is \$28K to \$43K. The ratio of grocery stores to fast food restaurants is 1:10. This follows the trend discovered by Block et al, of more fast food availability in lower income areas. It is necessary that in these areas the streetcar be used to transport residents to areas which have healthy food options.

## Impacts on Food Accessibility

While not all subareas have grocery stores, the Mitchell-Park subarea has the most easily accessible grocery store, which is located on the outer edge of the subarea. The streetcar will help connect

residents living near the other subareas, which have less access to grocery stores, to the Mitchell-Park subarea. Also, there will be a streetcar stop near the Fry's grocery store and pharmacy located on S. Mill and W. Southern Ave, reducing travel time needed to reach a grocer. All five other subareas will be connected to this grocery store via the streetcar. Additionally, the streetcar will help connect residents in the subareas without grocery stores to:

- Tempe Farmers Market, open daily on University and S. Farmer Ave;
- ASU Farmer's Market, open alternate Tuesdays;
- Thursday Night Open Air Market, open Thursdays 5-8pm at 5<sup>th</sup> Street and Forest.

These farmers markets not only provide quality produce, but they also reach out to individuals in lower socio economic levels. The ASU Farmer's Market accepts FMNP checks and WICS Cash Value Vouchers; Tempe Farmer's Market accepts food stamps and SNAP benefits. The increased transportation equity from the streetcar will also lead to an improvement in the community's diets.

## Recommendations

Choosing to eat an unhealthy versus healthy meal is ultimately a decision left to the individual. Policies, however, can provide consumers with appropriate information to make a well-educated decision. Please refer to Appendix 2 for a list of policies which will help individuals make informed decision about healthy eating. While the Tempe Modern Streetcar will connect residents to more healthy food options, the city of Tempe can further increase healthy eating by:

1. Requiring a minimum distance between any new and existing fast food restaurants, limiting the number of fast food restaurants in a geographical area, and/or require a minimum distance between fast food restaurants and schools. NOTE: This concept must be reviewed with city legal staff in the context of Prop 207.

***Rationale-*** *By limiting the location of additional fast food restaurants in the area there is less of a chance that the food imbalance will continue or increase.*

2. Encouraging the establishment of grocery stores or farmers markets – in addition to the market at Farmer & University - in underserved areas. For example, these establishments could be placed in the northwest corner of Ash Avenue and University, or the underutilized parking lot on the southeast corner of Broadway and Mill Ave.

***Rationale*** - *By establishing farmers markets and/or grocery stores, residents of underserved areas can make convenient healthy and nutritious choices. With the option to make healthier food choices the risk of chronic, diet-related disease will most likely decrease for the community.*

3. Promoting community gardens in underserved areas to assist residents in taking charge of their own food security, and to benefit from the other advantages a community garden can provide. The use of public land, such as the community garden at Escalante Park, should be pursued in other neighborhood parks.

***Rationale-*** *The establishment of community gardens can provide more than just fresh produce for the community. Community gardens can help to build and strengthen bonds between community members, reduce carbon emissions, teach residents about the natural life cycle, and preserve*

*cultural traditions through learning about native food plants and herbs. Establishing a community garden at a local school, park, or other community focal point such as a church can be used to involve school-age children and can be part of the school curriculum.*

4. Establishing regulations that encourage mobile food vendors on underutilized land and in other areas where they may be appropriate.

***Rationale-*** *Establishing food carts can help bring healthier options to underserved areas as well as add more to the local culture and sense of place.*

5. Creating healthy food zones around schools and/or other areas that are frequented by children. Focus on voluntary actions that will not be subject to Prop 207. These could include working with convenience stores to stock more healthy foods and drinks.

***Rationale*** - *Reducing easy access to unhealthy food options for children will help reduce negative health impacts and aid in developing better eating habits. This effort should be combined with programs that make it easier to access healthy food..*

6. Starting a farmer's market on the southwest corner of Mill and Southern Avenues.

***Rationale-*** *A farmer's market currently serves downtown Tempe, but the social capital will increase greatly from a second farmer's market. Local residents will gather on a regular basis to distribute or purchase food, and, while doing so, will create a sense of place in the community by facilitating social connectedness. A second farmer's market adds another destination for streetcar riders, increasing the viability of the line.*

# ASSESSMENT: NEIGHBORHOOD ENVIRONMENT

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## Neighborhood Environment and health

Health considerations should be integrated into planning and land use projects to create healthy neighborhood environments. The goal of healthy neighborhoods is to promote community development through a highly connected environment. This will increase social cohesion between community members. By taking appropriate measures, the Tempe streetcar can create healthier Tempe residents, through providing them with even more physical activity opportunities.

Characteristics of successful neighborhood environments include:

- 1. Transit Oriented Development (TOD)-** Cities participating in Transit Oriented Development (TOD) build structures that are conveniently accessed via public transportation.
- 2. Mixed Use Development-** Communities using mixed use development locate goods and services near or in residential zones. This allows community members to commute to work and complete their “to-do” list without using a vehicle and will increase the connectivity of a neighborhood.
- 3. Safety-** A high perception of fear will keep residents from socializing and being physically active in their neighborhood, and will increase stress levels and anxiety. Residents must feel safe, and actually be safe to enjoy spending time outdoors in their neighborhood.
- 4. Tailored for vulnerable populations-** Community design should consider all vulnerable populations in developing neighborhood connectivity. Gauging whether children can easily access their school, local ice cream parlor and park will help determine whether a neighborhood has a healthy built environment. Additionally, because Tempe is victim to excessive heat, and both old and young community members are more vulnerable to heat related illness, community design should include components which combat the urban heat island effect.

## Existing Conditions

### TOD

TOD incorporates higher density housing, mixed-use development, and availability of multiple transportation modes. The major requirement of TOD is that there is a ½ mile radius walking distance to transit. This encourages pedestrian activity on the streets which in turn increases economic development and housing opportunities near the transit line.

A TOD community will also have multiple transportation options to external services and businesses. Public transit currently available in the HIA study area includes the Valley Metro bus lines, the Valley Metro light rail and the City of Tempe Orbit neighborhood collector. Bus service is provided along the

major streets and there are two Orbit routes, Jupiter and Venus. Public services along the street corridor include St. Luke's Hospital, local clinics, and other medical offices. The Tempe Library is also in the streetcar corridor, and is vital to furthering the city of Tempe's education. Services include the Children's Library program for school aged children, computer classes for adults and career development services. The library is a center that is to be enjoyed by all residents of Tempe and to meet their needs.

### **Mixed Use Development**

The availability of mixed-project zoning districts in the study area is ample north of University Drive; However, there are no high-density mixed-project zoning districts south of University along Mill Ave. Striving to develop and create more mixed-project zoning districts will encourage walkability and compact development, as well as reap the benefits of mixed-project development which include increased diversity, increased density, civic identification, and increased walkability.

