



Healthy Corridor for All

A Community Health Impact Assessment of Transit-Oriented Development Policy in Saint Paul, Minnesota



SUMMARY

Healthy Corridor for All:

A Community Health Impact Assessment
of Transit-Oriented Development Policy
in Saint Paul, Minnesota

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POLICYLINK



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Foreword

The new Central Corridor light rail line has generated mixed feelings among residents of the Twin Cities who stand to benefit from increased transit access, new development, and greater opportunity to regional resources. On the one hand, many of these residents, representing racially diverse and low-income communities, are looking forward to the promise of this new light rail line and accompanying transit-oriented development: economic opportunity, affordable housing, increased transit access, and public investment in pedestrian safety and streetscaping. On the other hand, many are concerned that the increased desirability of the corridor will increase housing and small business costs, and price current residents out of their homes and businesses. They worry that the social support systems and the ethnic markets they depend on will not be able to withstand the community changes. Still, having largely been the victims of disinvestment, they are hungry to take advantage of this new investment as long as they can be sure that their communities will benefit.

Responding to community concerns, our three organizations came together to form a unique partnership bringing together community organizing, advocacy, and technical analysis. We set out to engage a diverse set of community groups along the Central Corridor as well as technical experts to assess the potential implications of the proposed transit-oriented development rezoning policy that would set the foundation for development and growth in the corridor. We used a tool called health impact assessment (HIA) to guide our analysis, along with principles of community participatory research and community organizing.

Health impact assessment is a tool that can infuse the consideration of health and equity outcomes into critical decision-making processes. Using this tool, decision makers can be fully informed of the implications of their decisions on the health of a community prior to implementing changes. Health impact assessments, first pioneered in Europe, are catching on in America as health practitioners, community groups, researchers, and advocates work to prevent ill health before it starts.

Research shows deep connections between health outcomes and the built environment—for example, people

who live in areas with access to transportation, affordable housing, fresh foods, good schools, and safe parks for physical activity tend to enjoy overall better health and an improved quality of life than those who lack access to those amenities. Stark disparities exist in the built environments of low-income communities versus affluent communities. This disparity is reflected in the health outcomes of low-income people and communities of color.

The Healthy Corridor for All Health Impact Assessment made important contributions to the rezoning debate, and helped to increase community participation, build capacity, and leave an indelible mark on the region as a whole. Through the organizing and advocacy of community leadership, the concepts of health and affordable housing were placed at the center of the rezoning debate and helped educate the media, policymakers, and the general public. The level of community participation—particularly from low-income people and communities of color—in the rezoning process was unique for the city. In addition, through the HIA process and analysis, the Twin Cities region now has a model in place for community engagement and analysis to help address community needs as it plans for other transit corridors.

This document presents a summary of the key components of our full analysis. The full report can be found at www.PolicyLink.org/HealthyCorridorforAllHIA. We hope this report will help inspire other communities facing similar issues to conduct assessments, come together in coalition, and support healthy, equitable transit-oriented policies. In particular, we hope the Healthy Corridor for All Health Impact Assessment is seen as a model for the careful analysis and consideration of important community priorities such as health, affordable housing, and economic opportunity in transit and land use planning, as well as a process for community participation that responds to the leadership and wisdom of communities.

We want to sincerely thank the Healthy Corridor for All Community Steering Committee and Technical Advisory members for their invaluable leadership and contributions to this project and report.

Angela Glover Blackwell,
Founder and CEO, PolicyLink

Dan McGrath,
Executive Director, TakeAction Minnesota

Doran Schrantz,
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Acknowledgments

This report is a collaborative effort that benefited immensely from the contributions of the Community Steering Committee (CSC) and Technical Advisory Panel (TAP). The CSC, representing a diverse array of advocates, activists, and community members, provided leadership and remained fiercely dedicated to giving input, collaborating, and building a powerful coalition throughout the project's more than one year timeline. The TAP represented leading researchers and technical experts in the areas of land use, transportation, law and environmental quality, among others, and supported the project's data and technical needs. The names and affiliations of the CSC and TAP members are listed on the inside front cover of the report.

We wish to thank the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts, as well as Blue Cross Blue Shield Center for Prevention, for their generous support of this project and for making this report possible. In particular, we would like to thank Aaron Wernham and Bethany Rodgers from the Health Impact Project and Vayong Moua from Blue Cross Blue Shield Center for Prevention for their commitment to the success of this project. We would also like to thank Human Impact Partners, in particular Lili Farhang and Celia Harris, for their thoughtful support.

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The images in this report reflect a local perspective and we would like to thank Wing Young Huie and Stephanie Rogers for supplying the moving photography.



Introduction

Across the country, a movement is building to develop and expand light rail transit systems, as demand increases for more urban and less autocentric lifestyles. Light rail systems in Austin, Baltimore, Denver, Los Angeles, Miami, Seattle, and Saint Paul, among other cities, exemplify this trend. With this development have come changes, not only to transportation systems, but to land use patterns in which compact, walkable communities are created, centered around high-efficiency transit—also known as transit-oriented development.

Transit-oriented development can be very beneficial for communities by providing opportunities for people to live, work, and play without having to get into a car, potentially reducing congestion, air pollution, and increasing access to opportunity for transit-dependent households. Yet, as TOD has been constructed in many cities, it has often been associated with displacement of low-income people and communities of color. As more higher-income residents are finding compact living near transit desirable, property values near transit have risen, increasing rents and property tax burdens in some neighborhoods for some existing residents, some of whom may be ultimately displaced due to higher living costs. Because of this phenomenon, PolicyLink, along with other groups, have developed tools to support equitable development—an approach to ensure that low-income households and communities of color benefit from TOD without being displaced.

As part of this larger TOD trend, the Twin Cities region is planning at least four transit corridors, the first of which is the Central Corridor Light Rail Line (CCLRT) that is currently under construction. The CCLRT is an 11-mile transit corridor along University Avenue connecting downtown Minneapolis with downtown Saint Paul. The CCLRT is a \$1 billion transit investment estimated to spur as much as \$6.78 billion in public and private investment in local development over the next 20 years.¹

The Central Corridor, home to over 60,000 people in the Saint Paul segment, passes through some of the region's most diverse and most low-income communities, including the second largest Hmong population in the United States, a large Somali refugee population, as well as Rondo, a historic African American community that has been negatively impacted by a large transportation infrastructure project before—the interstate highway system. Several hundred homes and businesses were demolished and families displaced as Interstate 94 was constructed right through the community, devastating the community's growth and economic prospects. What the people of Rondo and the broader Twin Cities community learned was that transportation planning and land use regulations must be carefully designed in order to ensure that everyone benefits, including the very people who stand to benefit the most: low-income people and people of color.

This time, with opportunity knocking in the form of increased transit access and public and private investment, the Central Corridor (CC) communities did not want history to repeat itself. While looking forward to benefiting from the new transit line and increased public and private investment, they voiced fear that they may ultimately be involuntarily displaced due to increased housing and business costs and began to worry that the large-scale community changes may lead to cultural and social upheaval with the communities' health taking a toll.

Healthy Corridor for All: A Health Impact Assessment

The community expressed concern that not enough analysis had been done to understand the impacts of the light rail line and subsequent land use changes on existing communities. Based on this, ISAIAH, the Hmong Organizing Program of TakeAction Minnesota (TAM's HOP), and PolicyLink partnered together to conduct a health impact



assessment (HIA) of the rezoning ordinance that would lay the foundation for the implementation of transit-oriented development (TOD) along the Central Corridor. A health impact assessment was the tool of choice because of the potential impacts of infrastructure development on the health and well-being of existing communities and the universal aspiration for improving community health in the Central Corridor. The project partners dubbed the HIA, “Healthy Corridor for All.”

ISIAH and TAM’s HOP worked closely with community groups to lead, organize, build capacity, and, in particular, support the engagement of community partners, especially low-income people and communities of color, in the rezoning process and the health impact assessment. PolicyLink served as the technical partner, conducting the research, and providing technical assistance and capacity building. The project partners convened a leadership team to guide the project—the Healthy Corridor for All Community Steering Committee (CSC). The CSC identified the focus for the analysis, advised on research, prioritized and advocated for policy recommendations, and informed policymakers and their constituency every step of the way. The project partners also convened a Technical Advisory Panel (TAP) to provide technical support, expertise, data resources and help integrate and coordinate related existing and ongoing analyses with the HIA. The project partners worked closely, each with different, but complementary roles, and worked closely with the CSC and TAP, together creating a well-rounded leadership team for the HIA.

The goals of the Healthy Corridor for All Health Impact Assessment were to:

- Assess the impacts of the rezoning proposal on community health, health inequities, and underlying conditions that determine health in the Central Corridor.
- Ensure positive health benefits are maximized and negative health impacts are addressed in the decision-making process.
- Empower Central Corridor local communities to meaningfully engage in the rezoning process.

The core values that guided this HIA included equity, community empowerment, collaboration, accountability, and scientific integrity.

What is a Health Impact Assessment?

Health impact assessments (HIAs) have been conducted in Europe and Australia for many years. In recognition that many policies, plans, and projects outside of the health arena have important health implications, groups in the United States have started to conduct HIAs in the last ten or so years to evaluate and support the consideration of health in decision-making processes.

Health impact assessment may be defined as “a combination of procedures, methods and tools that systematically judges the potential, and sometimes unintended, effects of a policy, plan, program or project on the health of a population and the distribution of those effects within the population. An HIA identifies appropriate actions to manage those effects.”² HIAs, such as the one conducted in Healthy Corridor for All, often focus on the “social determinants of health.” These have been defined by the World Health Organization as “the conditions in which people are born, grow, live, work and age, including the health system. These circumstances are shaped by the distribution of money and resources at global, national and local levels, which are themselves influenced by policy choices. The social determinants of health are mostly responsible for health inequities—the unfair and avoidable differences in health status seen within and between populations, [among race, income, gender and geography].”³

The role of health impact assessments goes beyond collecting and analyzing data on existing health disparities and impacts on health. The HIA process can be an instrument to engage and empower communities, emphasize everyday experiences in decision-making, build consensus around decisions, and build lasting relationships and collaborations across diverse constituencies.⁴ Embedded in the HIA process are opportunities for community engagement and leadership in order to achieve a participatory research process that reflects and resonates with resident concerns and aspirations.



Health impact assessments are particularly beneficial in communities that have long been disenfranchised, under-resourced or neglected by providing a means for engaging in policy decision-making processes and identifying recommendations that improve health and access to opportunity. Equity is a core value of HIA as described by the World Health Organization.⁵ HIAs must value equity and carefully consider how best to evaluate and promote equitable outcomes. As used by PolicyLink, equity is defined as just and fair inclusion for all, which allows all to participate, prosper, and reach their full potential.⁶

Why Focus on Health?

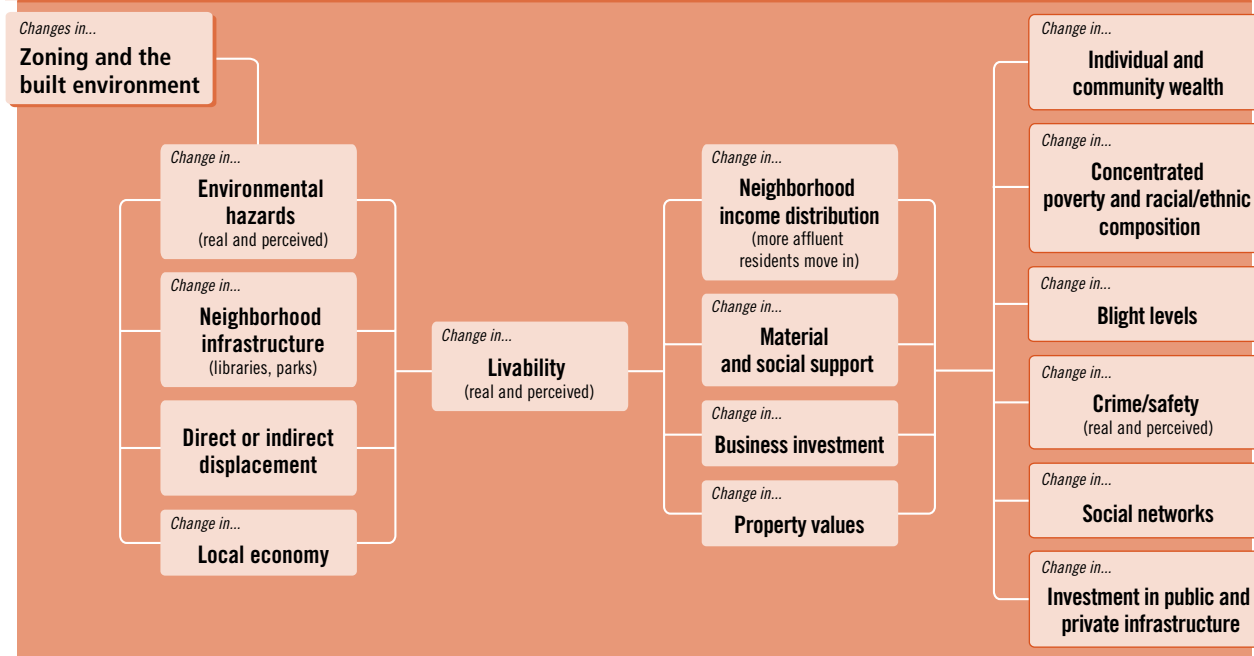
The Central Corridor LRT is one of several new proposed light rail line expansions across the country that traverses lower-income neighborhoods and communities of color. This HIA provides an opportunity to demonstrate how to ensure that new transit-oriented development (TOD) supports equitable and healthy outcomes for all. The health benefits of TOD are well-documented in urban planning literature;⁷ this type of development supports transit usage and active transportation lifestyles, thus reducing carbon emissions and increasing physical activity. However, these positive outcomes are not necessarily distributed evenly by race or income. Research has shown that transit investments can result in more expensive housing, more wealthy residents, and higher vehicle ownership, all of which can price out core transit users, such as renters and low-income households.⁸

Investments in transit do not impact all neighborhoods the same. Some transit-rich neighborhoods do not experience dramatic increases in investment and increased opportunity⁹ while many do. Careful land use and economic development planning must be done to support equitable investment and growth around new transit lines—such that current residents can stay and thrive in their neighborhoods and benefit from the increased economic activity and opportunities that can result from new transit. Figure 1 depicts pathways for how rezoning can impact the determinants of health.

The rezoning of the Central Corridor was one of the first major regulatory steps undertaken by the City of Saint Paul to implement TOD around the new transit line. The City's stated overall goals for the rezoning were: "higher density development, reduced demand for parking, pedestrian, and transit-oriented environments."¹⁰

This rezoning will undoubtedly impact the built environment of the Central Corridor and surrounding neighborhoods over the next few decades and for generations to come. Many studies have shown that our physical and social environments—where we live, learn, work, and play—affect our health even more than we previously imagined. Some neighborhoods provide opportunities for people to make healthy decisions, such as those with affordable housing, high-performing schools, safe places for children to

FIGURE 1. CHANGES IN NEIGHBORHOOD LIVABILITY AND HEALTH



Health outcomes include injury and morbidity from crime, stress-related illness, effects from lack of social cohesion, effects from lower incomes (e.g., from lack of access to jobs, education, etc.) increased risk of injury/death from lack of police and fire protection and others.

