Spokane University District

Pedestrian/Bicycle Bridge

Health Impact Assessment

October 2011

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Acknowledgments

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- Katherine Hebert, Planner, Researcher, ORISE Fellow (CDC)
- James Dills, HIA Coordinator, Nashville/Davidson County Metro Public Health

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Executive Summary

Introduction: The Spokane University District Pedestrian/Bicycle Bridge Health Impact Assessment (HIA) was developed to help inform decision makers about potential health impacts that development of a pedestrian bridge in the University District will have on the current and projected population who will live, work, and recreate within a quarter-mile radius of the bridge. The bridge project is key to a targeted redevelopment area where a land use and transportation study is now underway. This HIA is a collaboration between the City of Spokane and the Spokane Regional Health District.

Methods: Six health impacts were chosen for analysis: physical safety, physical activity, perceived safety, social capital, economic development, and air quality. Indicators were developed to measure each impact. A combination of primary and secondary research was utilized. The HIA team developed a survey that was administered to residents and business owners within the study area. Data pertaining to air pollution, perceived safety, and social capital were collected via this survey. Peer-reviewed journal articles and local data sources were also used to develop recommendations.

Results: Impacts and magnitude on the health of the study population were developed for each health impact. A review of physical activity literature suggests there would be a 13 percent increase in bicycle commuting for the students and employees who work at the Riverpoint campus. Based on the Spokane Regional Transit map and survey data pertaining to bicycle and pedestrian collisions with motorized vehicles in the past two years, collisions will likely increase by 18 percent once the bridge is built. Actual levels of various air pollution components were not assessed in the study area. Instead, survey data was used as a proxy to estimate the impact. Residents drive an average of 4.75 miles per week, which could be reduced by 0.86 miles per week once the bridge is built, resulting in an average reduction in CO_2—between 0.62-0.69 lbs. per person per week, and a reduction in 2.3 kilos of particulate matter. Based on secondary economic development research, the pedestrian bridge will likely draw more residents, businesses and patrons to the study area, resulting in higher costs per square foot of real estate, reduced vacant space, and increased business revenue.

Recommendations: First and foremost, this bridge HIA concluded that the bridge will contribute positively to the health of the study area. Authors recommend that this bridge be constructed. Design research shows that the following additional recommendations will have positive impacts on current and future populations within the study area, and all users of the bridge. Recommendations were prioritized by considering cost, impact on health, and impact on reducing vehicle miles traveled. Please see Appendix 6 for detail on how these recommendations are prioritized. The top ten are listed below in descending order of priority.

Top ten recommendations:

1. Reduce the availability of on- and off-street parking to encourage alternate forms of transportation
2. Provide zoning that allows and provides incentives for mixed-use residential / retail / office
3. Ensure there are bike lanes to and from the bridge
4. Ensure regular bus service, and provide covered bus stops in the area to make bus transportation more appealing
5. Ensure that sidewalks are properly maintained and repaired
6. Provide bike lanes on the bridge
7. Provide maps and signs that direct bicycle and pedestrian commuters to shortest and safest routes to destinations
8. Provide alternative transportation incentives
9. Implement traffic calming strategies such as chokers or raised crosswalks, for pedestrian safety
10. Continue to “brand” the University District, especially the South University District Revitalization Area (SUDRA)

We have concluded that if the recommendations made for each health impact are included within policy and project plans for the pedestrian/bicycle bridge that the health of people using the bridge and living and working within the study area will be improved beyond the initial benefits of the physical connection. The following report offers details supporting the inclusion of these recommendations into policy and plans for development of the pedestrian/bicycle bridge.

Call to Action

This HIA can be used by policy makers and elected officials when making University District pedestrian/bicycle bridge design decisions that affect human health. The priority recommendations have been deemed most important for having positive impacts on human health and promoting energy efficiency. The top ten recommendations should be considered first for implementation. The balance of the HIA recommendations should also be considered important in their ability to positively affect human health and should be implemented as time and funding allows.

Introduction

The Spokane University District Pedestrian/Bicycle Bridge Health Impact Assessment (HIA) is a product of the City of Spokane and the Spokane Regional Health District.

The City of Spokane applied for and received an American Recovery and Reinvestment Act (ARRA) grant to help fund the University District-Sprague Corridor Study (UDSC). The redevelopment study focuses on creating energy efficient land use patterns that will provide jobs, housing, and transportation alternatives, while reducing vehicle miles traveled and greenhouse gas emissions. Health impact assessments (HIA) are included as part of the study's scope because public health concerns align with project goals.

The University District Pedestrian Bridge will likely be the first infrastructure project within the UDSC study that will be implemented and may well have the largest influence on future redevelopment activities there. The South University District is intended to attract future residential development and a higher intensity of land uses, including support for businesses and employment growth. Therefore, the project was selected as the focus of this HIA.

This HIA takes into account six health impacts: physical safety, perceived safety, social capital, air quality, physical activity, and economic development. These impacts were chosen because of their relevance to the study's goals of reducing vehicle miles traveled, reducing greenhouse gas emissions, and creating jobs, and their relevance to reducing some of the top causes of preventable disease and death in Washington State.

Purpose

The Spokane University District Pedestrian/Bicycle Bridge HIA uses best available information to assess potential health impacts of the pedestrian bridge on the people who live, work, and recreate within a quarter mile of the bridge, now and in the future. The assessment produces several recommendations for increasing positive health effects, while avoiding or mitigating negative health effects relevant to the bridge project.

This document is intended for use by residents, city staff, and City of Spokane elected officials to inform planning process and decision making. The authors hope that this document will encourage conversation about the importance of assessing health impacts for the pedestrian bridge project and illustrate the link between human health, compact land use patterns, and energy efficiency.

Community Profile

The community profile provides an understanding of the geographic location of the study area, as well as how the area was developed. The residential population is described in the demographics section, which provides information about race, age, income, household types and numbers.

The HIA study area encompasses a quarter-mile radius surrounding the pedestrian bridge site. This radius was chosen due to natural boundaries created by arterials and is considered walkable. Also, anticipated future development within a majority of the study area will be residential.