There are currently several mixed-project projects in Tempe, including a mixed-project student housing facility on the ASU campus. In the South Bank urban infill district, adjacent to Tempe Town Lake, there is another mixed-project development under construction ([southbanktempe.com](http://southbanktempe.com)). Located between Rural Road and McClintock Drive on Rio Salado Parkway, Southbank is the City of Tempe's most complex development to date, and will encompass 3.6 million square feet of retail, office, hotel, and residential space.

Downtown Tempe is also focused on mixed-project development. Downtown Tempe hopes to become a holistic "Live-Work-Play" area, where residents need not travel far for their daily needs. Tempe Transportation Center, the Valley Metro Light Rail, and the Tempe Streetcar are all located within Downtown Tempe, and the residents of this area will therefore have the most options in terms of public transportation. In the future, the streetcar line should be extended to reach residents with a higher need for public transportation.

### **Safety**

According to HomeSurfer.com, a website that provides local statistics for real estate buyers and sellers, the crime rating for incidents such as violent crime and property crime for Tempe is 1.1 out of 5 total points, with a score of 5 indicating a very safe area. The crime rating is calculated on how the crime rate in a city compares with crime in the state and the nation. This indicates that Tempe needs to engage in efforts to reduce crime, especially along the streetcar corridor. If residents feel unsafe outdoors, and thus have a high perception of fear, they will be less likely to ride the streetcar. Based on the FBI Uniform Crime Rate database for 2008, Tempe, Arizona has a property crime rate of about 5,806 incidents per 100,000 people. This compares with the Arizona average of 3,872 per 100,000 in Arizona and a National average rate of 3727 incidents per 100,000.

### **Tailored for Vulnerable populations**

Children and older adults are two vulnerable populations in Tempe, influenced by the neighborhood environment. Children should have easy access to destinations which they routinely visit, such as school. In 1969, almost half of all students who lived up to one mile away from their school, either walked or bicycled to school. Now, only 13% of students walk or bicycle to school (citation).<sup>27</sup> According to the Safe Routes to School Guide, the major barriers to children walking to school are:

- Distance to School (61.5%)
- Traffic related danger (30.4%)
- Weather (18.6%)
- Crime (11.7%)
- Opposing school policies (6.0%)
- Other factors (15.0%)<sup>27</sup>

Another concern when building the Tempe street car is excessive heat. Both children and older adults are greatly impacted by excessive heat. In 2009, there were 110 deaths in Arizona, caused by excessive heat.<sup>28</sup> Urbanized regions of Arizona must also battle the urban heat island effect. The effect occurs when urban or developed land is hotter than surrounding rural and undeveloped land, because the surface temperature is altered as a result of the man-made built environment. In Phoenix, the UHI has caused an increase in minimum temperature of 0.47 °C per decade from 1960 to 2000.<sup>29</sup> Neighborhood environments can battle excessive heat and the urban heat island effect by increasing the amount of green and natural space. Natural surfaces are often composed of vegetation and moisture-trapping soils. Natural surface utilize a large proportion of the absorbed radiation and release water vapor that contributes to cool air in their vicinity.

## Impact on Neighborhood Environment

The Tempe Modern Streetcar will increase the connectivity of Tempe neighborhoods to services., and decrease the reliance on the automobile for transportation. The city of Tempe has been successful in slowly growing into a lively and pedestrian-friendly urban core. With the implementation of the streetcar, more people will become aware of the benefits of Transit Oriented Design and mixed-project Facilities. The HIA study area provides many opportunities and locations that are good for infill development or redevelopment. The Tempe Streetcar will allow many sites to be redeveloped for mixed use. Tempe Town Lake, the Mill Ave District and the corner of Southern Avenue and Mill Avenue are examples of such areas.

The Tempe Modern Streetcar will encourage school students to use public transit to reach their schools. There will be streetcar stations located near McKemy Middle School, Tempe High School and Arizona State University. Providing public transit to these schools will decrease the parents' and students' reliance on vehicles to commute and increase the opportunity to incorporate physical activity into their daily routines. The median of public transit users walk to and from transit stops for a total of 20 minutes per day, nearly reaching the recommended minimum of 30 minutes of physical activity per day.

The Tempe Streetcar Project will utilize successful mitigation measures and practices to foster an adequate, livable, surface land temperature. Mitigation measures include the use of lighter colored pavement, narrower streets, and tree cover for natural shading. Lighter colored pavement and materials absorb less heat than darker surfaces. By using these, less heat will accumulate in the built environment. By providing shade using native shade trees, the surface temperature will be decreased, mitigating the effects of the UHI (citation). This will make the streetcar corridor more accessible in the summer months, providing greater benefit for both businesses and citizens.

## Recommendations

To help develop healthy neighborhood environments, the city of Tempe should consider:

1. Continuing the Streetcar to the Tempe public library at Southern Avenue and Rural Road (Phase II).

**Rationale** - *The extension would link the streetcar to the Tempe library and adult recreation center.*

2. Working with the city of Mesa to develop a plan for a multi-phase project that would continue the Streetcar to the Fiesta District (Phase III) and then north on Alma School Road to connect with the light rail at Main Street (Phase IV).

**Rationale** - *The multi-phase project would be a collaborative project that could benefit both cities relative to economic development goals.*

3. Preparing placemaking guidelines to use in the development of public spaces.

**Rationale**- *Placemaking is a multi-faceted approach to the planning, design and management of public spaces, such as parks. It involves creating a vision for a community through understanding the needs of its residents. For example, placemaking can be utilized on the southwest corner of Mill Ave and Southern Avenue to transform an underutilized and desolate area, into a space which the community cherishes. Local parks are usually empty and do not benefit the community; placemaking would encourage the residents to be part of the planning process to determine how to transform local parks to better fit their needs.*

4. Identifying disconnected neighborhoods, and focus efforts on increasing their internal connectivity.

**Rationale**- *Cul-de-sacs and dead ends significantly decrease the walkability of neighborhoods, and therefore should be eliminated where possible. A system of walkways that pass between houses can increase neighborhood connectivity.*

5. Encouraging Neighborhood Block Watches in areas where the streetcar will be built.

**Rationale**- *Having safer neighborhoods in the vicinity of the streetcar promotes ridership, because people will feel more safe riding the streetcar. This also mitigates the negative stigma of public transit being a magnet for criminal activity (citation).*

6. Partnering with community groups to decrease vandalism cleanup and graffiti removal in the streetcar corridor.

**Rationale**-*The prevalence of graffiti, broken windows, and other forms of vandalism often sends the message that crime is uncontrolled in a city. By enlisting volunteers, the city will have the manpower to clean up vandalism at homes and businesses on private property, with the owner's permission. These clean up efforts should focus on the streetcar corridor to make the corridor feel safe and look pleasing to riders. Residents will ride the streetcar if they feel comfortable and safe in the areas which it travels through.*

7. Organizing programs which engage community members in the importance of healthy neighborhoods.

**Rationale**- *Gilliland Middle School is actively involved in promoting green living awareness by providing courses that educate and encourage students to recycle, start their own gardens and educate themselves on the current issues of global warming. Programs, such as these, help to achieve healthy community goals and lead to community empowerment*

# ASSESSMENT: LIVELIHOOD

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## Livelihood and health

Livelihood is the means of making a living that encompasses people's assets, capabilities, income, and activities required to secure life's necessities. Indicators of livelihood include housing, employment opportunities and transportation equity. These indicators relate to health because they are all necessities for individuals leading high quality lives. Having stable housing and employment opportunities guarantees that individuals are able to meet the basic necessities of life.