Source: Adapted from Human Impact Partners, 2011.

play outside, and access to grocery stores. People who live in neighborhoods that lack these healthy opportunities—often low-income communities and communities of color—experience the worst health outcomes—such as high rates of obesity, diabetes, asthma, and heart disease.¹¹

Components of this Report

This document is written for policy advocates and decision makers in the Twin Cities area as a way to demonstrate the clear connections between land use decisions and health and equity outcomes as the Central Corridor LRT develops. This document can also be used to inform city and regional decisions regarding other proposed TOD or transit planning projects. This report presents a methodology for conducting equitable TOD analysis with community leadership. In this document you will find the following components:

- **Methodology**, in which the process of implementing the HIA is discussed and where you will find some technical information about data sources and collection, and research methods for the assessment. For a detailed methodology description, please see the full report.

- **Background**, which details the history of the Central Corridor and surrounding neighborhoods, information about demographic and neighborhood characteristics of the corridor, and an overview of the Saint Paul real estate market.
- **Rezoning Proposal Analysis**, which describes the City of Saint Paul’s rezoning proposal and the implications it can have on land use in the Central Corridor.
- **Assessment Findings**, in which the existing conditions of the Central Corridor and potential impacts of rezoning are included and organized by the CSC priorities.
- **Prioritized Policy Recommendations**, which detail the policies the CSC has designated as highly important for implementation as a result of the assessment findings.

For a detailed description of each of these sections, visit the full report at www.policylink.org/HealthyCorridorforAllHIA.



Healthy Corridor for All: HIA Process and Methodology

The Healthy Corridor for All Health Impact Assessment began in May 2010 and continued through April 2011 when the Saint Paul City Council passed the new rezoning to accommodate higher-density TOD. The HIA was conducted to help inform the April city council decision and any upcoming development decisions for the Central Corridor. The Community Steering Committee made recommendations to the city council in preparation for its decision on the rezoning proposal.

To carry out the health impact assessment, the process outlined below was followed. The full report presents the HIA process in more detail.

Screening: Does a Health Impact Assessment Add Value?

In this initial phase, the project team—ISIAH, TAMN’s HOP, and PolicyLink—worked with community leaders and organizations to determine the need for, and value of, a health impact assessment. The team recognized that health had not been discussed in the zoning debate, and that the goal of the zoning change was not necessarily to make transit-oriented development more equitable even though properties located in some of the city’s most low-income and racially diverse communities would be impacted. Given the interest expressed by the community, the project team decided to conduct an HIA as a way to evaluate the potential impacts of the rezoning and provide the community and decision makers with recommendations that would assist them to assure creation of a healthy, equitable community.

Scoping: Creating the Framework for the Project

Developing a Community Steering Committee and Technical Advisory Panel

In June of 2010 the project team created a Community Steering Committee (CSC) of over 20

organizations representing diverse constituents living and working along the Central Corridor. These groups represented varied interests from labor to faith groups and small business.

The project team then created a Technical Advisory Panel (TAP) of over 20 organizations, ranging from the City of Saint Paul Planning and Economic Development Department and university professors, to affordable housing developers and economic development associations. Additionally, a set of key policymakers in the zoning and transit station area planning process were identified to ensure consistent communication with decision makers throughout the HIA.

Developing a Research Proposal for the HIA

In July of 2010, the project team brought together the full CSC and TAP for the official public launch of the Healthy Corridor for All Health Impact Assessment. This group spent time creating a collective vision of a healthy Central Corridor, and through discussions and a vote, prioritized three of the elements they believed were critical in achieving a Healthy Corridor (these priorities are discussed in the section, Healthy Corridor for All: Assessment Findings).

Next, the project team worked with the CSC and TAP to develop a research proposal that established a set of indicators to best evaluate the zoning based on the priorities of the community given constraints in data availability, time, and resources. Approximately 50 indicators were selected for the research plan.

Enhancing Advocacy and Building Capacity

The HIA process proved to be a promising tool to forge alliances among stakeholders along the Central Corridor who might otherwise not work



with one another. This included African American residents, Hmong and other Asian business owners and residents, as well as white residents. The group as a whole worked together to build their capacity to engage in the rezoning decision-making process, and developed into a coalition to advocate for healthy, equitable zoning policies and plans.

Assessment: Analyzing Current Conditions and Potential Impacts

To understand how rezoning would impact the prioritized objectives and thus the health of Central Corridor residents, the project partners:

- Explored key features of the zoning proposal.
- Assessed the existing conditions in the community.
- Analyzed how the existing conditions will be influenced by the zoning proposal.
- Made recommendations for alternative zoning approaches and improvements where necessary.

In the existing conditions analysis, approximately 50 indicators were assessed to identify current conditions. A methodology was then identified to analyze how the anticipated changes in the built environment would affect existing conditions according to two different scenarios. One scenario was market-based, using estimates from a market analysis conducted by the real estate firm Colliers Turley Martin Tucker, now named Cassidy Turley, commissioned by the City of Saint Paul Planning and Economic Department. The second scenario used the maximum allowable development outlined in the City's rezoning proposal.

Recommendations

Once the impact analysis was complete, best practices in equitable development were identified related to the priorities of the CSC. The project team then created an inventory of policy recommendations to mitigate the potentially negative impacts of the rezoning that were identified. The CSC prioritized five policy recommendations for the rezoning, described in the Creating a Healthy Corridor for All: Five Policy Recommendations for Moving Forward section.

**“We can do this together...
we can build it better for
our children.”** Chong Vang, small
business owner on University Ave



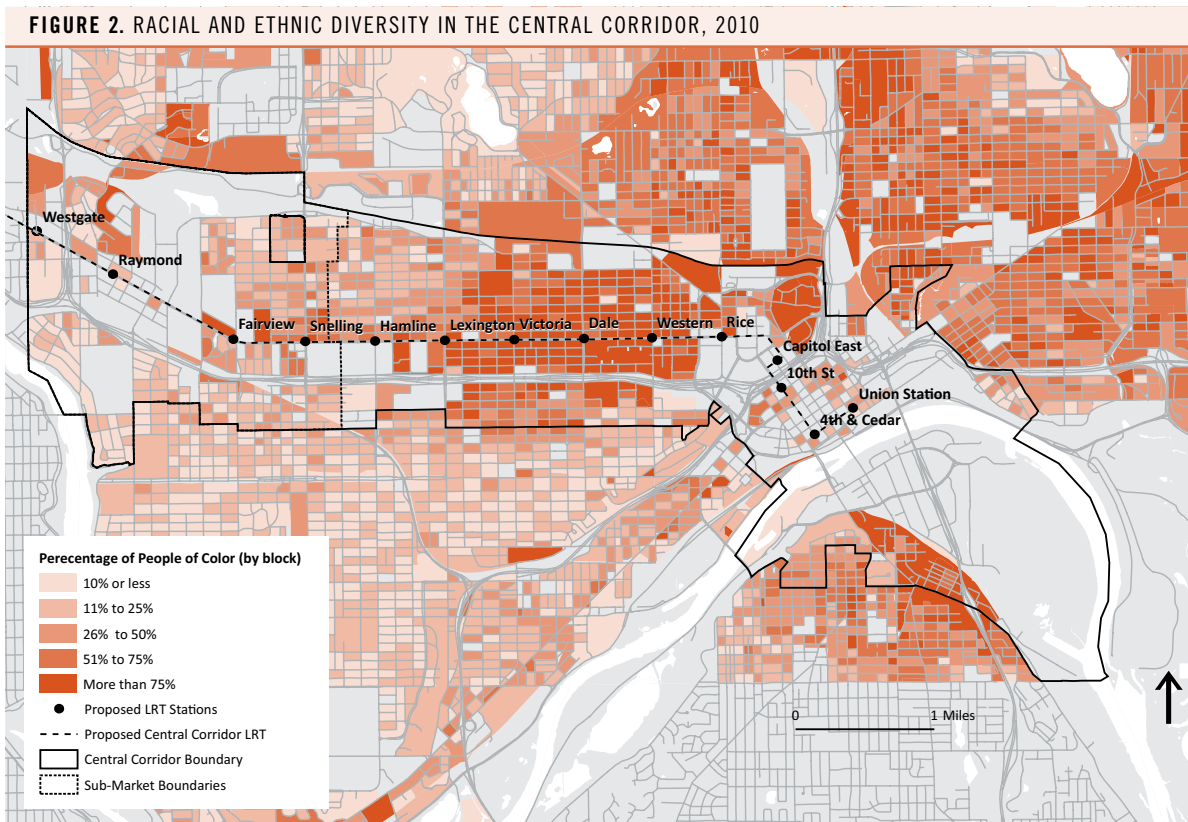
Central Corridor: Demographics and Neighborhood Characteristics

The Central Corridor is racially and ethnically diverse. Within the corridor, the population is 44 percent white, non-Hispanic, 28 percent black or African American, 16 percent Asian or Pacific Islander, 7 percent Latino, 4 percent two or more races, and 1 percent American Indian. Communities of color are especially prominent in the neighborhoods in the east and central submarkets* as well as across the river from downtown. See Figure 2 for details.

Poverty is prevalent in corridor neighborhoods. In 2005–2009, the estimated corridor poverty rate was 27 percent, up from 23 percent in 2000. Poverty is higher in the Central Corridor than in the city or county.

Many corridor neighborhoods have been or are currently immigrant gateways into the Twin Cities. In several Central Corridor neighborhoods, more than a quarter of the population is foreign-born. Since the late 1970s, the Central Corridor has drawn significant immigrant populations from southeast Asia, eastern Africa, and Latin America.

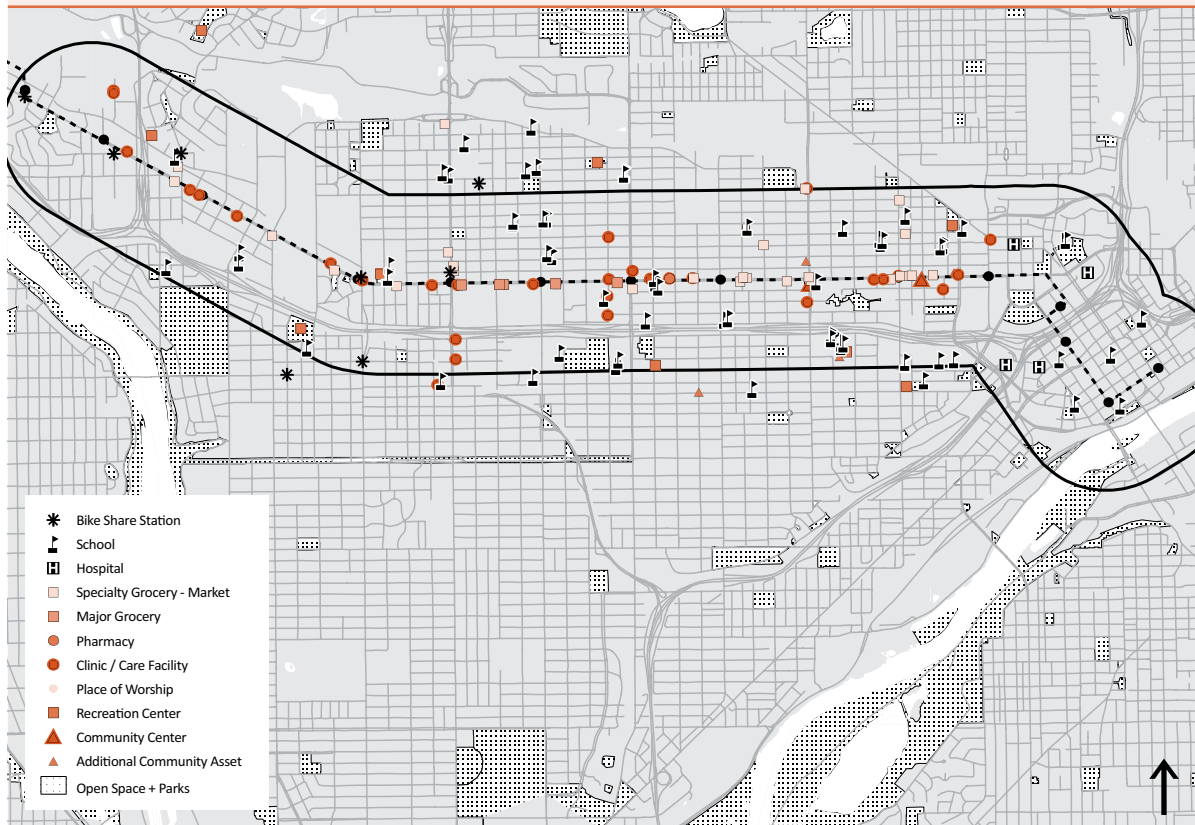
* The Central Corridor Development Strategy (CCDS)—the vision of corridor development—and subsequent market analysis separated the Central Corridor into five separate submarkets based on varying demographic and market conditions throughout the corridor. In this report, submarkets include all block groups that are mostly contained by the original boundaries established in the CCDS.



Source: Census 2010; Metropolitan Council GIS; City of Saint Paul.



FIGURE 3. CENTRAL CORRIDOR COMMUNITY ASSETS



Source: ESRI; Minnesota Center for Environmental Advocacy; Metropolitan Council GIS; GoogleMaps.

Neighborhoods in the Central Corridor generally experience poorer health outcomes compared to the region.

According to research by the Minnesota Department of Health, zip codes in the Central Corridor have higher infant mortality rates and asthma rates, and a higher prevalence of babies born with low birth rate, compared to the Twin Cities region or the state of Minnesota.¹² Furthermore, there are some environmental conditions in the corridor that do not promote health: the Central Corridor contains several potential brownfield sites¹³ and estimated pollution levels are higher throughout much of the corridor due to its proximity to Interstate 94 and State Route 280.¹⁴

Schools in the Central Corridor are becoming increasingly segregated by income and race.

Based on research by Myron Orfield and others at the Center for Race and Poverty at the University of Minnesota, schools on the east side of the corridor are racially segregated and poor, and produce low test scores.¹⁵

The Central Corridor contains many assets.

Figure 3 identifies some of the assets in the corridor, which include schools, community centers, grocery stores, and places of worship, among others.



Proposed Central Corridor Land Use Changes

Existing neighborhood conditions and demographic trends will be influenced by the incoming light rail line and accompanying land use changes. This health impact assessment focused on analyzing the impacts of the rezoning proposal on key elements of the built environment that influence health. The rezoning proposal, drafted by the Saint Paul Planning and Economic Development Department, was largely crafted to implement the vision and objectives of the Central Corridor Development Strategy (CCDS), a document created in 2008 through a series of community workshops to plan for the future of the light rail transit station areas. The focus of the rezoning was primarily to align city regulations on land use, density, and parking to accommodate higher density, mixed-use transit-oriented development.