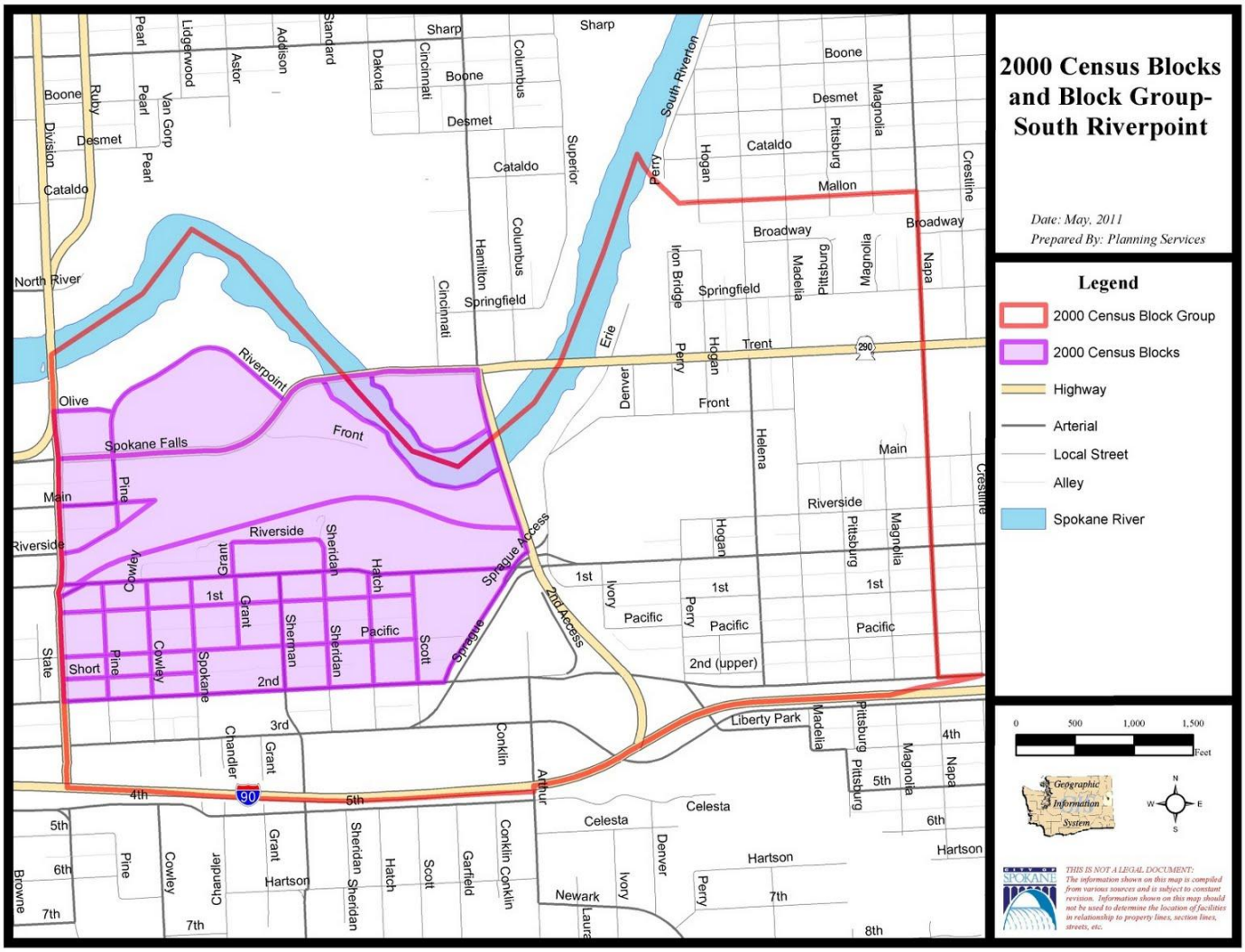
The area sits on the southwest corner of the East Central Neighborhood and is within the boundaries of the South University District next door to the city's central business district. The area is zoned Downtown University and General Commercial. Both of these zones provide for a wide range of uses and building heights. The City of Spokane land use standards for the Downtown University zone specifically encourage a pedestrian-friendly and safe urban environment for the Riverpoint Campus, along with a wide range of residential, office, retail, and other supporting commercial uses. (Spokane Municipal Code Section 17C.124.030)

The study area is bisected by railroad tracks, which the pedestrian bridge will cross when constructed. The area to the north of the railroad tracks is zoned Downtown University and is home to the Riverpoint Campus, housing branch locations of Washington State University, Eastern Washington University, Whitworth University, University of Washington, and Community Colleges of Spokane. The campus area is a former rail yard and was redeveloped over the last 20 years. There are also a few businesses such as a hotel, restaurant, and animal clinic on the north side of the study area. The south side of the tracks is zoned General Commercial and was primarily residential pre-1960. Since the construction of Interstate 90, it transitioned to an area characterized by a mix of light industrial, wholesale and retail businesses with little residential.

Since 2010 U.S. Census data is still being analyzed, and not all available data is specific to block level, U.S. Census data from 2000 was used to supplement 2010 data.

According to 2010 census data there are 99 people that live within the study area. The average age falls into the 41-62 age group, with only six residents under the age of 18. The population is predominantly white. There were 102 housing units within the study area at the time of the 2010 census; 78 of the units were occupied.

Household income is provided only at the block group level, which does not allow for a specific look at the exact study area, but it gives us a general idea of income for a larger boundary including the study area. There are 391 households within the block group, 66 percent of these households report an income of $24,999 or less, which is < 250 percent of the federal poverty level (FPL) (US Census 2000). A quarter of the households in this block group report making less than $10,000, which is < 100 percent FPL (US Census 2000). The federal poverty level is used to indicate how poor an area is. In general, an individual or family earning 250 percent FPL can survive but has no savings for emergencies.



City of Spokane

This map displays the study area, which is shaded in purple, and the census block group, which is outlined in red.

The World Health Organization (WHO) describes an HIA as "a combination of procedures, methods and tools by which a policy, program or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population" (WHO, 1999).

Since HIAs look at the potential health effects that a project or policy may have on a population which can contribute to community costs or benefits, they provide another tool to help elected officials, administrators, and the public make informed decisions about policy or project implementation.

There are generally four types of HIA: desk-based, rapid, intermediate, and comprehensive. Resources and amount of time needed to perform an HIA vary by type. A desk-based HIA may utilize secondary research resources and take a few weeks to complete, while a comprehensive HIA may utilize primary research gathered specifically for the assessment and take a year or more to complete.

Because of the pedestrian bridge design decision timeline and size and scope of the project, the HIA team decided to perform a rapid assessment. This HIA has taken five months to complete, and has utilized both primary and secondary research resources.

The HIA process is comprised of six steps: screening, scoping, identification, assessment, decision making and recommendations, and evaluation and follow up. (Refer to appendix 1 for how authors completed each step.)

Methodologies

The methodologies section provides an explanation for why the authors chose to cover the health impacts included within this HIA, survey, data collection and analysis methods, and authors' observation methods.

Identification of Indicators

Authors started with a list of topic areas commonly utilized in HIAs. From this list, authors chose topic areas most relevant to the bridge project. For example, the bridge is likely to impact physical activity by providing a connection to destinations. Topics were then researched using the Entrez Pubmed Website to look for specific methods that could be used to collect primary and secondary data. This search yielded the indicators that are mentioned in the corresponding section for each topic.

Collection of Primary Data

Survey

A survey was developed with questions derived from authors' literature research of conducted studies. Since the survey area was small—with approximately 102 residences and 120 businesses—all residences and businesses in the area were surveyed. The number of houses and residences were verified during a house-to-house distribution of notices regarding the forthcoming survey. For the residential portion, the survey was conducted verbally using volunteers who went house to house in pairs. When residents were not at home or did not have time to answer the survey, a survey and self-addressed and stamped return envelope was left. Businesses were called to set up an appointment to be interviewed over the phone or in person. Occasionally, a survey was faxed or e-mailed to the business owner, who could then return it the same way, mail it, or have it picked up. There were a total of 57 responses to the survey from both residents and businesses. This is approximately a 24.8 percent response rate.

Observations

While the surveys were being administered, the incidence and density of vandalism was observed. Every incidence was noted on a form that also looked at the number of buildings per block and the amount of windows facing the street. The windows are a proxy for a measure called "eyes on the street." Statistically, fewer crimes occur in areas where there are more unobstructed windows to view what is happening on the street (Jacobs, 1961). One notation form was used for each city block.

Commute Trip Reduction Data

Commute Trip Reduction (CTR) is a statewide program that offers incentives to increase alternative modes of transportation and reduce single occupancy vehicle miles traveled. This program surveys all participants when they enroll, then yearly, to measure ongoing change. Authors gained access to the CTR database for Spokane's local universities. This information was analyzed to sort out the target population and estimate the average percentage of respondents using alternative modes of transportation.