The Tempe Modern Streetcar will directly increase the livelihood of the Tempe residents by creating efficient transportation networks. This section will look at how the implementation of a modern streetcar will impact indicators of livelihood such as housing, laborers, and transportation efficiency. Transportation equity insures that individuals can reach resources within and outside of their community, regardless of their socio-economic status and financial ability to own a vehicle.

## Existing conditions

### Housing

According to Shaun Rieves, an employee at the Arizona Department of Housing, Tempe's focus on housing in the project area is as follows:

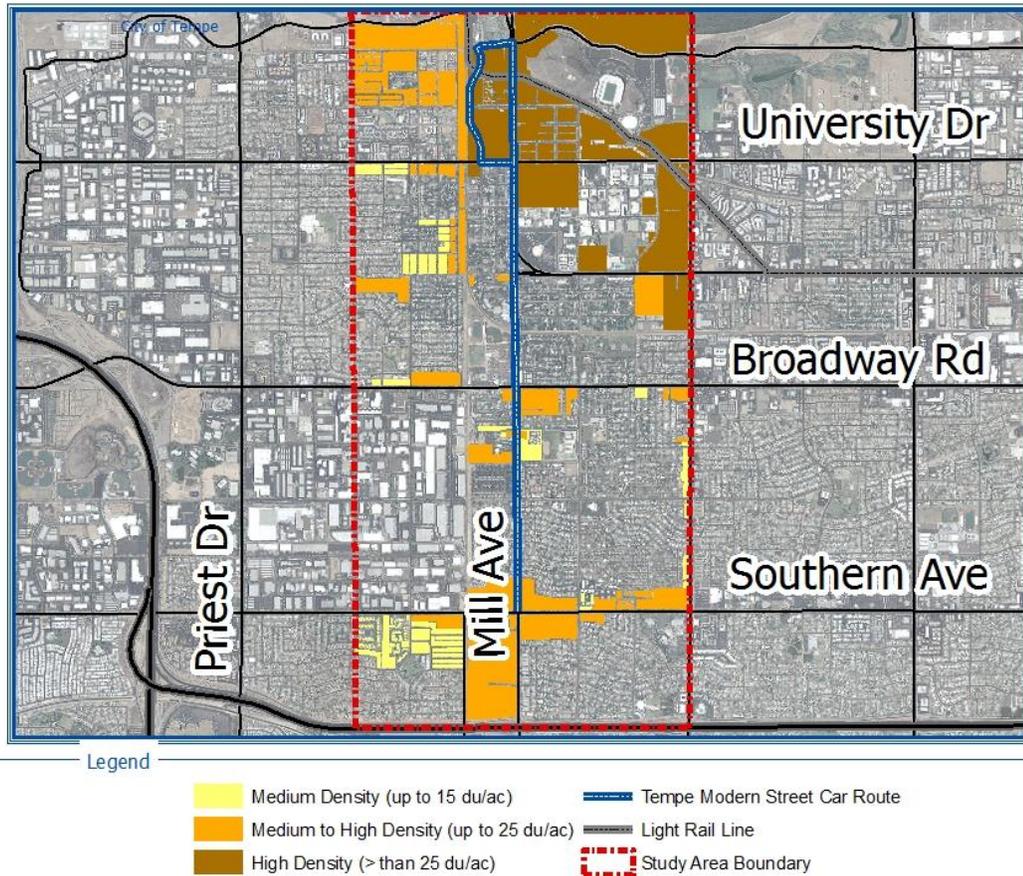
1. Housing impact from rapidly changing pace of transportation, physical and development standards of homes, and construction materials related to income levels, thus the health ramifications related to income.
2. Affordability/Cost of housing: department of housing is focusing on providing more-mixed income housing, in particular low income-housing, in our research area due to close proximity of light rail and future streetcar.
3. Infill development and neighborhood revitalization through economic development at a more consistent measure throughout the study area is a main focus and obligation to support better livelihoods by a diversity of means, such as grocery stores and general stores, for local residents

Currently, Tempe provides a variety of housing densities. The map below highlights the areas of medium to high housing density in Tempe. Much of the high density housing is located around the university and Mill Ave.

# Tempe Modern Streetcar Project HIA

Redevelopment Opportunities

HIA Study Area



4/5/2011

Figure 16 Shows the varying housing densities in the HIA study area.

Below is a list of all 5-digit zip codes fully or partially contained in Tempe. The percentage shows the amount of total households which receive public assistance, and thus have a lower livelihood. The low percentage of 2.28% shows that, overall, the livelihood of Tempe is high. The majority of Tempe has the means to provide themselves with resources to create a stable living.<sup>30</sup> Because this number is low, one can assume that a majority of the Tempe community is provided with the amenities needed to create a stable living. However, along with the City of Tempe’s current focus on housing, the addition of a streetcar will provide those with public assistance income with an opportunity to use an economic and efficient form of transportation.