After a review of the City's rezoning proposal, the following general changes to land use along the Central Corridor were identified:

- Office space will significantly increase as the market for office space improves.
- Retail will increase fairly moderately.
- As many as 6,775 new residential units may develop along University Avenue and within the station areas in the next 20 years under current market conditions; under the maximum build-out of the rezoning, the number of new housing units could be over four times as many.
- A significant portion of industrial land near station areas is being rezoned to allow for higher-density, mixed-use development.

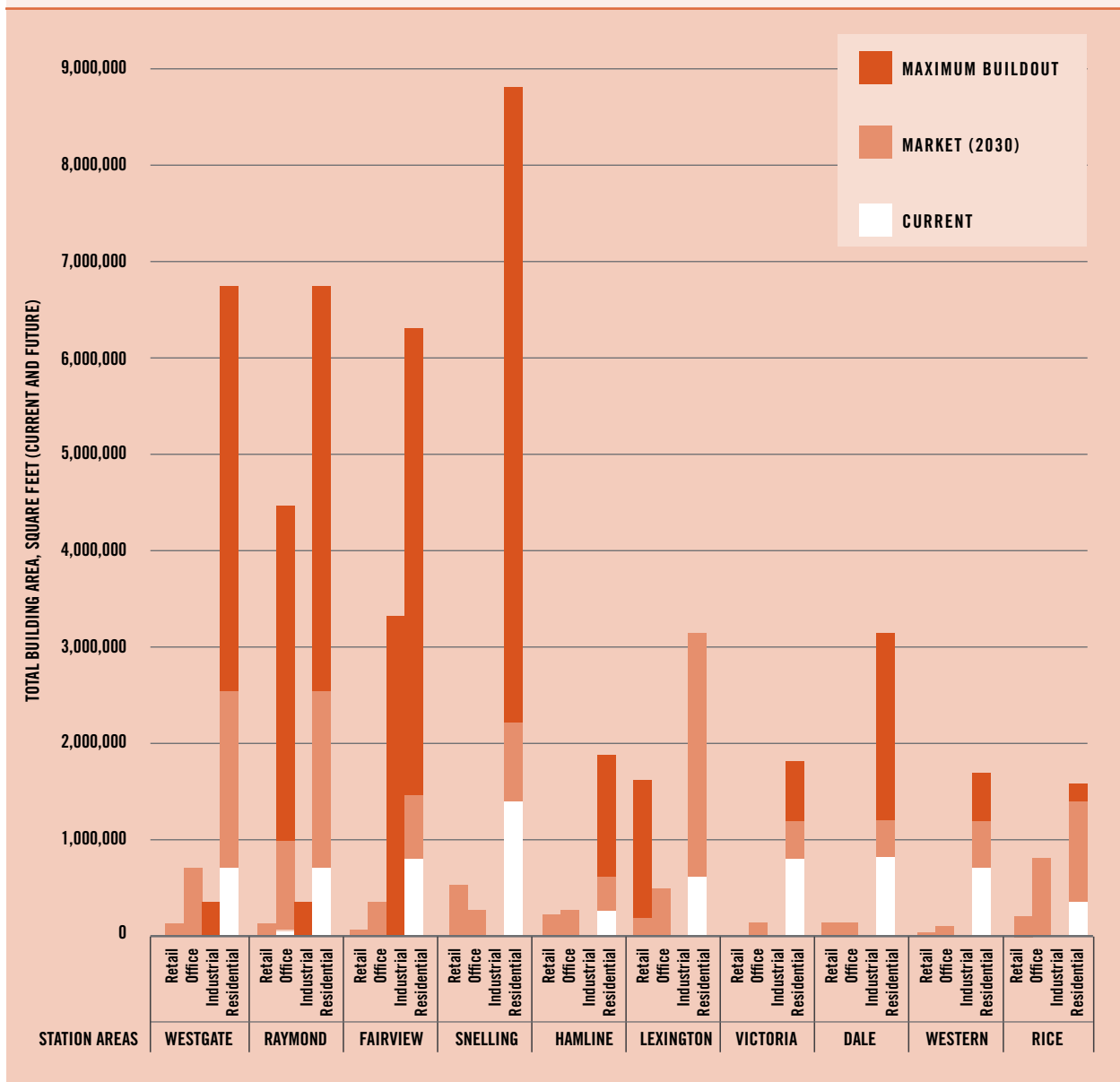
“We are not opposed to light rail coming through. We welcome the light rail. We just want to make sure that we have benefits to this light rail as well.”
Eve Swan, Save Our Homes Coalition



Figure 4 demonstrates land use changes by station area in the areas where rezoning is proposed. This figure shows that the majority of development will be concentrated in the station areas on the western end of the Central Corridor, and that the market

build-out scenario projects far less development than the rezoning regulations will allow at maximum allowable build-out. Regardless of which scenario actually unfolds, the figure shows that significant changes will occur in the affected communities.

FIGURE 4. POTENTIAL CHANGES IN LAND USE BY STATION AREA



Source: Central Corridor Development Strategy and Station Area Plans; City of Saint Paul.



Healthy Corridor For All: Assessment Findings

The potential changes to land use that may result from the rezoning, as described in the previous section, will impact community conditions and health outcomes. In assessing impact, the Community Steering Committee (CSC) focused on three priorities: healthy economy; affordable, healthy housing; and safe and sustainable transportation. For each priority, the CSC identified community objectives, as shown in Table 1, and related questions to guide the impact analysis. Each objective was assessed through an existing conditions analysis and an impact analysis. Key findings have been included in this summary report. The full range of indicators and assessment findings can be found in the full report at www.policylink.org/HealthyCorridorforAllHIA.

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Table 1. Community Priorities and Objectives

Healthy Economy

Objective 1:

High Quality, Healthy Jobs that Increase Wealth, Income, and Equity for All Residents

How will the proposed zoning change the amount and quality of jobs that will be available to residents in the corridor neighborhoods?

Objective 2:

Diverse, Local Businesses—Existing and New—Are Developed and Supported

How will the zoning changes affect small, locally and minority-owned businesses that are located along the corridor?

Healthy, Affordable Housing

Objective 3:

Protect Residents from the Negative Impacts of Gentrification

How will the proposed zoning affect the likelihood of neighborhood gentrification and the involuntary displacement of current residents?

Objective 4:

Construct and Preserve Affordable and Diverse Housing In Proportion to Demand

How will the proposed zoning impact the cost of housing in the neighborhood and the availability of affordable housing?

Safe and Sustainable Transportation

Objective 5:

Maintain and Improve Affordable and Accessible Transportation

How will the proposed zoning coordinate with, and affect, affordable and accessible public transportation in the Central Corridor?

Objective 6:

Safe, Connected Walking Routes to, from, and across Transit Stops

How will the proposed zoning coordinate with, and affect, access to safe and connected routes to, from, and around rail and bus stops?



Healthy Economy

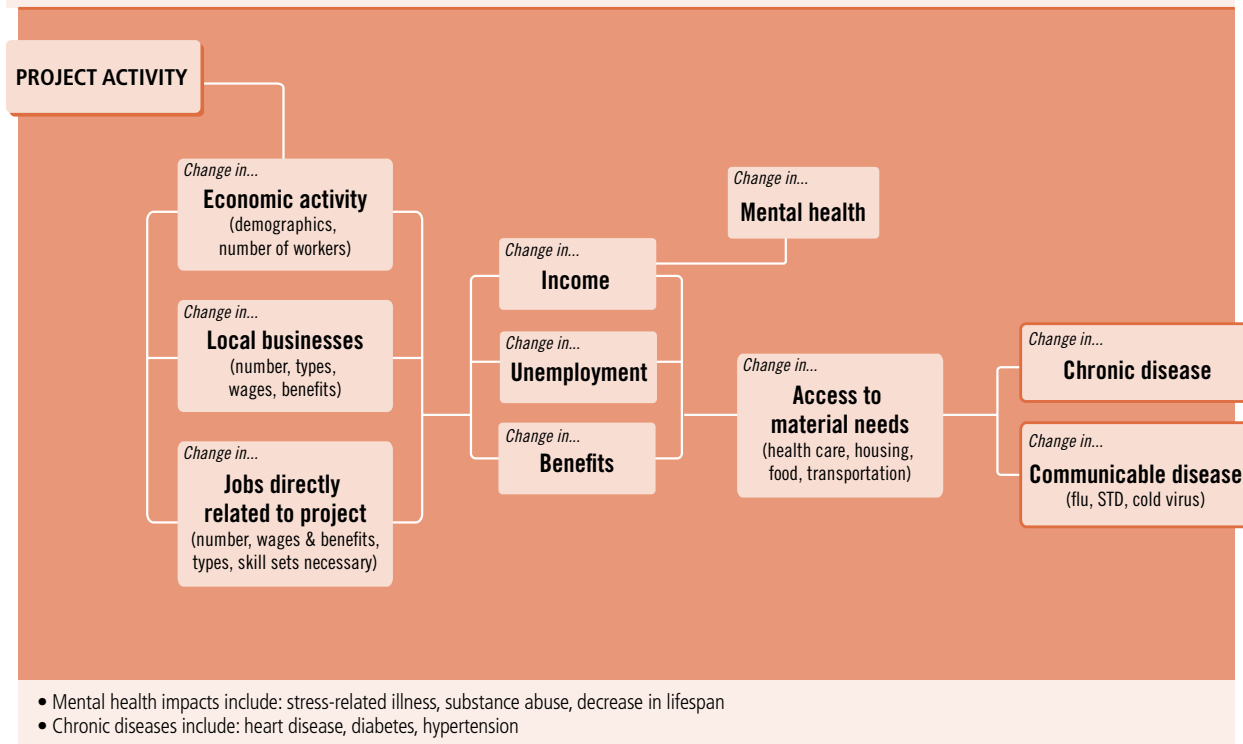
Overview

The new transit line and potential development around this line will impact the economy of corridor neighborhoods in many ways, including changes to employment opportunities for residents (both along the corridor itself and accessible via the broader transportation network), changes to the success of local, small, ethnic businesses, and the availability of a variety of goods and services. The construction of the transit line itself as well as new development will not only create job opportunities for residents but also contracting opportunities for area businesses.¹⁶

However, there may also be a time when existing business is disrupted along the corridor because of the construction process, obstructing access to small businesses. In addition, the changes in parking, the customer base, and redevelopment may impact small businesses after the construction is complete.

The relationship between the state of the economy and health is documented in the literature. Figure 5 describes how different factors related to the economy can impact physical and mental health.

FIGURE 5. EMPLOYMENT EFFECTS ON HEALTH



**OBJECTIVE #1:
High Quality, Healthy Jobs that
Increase Income, Wealth, and Equity
for all Residents**

**Existing Conditions Analysis:
Jobs and Opportunity**

KEY EXISTING CONDITIONS FINDINGS:

- There is a fairly even split between well-paid jobs and those that do not pay well in the Central Corridor (CC).
- Approximately 21 percent of all workers in Saint Paul and 11 percent of all workers in Ramsey County live in the CC, yet only 6 percent of the jobs in the CC are filled by CC residents. This may be partly due to the fact that downtown Saint Paul is a regional employment hub.
- The need for employment is high in the CC, with an estimated 9.9 percent unemployment rate in 2005–2009, compared to that for Saint Paul (8.5 percent) and Ramsey County (7.2 percent).
- People of color in the CC have high unemployment rates. The unemployment rate for African Americans in the Central Corridor was 18.1 percent, 24.0 percent for American Indians, 15.5 percent for Latinos, and 9.4 percent for Asian/Pacific Islanders, compared to just 6.3 percent for non-Hispanic whites in the 2005–2009 period.
- Jobs in the Central Corridor held by CC residents are more likely to be the lowest paying—those that pay less than \$14,400 per year.
- There is a jobs and education attainment mismatch in the Central Corridor.
- Manufacturing stands out as an industry in the CC that is high paying (fifth highest paying industry in the county), and employs a relatively high number of CC residents.

While jobs in the Central Corridor are split evenly between well-paid and non-well-paid jobs, Central Corridor residents work disproportionately in lower-wage industries.

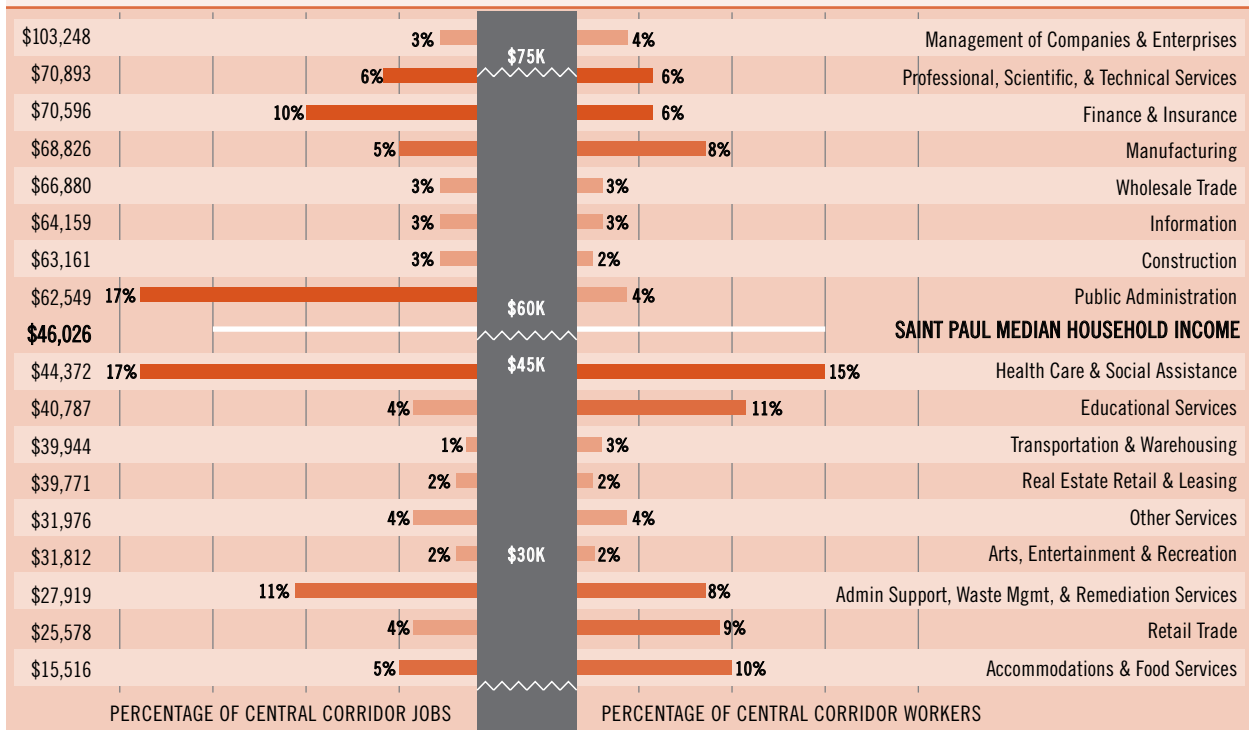
Figure 6 depicts the industries in the Central Corridor (CC) ranked by the average annual wages for that industry in Ramsey County and depicts the proportion of CC workers and jobs in the CC that are in each of those industries. Central Corridor residents hold a disproportionate percentage of jobs in industries that average lower wages.