Statistical Analyses

The data was analyzed using both Microsoft©Excel and IBM© SPSS software. Correlative analyses were performed in SPSS using a two-tailed Pearson correlation. P-values were considered to be significant at 0.05.

Collection of Secondary Data

Information about pedestrian/bicycle bridge impacts to economic development was gathered from a book called "The University as Urban Developer," from a U.S. government report titled "An Economic Analysis of Infrastructure Investment," which is a report on the impacts of several different pedestrian infrastructure projects. That report was titled "Pedestrian Safety Guide and Countermeasure Selection System." Additionally, a document from Oklahoma City was used titled "Construct the SkyDance Pedestrian Bridge." Other data about the current economic situation for the University District was gathered from the EWU Urban and Regional Planning Studio Class Project (2009, 2010), from the Fast Forward Spokane Downtown Plan Update Appendix D (2008), from the City of Spokane South University District vacant land field study (2011), and from the Zimmerman Volk University District Housing Study (2009).

Social capital data was gathered by using Ebsco Host to search for articles in peer-reviewed journals. The phrases "social capital and health," and "social connectedness and health" were used to find applicable articles. The Social Capital Research Web site was also used to locate peer-reviewed articles.

Perceived safety data was gathered using Ebsco Host to search for articles in peer reviewed journals. The phrases "perceived safety," and "perceived safety and the built environment" were used to find applicable articles. Data about how light levels relate to crime was introduced to authors by Dr. Olaf Kuhlke, who shared a lighting level and crime bibliography and methodology from his forthcoming lighting study, and a recent lighting study of the University of Minnesota – Duluth Campus (Kuhlke & Parent, 2009).

The City of Spokane Crime Map was used to identify the incidence of crime and locations within the study area. Crime incidence was broken down into assaults, thefts, drug crimes, and all crimes. Crimes were compared to "eyes on the streets" observations and the incidence of vandalism to determine if there is a connection.

Authors also considered safety and sexual crimes; WSU crime reports, as well as the Spokane County Sherriff's Office sexual predator map, were consulted to determine the incidence of crimes and the presence of sexual offenders.

Health Impact Assessment Chapters

Each health impact assessment chapter is broken into four sections.

1. The first section introduces the health impact, defines the impact and informs the reader with the best-available science about the health impact.
2. The second section provides baseline indicator data collected with surveys and observations.
3. The third section describes the impact and magnitude that the health impact will have on the study area. The impact and magnitude measures what kind of effect and how much of an effect the bridge will have on a chosen health impact.
4. The fourth section provides recommendations intended to make the study area a healthier place for people who live, work, and recreate in the area.

Physical Activity

In recent years, research demonstrates a connection between how a community is built and how it relates to levels of physical activity of residents. Walking and biking is a form of physical activity. The U.S. Centers for Disease Control and Prevention (CDC) recommends people get at least 30 minutes a day on most days of the week to maintain health. Currently, only about half of Spokane residents reach those recommended levels. (Spokane Counts) Physical inactivity has been linked to chronic illness such diabetes, heart disease, high blood pressure, stroke, osteoarthritis, and some forms of cancers.

Indicators

Physical activity data was not available for the quarter-mile radius around the proposed pedestrian bridge due to the limited number of residents. The majority of the study area consists of businesses and universities; therefore, it was difficult to gauge the levels of physical activity of employees and students from existing indictors. However, there was a CTR survey completed by Riverpoint Campus students (just north of proposed bridge) that measured levels of non-motorized transportation practice. Thirteen percent of students responding to the CTR questionnaire lived within two miles of their campus and 36.4 percent within five miles of campus. Of students responding, 15.9 percent walk, bike and/or take public transit.

Impact/Magnitude

Bridges improve connectivity. Survey maps showed researchers destinations on the other side of the proposed bridge that people could walk to (within one mile) or bike to (within two miles). The Spokane River Centennial Trail would be within a half mile of most portions of the study area. At least one study has shown that those with good access to large, attractive open spaces, were 50 percent more likely to achieve high levels of walking (Giles-Corti, 2005). Similarly, in London, a bike lane over the Thames increased bicycle commuting by 13 percent between 1996 and 2004 (Livingstone, 2004). Authors hypothesize that there would be a positive impact similar in magnitude to the London study.

Recommendations

In a systematic review of studies on street-scale urban design and land use policies to increase physical activity done by the Task Force on Community Preventative Services, both were found to be an effective intervention to increase physical activity. These policies and practices included: sidewalk continuity, enhanced street landscaping, improved street lighting or infrastructure projects that increase the ease and safety of street crossing, traffic calming, or enhanced landscaping features. In the six studies reviewed, there was a 35 percent overall median increase in physical activity in areas implementing these features. "Knowledge of green space—and intention to use green space for activities—may be associated with positive changes in health behavior and quality of life even before individuals reach their desired level of green space use. And, that benefit may persist although a long period of time has passed since they have used green space." (Willis, 2005) Thus, it is safe to say if those features are used in the study area (including on the bridge), research shows it will increase physical activity of the people who live, work, and play in the study area. Based on systematic review, the following recommendations will increase physical activity in the study area:

- *Ensure that lighting is a minimum of 20 lux across bridge and landing areas.*
- *Ensure that lighting is focused on the pathways.*
- *Provide signage at crossings to alert traffic to presence of bicycles and pedestrians.*
- *Provide traffic calming approaches such as a speed table at intersections with crosswalks.*
- *Provide green space. Consider using drought resistant flora, and shade producing trees.*

Regarding urban planning for the larger community around the study area (several square miles), the same study showed that there are design elements that address specific areas that can increase physical activity by up to 161 percent. Those design elements address:

- Proximity (0.5 miles) of residential areas to stores, jobs, schools and recreation areas
- Continuity and connectivity of sidewalks and street
- Aesthetic and safety aspects of the physical environment such as trees, green spaces, lack of apparent vandalism, interesting architecture, and fewer vacant lots

It is recommended those areas be addressed when planning for the larger community around the study area.

Perceived Safety

Perceived safety is how people think an environment will affect a person's ability to avoid or negate physical harm. Environments that appear harmful, such as a busy street or environments that could pose harm, such as a dark alleyway in a high-crime neighborhood are not appealing environments for most people. Harmful environments induce fear, and are avoided by people for different reasons, and at different times. People are affected differently by environments that may be perceived as unsafe. Several factors influence if a person perceives an environment as unsafe including his/her physical abilities, familiarity with an environment, or neighborhood reputation. "Feelings of fear of crime are not described by mathematical functions of actual risk but are rather highly complex products of each individual's experiences, memories, and relations to space'' (Koskela,1997, p. 304).

Decreased physical activity is an effect of perceiving an environment as unsafe. People who feel unsafe in an area are less likely to be physically active in that area. Areas that are economically unstable often have higher crime rates, and are perceived by residents as unsafe, preventing residents from being physically active outside in their neighborhoods. Studies by CL Craig and RC Brownson et al. (2002) reveal that perceived lack of safety leads to decreased physical activity in low-income populations.