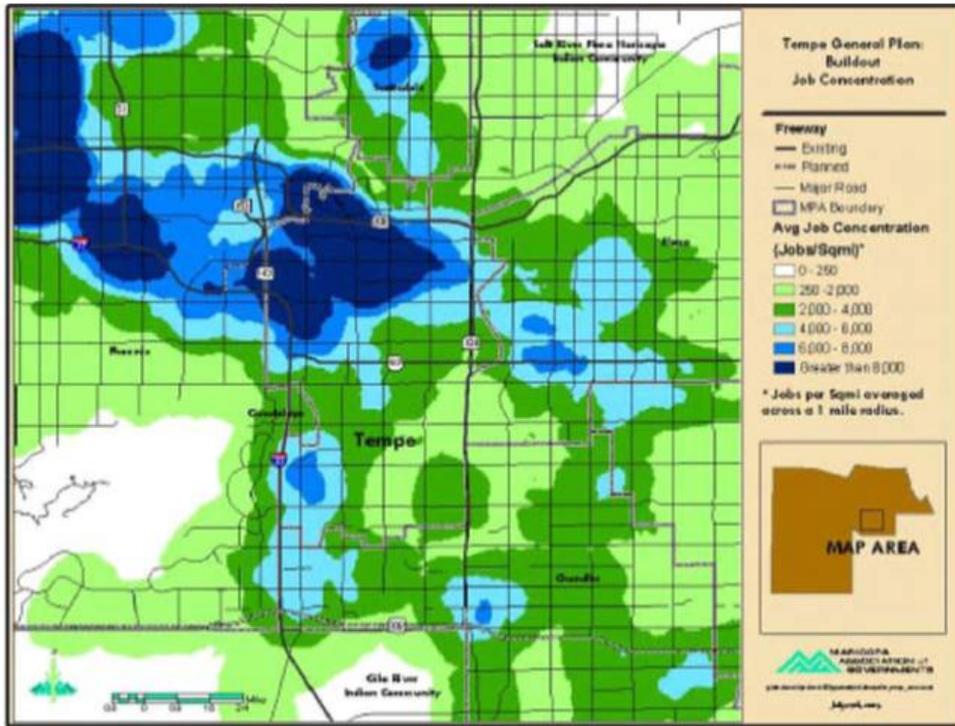
### Zip Codes in Tempe and Public Assistance

Zip Code	Households: Total	Households: With public assistance income
85034	2390	223
85040	17694	716
85044	16875	105
85201	19045	715
85202	16970	413
85226	14419	108
85281	20302	455
85282	21426	397
85283	16970	271
85284	5934	68

Table 7 Displays the households in each zip code in Tempe which have a supplemental income from public assistance.

### Employment opportunities

The majority of employment opportunities in the HIA study are on Mill Ave. From the chart below, one can see that there are over 8,000 jobs concentrated in the Mill Ave area, which rapidly decreases as one travels further away from Mill Ave.



Maricopa Association of Governments Map

Figure 17 Shows the high concentration of jobs in the Mill Avenue District that will be impacted by the Tempe Modern Streetcar; from the Tempe Transportation Plan.

The HIA study area includes many different types of businesses, such as fast food places, service industries, distribution warehouses, and medical complexes. Examples of businesses in the area are:

- Mill Avenue Family Dentistry
- Dynamic Auto Glass
- Walgreens
- Xpedex Paper and Graphix
- Just Breaks
- Arbys

These businesses have between six to 40 employees, and no businesses are currently hiring. The unemployment rate in Tempe, in May, 2012 was 5.9%.<sup>31</sup> The dropping peak unemployment rate since 1990, was in January 2010 at 9.2%. The national economic downturn impacted job availability in Tempe, which is just now slowly recovering. Additional jobs provided by the streetcar construction and project, would speed up the economic recovery process, to help the Tempe community reach financial stability.

### Transportation Equity

Transportation equity provides connectivity to internal and external resources, regardless of the transportation mode and the socio economic status of individuals. In Tempe, there is a large emphasis on public transit used to commute. Below is a table that illustrates the number of workers in Tempe who commute, and the percentage of those who use public transportation as a means to travel to work.

**Average Commute to Work**

Zip Code	Workers 16 years and over who did not work at home: Travel time to work; Less than 30 minutes	Workers 16 years and over who did not work at home: Travel time to work; Less than 30 minutes; Public transportation
85034	1548	59
85040	16123	363
85044	14359	20
85201	15812	204
85202	16565	86
85226	14331	0
85281	22041	463
85282	21345	389
85283	17915	149
85284	6281	17

Table 8 Shows the amount of employees over the age of 16 and those who use public transportation; data available through American Fact Finder from the U.S. Census Bureau<sup>30</sup>

The following shows the percentage of people in each zip code that either walk to work or use public transportation, out of the total population. The percent of workers who use public transportation is 2.55%; the percent of workers who walk to work is 2.95%.<sup>30</sup>

### Tempe residents who commute by using public transportation and by walking

Zip Code	Workers 16 years and over: Means of transportation to work; Public transportation	Workers 16 years and over: Means of transportation to work; Walked
85034	257	152
85040	981	536
85044	234	493
85201	838	739
85202	259	510
85226	88	263
85281	1182	2525
85282	1018	591
85283	539	430
85284	26	40

Table 9 Shows the number of Tempe workers who walk to work and the number who take public transportation; data available through American Fact Finder from the U.S. Census Bureau<sup>30</sup>

## Impacts on livelihood

Streetcar projections predict that the streetcar will spur economic development by creating jobs. Tempe Mayor Hugh Hallman was quoted in the Tribune, stating, *“The transit line will encourage redevelopment of declining shopping centers, including the long-struggling Danelle Plaza at the southwest corner of Mill and Broadway Road.”* Regional transportation planners are also invested in developing Tempe’s economy. METRO’s presentation for the project has mentioned *“for every \$1 invested in rail transit, you can expect \$1.30 in return in other community benefits.”* The Tempe Streetcar should therefore see a net gain in community benefits from money invested into the project. Additionally, construction will require hiring of project managers and a blue collar workforce, while the finished streetcar will require conductors, managers, and a maintenance crew. The increase of jobs will also increase the livelihood of Tempe.

The streetcar will greatly affect those who use public transportation and commute less than thirty minutes. The projected time to get from one end of the route to the other is 20 minutes. With the

streetcar route continuing on Mill Ave, and with such a high job density occurring in that area, the streetcar will connect many employees to their work destinations. Close proximity to public transit impacts employment participation.<sup>32</sup> A study discovered that in Atlanta, proximity to bus stop location was directly correlated to weeks worked out of the year. The number of weeks worked per year decreased by three weeks for every .5 km increase in the distance between an individual's house and the nearest bus stop.<sup>32</sup> Tempe streetcar will provide reliable public transit, and will increase the number of weeks worked for nearby residents.

The streetcar will add another system to the current transportation network in Tempe, which presently includes a light rail and a bus system. Increased options for public transportation will encourage more people to use public transportation, as they can now choose between a bus, the light rail, or a smaller and more intimate streetcar. Commuters will be able to take the streetcar to the light rail station, and thus downtown Phoenix. By connecting the Tempe community to other public transit options will help connect the community to the greater metro region.

## **Recommendation**

To encourage economic development, the city of Tempe should provide incentives to businesses. These efforts could target Arizona State University graduates as emerging business owners. By encouraging investment in local businesses, the city of Tempe can greatly foster development in the local economy and increase the number of jobs. By bringing in small-scale, local businesses, a unique sense of place can be created. Arizona State University is home to thousands of business majors looking to start their business upon graduation. By providing incentives to small businesses, they can keep these graduates in the city, fostering development, innovation and new jobs.