While the CC certainly attracts workers from a wide area due to the large employment centers at the State Capitol and in downtown Saint Paul, there are many CC residents that are not filling those higher wage jobs, especially in the public administration or in the finance and insurance industries.

There is an education and jobs mismatch in the Central Corridor. The educational attainment level of CC residents does not match the average educational attainment necessary for the industries currently in the CC. See Figure 7 for details. Generally, the higher paid industries are also those that have higher educational attainment levels.

Overall, CC residents currently fill very few jobs in the Central Corridor and many do not have the educational attainment needed to work in the majority of industries currently in the CC. Many Central Corridor residents of color are particularly disadvantaged because they have lower educational attainment levels on average, compared to the non-Hispanic white population. See the full report for a racial breakdown of education attainment. CC residents also hold lower educational attainment levels than the county average and therefore are at a disadvantage when competing for jobs against other Ramsey County residents.

FIGURE 6. AVG. ANNUAL WAGES BY INDUSTRY RELATIVE TO PROPORTION OF CC JOBS AND WORKERS EMPLOYED IN THOSE INDUSTRIES



Source: LEHD 2008; American Community Survey 2005–2009; QCEW 2009.

Impact Analysis: What Jobs Will be Lost and Who Will Get the New Jobs

KEY IMPACT ASSESSMENT FINDINGS:

- Several thousand jobs will likely be added to the Central Corridor over the next two decades, most of which will be near the station areas on the western end of the corridor.
- There will be less opportunity for growth in the manufacturing sector.
- The number of higher-paying jobs for lower-educated workers will likely decrease over time.
- The majority of new jobs added will likely be higher-paying and require higher education.

Employment opportunities will increase.

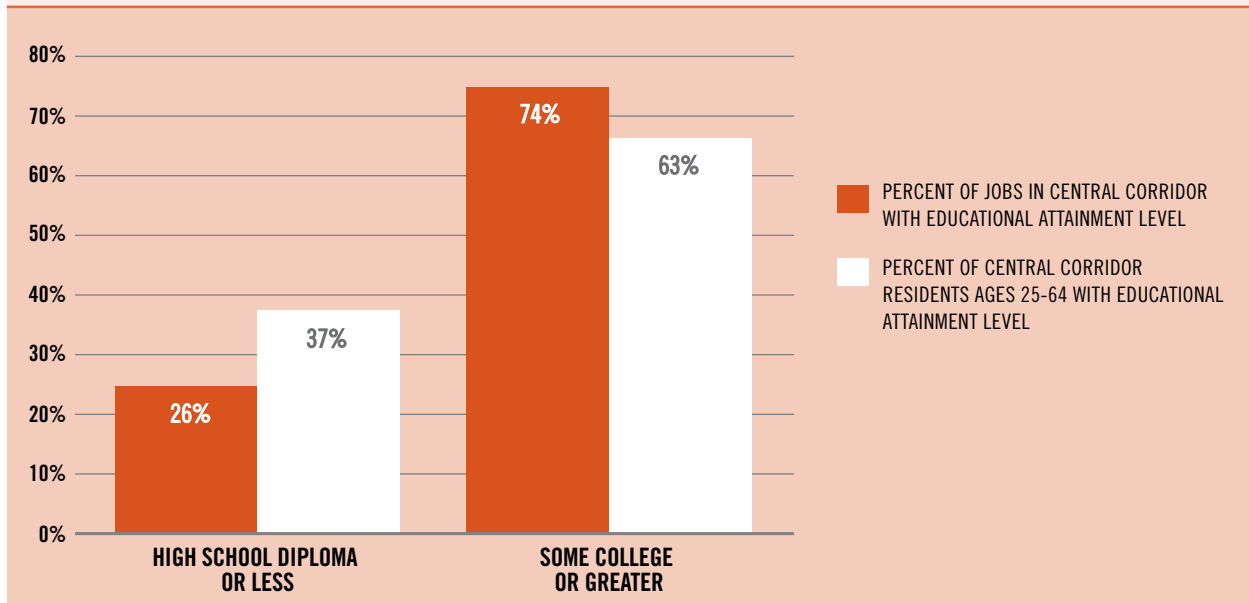
With the rezoning’s increase in allowable density for new development in the corridor, the number of jobs is likely to significantly grow as the market improves and as new offices and mixed-use buildings are constructed. The quality of these jobs,

and the degree to which they will be available to Central Corridor residents, is less certain. Industries that will likely fill new office space in the corridor include health care and social assistance, finance and insurance services, professional, scientific, and technical services, administration, and support and waste management. It is likely that job growth for lower-educated workers in these industries will be in occupations such as janitors, home health care workers, and administrative workers, all of which pay lower wages on average.

As the amount of retail and hotel space increases in the corridor, the number of jobs in the retail trade and accommodation and food services industry will likely increase. These jobs require less education as well as provide low wages.

Finally, current industrial uses may face pressure to relocate if property values rise due to the rezoning and if there is substantial profit to be made in redeveloping these sites. As a result, manufacturing as well as other jobs that are often located on industrial land may be lost. These jobs typically have higher wages for lower educational attainment.

FIGURE 7. JOBS AND EDUCATIONAL ATTAINMENT MISMATCH IN THE CENTRAL CORRIDOR



Source: American Community Survey, 2005-2009 5-Year Estimates; Census EEO 2000.

**OBJECTIVE #2:
Diverse, Local Businesses—Existing and New—Are Developed and Supported**

Existing Conditions Analysis: Small Businesses along University Avenue

KEY EXISTING CONDITIONS FINDINGS:

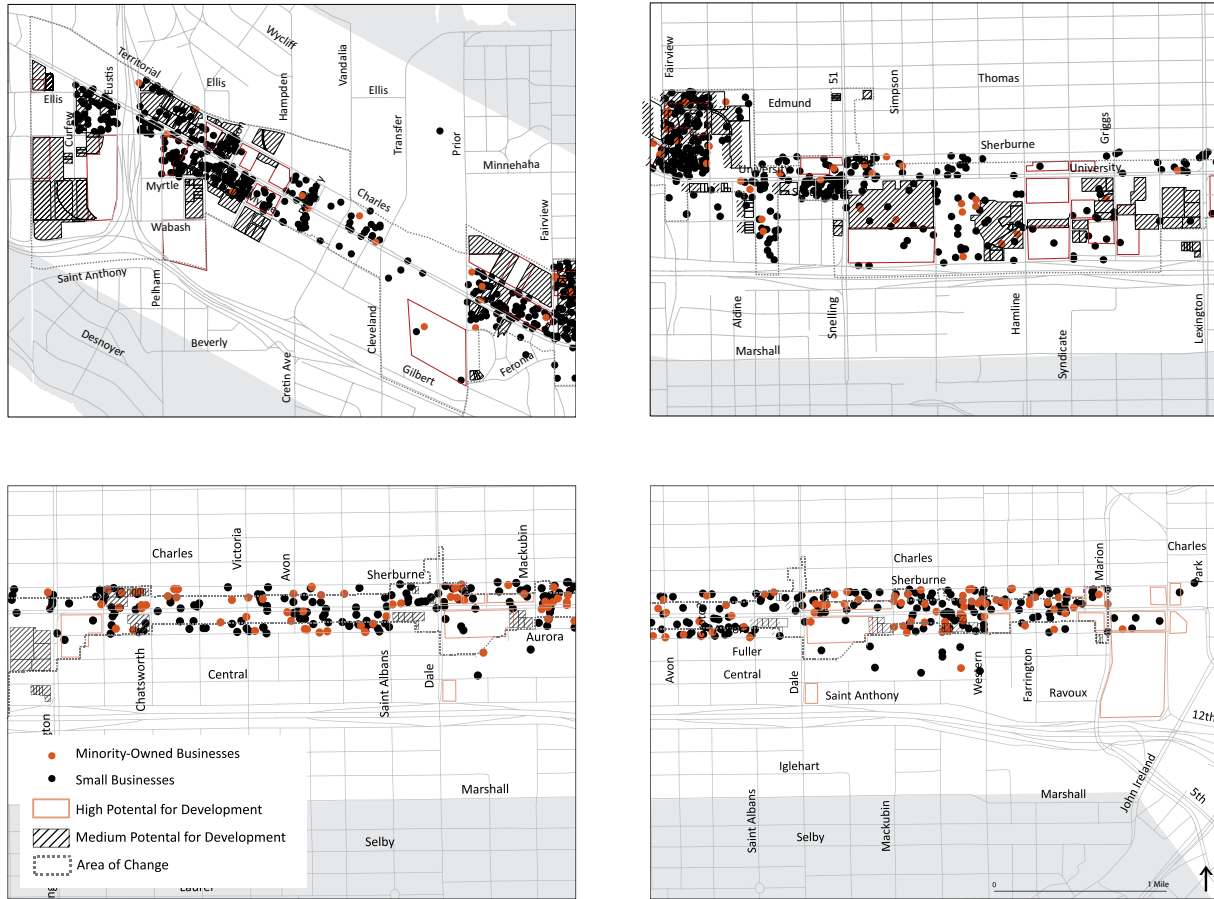
- Eighty-three percent of all businesses along the corridor are small businesses. These businesses account for over a third (38 percent) of all employees in University Avenue businesses, with over 4,000 employees.
- Twelve percent of all businesses along the corridor are minority-owned.
- U-Plan has found that 87 percent of on-street parking spaces will be lost along University Avenue due to light rail construction and implementation. The majority of these parking spaces will be lost in the central and west submarkets of the corridor, and may have implications on small businesses.

Impact Analysis: Displacement Risk for Small Businesses

KEY IMPACT ASSESSMENT FINDINGS:

- More than one-third of small businesses and nearly one-quarter of minority-owned businesses are on parcels with high or medium potential for redevelopment.
- Property values in many station areas have already increased dramatically—see Objective 3 for more details—potentially placing many small and minority-owned businesses at risk for displacement as redevelopment occurs in the corridor and rents rise due to increased property values.
- Small and minority-owned businesses that rely on on-street parking for customers may lose some business due to permanently lost parking.
- Increased residential and office density will expose significantly more people to businesses along University, potentially increasing the customer base of small and minority-owned businesses.

FIGURE 8. SMALL AND MINORITY-OWNED BUSINESSES ON REZONED PARCELS



Source: U-Plan; Central Corridor Development Strategy, City of Saint Paul; Metropolitan Council GIS.

More than one-third of small businesses and nearly one-quarter of minority-owned businesses are on parcels with either medium or high potential for redevelopment.* Figure 8 maps the location of small businesses and minority-owned businesses relative to sites with high and medium potential for redevelopment. As the map shows, there are a number of parcels proposed for rezoning which could place small and minority-owned businesses at risk for displacement.

* Parcels with medium potential for redevelopment are those with an FAR (floor area ratio) differential of two or greater and are located adjacent to at least one vacant parcel; parcels with high potential for redevelopment are those that have been identified in the Central Corridor Development Strategy as "major opportunities for investment."

“The development along the Central Corridor holds the possibility of construction careers, not just jobs but careers. We owe it to ourselves as a community to be involved and to seek out development that provides good wages and benefits with training and a future.” Barbara Pecks,
N. Central States Regional Council of Carpenters



Healthy, Affordable Housing

Overview

Research and precedent have shown that new fixed rail transit investments tend to lead to greater housing demand and increased land values around revitalized transit stations because people will often pay more to live near transit.

How these changes impact the existing neighborhood depends to a large extent on the strength of the original housing market. A neighborhood with a weak housing market—with many blighted homes, vacant properties (including foreclosed properties), and a lack of reinvestment by existing homeowners and landlords—can accommodate new demand for housing by filling in vacant spaces and units. In this case, new development can lead to neighborhood revitalization, and providing amenities without displacing or significantly increasing prices for existing residents. At some point, as the market improves, this scenario may lead directly into a second scenario. In a neighborhood with a stronger housing market and few vacancies, existing houses are renovated and resold at higher values, apartments are converted to condominiums, renovated, and sold, and older, more affordable buildings are demolished to make way for newer buildings. In this last scenario, without proactive strategies and policies to maintain the affordability of the housing stock, new investment can lead to speculation, rising housing costs, the loss of affordable homes, and the displacement of existing residents.¹⁷

There are several ways in which housing—both the physical quality of housing and the stability of residential tenure—is related to health. In the Central Corridor, there is a potential for rents and home values to rise with the introduction of the light rail and higher density mixed-use development. With these rising housing costs, housing cost burdens (the portion of household income spent on housing) may rise along with the potential for involuntary displacement of low-income residents. This may disproportionately affect persons of color in the corridor, who are statistically more likely to be low-income than white. Displacement can

have several negative health outcomes, including increases in infectious disease, chronic disease, stress, and impeded child development. Figure 9 demonstrates the pathway between displacement and health outcomes.

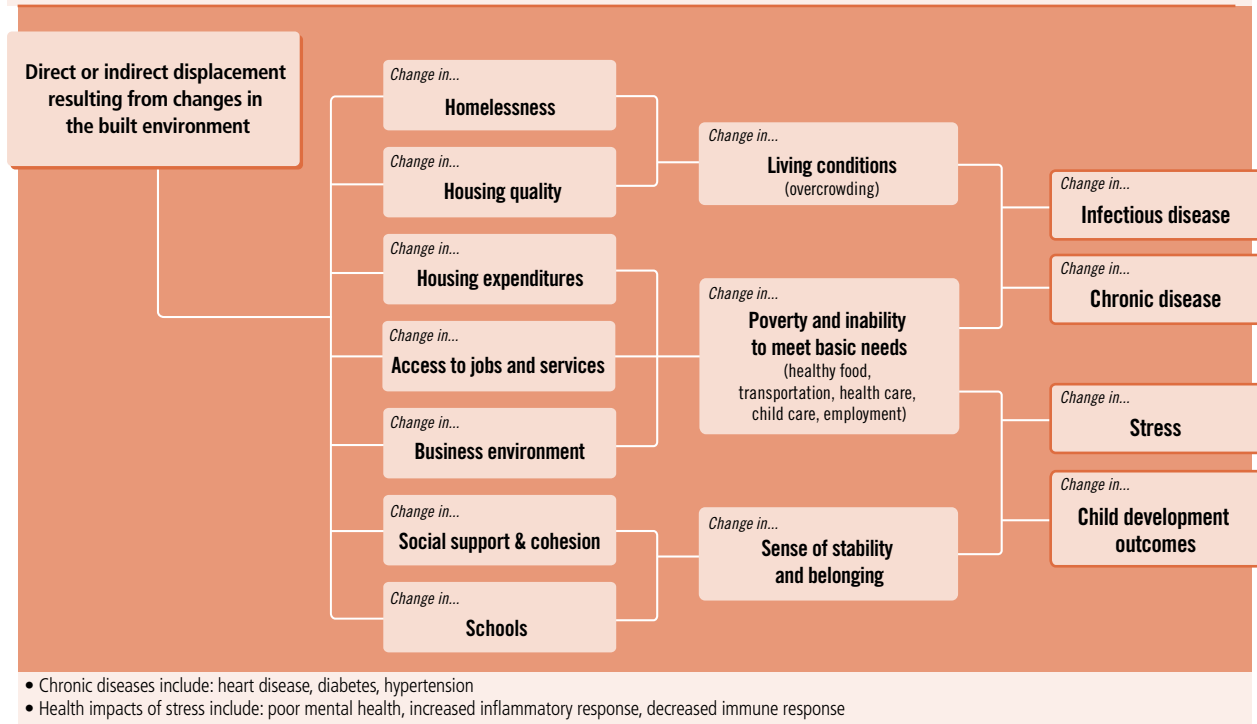
OBJECTIVE #3: Protect Residents from the Negative Impacts of Gentrification

Existing Conditions Analysis: Gentrification and Risk of Displacement

KEY EXISTING CONDITIONS FINDINGS:

- The majority of the Central Corridor is at risk for gentrification.
- Home values have increased significantly in the CC—up 73 percent in the last decade, significantly higher than city and county increases. While rents have increased, they have done so at a much lower rate—up 8 percent since 2000.
- CC residents spend a high percentage of their income on housing. Fifty-nine percent spend more than 30 percent compared to 40 percent in the city and 37 percent in the county. Twenty-seven percent of CC households spend 50 percent or more on housing.
- Property values have increased by 8 percent within a quarter-mile of the planned station areas in the CC while the city as a whole has seen a drop of 8 percent.
- The CC has a higher percentage of lower-income residents than the city or county. For the 2005–2009 period, the estimated poverty rate was 27 percent in the corridor, compared to 20 percent in Saint Paul and 14 percent in Ramsey County.