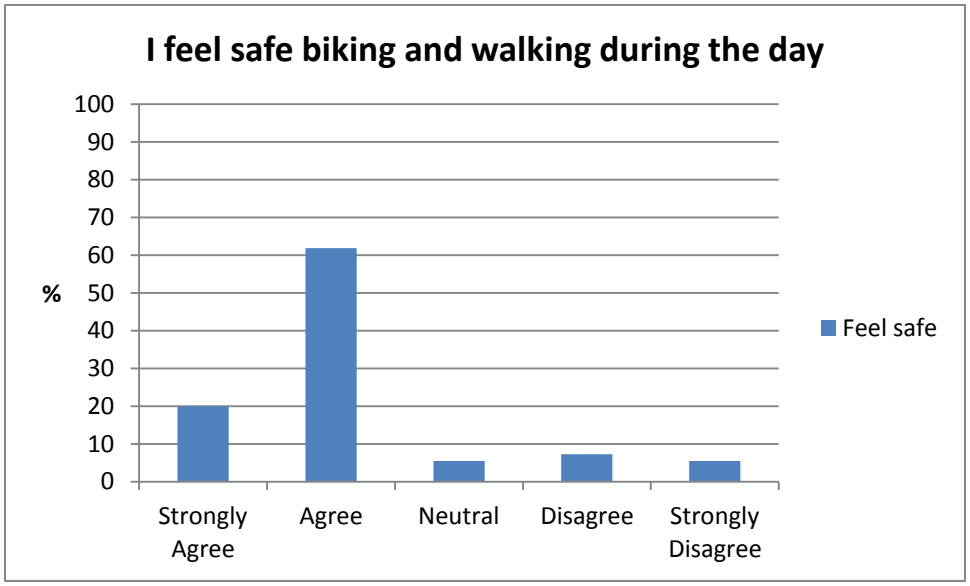
Age groups can be affected as well. Studies by the CDC and Economic Cooperation and Development (1996) have found that lack of safety leads to decreased activity in senior citizens. Senior citizens, being less physically capable of fleeing or fending off a dangerous situation, feel especially vulnerable, and can be especially sensitive to perceiving environments as unsafe. Since the average age in the study area falls within the 41-62 age range, this could be a concern, particularly for the female population.

Environments that are generally perceived as unsafe are those without easily accessible escape routes, lacking in good visibility, or that are isolated. A study by G. Valentine (1990) shows that subways and enclosed parking garages can be perceived as unsafe for people because these locations offer opportunities for criminals to trap their victims. Open spaces such as vacant lots, desolate transit stops, and recreational areas can also be perceived as unsafe because they can provide a criminal with the opportunity to conceal crimes and act outside of visual range of others. A study by K. Day (2001) reveals that fear inducing factors in public environments include darkness, desolation, lack of opportunities for surveillance by the general public, lack of maintenance, and poor environmental quality.

Indicators

Opportunities for human surveillance, or 'eyes on the street,' coined by Jane Jacobs (1961), is a strategy for discouraging criminal activity, which can lead to perceptions of safety. This study did not show a significant correlation between "eyes on the street" or the number of windows on a block with perceived safety (p=0.66). Nor was there any correlation between either perceived safety or "eyes on the street" with any actual crime numbers (total crimes, assaults, drug crime, thefts).

The survey found that residents and people working within the study area felt safe walking and biking during the day, but did not feel safe walking and biking in the study area at night. When given the statement "when biking and walking in my neighborhood during the day I feel safe," respondents gave a 3.77 average on a scale of 1-5, which indicates that most respondents mildly agree with the statement. When given the same statement, but with the word 'night' replacing the word 'day,' responses yielded a 1.82 average on a scale of 1-5, which indicates that respondents disagree with the statement.



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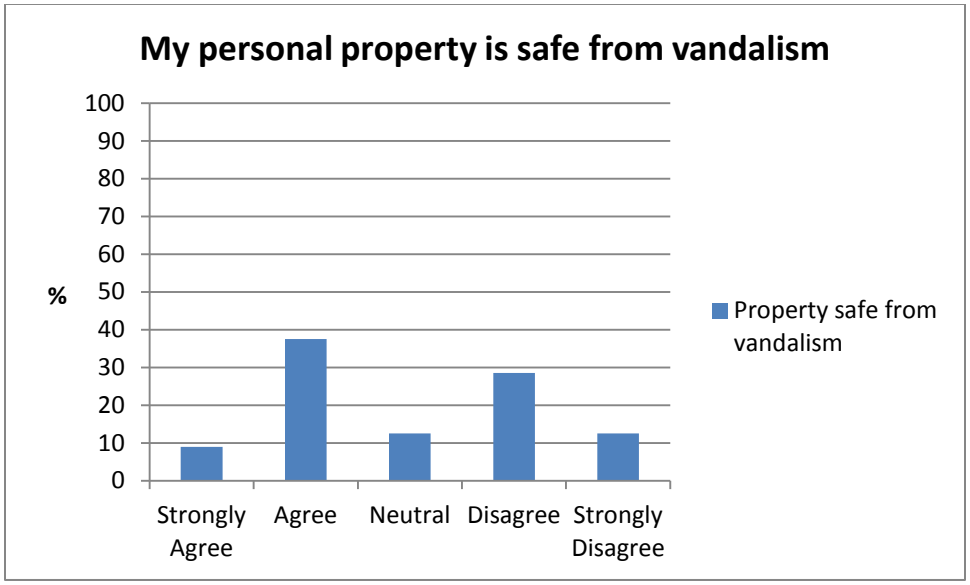
Regardless of the time of day, the survey found that people feel safe in front of their house, or where they worked. When given the statement "I feel safe hanging out in my front yard or in front of my home

(also adapted for the business survey)," people responded with a 3.95 average on a scale of 1-5, which indicates that most respondents agree with the statement.

Responses were mixed regarding vandalism and theft, which resulted in a neutral score for both of these statements on the survey. When presented with the statement "my personal property is safe from *vandalism* in the neighborhood," responses yielded a 3.12 average on a scale of 1-5, which is considered neutral. When presented with the statement "my personal property is safe from *theft* in this neighborhood," responses yielded a 3.02 average on a scale of 1-5, which is also considered neutral.



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Keep in mind, although the graph may appear to illustrate that more respondents agree than disagree with the statement, there are also responses for 'neutral,' 'strongly agree,' and 'strongly disagree' that weigh in on the average as well. The combined percentage for responses 'disagree,' and 'strongly disagree' is 41.1 percent, compared to a combined percentage of 46.4 percent for 'strongly agree' and 'agree.' The percentage for 'neutral' is 12.5 percent. This tells us that there are two opinion groups among respondents.

Impact/Magnitude

One impact of increased connectivity is increased use. Increases in the flow of pedestrians and bicyclists usually increases 'eyes on the street'. This, in turn, can improve perceived safety of person and personal property in the area (Jacobs, 1961). Increased use, in turn, fosters the feeling of 'safety in numbers'.

Since this bridge will likely be used more during the day for commuter transportation, the primary impact of the bridge will likely be positive during the day. There is currently a relatively high feeling of safety in front of homes or places of business. Until housing is built in the study area and there are more residents living in the area, feelings about safety at night are not likely to change. The divided responses to vandalism and theft may become more positive.

Recommendations

- *Light the bridge and surrounding sidewalks* and roads with a light source that emits a minimum of 20 lux every 90 ft. Placement of 20 lux lighting every 90 ft. will provide continual ability to distinguish facial features and colors as a person walks over the bridge at night.