# CONCLUSION

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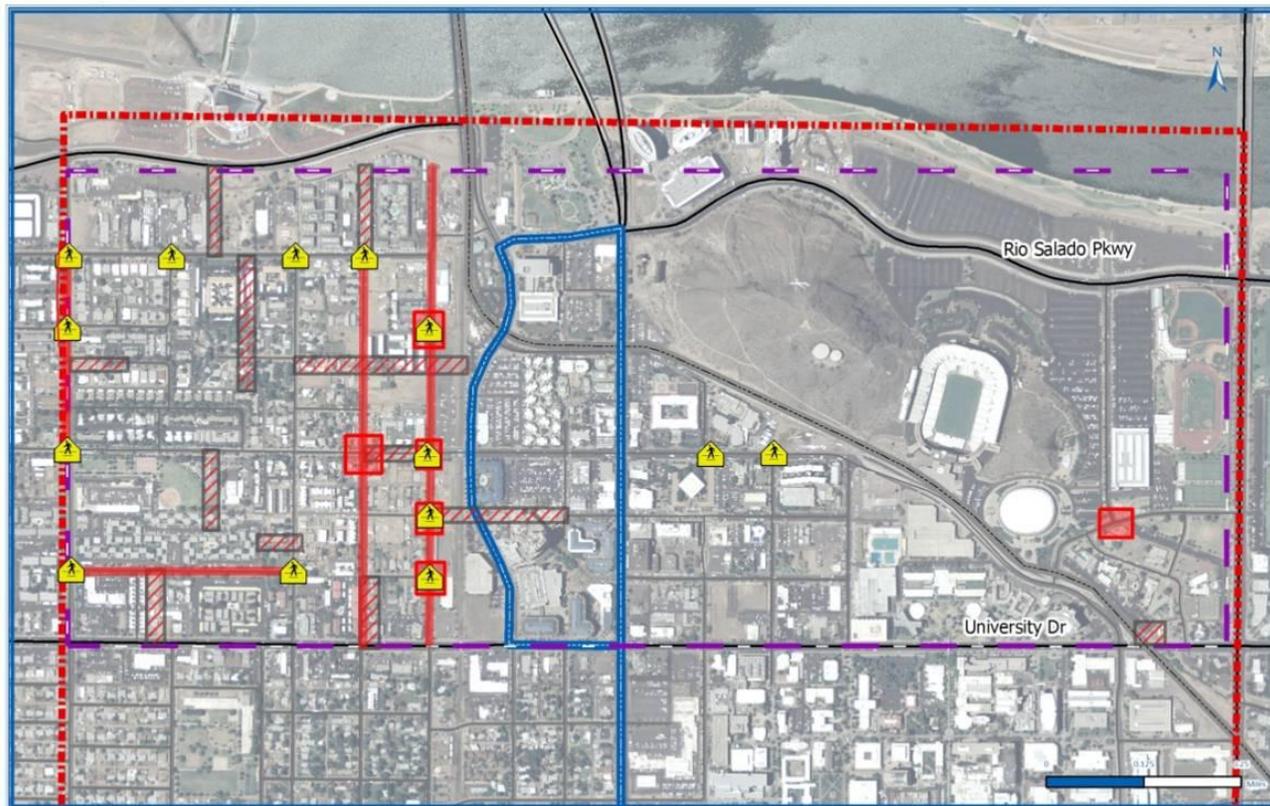
The Tempe Modern Streetcar will positively impact the Tempe community. The streetcar will increase air quality, provide a plethora of physical activity opportunities, safely connect neighborhoods to each other and to external resources, progress the sustainability of neighborhood environments and increase the number of employment opportunities. The streetcar project should monitor these health determinants closely to understand how changes in transportation effect the Tempe community and to prevent and mitigate any negative repercussions. Involving community members into the decision making process for the streetcar will empower the community, and build social capital. Finally, the city of Tempe can follow the recommendations presented in this assessment to address additionally community needs and to ensure sustainable community development.