FIGURE 9. DISPLACEMENT EFFECTS ON HEALTH



- Educational attainment has increased in the corridor. The proportion of CC residents 25 years and over with a bachelor's degree has increased by 29 percent over the last decade, compared to 15 percent in Saint Paul and 11 percent in Ramsey County.
- The CC is significantly more racially diverse than the city or county. Persons of color represent 53 percent of the Central Corridor population in 2010, compared to 44 percent in Saint Paul and 33 percent in Ramsey County.
- Despite high diversity, the racial and ethnic composition of the corridor is changing: while the non-Hispanic white population remained steady at about 47 percent of the total, the black/African American population rose from 22 percent in 2000 to 26 percent in 2010, and the Asian/Pacific Islander population declined from 17 percent of the total population in 2000 to 15 percent in 2010.

Using nationally recognized indicators of gentrification, as identified by the Brookings Institution and the Dukakis Center at Northeastern University,^{18,19} this assessment has concluded that while many neighborhoods are at risk of gentrification throughout the corridor, no one neighborhood meets all five key indicators for gentrification. Details on each indicator are listed in Table 2.

While an important indicator for gentrification is decreasing racial and ethnic diversity, gentrification is ultimately an economic phenomenon and changes to income levels and property values are stronger indicators of the direction of such a trend. The dramatic increases in property values near a number of station areas—as demonstrated in the Impact Analysis section—indicate a speculative market with a trend towards gentrification that should be carefully monitored.

In addition to evaluating the current extent of gentrification, this analysis used another set of indicators (listed in Table 3) to assess whether the community may currently be at risk for future gentrification. The Center for Community Innovation at the University of California, Berkeley, has assessed the factors that make neighborhoods more likely to gentrify and identified a set of gentrification risk factors.²² Table 3 includes these indicators and their status in the Central Corridor. The Central Corridor as a whole meets the majority of factors that indicate risk for gentrification.

Table 2. Indicators of Gentrification in the Central Corridor

Indicators of Gentrification	Conclusion ²⁰
Rising rents and home values	Yes: Rents are rising, though slowly. Home values are rising at a much higher rate than in city.
Decreased racial diversity	No: Diversity has slightly increased in the last decade.
An influx of higher-income residents/ outmigration of lower-income residents	Somewhat: Percent of higher-income residents is increasing and the percent of lower-income residents is also increasing.
Increases in educational attainment of residents	Somewhat: The proportion of residents with a bachelor's degree is increasing, although at a lower rate than the city of Saint Paul.
Increases in Property Values ²¹	Yes: 8 percent increase in property values within a quarter-mile of planned station areas whereas the city has seen a decrease of 8 percent.

Table 3. Indicators of Gentrification Risk in the Central Corridor

Indicators of Gentrification Risk	Conclusion
Close proximity to transit	Yes
High density of amenities including youth facilities and public space	Somewhat
High percent of workers taking public transit	Somewhat
High percent of non-family households	Yes
High percent of buildings with three or more units	Yes
High number of renter vs. owner occupancy	Yes
High number of households paying a large share of household income spent on housing (Housing Cost Burden)	Yes

**Impact Analysis:
Potential for Involuntary Displacement**

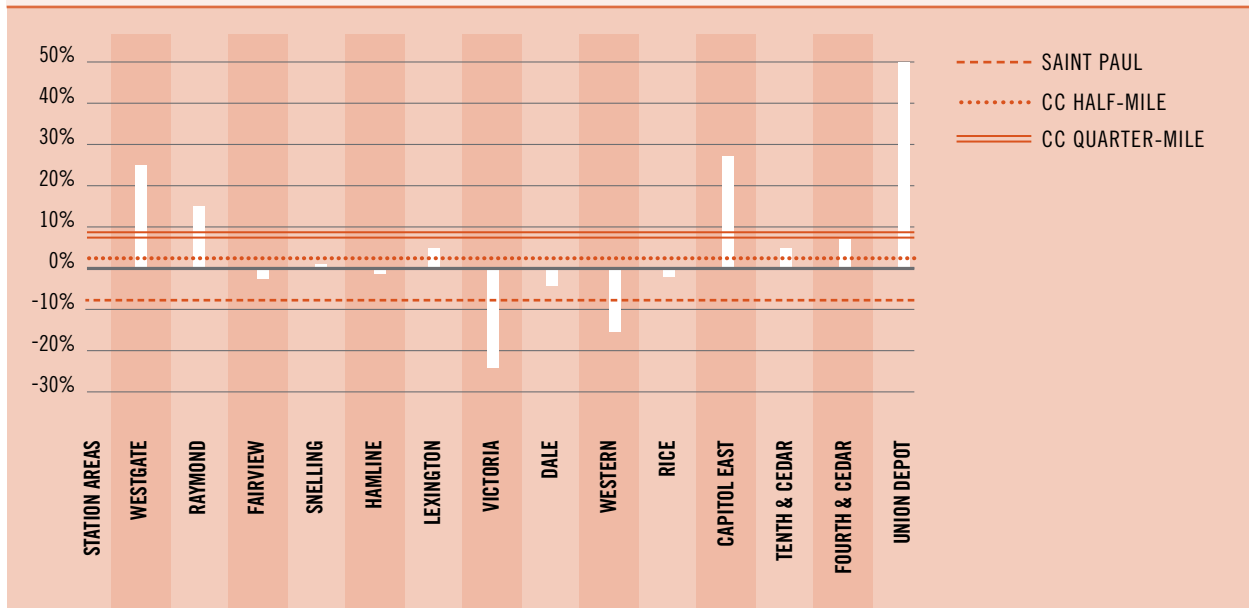
KEY IMPACT ASSESSMENT FINDINGS:

- Property values are increasing around many station areas whereas property values are decreasing across the city.
- Increased property values have the potential to increase wealth for existing homeowners in corridor neighborhoods that do not already have a high housing cost burden and can absorb any increases in property taxes.
- Given the high housing cost burden, many in the CC will not be able to absorb increases in rents.
- Many neighborhoods at risk for gentrification may start gentrifying as new development occurs around transit, increasing potential for involuntary displacement, particularly for low-income people and people of color—especially those that are renters.
- Potential risk of loss of historic and cultural character of existing neighborhoods due to gentrification.

Property values are increasing dramatically near a number of station areas. Property values within a quarter-mile of the station areas have cumulatively risen by 8 percent between 2007 and 2010 while Saint Paul as a whole has seen an 8 percent drop in property values during the same time period. In addition, property values between a quarter-mile and a half-mile radius of the station areas also rose, but only by 1.5 percent. This indicates that, overall, there is an increased demand for development around the planned station areas.

Despite these increases in property values near station areas in the aggregate, increases in property values vary significantly by station area. See Figure 10 for details. This reflects more nuanced trends by neighborhood that have been observed elsewhere in the existing conditions analysis. It is not clear why the east

FIGURE 10. PROPERTY VALUE CHANGES BETWEEN 2007 AND 2010 BY STATION AREA



Source: Ramsey County Assessor's Office.

Table 4. Estimated Impact of Zoning on Existing Conditions Related to Gentrification

Indicator of Gentrification	Potential Impacts
Rising rents	Will continue to rise at an increasing rate. As described previously, as property values increase, landlords will likely increase rents. CTOD estimates the completion of the light rail to increase rents and property values by 15 percent. ²³ Rents are already increasing in the west submarket and downtown submarket where property values have been observed to be rising in the last few years as well.
Rising home values	Will continue to rise. The increases in allowable density will aid in increasing property values. As noted, transit is expected to increase property values by approximately 15 percent within a half mile of the light rail line.
Influx* in higher-income residents	The rezoning allows for substantially more housing in the Central Corridor, particularly near the western corridor station areas. If this housing is constructed at the market rate, combined with the 15 percent expected increase in rents, new residents who will be able to afford this housing will likely have a median household income higher than current corridor residents.
Outmigration** of lower-income residents	As rents and home values continue to rise, the housing burden of many lower-income residents will continue to increase beyond current levels potentially forcing residents out of corridor neighborhoods. This process will likely not occur evenly across the corridor; rather, pressure will happen on western neighborhoods first where development feasibility is more likely in the short term.
Increase in educational attainment of residents	Will likely continue to increase. As higher-income residents move into the neighborhood with an increase in the supply of market-rate housing, educational levels will likely begin to rise since higher education is correlated with income. ²⁴
Decrease in racial diversity	Racial diversity will likely decrease. Due to the racial income gap in the Twin Cities and in the CC, incoming households that will be able to afford the higher prices in the corridor will likely be white. Also, due to the correlation between income and race, if displacement of lower-income residents occurs this will also mean a likely loss of people of color.

* The data is not clear on whether there is an influx of new residents making more income or if existing residents are dramatically increasing their income.

**The data is not clear on whether existing low-income residents are leaving the corridor or existing residents are increasing their income.

submarket has not seen the same level of property value increase or maintenance that other station areas have experienced; however, the neighborhoods in the eastern corridor have experienced a high number of foreclosures in the past two to three years which may have impacted property values.

Rents and accompanying rent burden, as well as property tax burden, are anticipated to increase with rising property values. The new transit line, as well as increased development potential, will likely heighten demand for living and working in the Central Corridor. This heightened demand, plus increased development potential, will likely increase property values, rents, and property taxes—in turn increasing the existing rent and housing cost burden in the Central Corridor. Because the housing cost burden, especially for renters and low-income residents, is high (as described in the Existing Conditions Analysis), the potential for an increased housing cost resulting in displacement is a real possibility.

Neighborhoods where property values are increasing will likely start gentrifying as a result of the rezoning. As demonstrated in Table 4, the rezoning proposal may further tip neighborhoods towards gentrification, especially those close to station areas with property values trending upward.

**OBJECTIVE #4:
Construct and Preserve Affordable and Diverse Housing in Proportion to Demand***

***Existing Conditions Analysis:
Need for Affordable Housing***

KEY EXISTING CONDITIONS FINDINGS:

- In 2010, the vacancy rate was at 9 percent in the CC, compared to 8 percent in the city and 7 percent in the county. The downtown submarket has the highest vacancy rate (13 percent), compared to the central submarket with a low vacancy rate of 5 percent. The vacancy rate for the first quarter of 2011 is very low for the Twin Cities and indicates a downward trend.

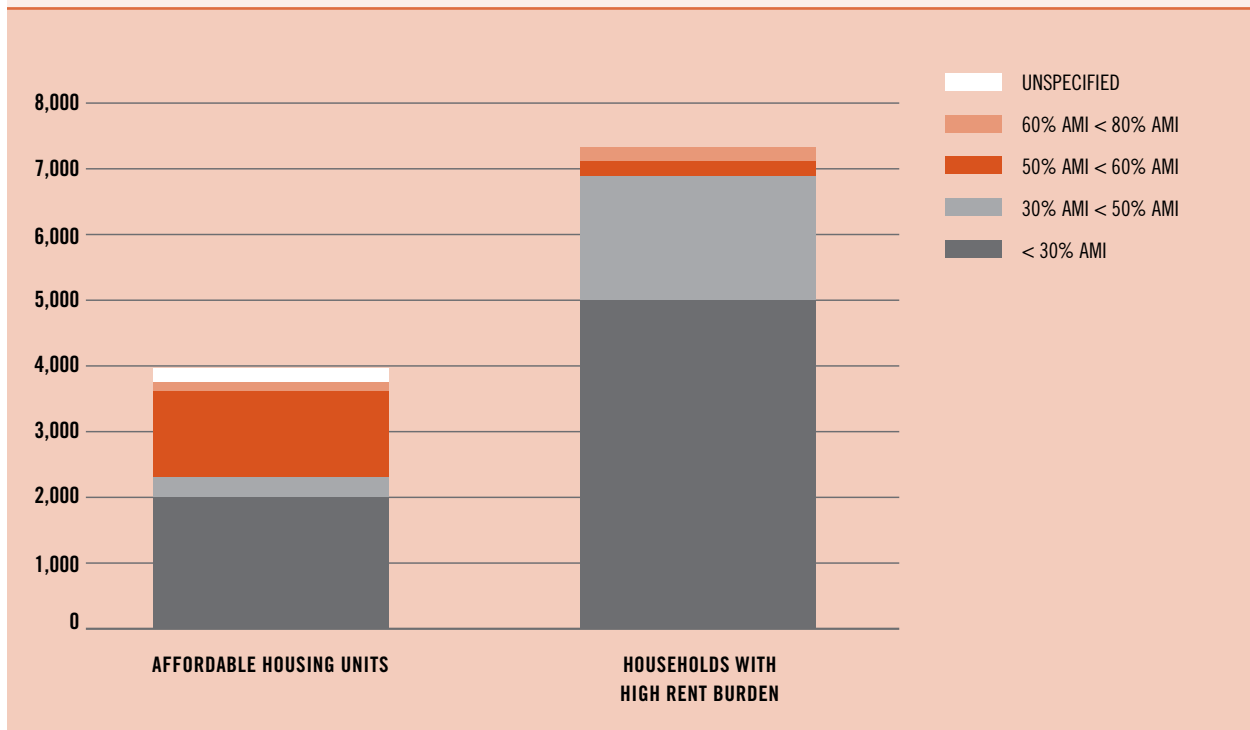
- Fourteen percent of the total housing units in the CC are subsidized affordable units available to households making 80 percent of area median income (AMI) or less, compared to 12 percent in Saint Paul and 8 percent in the county. However, an estimated 65 percent of corridor residents make less than 80 percent AMI, compared to 63 percent in the city and 57 percent in the county.**
- Housing cost burden is high and rising. Fifty-nine percent of CC residents spend more than 30 percent of their income on housing, compared to 40 percent in Saint Paul and 37 percent in Ramsey County. Conditions in the CC are getting worse as well: after decreasing between 1990 and 2000, this proportion of CC residents jumped by 12 percentage points in the last decade, up from 34 percent in 2000.
- Renters are particularly burdened: an estimated 68 percent of households paid more than 30 percent of their income in rent and 47 percent of owners paid more than 30 percent in ownership costs*** in the 2005–2009 period, up from 41 percent for renters in 2000 and a much lower 21 percent for owners in 2000.
- The housing burden for homeowners has risen dramatically as well, increasing 26 percentage points in the CC between 2000 and the 2005–2009 period. While there were increases in the housing cost burden for owners in both Saint Paul and Ramsey County, they were not as stark.