  A well-lit environment can discourage criminal behavior. Dr. Robert Samuels (1995, 1995b, 1996), an environmental criminologist in Australia, carried out a variety of studies about lighting and crime prevention. These studies reveal that crime is more likely to happen in low-light settings, especially under 5 lux (40 percent of crimes investigated in the study), while settings above 20 lux (3 percent of crimes investigated) saw remarkably less crime. Twenty lux lighting provides an opportunity for identification of facial features and colors up to 90 ft. from the center of the illumination point (where light shines strongest).

- *Provide light fixtures that direct light to the ground*, eliminating excess light pollution, and making the best use of available light for pedestrian and bicyclist visibility. Providing light fixtures that direct light to the ground will provide light where it is most needed for people who are using the bridge. Allowing less light to escape provides for brighter and better focused light on the bridge, which will deter criminal activity.

Improved lighting can have a significant impact on reducing crime. A systematic review of eight lighting studies by Ferrington and Welsh (2007) found that crime reduced by 22 percent in areas that experienced improved lighting. Lighting can make a dramatic difference in how safety is perceived within an environment. Studies by Robert Samuels (1995) and S.E. Merry (1981) describe that perpetrators prefer to commit crimes in dark places, and a safety audit in Warsaw Poland (Un-Habitat, 2007) reveals that one of the main problems for women's feeling of insecurity is directly related to inadequate lighting of public spaces.

- *Provide emergency phones where appropriate*. Emergency phones can discourage criminal behavior, because they increase the chance of apprehension.

- *Clean up vandalism and provide maintenance* that will communicate that the bridge area is monitored. Quick responses to vandalism and routine monitoring of the bridge and its landing sites will provide a sense of activity. This may discourage criminal activity by giving the sense that people are in the area that will intervene with criminal activity. A study of Chicago transit stations by Block and Davis (1996) observed that high levels of guardianship in high-traffic stations had a positive effect on reducing crime incidents, which suggests that an area that is maintained and populated experiences less criminal activity.

Physical Safety

Installing a bike and pedestrian bridge over the railroad tracks will hopefully increase the amount of active transportation. As more citizens become cyclists and pedestrians, the risk of personal injury becomes an important health impact of the bridge. Cyclists and pedestrians can run into inanimate objects, each other, or motorized vehicles on the bridge or on their way to and from the bridge.

In addition, it is assumed that getting out of the car and walking, running or biking opens people up to physical assaults. When using motorized transportation such as cars or trucks, people are protected by glass and metal from would-be attackers. Those using active transportation appear to be at a higher risk for physical assaults.

For these reasons, authors looked at the possible impacts on physical safety and chose some indicators to assess the baseline and monitor improvements or negative consequences of the bridge.

Indicators

In order to determine the number of bicycle and pedestrian collisions with motorized vehicles, authors accessed Spokane Regional Transportation Commission (SRTC) maps for incidents between 2007 and 2009. Per biennium, it appears there were two collisions involving bicyclists and four collisions involving pedestrians on the periphery of the study area on Division Street. That results in an average of one collision involving bicyclists and two collisions involving pedestrians per year. There were no reported collisions within the rest of the study area. Outcomes of those collisions are unknown.

The number of assaults per year in the study area was calculated using the City of Spokane Crime Map and the WSU Cleary Report. As of May 3, 2011, assaults were analyzed up to the last year. There were a total of seven assaults in the study area, three of which were on Sprague Avenue within a block of the proposed bridge landing site. Two more were on First Avenue and the other two were on Second Avenue. There were 10 more assaults on Division Street that were not included in this count. On the north side of the bridge there were no reported assaults aside from those on Division Street.

Using the Spokane County Sheriff's Office Web site that is dedicated to tracking sex offenders, authors were able to obtain the number of registered sex offenders currently residing in the study area. As of May 3, 2011, there was one, level-two sex offender living on the periphery of the study area on Division Street. Based on the reported crime data mentioned above, there were no reports of sexual assault in the study area. It should be noted that City of Spokane data does not distinguish sexual assaults from other assaults.

Suicide from bridges is also a major concern that is shared by train engineers and suicide prevention advocates. Nationally, the number of suicides by train may be as small as 200 or 300 cases a year. Suicide is also the third leading cause of death in the 15-24 year old age group. This is the age group most likely to use the bridge. Depending on the speed of the train, there is a 60-90 percent suicide success rate. Those who survive have major medical problems for the rest of their lives. Since 2002, there has been an average of 73 suicides per annum in Spokane County considering all means of suicide. (Spokane Counts). There is no mechanism in place for researchers to calculate suicide rates within the study area.

Impact/Magnitude

As part of the survey that was fielded to residents and local businesses, it is estimated that there will be an 18 percent increase in bicycle and pedestrian trips among current residents. One potential secondary impact of the bridge, and other revitalization projects, is an influx of residents into the area. If this were to happen the increase in bicycle and pedestrian trips is likely to increase substantially. For example, one major housing project could double the resident population in the study area. The increase in the number of residents, the number of residents' bike and pedestrian trips, and the increase in commuters riding through the area could lead to an increase in collisions involving cars particularly along Sprague Avenue and Division Street. These collisions have many costs associated with them, including but not limited to: health care costs , city personnel costs (police), costs of damaged property, potential loss of income, and costs to social capital. Pedestrian and bike fatalities can cost as much as $3,840,000 including all costs (Bicycling info, 2011). These costs are likely to increase with the implementation of the bridge due to the increased volume of pedestrians and cyclists and the change in non-motorized traffic patterns in the study area.

There is no evidence to suggest that assaults would either increase or decrease with construction of the bridge. Sexual assaults are not likely to increase as there is currently no history of them. If physical assaults occur during daylight hours, there is a possibility that these will decrease with an increase in population, i.e. more witnesses. However, if these occur at night, it is unlikely that the incidence of assault will change until the area is further developed. A recent study (Browning, 2011) found that rates of aggravated assault and homicide declined in areas of increased commercial and residential density, which supports Jacob's 'eyes on the street' hypothesis. With respect to this study it can be anticipated that the pedestrian/bicycle bridge study area will experience less assault if residential and commercial density increases. This impact would be a secondary impact not directly related to the presence of the bridge.

It is possible that with the implementation of a bridge over the railroad track, that the incidence of suicide at the bridge could increase, although it would likely not influence Spokane County statistics significantly.

Recommendations

- *Provide raised medians or pedestrian refuge areas at pedestrian crossings* around the bridge landing area and particularly crossing busy streets such as Sprague. Providing this kind of infrastructure has demonstrated a 46 percent reduction in pedestrian crashes. Installing such raised channelization on approaches to multi-lane intersections has been shown to be particularly effective. At unmarked crosswalk locations, medians have demonstrated a 39 percent reduction in pedestrian crashes. Medians are especially important in areas where pedestrians access a transit stop or other clear origin/destinations across from each other. Midblock locations account for over 70 percent of pedestrian fatalities. Also vehicle speeds are higher contributing to the injury and fatality rate at this location. Over 80 percent of pedestrians die when hit by vehicles traveling at 40 mph or faster, while less than 20 percent die when hit at 20 mph.

- *Install crosswalks according to Complete Streets standards* in the areas leading up to and away from the bridge. The presence of a sidewalk or pathway on both sides of the street corresponds to approximately an 88 percent reduction in "walking along road" pedestrian crashes.

- *Design for visibility up to 50 feet.* Lighting and designated bike lanes on the bridge are some ideas to help facilitate safe travel. Consider larger numbers of pedestrian and bicycle commuters in the bridge design to ensure that high volumes can cross safely during peak hours of use.