# APPENDIX 1: WALKABILITY MAPS

## Ash Avenue-Farmer Avenue Subarea

### Tempe Modern Streetcar Project HIA

Walkability Issues: Ash - Farmer Ave



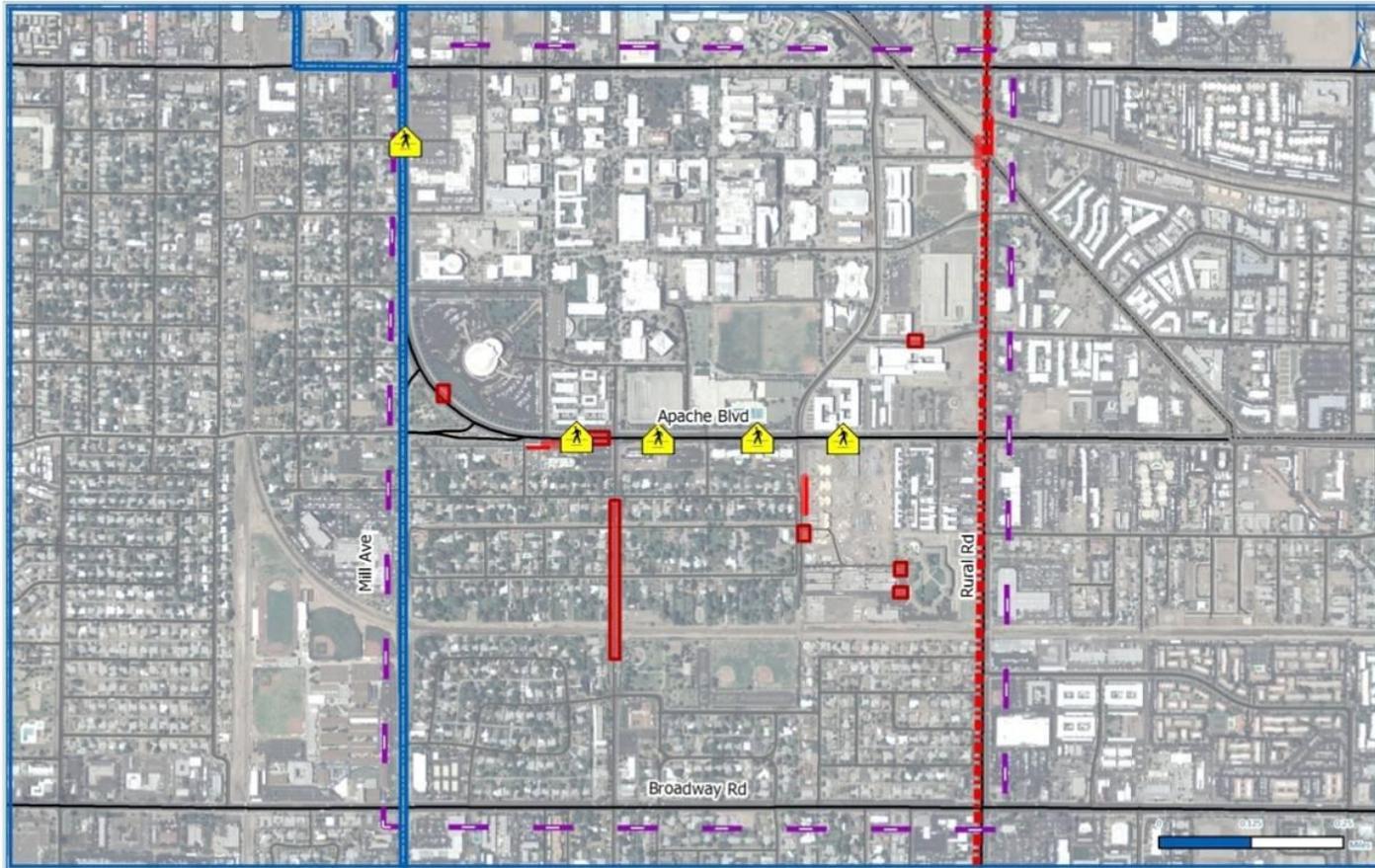
Legend

- |                     |                   |                     |
|---------------------|-------------------|---------------------|
| Sidewalk Issues     | Crosswalks Needed | Streetcar Route     |
| Connectivity Issues | Traffic Calming   | Sub Study Area      |
|                     |                   | Study Area Boundary |

4/5/2011

# Tempe Modern Streetcar Project HIA

Walkability Issues: ASU - Daley



Legend

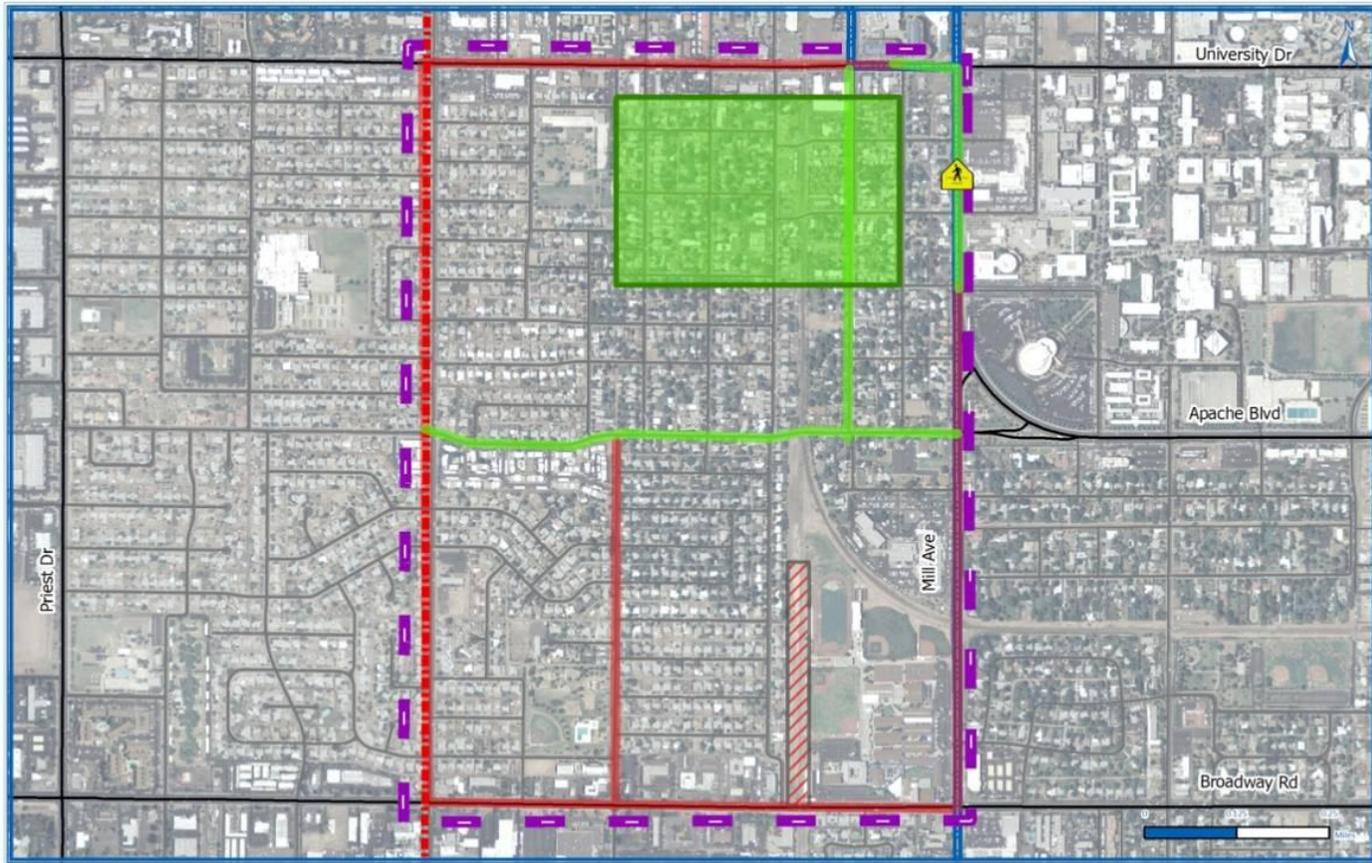
- Bad Sidewalks
- Crosswalks
- Streetcar Route
- Needs Traffic Calming
- Sub Study Area
- Study Area Boundary