* The full report includes a greater level of information on the supply and demand of housing size as well as affordability.

** Based on a family of three for the Area Median Income in the Minneapolis-Saint Paul-Bloomington MSA in 2009.

***Ownership costs include a mortgage, real estate taxes, condo fees, homeownership insurance, and utilities.

FIGURE 11. SUPPLY OF AFFORDABLE HOUSING IN THE CENTRAL CORRIDOR RELATIVE TO DEMAND



Source: HousingLink; HUD Inventory of Subsidized Housing; American Community Survey 2005–2009 5-year Estimates.

Overall, the CC is a place with a high proportion of low-income residents that are in need of affordable housing options in order to remove the high burden of housing costs on their income. Figure 11 illustrates the total number of subsidized affordable housing units in the Central Corridor by affordability levels and compares the supply with the demand for affordable housing as identified by the number of households in the Central Corridor that pay more than 30 percent of their income in housing costs, identified by area median income (AMI).

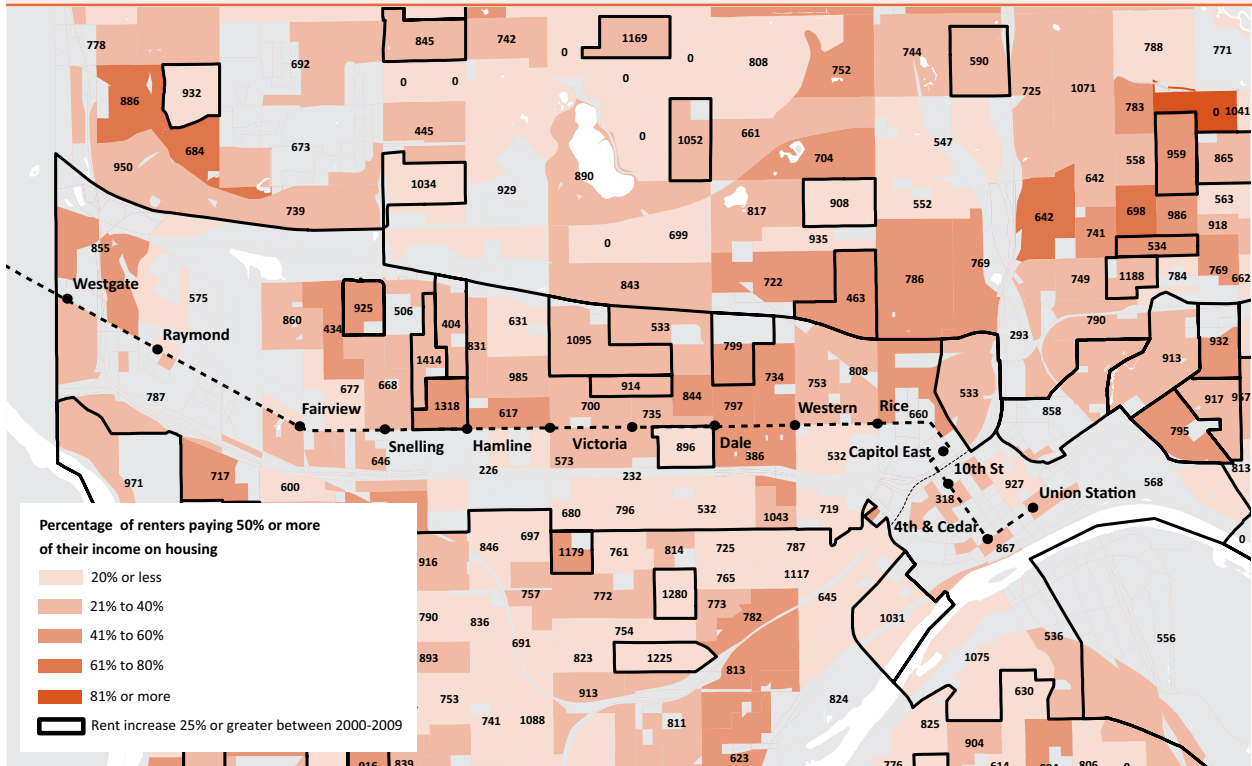
From Figure 11, it is clear that, currently, there is not enough subsidized affordable housing—at any income level—to meet the “demand” of Central Corridor residents, as defined by those households that pay an unaffordable amount of their income in housing. While the Central Corridor has a relatively high vacancy rate, recent reports show that the vacancy rate in the first quarter of 2011 was 3.1 percent for the Twin Cities metro area and 3.2 percent for Saint Paul; these rates are expected to trend further downward. Not surprisingly, as vacancy rates in the region are declining, rents are rising.²⁵

It is also important to note that community groups have been clear that comparisons to AMI are problematic. The Twin Cities metro area has an AMI that is far higher than the median household income for Saint Paul or the Central Corridor. This deficit has a significant impact on what is actually affordable to low-income people in Saint Paul. For example, 80 percent of AMI would continue to be unaffordable to the majority of Saint Paul city residents. Many advocates in Saint Paul have been recommending that there must be deeper subsidies in the city for housing to become affordable to low-income people.

The Central Corridor is becoming less affordable. Figure 12 depicts the variation in extreme housing cost burdens* across the corridor with the median gross rents labeled by block group. Note that areas with a high proportion of households with an extreme rent burden do not necessarily overlap with areas with a relatively high median gross rent. This is a possible indication that the current supply of affordable housing is still not meeting the affordability levels needed by low-income residents in the area.

* Extreme housing burden is defined as those paying 50 percent or more of their household income on housing.

FIGURE 12. EXTREME RENT BURDEN AND MEDIAN GROSS RENTS IN THE CENTRAL CORRIDOR, 2005–2009



Source: American Community Survey 2005–2009 5-year Estimates; City of Saint Paul; Metropolitan Council GIS.

While foreclosures significantly impacted neighborhoods in the Central Corridor, vacancies are expected to decline. Not unlike the rest of the Twin Cities region and the country, foreclosures are an issue in Saint Paul and the Central Corridor. While vacant and foreclosed properties in Saint Paul peaked in 2008, they remained high in 2009²⁶ and 2010, and are starting to decrease in 2011.²⁷ The Frogtown neighborhood within the Central Corridor was hit particularly hard by the foreclosure crisis; more than 500 units were vacant as of 2010.²⁸

While the Central Corridor has a relatively high vacancy rate (9 percent in 2010), the distribution of vacant properties is not even throughout the corridor, and recent reports indicate that vacancy rates are trending downwards in the Twin Cities. This is expected to boost rents higher. Whether this has an effect on the absorption of previously foreclosed homes is not known.

**Impact Analysis:
Availability of Affordable Housing**

KEY IMPACT ASSESSMENT FINDINGS:

- According to market projections, nearly 7,000 new residential units may be built in the station areas by 2030, of which several hundred may be affordable *if* projects use public funding.
- The percent of existing subsidized affordable housing units is likely to decrease, increasing existing housing burdens and potentially leading to involuntary displacement.
- Rising rents and home values will likely decrease the amount of market-provided affordable housing.
- If property values near transit stations continue to rise, acquisition of land for affordable housing near transit will be more difficult due to higher land costs.

Many subsidized affordable housing units may be lost due to rising property values, redevelopment, and expiring funding contracts.

While few subsidized properties are located on parcels identified to have high or medium redevelopment potential, many subsidized units (1,143) are located in the rezoned areas. None of these properties are public housing and only one is publicly owned. As the allowable density and uses rise on parcels, even though they may not redevelop in the short or medium term, property values may rise with the estimated 15 percent transit premium projected by the Center for Transit-Oriented Development leaving subsidized properties in private ownership vulnerable to potential conversion to market-rate housing as their contracts expire.

The City of Saint Paul Housing Action Plan has stated that they plan to preserve 399 currently subsidized units in the Central Corridor by 2013. It is unclear what mechanisms will be used to ensure that those units are preserved. It should be noted that research shows it costs about one-third less to preserve existing rental housing than to construct new units.²⁹

New residential construction in the corridor may increase the amount of affordable housing, but not enough to meet current affordability needs.

Under current rezoning, without City or Housing and Redevelopment Authority (HRA) assistance, housing units will be constructed at market rate. Where the City provides assistance for development, city ordinance mandates that some percentage of the development be affordable at varying area median incomes (AMI). The City of Saint Paul 2010–2013 Housing Action Plan estimates that about 215 of the new units currently slated to be constructed in the Central Corridor by 2013 will be affordable to households earning 60 percent AMI or less. It is unclear what policies and programs will ensure the construction of affordable housing after 2013, or if there will be sufficient funding allocated to these goals.

Rising rents and home values will decrease the amount of market-provided affordable housing.

Many block groups in the Central Corridor have a median gross rent less than the federal fair market rent for a one-bedroom household in the metropolitan area. As property

values rise with the premium of transit and with increased development potential due to the rezoning, the market rate in these block groups will probably rise, likely leaving households who live in market-provided affordable housing with a higher rent burden.

New siting of affordable housing should be conducted with careful consideration of current school segregation by race and income.

Increasing the housing opportunities for low-income people and communities of color in the areas of the Central Corridor where schools are already segregated will need careful school planning in order to ensure all students have access to high-performing schools. Professor Myron Orfield’s research at the University of Minnesota identifies schools in the eastern submarket of the Central Corridor to be segregated and poor performing.³⁰ The Federal Fair Housing Act acknowledges the challenges faced by segregated schools and prohibits further segregation of schools through inappropriate concentrations of affordable housing or poor school planning.

There are many who are working passionately to ensure all children have the opportunity to attend high-performing schools. One way to support this goal is to provide choice plans where students are able to attend higher-performing schools that may not be located in their neighborhoods, or by adding integrated, high-performing magnet schools such as Capitol Hill and Central High School—two high-performing and integrated magnet schools in Saint Paul.



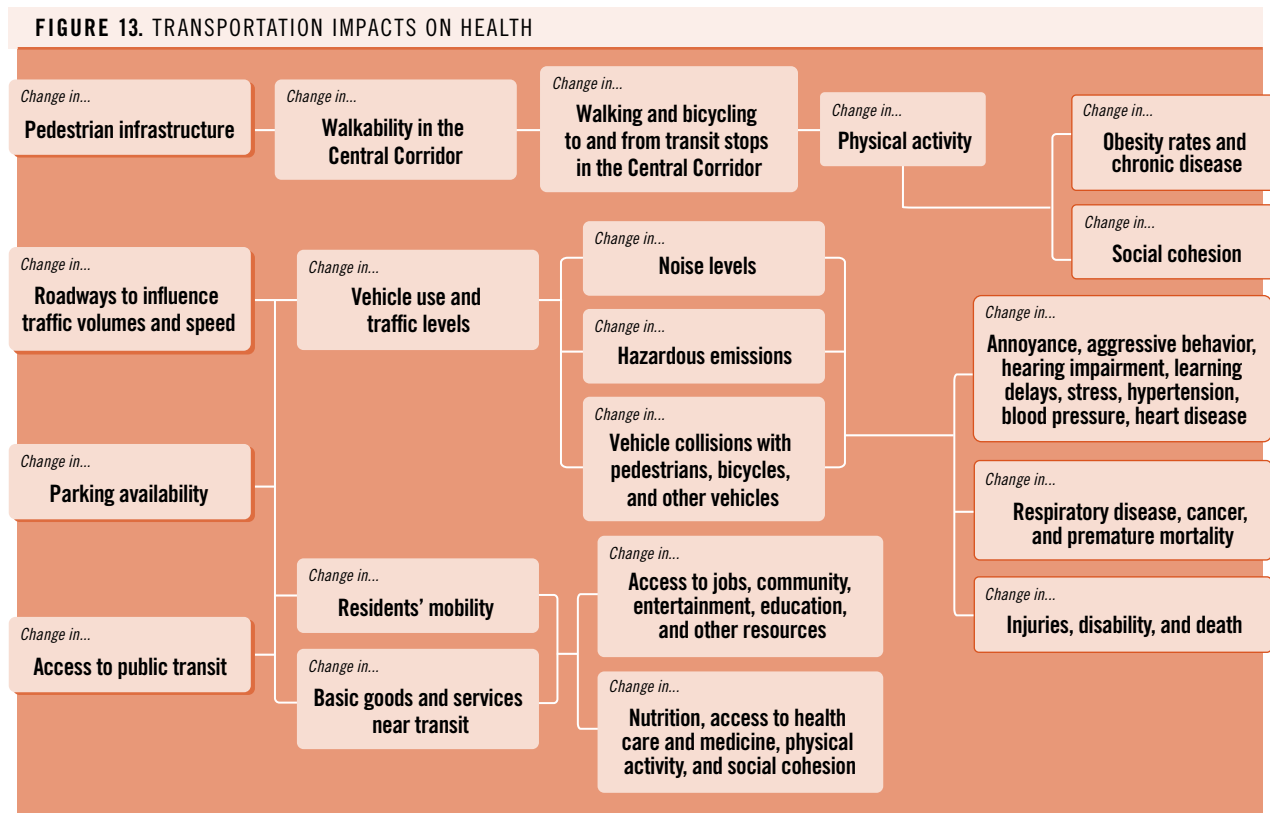
Safe and Sustainable Transportation

Overview

The development of the Central Corridor light rail line will provide a new source of mobility for corridor residents. The zoning changes along the corridor will be instrumental in attracting more transit riders, potentially reducing dependence on car use, and increasing access to more opportunities throughout the region for transit dependent, disabled, and low-income residents. The new light rail is only one piece of the neighborhood transportation system. Promoting use of, and access to, successful bus service and bicycle and pedestrian infrastructure is also necessary for a truly sustainable transportation system. All three components must be coordinated with each other and with the new changes in the built environment that will result due to the transit line and rezoning.

The increase in land zoned for residential uses will undoubtedly add to the population of the Central Corridor, giving more people access to transit, potentially increasing ridership levels not just for the new light rail line but also on existing bus lines that traverse corridor neighborhoods. This potential increase in ridership could further exacerbate demand for safer pedestrian and bicycle connections throughout the corridor and, without adequate safety improvements, may result in increased pedestrian injuries.

There are many documented connections between transportation and health outcomes. Figure 13 demonstrates these connections.



Source: Adapted from Human Impact Partners, 2011.