- *Utilize traffic calming strategies* in this area. If bike lanes are included on the streets, authors suggest that there be signage and white lines indicating the bike lane. If bike lanes are not used, chokers are recommended to make pedestrian crossings more visible. Chokers result in a 14 percent decrease in speed on major roads. Whether or not a bike lane is added to Sprague Avenue, raised crosswalks are recommended based on an estimated 45 percent reduction in collisions (trafficcalming.org).

- *Provide suicide deterrents.* Implementing a form of suicide deterrent will likely prevent potential future suicides. "Decades of research clearly demonstrate that bridge barriers effectively prevent suicides" (e.g., Beautrais, 2007). In reviewing all suicide prevention approaches—barriers, signs and telephone hotlines, bridge patrols and staff trainings—Beautrais concluded that "The most effective form of prevention at jumping sites is a physical barrier, which literally restricts access to the drop" (Suicide, 2008). Hotlines have also had some efficacy for those who are ambivalent. Posting hotline signs next to the phone may deter some casing the bridge while planning their suicide (Glatt, 1987). Using some form of a barrier method would be the most beneficial to preventing suicide, but if not feasible, installing a phone connected to a suicide hotline would also be beneficial.

Air Pollution

Traffic is a major source of air pollutants including CO_2, particulate matter, etc. Traffic density and vehicle miles traveled contribute significantly to health effects. Previous research shows a strong relationship between health outcomes and air pollution from motorized vehicles. Exposure to air pollution is associated with cardiovascular and respiratory diseases, neurological impairments, an increased risk of preterm birth, genotoxicity, cancer and even mortality (Beate, 2008). In Spokane County, air pollution can be correlated to the incidence of asthma hospitalizations.

In addition, there are many impacts that air pollution can have on climate change that affects human health indirectly. Increased temperatures can pose a health risk to seniors and infants during summer months. Increased rainfall can lead to flooding. An increased incidence of severe natural disasters such as tornadoes and hurricanes can also negatively affect human health. However, for the purposes of this study, authors mainly focused on the direct role that air pollution has in connection with health.

Indicators

Although authors were not able to assess the actual levels of various air pollution components in the study area, data was used from the residential and business surveys to help determine how many miles per week individuals in the study area drive and how many of those trips could be reduced and converted to active transportation trips. The survey also included a map component to determine how many car trip miles could be reduced within a half mile of destination after the construction of the bridge.

Impact/Magnitude

The Vermont Street Footbridge in San Diego contributed to a 10 percent drop in vehicle generation and a higher pedestrian mode share. In this study area, residents currently drive an average of 4.75 miles per week. This is a low amount of single occupant vehicle (SOV) trips. After the University District bridge is built, residents and employees could reduce SOV trips by 0.86 miles per week which is a calculated reduction of 18.1 percent. If the average reduction is multiplied by the estimated number of adult residents and workers in the area there could be an average reduction in CO_2 between 0.62-0.69 lbs. per person per week. This is based on the assumption of average fuel economy of 22.3 miles per gallon and an average of 12,500 miles driven per year. Since there are ~100 residential addresses and ~110 businesses, and there is an average of one person per residence and an estimated average of five persons per business, there are approximately 650 driving adults in the study area. The amount of miles that could be reduced on average would be 29,068 miles per year. This would prevent 8.23 kilos of non-methane hydrocarbons, 122 kilos of CO, 17.4 kilos of nitrogen oxides, 2.3 kilos of particulate matter, and 12.7-14.2 tons of CO_2 from being emitted annually.

Based on reductions in motorized transportation use for current residents, it is unlikely there will be large reductions in CO_2 and other pollutants from cars. Overall, there is likely to be an increase in air pollution in the area as a secondary impact of residential and business development. However, there will be a decrease in air pollution per capita for those moving into the areas, since these people are currently assumed to drive more than 4.75 miles per week. The exact amount of this impact cannot be evaluated because authors do not know the extent of the residential and business growth that can be expected. Nor do authors know the demographics and vehicle miles traveled of persons who would move into the area.

Recommendations

- *Provide incentives for reducing reliance on motorized transportation* such as offering a free bicycle to those who buy condos or move into the area. Promoting CTR and related prizes will also help.

- *Provide a bicycle sharing program*. A recent HIA that assessed bicycle sharing in Barcelona, Spain concluded that annual carbon dioxide emissions were reduced by an estimated 9,062,344 kilos and 12.46 deaths were avoided annually as a result of physical activity.

- *Reduce the availability of on and off street parking* and increase monthly parking rates closer to daily parking rates to encourage alternate forms of transportation. Salem and Portland Oregon, and Berkley, California, have successfully implemented these policies. In Portland, the Central City Transportation Management Plan specifies maximum off-street parking ratios from 1.5 to 2.0 (per-dwelling-unit for residential developments and per 1,000 square feet for office developments).

- *Ensure regular bus service and provide covered bus stops in the area*. This will make bus transportation more appealing. Bus routes that incorporate frequent destinations would also be useful. Further research would need to be conducted to find out where these should be, if not already in existence.

- *Provide maps and way finders* to direct commuters to the shortest and safest route to their destination.

Social Capital

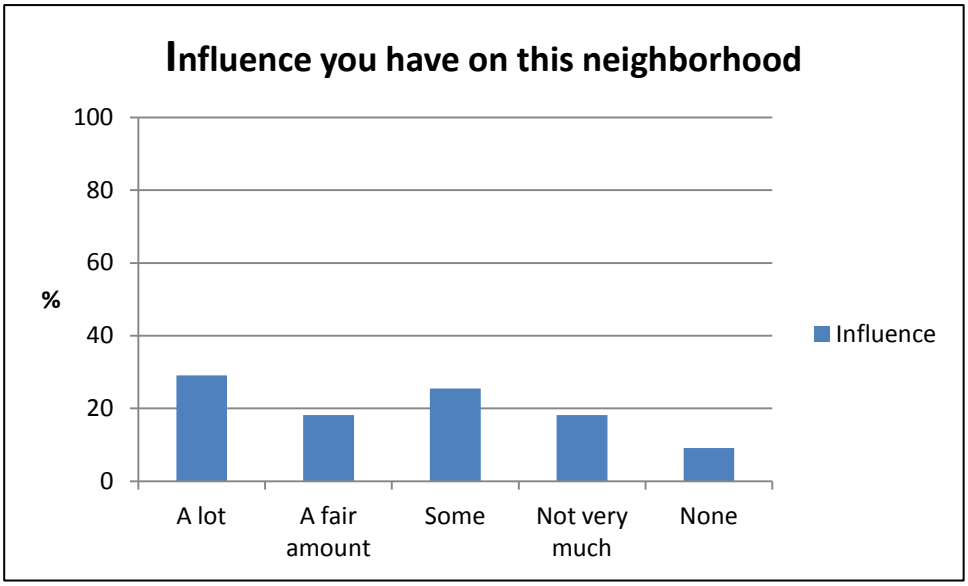
Social capital can be thought of as the social connectedness of a community, and how those social connections affect a community. Although there is no commonly agreed upon definition for social capital, a comprehensive resource, Social Capital Research, states "the commonalities of most definitions of social capital are that they focus on social relations that have productive benefits" (socialcapitalresearch.com).