4/5/2011

Mitchell Park Subarea

# Tempe Modern Streetcar Project HIA

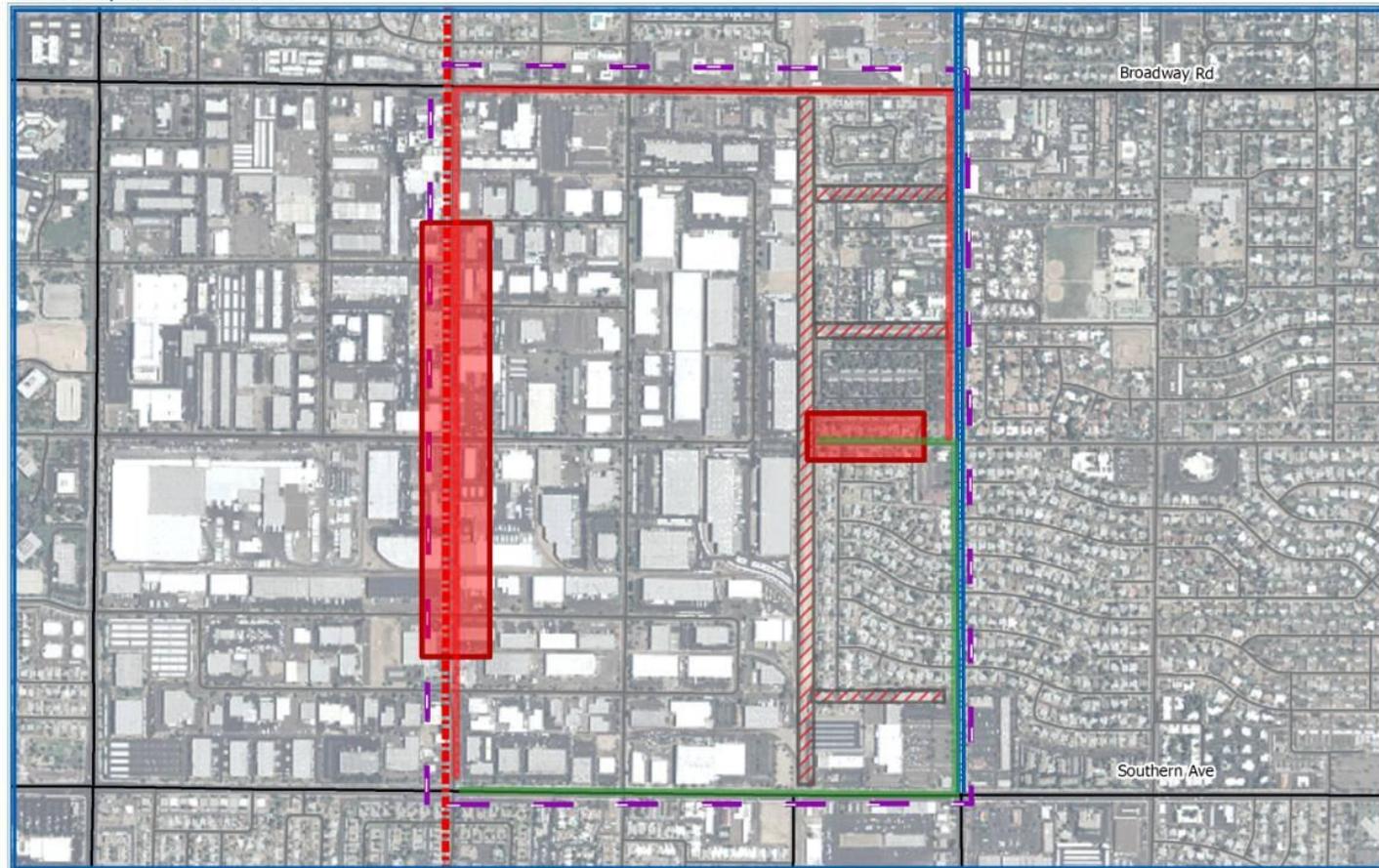
Walkability Issues: Mitchell Park



4/5/2011

# Tempe Modern Streetcar Project HIA

Walkability Issues: RESCOM



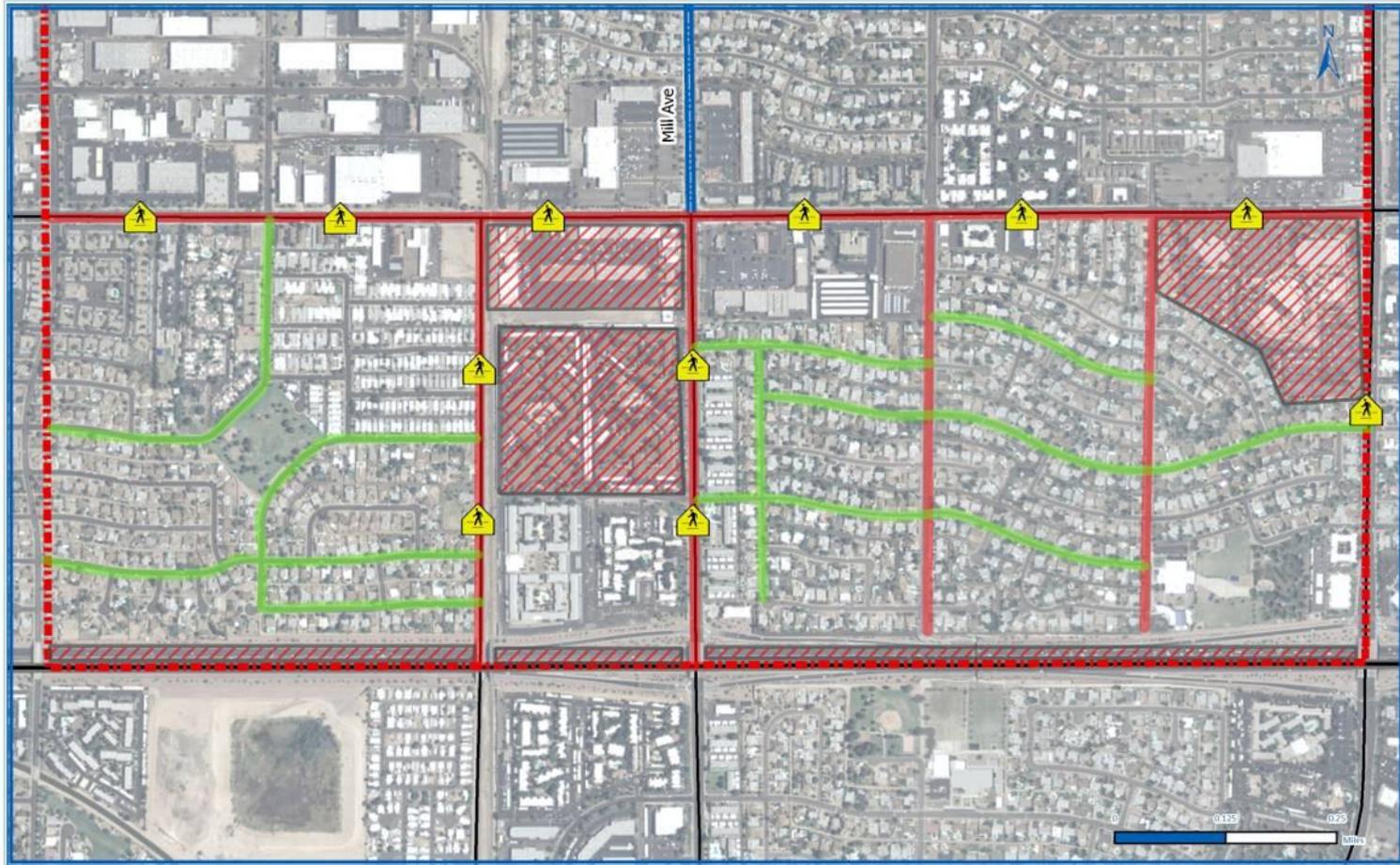
Legend

- Pedestrian Friendly Sidewalks
- Bad Sidewalks
- Connectivity Issues
- Traffic Calming Needed
- Streetcar Route
- Sub Study Area
- Study Area Boundary

4/5/2011

# Tempe Modern Streetcar Project HIA

Food Accessibility: Southern - South



Legend

- Pedestrian Friendly Sidewalks
- Sidewalk Issues
- Crosswalks
- Connectivity
- Streetcar Route
- Sub Study Area
- Study Area Boundary

# APPENDIX 2: HEALTHY EATING POLICIES

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## 1. Menu Labeling

Earlier this year, the U.S. Patient Protection and Affordable Care Act which requires national chain restaurants of 20 or more locations to provide caloric content on menus or menu boards was passed. The act also requires restaurants to make other nutritional information of their products (e.g., fats, carbohydrates, sodium) readily available. Some communities, such as Louisville, Kentucky, have already implemented menu labeling programs for restaurants with less than 20 locations. This can be implemented through building relationships with vendors (often with a high success rate) or mandated through policy.