OBJECTIVE #5: Maintain and Improve Affordable and Accessible Public Transportation

Existing Conditions Analysis: Transit Access in the Central Corridor

KEY EXISTING CONDITIONS FINDINGS:

- About 12 percent of corridor residents commute to work via public transportation in comparison to 9 percent in the city and 7 percent in the county; a majority of those CC residents live in the downtown and eastern submarkets.
- The Central Corridor is generally well-served by transit: about 81 percent of the population lives within a quarter-mile of a high frequency bus route—as defined by those with peak hour frequency with 20-minute or less intervals between buses.
- Ninety-two percent of low-income households currently live within approximately one quarter-mile of a high frequency bus route.
- The central and east submarkets lack substantial north-south bus routes.
- Twenty-three percent of Central Corridor households lack access to a car, compared to just 11 percent of Ramsey County households. Neighborhoods with high proportions of households without car access are often places with higher numbers of low-income residents.
- Transit dependent households are generally well connected to existing bus routes.

Transit accessibility is especially critical for lower-income residents and other transit dependent populations* who rely heavily on transit to access their basic needs including work, groceries, and medical care. Across the

* Block groups with a high proportion of households without access to cars and low-income, as defined by having a median household income at 150% of the federal poverty line for a family of three.

nation, people of color are four times more likely than whites to rely on public transportation for their work commute.³¹

Effective transit can be a potent force for economic stabilization, because when residents can get by without a car, as many low-income families must, they can save an average of \$9,500 annually, based upon 2008 gas prices.³² The transit access of low-income populations will also affect the revenues and therefore the sustainability of the overall transit system.

While the corridor in general is fairly well connected via public transportation, there are some neighborhoods with higher proportions of transit-dependent populations that are not located within a convenient distance to transit. In particular, there are blocks in the east submarket on its northern edge that are fairly low-income, have many households without access to a vehicle, and are not located within a quarter-mile of a high frequency bus route. Figure 14 shows the proportion of households without access to a vehicle in relation to low-income block groups.

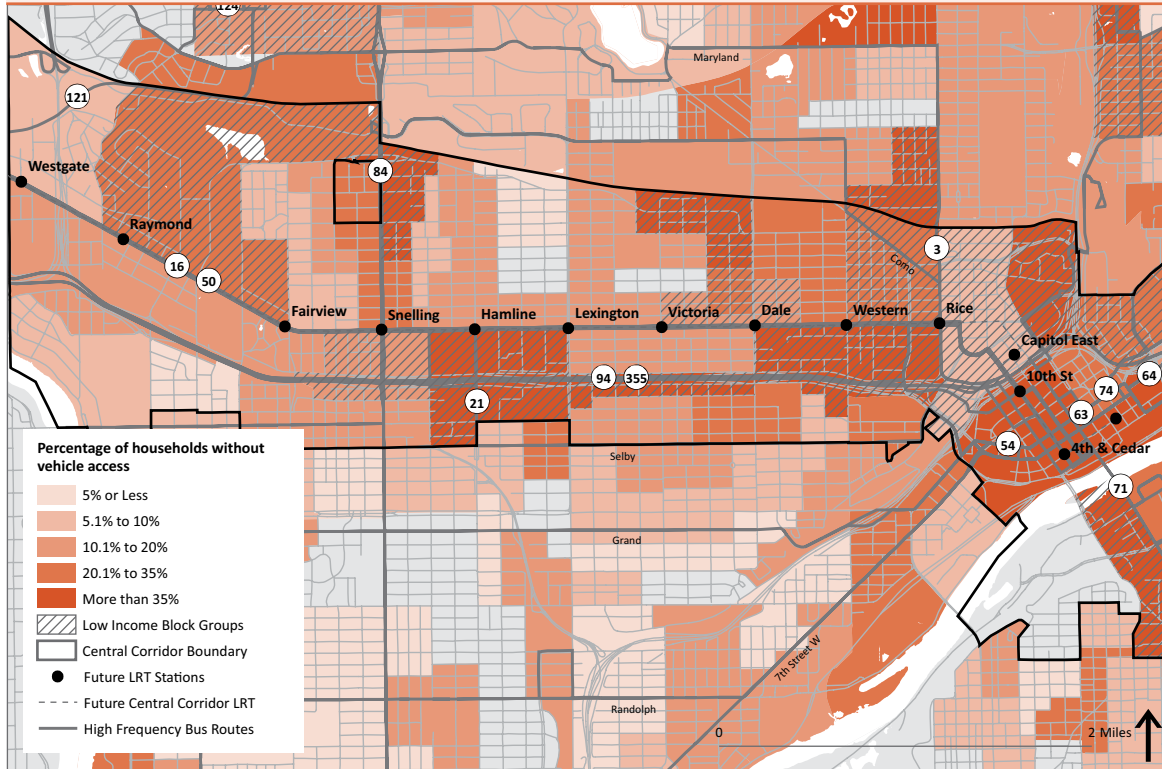
Impact Analysis: Changes in Demand for Transit

KEY IMPACT ASSESSMENT FINDINGS:

- Increases in residential and employment density will increase total number of people with access to transit.
- There will be more demand for north/south bus service connecting to, and from, the light rail.

Increased access to transit will likely increase ridership along existing bus routes. The Central Corridor population around the station areas alone is expected to increase by 16,000 people according to the market build-out scenario and up to 75,000 people according to the maximum allowable build-out scenario, the latter of which would nearly double the Central Corridor population. This anticipated increase in population will most likely result in increased transit ridership and increased demand for additional north/south bus connections beyond what currently exists in the corridor. Given the existing need for additional north/south bus

FIGURE 14. TRANSIT DEPENDENCE IN THE CENTRAL CORRIDOR, 2005–2009



Source: American Community Survey 2005–2009 5-year Estimates; City of Saint Paul; Metropolitan Council GIS; MetroTransit.

connections in the east and central submarkets (as identified in the Existing Conditions Analysis), the increased demand will exacerbate the need for additional service.

In addition, residents have expressed concern about the potential loss in frequency of the Route 16 bus once the light rail line begins. The Route 16 bus travels east/west along University Avenue making numerous stops that are often approximately one-quarter mile apart. Residents have expressed that they would like to maintain the full schedule of east and west routes in addition to the light rail line. This bus route makes more numerous stops along University Avenue than the new light rail will, and residents have indicated that they depend on it.

OBJECTIVE #6:
Safe, Connected Walking Routes to, from, and across Transit Stops

Existing Conditions Analysis:
Active Commuting in the Corridor

KEY EXISTING CONDITIONS FINDINGS:

- Seven percent of Central Corridor commuters walked to work in the 2005–2009 period, compared to 5 percent in Saint Paul and 3 percent in Ramsey County. Many of these walkers are located in the downtown area, where walking represented 22 percent of commuters.
- Only 25 percent (14) intersections from a sample of 55 met the definition of a safe intersection.³³ Additionally, only one intersection along University Avenue is identified as safe (University and Western).
- There is a relatively substantial amount of bike commuters in the corridor: 2 percent of CC workers in the 2005–2009 period. Most bike commuters live in the west submarket.

Quality infrastructure, such as walking paths, comfortably wide enough to accommodate a considerable number of pedestrians, ADA (American Disabilities Act) accessible sidewalks, and safe, ADA accessible street crossings, can impact the ease of access to public transportation. Pedestrian infrastructure can also affect the use of the car for short trips and the viability of neighborhood retail. Figure 15 displays the location of safe and unsafe intersections in the Central Corridor.

Increasing residential density can lead to a greater number of vehicle injury collisions.³⁴ If the increase in density along the corridor causes vehicular traffic to surge due to increases in residents or commercial destinations, then pedestrians will be at a greater risk for injuries related to collisions if pedestrian improvements are not made.³⁵

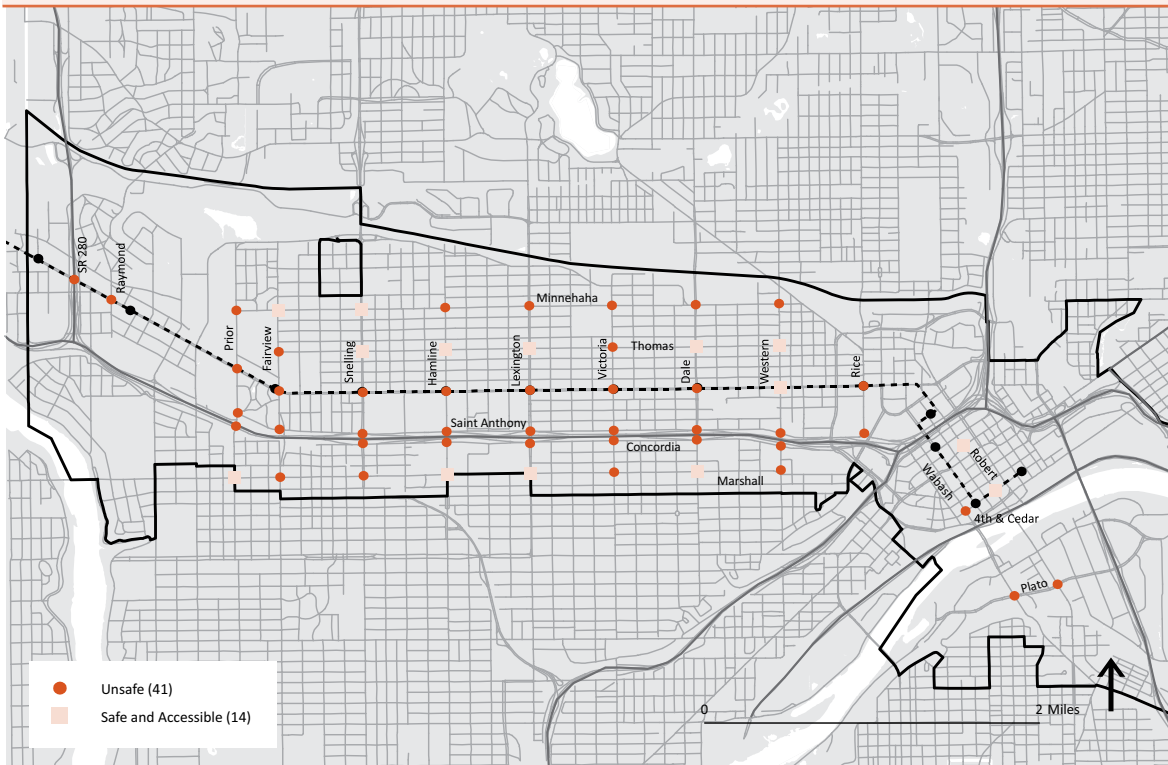
While the increase in people walking and biking in the corridor has several positive health and environmental benefits, these benefits will not fully be realized for pedestrians and bicyclists without corresponding supportive infrastructure to create a safe environment.

Impact Analysis: Pedestrian Safety

KEY IMPACT ASSESSMENT FINDINGS:

- Increased exposure to unsafe pedestrian infrastructure due to increased residential and employment density near station areas in the Central Corridor.

FIGURE 15. PEDESTRIAN INTERSECTION QUALITY IN THE CENTRAL CORRIDOR AT SELECT CROSSINGS



Source: City of Saint Paul; Metropolitan Council GIS; Google Earth data.



Creating a Healthy Corridor for All: Five Policy Recommendations for Moving Forward

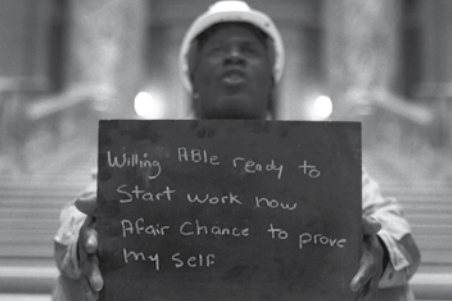
Based on the findings of the impact analysis described in the previous section, the project team developed an inventory of policy options culling from best practices in equitable development. The policy options provided recourse to mitigate the negative impacts identified in the analysis and maximize positive health outcomes.

After consideration of the local context and community needs, the Community Steering Committee (CSC) prioritized five policy recommendations and decided to focus their advocacy around the development and preservation of affordable housing. The CSC wants to ensure the City of Saint Paul carefully considers and develops their policies in order to limit displacement possibilities. The five priority recommendations are described in the following bullets. These priorities aim to maximize health and focus on community concerns while carefully considering feasibility in the current context of Saint Paul. The recommendations were shared with city council members to inform their final decision on the rezoning proposal.

- **Community Equity Program:** This proposed pilot program, modeled after a narrowly targeted inclusionary zoning program, is intended to recapture a portion of the increased value of development sites close to proposed light rail stations to help cover the cost of reserving some of the housing on these sites for lower-income households. The program would require residential and mixed-use projects on sites within a quarter-mile radius of transit stations to make a percentage of the units in those projects affordable or to facilitate the production of affordable housing by paying in-lieu fees to the Housing Trust Fund or by providing gap financing or land for deed-restricted permanently affordable development on alternative sites.

Developers subject to the requirements of the pilot program would also be entitled to any incentives for providing affordable housing that are available throughout the Central Corridor. Because it is anticipated that little new development would not occur until the light rail line is completed and the housing market improves, the initiation of the program for each station area could be tied to the indicators of improved housing market conditions such as increased property values and/or lower vacancy rates.

- **Codifying the Commitment to Affordable Housing:** Codify the City's commitment to affordable housing by specifying housing objectives as a purpose of the Traditional Neighborhood (T) zoning regulations that will apply to the Central Corridor. Establishing the provision of affordable housing and maintenance of diverse communities among the specific purposes of regulations will provide a nexus or link between underlying adopted policies and implementing regulations. The proposed changes to the zoning ordinance would include:
 - Explicit statements of the ordinance's intent to promote diversity by providing a range of housing types affordable to all economic groups, maintaining neighborhood cohesion by increasing housing choices for residents who desire to continue living in neighborhoods undergoing redevelopment, and improving opportunities for residents to work close to where they live.
 - Specific cross-references to adopted plans and policies to strengthen basis for regulation (e.g., Housing Plan 2010, Central Corridor Development Strategy, etc.).



- **Density Bonus Program:** The proposal is to expand the incentives that the ordinance would offer to include increased density in the form of floor area and height bonuses and/or modification of development and parking requirements to developers who provide affordable housing in new residential and mixed-use development projects anywhere in the Central Corridor. The incentives would be available to developers who reserve a specific percentage of units or floor area for housing affordable to households with incomes that do not exceed 80 percent of AMI adjusted for household size. The program could be designed with a sliding scale that increases the size of the bonus or incentive relative to the percentage of affordable housing provided and the level of affordability.
- **Relieving the Lack of Commercial Parking:** Adopt regulations that would allow use of undeveloped parcels for temporary parking lots to relieve parking problems during construction of the light rail line and in the near term. The temporary lots would be subject to specific standards to control potential impacts on local traffic conditions and to minimize their aesthetic impact.
- **First Source Hiring:** The First Source Hiring Program would require that all applicants for development require construction contractors to notify the Saint Paul Human Rights and Equal Economic Opportunity Department or a comparable designated referral program of available job openings and provide a description of job responsibilities, qualifications, and terms. After receiving notification, the referral system shall identify targeted applicants who meet the contractor's qualifications. The contractor would be required to maintain a log of referrals and applicants hired to allow the program to monitor compliance.

The city council voted to approve the rezoning proposal on April 20, 2011. The next section details the status of the prioritized recommendations within that zoning decision.

Beyond the immediate impacts of the HIA on the zoning ordinance there are additional ways to further these recommendations. For example, amendments can be made to zoning codes after they have been passed. The city council will be reviewing affordable housing recommendations in the fall of 2011 and may decide to amend the zoning code.