A benefit of social connectedness is social support. A study by Berkman and Glass (2000) found that social support influences health through three different pathways: health behavior, psychological, and physiological pathways. This study suggests that a lack of social support can lead to negative health behavior such as excess smoking, an unhealthy diet, less physical activity, and less likelihood of seeking medical attention when sick. Social support was found to have positive psychological effects such as promoting self-esteem and self-efficacy. The study also found that social support strengthened a person's ability to cope, which reduces stress creating positive physiological effects on the immune and cardiovascular systems. A study carried out in Thailand (Yiengprugsawan, 2011) found correlations between poor self-assessed and psychological health and low trust and low social support.

Indicators

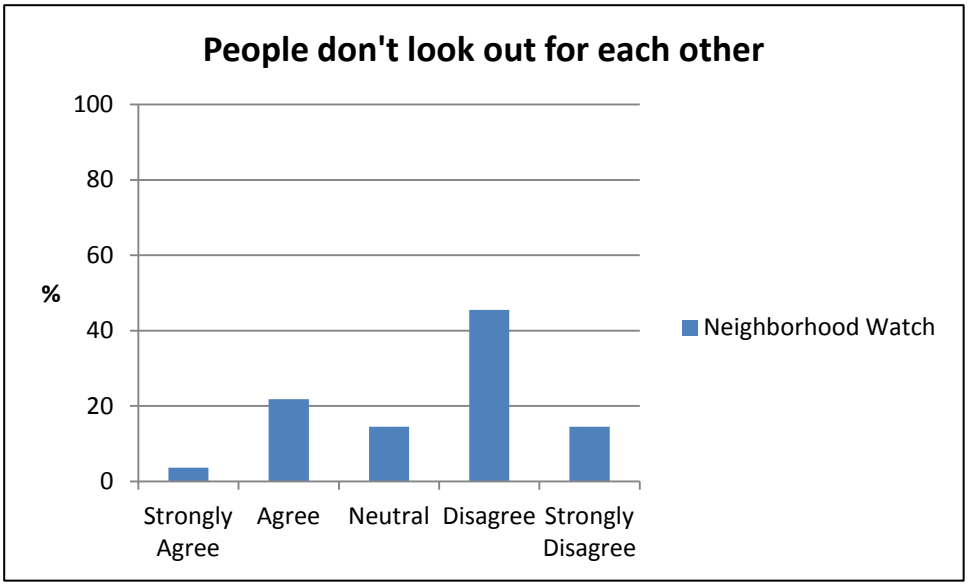
Indicators for social capital were chosen based upon their ability to gauge social connectedness within the study area. Authors chose to measure social connectedness with this survey.

Survey mean results reveal that social capital is neither lacking, nor very strong. When asked "how much influence can you have on this neighborhood," local businesses and residents responded with a 3.4 average on a scale of 1-5, which indicates that respondents feel that they have some influence on positively impacting their neighborhood.



Spokane Regional Health District

When presented with the statement "people here look out mainly for the welfare of their own families and are not much concerned with community welfare (neighborhood watch)," responses yielded a 2.6 average on a scale of 1-5, which indicates that people feel neutral. For "neighborhood watch," there are two peaks in the graph below, but one is much stronger than the other. This indicates two positions among respondents, but one of these positions is more strongly supported. In this case, this is a positive result for social capital.



Spokane Regional Health District

When asked how often members in your neighborhood come together, 12.5 percent of local business and residents responded with every week, and 12.5 percent responded one to two times per month.

Social capital has been shown to affect crime levels. Kawachi's (1999) study on community health, used crime as an indicator of community well-being. He found that violent crimes such as homicide, assault and robbery were often associated with indicators of low social capital. Property crimes, such as burglary were also associated with indicators of low social capital. Buonanno (2009) used recreational associations, voluntary associations, referendum turnout, and blood donation as measurements of social capital. His findings suggest that civic norms and social connectedness reduced crime rates. A study done in the Netherlands suggests communities with higher levels of social capital experience less crime. This study notes that "communities play an important role in crime prevention by providing informal social control, support and networks" (Akçomak & Weel, 2008). This study did not show these connections.

Impact/Magnitude

Magnitude is unknown due to lack of previous study evidence. Providing public space encourages social interactions, which can increase social connectedness. Since the current bridge design incorporates green and recreational space at the landings, this is likely to occur. If design of the bridge encourages social connectedness, the impact of social capital is predicted to be positive for the area. "Passive use of green space (e.g. visually), low-level physical use (e.g. picnicking and social activities) and intermittent or irregular use, i.e. not on a weekly or daily basis ... is associated with psychological and quality of life benefits. Again there is a lack of evidence as to the size of the benefits using validated health-related quality of life (HRQOL) scales such as the gold standard SF-36 or SF-12..." (Willis, 2005).

Recommendations

- *Incorporate green space, shade, and visually-appealing designs to* ensure that landings will encourage residents and commuters to collect for social interactions. Research has shown that this can be done. Drought resistant vegetation can be used to improve the appeal of the area.

Economic Development

Economic development activity, including infrastructure investment, impacts the health of a community in many ways. According to WHO, the two are interrelated so that not only does wealth creation equal better health, but it can also be said that better health results in more productive and wealthier people. Therefore, authors' research should look both ways; how bridge construction could spur economic growth and its resulting impact on health, and how the bridge could improve health resulting in economic growth.

The second and more common conclusion in research and discussion of health and economic development is job creation and the factors that influence it. This view holds that good health flows from the activities that result in wealth creation. The decline of American inner cities in the last half of the 20th century has seen disinvestment and resulting job loss. This decline is seen as one of the nation's most profound challenges. This is particularly true for neighborhoods located around central business districts (CBDs), like derelict industrial zones and blighted residential areas, where the value of underutilized and deteriorated public infrastructure and private building stock measures in the trillions nationally. Providing for public safety in these environments is often challenging and costly, and accompanied by additional impacts to health and well-being.

These factors combine to drive away economic investment, leading to further job loss. The South University District Revitalization Area (SUDRA), located south of the proposed Pedestrian and Bicycle Bridge, shares some of these conditions. Although not severe, conditions do include some vacant or boarded up buildings and housing, loss of population, crime, and public infrastructure that is in poor condition for remaining residents and businesses. Economic growth can provide people living here, or moving into the area, with incomes that give them access to better nutrition, housing, better health care services, and less stressful lives.

Indicators

For economic development, authors chose indicators likely to be impacted by the construction of the pedestrian bridge, like affordable housing. A 2009 Zimmerman Volk housing study indicates 1,740 households (faculty, staff, and student) desiring to locate in the University District. In 2009, the Zimmerman Volk study offered this absorption forecast: "barring a long-term continuation of the downturn in national, regional, and local economies, it is likely that between five and six percent of the potential market for new dwelling units within the District could be absorbed per year over the near term. As the economic environment improves over the next five years, it is likely new developments could begin to capture higher percentages of the annual market potential; with a strong economy, it should be possible to capture up to 10 percent of the market for each housing type, which would double the annual forecast absorption." The current residential population is small (less than 100) and most of the housing units are in poor condition. This indicates a gap of 1,700 housing units, and a portion of that is in demand by low-income student population.

According to Spokane County Parcel information from November 2009, land in the SUDRA is considerably less expensive than in the nearby CBD. Land in the SUDRA costs $8.04 per square foot on average, compared to $31.55 per square foot on average in the CBD. However, redevelopment costs, demolition for instance, will likely close that gap for some parcels.

Land utilization is also likely to be affected. A recent field study (March 2011) conducted in the SUDRA by the City of Spokane verified 90 vacant parcels in the area. With a total of 486 parcels in the SUDRA, this means that about 18.5 percent of parcels in the area are currently vacant. There are a similar amount of underutilized properties, indicating there is siting potential for new and expanding businesses, as well as housing.