## 2. Market Makeovers

A significant element in community health programs, Market Makeovers are focused on changing the offerings of existing convenience stores to a more nutritious selection. Specific actions included in Market Makeovers are moving unhealthy items to less visible locations, fixing produce refrigerators, and working with store owners and vendors to provide and promote a healthier selection of food items. A good example of a community program designed to assist in helping convenience or corner stores provide healthier food options is Philadelphia's "Healthy in a Hurry" Corner Store Program (citation).

## 3. Location of Fast Food Restaurants

While fast food restaurant advertisements are visible from billboards to the internet, policies impact the location of these establishments, so as to not attract as large of crowds. These policies include:

- Setting fast food establishments back from the sidewalk so they attract fewer pedestrians;
- Requiring a minimum separation between fast food restaurants and schools.

## 4. Limiting of Advertising Signage

The average individual is bombarded with thousands of food advertisements per day. For advertisements, in particular for fast food or unhealthy foods, should not take attention from grocery stores. Policies can guide the location and prohibition of advertising for specific foods

## 5. Farmers Markets and Community Gardens

Establishing Farmers Markets and community gardens in underserved areas are ways to inhibit access to fresh healthy food. There are multiple grant programs offering funds to establish and maintain farmers markets and community gardens. There are also other benefits to these actions, such as supporting local agricultural industries, providing educational tools, and promoting physical activity.

## 6. Federal Grant Programs

There is a diverse selection of grant programs with the purpose of promoting healthy food access through both these and other means.

- **Community Economic Development Program (CED Program)**
  - Offered through the U.S. Department of Health and Human Services, this program awards competitive grants for support projects financing groceries, farmers markets, and other means that provide fresh nutritious food. These grants are awarded to Community Development Corporations (CDCs) for establishing a partnership with an organization such as Chicanos Por la Causa or another local CDC. For more information see <http://www.acf.hhs.gov/programs/ocs/ced/index.html>
- **Farmers Market Promotion Program (FMPP)**
  - Offered through the U.S. Department of Agriculture (USDA), FMPP provides competitive grants that target the development, expansion, and improvement of domestic farmers markets, community-supported agricultural programs, and other similar entities. Applicants can be local governments (Tempe), agricultural co-ops, non-profits, and other entities.
- **For more information on FMPP: <http://www.ams.usda.gov/AMSV1.0/FMPP>**
- **Community Food Projects Grant Program (CFP)**
  - A USDA program, CFP provides support for projects that help meet the food needs of low-income people and improve communities' self-reliance in providing for their own food needs. Up to \$300,000 may be requested for projects with duration of up to 3 years. Only private non-profits are eligible for funding but collaborations are recommended. To learn more about CFP, follow <http://www.foodsecurity.org/funding.html>
- **Healthy Urban Food Enterprise Development Center (HUFED)**
  - A USDA program, HUFED provides grants for establishing and supporting a HUFED Center to increase access to healthy, affordable, locally produced foods to underserved communities. The established HUFED center would provide training and technical assistance and award sub-grants for healthy food enterprise development. Nonprofit organizations are the eligible applicants. To learn more about HUFED, see the website [http://www.nifa.usda.gov/funding/rfas/healthy\\_urban\\_food.html](http://www.nifa.usda.gov/funding/rfas/healthy_urban_food.html)

# APPENDIX 3: SUSTAINABLE URBAN DESIGN

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## Overview

It is essential to keep in mind the need to build sustainably; in this sense, design is paramount. People will not use a site or building if they think that the area looks unappealing or if it is dysfunctional. The site must look aesthetically pleasing to a visitor to entice them to visit the site. The project must also be functional in terms that it is designed so it will perform based on the adopted sustainability standards.

## Different principles

**1. Smart Code:** used as an ordinance template for planning and urban design. Through Smart Code, a predicted outcome of a community can be planned for the specific needs of the community concerning efforts to create walkability and public spaces within a community.

***Rationale-**The utilization of Smart Code will promote more pedestrian friendly areas, and create a sense of character and uniqueness to the general atmosphere of Tempe. This would be beneficial in tailoring a unified and unique feeling of place within established Tempe communities. Smart Code will allow the city of Tempe to develop a pedestrian friendly community that in turn promotes healthier lifestyles and community involvement.*

**2. Form-Based Zoning Code:** dictates zoning by the shape of a space, rather than traditional zoning based on type (residential and commercial).

***Rationale-** The use of a form-based code can increase the sense of place in Downtown Tempe, and along the corridor. Form-based codes rely on design concepts and patterns intended to preserve the assets of a community, creating more livable environments and spaces.*

**3. New Urbanism:** encompasses the ideas that a resident should be able to live, work, and play in the same development. New urbanism takes ideas from dense development; using transit oriented development and walkability to create an improved standard of living. It is important to incorporate these ideas because it allows us as a society to live a more sustainable and healthy lifestyle, while benefiting the environment.

***Rationale-** If Tempe followed new urbanism elements, the residents would have an improved standard of living. With new development being placed in the same vicinity as the streetcar, it would allow for more growth within the area that would, in turn, create more revenue for the city, businesses, and the community.*

**4. Traditional Neighborhood Design:** requires that there a town center, dense neighborhoods, and homes in close proximity to wide sidewalks.

**Rationale** –By promoting TND, the streetcar corridor has the ability to become a more walkable, and less automobile-oriented area. Each individual neighborhoods will have its own park and natural space. Neighborhoods will emphasize mixed-use development, blending retail centers with businesses and multi-family housing. Tempe’s residents will not only receive a plethora of health benefits, but they will become a stronger community.



*Traditional neighborhood design communities encourage walking promoting a healthier lifestyle.*

**5. 20-Minute Neighborhood:** builds residential and commercial neighborhoods all within a 20 minute walking distance to essential services, such as grocery stores and schools.

**Rationale-** This idea will make the city much more sustainable, it will reduce traffic congestion and emissions, and it will increase active transportation. Portland and Eugene, Oregon, both known for their sustainability efforts, are currently implementing this approach to new development.

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