Strategies outside of the zoning process may also be taken to support these recommendations outside of the zoning process. The full Healthy Corridor report presents a set of policy options outside of zoning that can help mitigate the negative impacts of the zoning policy. The Community Steering Committee, the Technical Advisory Panel, city agencies, or other advocates and coalitions may decide to further any of the policy options laid out in this health impact assessment.



Impacts of the Healthy Corridor for All HIA

The Healthy Corridor for All Health Impact Assessment has affected the community in a number of ways, impacting the rezoning debate as well as the larger conversation on transit expansion in the region as it relates to health and equity.

Community Impacts

The Healthy Corridor for All HIA Community Steering Committee (CSC), a diverse group representing various interests, backgrounds, races, and ethnicities, came to work together under one common vision of a Healthy Central Corridor. Impacts on the community include:

- Increased relationships among CSC members who had never worked together in the past and never saw their interests aligned previously. The CSC also built relationships with the Technical Advisory Panel (TAP), who could be an asset to community efforts across various situations and projects. The TAP members also built relationships with the community, which enabled them to be better connected to community needs, aspirations, and solutions. The TAP also built its capacity by learning from the experiences, deep knowledge, and expertise of the CSC.
- Increased community capacity to understand land use policy and its impacts on health and equity. Throughout the HIA, the project team, as well as TAP members, supported the capacity building process. For example, Jim Erkel at Minnesota Center for Environmental Advocacy and Diana Dube from William and Mitchell Law School, held a Zoning and Equity 101 workshop.
- Research and data that CSC leaders can continue to use beyond the scope of the HIA. Members of the CSC have already used various parts of the analysis in their work unrelated to the HIA.
- Engagement of new community groups in land use policy. ISAIAH and TakeAction Minnesota's HOP facilitated the participation of CSC members in the rezoning decision-making process and supported their civic participation on issues that impact their lives. They facilitated and helped organize a set of educational visits between the CSC members and the Saint Paul Planning Commission, who first reviewed the rezoning proposal put forth by the Planning Department, as well as city council members and the Planning Department, who were key decision makers on the rezoning. The CSC provided testimony at the planning commission hearings and city council hearings on the rezoning proposal.

The capacity building, relationship building, civic participation, as well as the power to make decisions and set the course for the HIA all contributed to the empowerment of the CSC to have more control over the policies and projects that impact the health of their community. Members were able to set the direction for the research that would help them to better understand policy impacts. They were also able to voice their opinions and share their knowledge and experiences with key decision makers as a powerful collective engaging in the often esoteric, but important process of land use policy and planning.



Policy Impacts

The rezoning proposal was approved by the Saint Paul City Council on April 20, 2011 and went into effect on June 4, 2011. The policy did not specifically include the priority recommendations of the Healthy Corridor for All project but, prior to the final vote, the city council moved to put in place a number of mechanisms to address the affordable housing issues raised by the CSC. These policy impacts include:

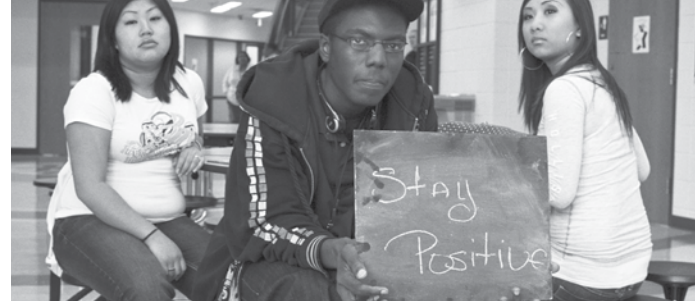
- The creation of an affordable housing workgroup. The city council, under the recommendation of Councilmember Russ Stark, included a resolution to create a working group to identify a set of recommendations to preserve and enhance affordable housing for city council consideration. This working group includes community advocates, city agencies, as well as developers. ISAIH was asked to join the workgroup given their leadership on affordable housing issues as a result of the HIA.
- The city council commissioned feasibility analyses on a number of affordable housing recommendations including two of those prioritized and advocated for by the CSC—density bonuses and targeted inclusionary zoning. The workgroup recommendations, as well as the feasibility analyses, will be presented to the city council in the fall of 2011 for consideration.
- A shift in the policy debate around the rezoning to include more community voices, introduce health into the discussion, and advocate for important affordable housing policies.

Overall, the HIA policy impacts have been critical and continue to evolve in the form of the housing working group and additional analyses that the city council will consider before the end of 2011. The HIA findings and the efforts of the CSC have also engaged a whole new set of players in the city's land use debate.

Regional Impacts

The HIA is also having impacts on transportation and land use planning at the regional level. The Twin Cities region is in the process of restructuring its regional planning process through support from a number of places including a federal Sustainable Communities Regional Planning grant and a Living Cities grant. Together, these two funding streams comprise the Corridors of Opportunity Initiative that will identify a process for interagency collaboration to better synchronize transportation and housing plans through collaboration, community engagement, evaluation, and an equity lens.

The HIA is seen as an opportunity to learn from a community participatory analysis of transit-oriented development policy with a focus on equity. The Sustainable Communities grant proposal to the Department of Housing and Urban Development listed the Healthy Corridor for All HIA as an example of how to effectively conduct and incorporate community engagement. The HIA partners were asked to present the HIA and have discussions with the team responsible for developing evaluation measures for the Corridors of Opportunity project. The HIA indicators and our analysis were shared and the community leadership component of the HIA was lifted up as an important practice. The HIA team has also been working closely with the Community Engagement Team of the Corridors of Opportunity project to support their robust and meaningful participation in the interagency regional planning process and provide technical assistance.



Conclusion

The Healthy Corridor for All Health Impact Assessment has been a community action research project under the vision of a healthy Central Corridor for all—including and especially for those current residents that are low-income and people of color who have experienced disinvestment and historic discrimination.

With a \$1 billion dollar investment in light rail, expected to be followed by an estimated \$6 to \$7 billion in public and private investment, this is the largest opportunity this community has ever seen. Community members are excited for the opportunity but also apprehensive. Community members and business owners have expressed significant concern that the transit-oriented development along University Avenue will not benefit them, their families, or their long-standing communities. In fact, many are concerned that not only will they not benefit, but they will be harmed.

In cities across the United States transit-oriented development and redevelopment have not always brought relief from existing challenges, but in fact have sometimes brought displacement, diminished social connections, and an eroded sense of community. The Twin Cities has the benefit of learning from the experiences of other cities and taking the precautions necessary to ensure that community concerns are not only heard but addressed with concrete and creative solutions.

While the vision of the redevelopment in the Central Corridor, as expressed by the community-engaged process that led to the Central Corridor Development Strategy, is inclusive and describes the values and strategies of anti-displacement, economic opportunity, and small business protection, the rezoning proposal did not go far enough and was not creative enough to maximize this vision. The zoning focused on enabling transit-oriented development (TOD) whereas in the Central Corridor

it is particularly important to lay a foundation for *equitable* transit-oriented development in order to support existing communities.

This health impact assessment helped draw out some of the challenges to equitable TOD with the proposed zoning plans. Health impact assessments can be a powerful tool to better understand the implications of policies before they are passed and to support community leadership and participation in decision making processes that impact residents' lives. They also help to promote health and equity.

The Healthy Corridor for All Community Steering Committee continues to be hopeful. There is good reason, considering the city council has resolved to analyze the feasibility of affordable housing policies—including two of those prioritized by the HIA, the targeted inclusionary zoning we termed the Community Equity Program and the density bonus—and to create an affordable housing working group to identify policies that support the preservation and development of affordable housing.

The Community Steering Committee will continue to work with the city council and planning commission as they review affordable housing policies in the fall of 2011, as well as work in other venues to accomplish the objectives they collectively identified to support the vision of a healthy, equitable Central Corridor. The Healthy Corridor for All Health Impact Assessment will continue to provide an example of a community-guided analysis of transportation and land use plans that holds technical rigor, serves communities, and helps policymakers make informed decisions.



“Black, Vietnamese, Hmong, Somali, Latino, and white — we all live here, play here, do business here, pray here, cry here, love right here on the Central Corridor.” Liz Xiong, TakeAction Minnesota’s Hmong Organizing Program

Notes

¹ Center for Transit-Oriented Development, Bonestroo, and Springsted, *Central Corridor TOD Framework: A Corridor Investment Strategy* (Washington, DC: Center for Transit-Oriented Development, 2011).

² International Association of Impact Assessment, 2006. <http://www.iaia.org/publicdocuments/special-publications/SP5.pdf>.

³ World Health Organization, 2009. <http://www.who.int/hia/about/why/en/index.html>.

⁴ Human Impact Partners, 2011. <http://www.humanimpact.org/hia#HIA>.

⁵ World Health Organization, 2009. <http://www.who.int/hia/about/why/en/index.html>.

⁶ PolicyLink, 2011. http://www.policylink.org/site/c.lkIXLbMNJrE/b.5136443/k.C7E4/About_Us.htm.

⁷ Todd Litman, *Evaluating Public Transportation Health Benefits* (Victoria, British Columbia: Victoria Transport Policy Institute, 2010).

⁸ C. Billingham, B. Bluestone, and S. Pollack, *Maintaining Diversity in America's Transit-Rich Neighborhoods: Tools for Equitable Neighborhood Change* (Boston, MA: Dukakis Center for Urban and Regional Policy at Northeastern University, 2010).

⁹ Ibid.

¹⁰ D. Drummond and S. Zorn, "Central Corridor Zoning Study and Traditional Neighborhood Regulation Review" (City of Saint Paul Department of Planning and Economic Development: October, 2010), <http://www.stpaul.gov/DocumentView.aspx?DID=14511>.

¹¹ Judith Bell and Mary Lee, *Why Place and Race Matter: Impacting Health through a Focus on Race and Place* (Oakland, CA: PolicyLink, 2011).

¹² Minnesota Department of Health, "Healthy Communities Count!, January, 2011" <http://www.health.state.mn.us/divs/eh/hazardous/lightrail/intro.html>.

¹³ Minnesota Department of Health, "Polluted or Under-used Land," January, 2010, <http://www.health.state.mn.us/divs/eh/hazardous/lightrail/brownfields.html>.

¹⁴ Minnesota Department of Health, "Vehicle-Related Air Pollution based on 2008 Traffic Counts," 2008, <http://www.health.state.mn.us/divs/eh/hazardous/images/airpollutiondisplg.jpg>.

¹⁵ Email and phone correspondence from Myron Orfield, Center for Race and Poverty at University of Minnesota, to Shireen Malekafzali, PolicyLink, February, 2011 and September 2011. Correspondence focused on school segregation and poverty status in Twin Cities.

¹⁶ While our focus is specifically on jobs located in the Central Corridor and accessibility of new or changing industries to residents of the nearby neighborhoods, it should be noted that economic dynamics are typically regional. People are often willing to commute to work in different cities or counties and the commuting dynamics in the Twin Cities reflect that pattern. We are assessing local impacts because of the focus of the analysis on local communities, as well as rezoning, which is a localized land use shift. The rezoning also presents a specific occasion to increase job and income opportunities for those most in need, and the Central Corridor is home to higher than citywide unemployment rates and lower-income households.

¹⁷ Maureen Kennedy and Paul Leonard, *Dealing with Neighborhood Change: A Primer on Gentrification and Policy Choices* (Washington, DC: Brookings Institution, and Oakland, CA: PolicyLink, 2001).

¹⁸ Ibid.

¹⁹ Billingham, Bluestone, and Pollack, *Maintaining Diversity in America's Transit-Rich Neighborhoods*.

²⁰ For the gentrification analysis we removed the downtown area from the analysis. While all the submarkets along the Central Corridor vary significantly, the downtown submarket particularly stands out as an area with differing characteristics than the whole of the Central Corridor. The downtown has long been a center of economic activity with just a few public and senior housing projects, and only recently has been developing more market-rate residential units. Responding to suggestions from the community, we examined the indicators of gentrification in the Central Corridor excluding the downtown submarket to produce a general assessment of gentrification in the areas of the corridor that have a more residential and retail focus.

²¹ The downtown submarket remains in the property value analysis. Therefore the increase of 8% in property values within a quarter-mile of a station area takes into account the property value changes in the downtown area.

²² Karen Chapple, *Mapping Susceptibility to Gentrification: The Early Warning Toolkit* (Center for Community Innovation at the Institute of Urban and Regional Development, 2009), <http://communityinnovation.berkeley.edu/reports/Gentrification-Report.pdf>.

²³ Center for Transit-Oriented Development, Bonestroo, and Springsted, *Central Corridor TOD Framework*.

²⁴ Sarah R. Crissey, *Educational Attainment in the United States: 2007* (U.S. Census Bureau, 2009), <http://www.census.gov/prod/2009pubs/p20-560.pdf>.

²⁵ Minnesota Public Radio, "Twin Cities' Apartment Vacancies Down, Rents Up," (April 28, 2011).

²⁶ City of Saint Paul 2010-2013 Housing Action Plan.

²⁷ HousingLink Q1 2011 Foreclosure Update.

²⁸ Greater Frogtown CDC, <http://www.stpaul.gov/DocumentView.aspx?DID=15885>.

²⁹ National Housing Trust, "Affordable Housing Preservation." http://www.nhtinc.org/preservation_faq.php, September, 2011.

³⁰ Email and phone correspondence from Myron Orfield, Center for Race and Poverty at University of Minnesota, to Shireen Malekafzali, PolicyLink, February, 2011 and September 2011. Correspondence focused on school segregation and poverty status in Twin Cities.

³¹ Based on the 2000 U.S. Census: percentages relying on public transit for work commutes: 3 percent of whites, 12 percent of African Americans, 9 percent of Latinos, 10 percent of Asian Americans. Clara Reschovsky. *Journey to Work: 2000, Census 2000 Brief*. (Washington, D.C.: U.S. Census Bureau, 2004).

³² Expert testimony by William W. Millar before the House Committee on Ways and Means on Public Transportation's Contribution to the Reduction of Greenhouse Gas Emissions on September 18, 2008. <http://www.apta.com/gap/testimony/2008/Pages/testimony080918.aspx>.

³³ The criteria for safe pedestrian crossing used in this analysis include:

- 1) Presence of a curb cut on each corner
- 2) Striping at the crosswalks
- 3) Presence of a timed signal for pedestrians (if intersection was signalized)
- 4) Absence of the following hazardous conditions:
 - a. Extremely narrow sidewalks
 - b. Wide curb radii at intersections
 - c. Designated right-hand turning lane for vehicles
 - d. Large driveways adjacent to the intersection
 - e. Extremely long crossing distance

³⁴ E. A. LaScala, D. Gerber, and P.J. Gruenewald, "Demographic and Environmental Correlates of Pedestrian Injury Collisions: A Spatial Analysis," *Accident Analysis and Prevention* 32(5) (2000): 651-658.

³⁵ C. Lee and M. Abdel-Aty, "Comprehensive Analysis of Vehicle-Pedestrian Crashes at Intersections in Florida," *Accident Analysis and Prevention* 37(2005): 775-786.

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