2010 Nielsen SiteReports data reports that consumer expenditures (including eating and drinking places) by the population within the South University District boundary totaled $3,757,363. This compares to a total available retail supply value of $ 65,966,554, resulting in a surplus of goods and service for sale of $62,209,191.

Impact /Magnitude

Research quantifying the impact of pedestrian and bicycle bridges on the economies of the immediate area is sparse and hindered this analysis. While research did not provide much quantifiable evidence on how infrastructure investments can impact economic growth, there is at least anecdotal evidence and examples of pedestrian and bicycle bridges that either helped to induce economic development (Vermont Street Footbridge, San Diego, CA) or are anticipated to induce economic development (SkyDance Pedestrian Bridge, Oklahoma City, OK).

For example, in anticipation of the Vermont Street Footbridge being rebuilt, a large Sears department store was redeveloped as part of Southern California's first new urbanist development including shops, a grocery store, small offices and 310 dwelling units. Pedestrian bridge construction in the SUDRA area, along with other public improvements, will likely spur further development by the private sector creating both jobs and housing. With the housing demand indicated both by informal planning surveys and the Zimmerman-Volk study, it is likely that the revitalization signaled by this public investment should align with new development interest in residential and commercial uses. New development would absorb the excess supply of land and existing uses would transition as

redevelopment becomes a more profitable proposition, stabilizing and contributing to land value, thereby increasing investment options for current property owners.

Rising land values are key to development interest, as is risk mitigation. A recent study on the economic impacts of public infrastructure investments (Department of the Treasury with the Council of Economic Advisors, 2010) found evidence that private sector productivity stands to gain from public infrastructure investments. Well-designed infrastructure investments can increase economic growth, productivity, and land values while also providing significant growth to economic development, energy efficiency, public health and manufacturing. The bridge landing concepts add green space, lighting, and other urban amenities to an area of blight, removing some of the risk currently perceived by investors and adding potential pricing premiums to new development.

Increasing consumer expenditures would indicate a rise in disposable income, or wealth, and an increase in residents. A survey was conducted in a joint effort between the City of Spokane and the Spokane Regional Health District in April 2011 that was administered to businesses in the pedestrian/bicycle bridge study area. One of the questions asked was, "What do you think will be the other impacts that this bridge will have on you and/or on your neighborhood?" About 26.8 percent of the businesses surveyed believed that the bridge will make the area more accessible and user-friendly, and about 17.9 percent believed that the bridge will create more business and a livelier neighborhood, thereby increasing utilization of available property.

Based on the research, it should be anticipated that the completion of a pedestrian/bicycle bridge will:

- Meet the needs of the growing student population by making housing in the SUDRA more available/convenient for students and workers
- Raise costs per square foot on average in the SUDRA
- Reduce vacant space due to increasing levels of customers, which should attract new businesses and new housing
- Increase business revenue by bringing more customers into the SUDRA

Recommendations

While a pedestrian/bicycle bridge may contribute to overall economic growth in the University District, it is not a standalone policy for redeveloping and revitalizing the area. The following policies are recommended to coincide with the completion of a pedestrian/bicycle bridge:

- *Enhance the public realm with green spaces, street trees, landscaping in the area of the railroad tracks, better lighting, sidewalk repair, and safe crosswalks*. These support and attract private investment and encourage energy efficiency and physical activity. Studies by the University of Washington state that drivers indicated it was easier to locate roadside businesses when they were framed by trees and vegetation and that greenery and flowers increase retail activity by attracting shoppers and residents to urban areas, spurring economic growth. In addition, parks improve property value. There is a significant link between the value of a property and its proximity to parks, greenbelts and other green spaces. Studies of three neighborhoods in Boulder, CO., indicate that property values decreased by $4.20 for each foot away an urban area was from a greenbelt. And finally, small businesses choosing a new business location rank the amount of open space and proximity to parks and recreation as their first priority in site selection.

- *Provide zoning that allows mixed-use residential/retail/office/light industrial* and support development with incentives. A 2010 survey by Smart Growth America shows one-third of the housing market seeks smart growth, or mixed-use with transit development, with demand increasing as commute times decrease. It also found that pricing premiums exist for mixed-use or traditional neighborhood development.

- *Continue to "brand" the University District*, especially the SUDRA. Specifically, it is important that SUDRA is branded as part of the University District before and after the completion of the pedestrian and bicycle bridge. Although this recommendation was not highly prioritized as a mitigation factor for health impact, marketing is key to successfully attracting development and business interest early, and to strengthening the connections to the campus, medical district and downtown.

Conclusion

The purpose of this HIA is to evaluate the health impacts that the South University District Pedestrian and Bicycle Bridge will have on the current and anticipated population within a quarter-mile radius of the bridge. The goal of this HIA is to present information to the public and to policy makers, which will facilitate informed decisions. Hopefully the HIA will result in positive impacts on the health of people who will use the bridge to live and work within the study area. Recommendations are included to improve six health impacts: physical activity, perceived safety, economic development, social capital, air quality, and physical safety.

Positive health impacts and energy efficiency are likely to occur with the implementation of the recommendations included within this HIA. The following recommendations scored among the highest on the prioritization matrix for providing positive health impacts and reducing vehicle-miles-traveled.

- Reduce the availability of on- and off-street parking to encourage alternate forms of transportation
- Provide zoning that allows and provides incentives for mixed-use residential/retail/office
- Ensure that there are bike lanes to and from the bridge

Some of the conclusions may be limited when there is no quantifiable evidence regarding the impact and magnitude for some of the health impacts. For example, quantifiable evidence is lacking about impact and magnitude of the bridge on social capital in the study area. There have not been studies describing the effect that social capital has on reduction in crime in an area over a certain amount of time. As a result, authors rely upon evidence that describes social capital's effect on crime in areas where social capital is measured to be strong and presume that if social capital development is facilitated by the bridge and related development in the area, that crime rates will recede.

The authors' general assessment is that this bridge will likely have a positive impact on human health. Recommendations and their prioritization are found in the table in Appendix 6.

Call to Action

This HIA can be used by policy makers and elected officials when making University District pedestrian/bicycle bridge design decisions that affect human health. The priority recommendations have been deemed most important for having positive impacts on human health and promoting energy efficiency. The top ten recommendations should be considered first for implementation. The balance of the HIA recommendations should also be considered important in their ability to positively affect human health and should be implemented as time and funding allows.

Appendix 1 • HIA Steps and Tasks Performed

Screening

Purpose	Tasks
Determine whether HIA is appropriate and required	• Met With City of Spokane and Decided that the Most Feasible HIA Would be Starting with the Pedestrian Bridge HIA • Grant was Written by the City of Spokane to Focus on the East Sprague Corridor • Site Visit Done by HIA Team

Scoping

Purpose	Tasks
Set Out Parameters of HIA	• Set up a Steering Committee • Chose to Make this a Rapid HIA • Chose Which Impacts Will be Assessed • Scoped Evidence to be Gathered • Developed Project Plan

Identification

Purpose	Tasks
Develop a Community Profile and Collect Information to Identify Potential Health Impacts	• Develop a Neighborhood Profile • Develop a Literature Review for Health Impacts and Indicators • Develop Methodologies for Measuring Effects of Impacts • Develop and Implement a Residential and Business Survey

Assessment

Purpose	Tasks
Synthesize and Critically Assess the Information in Order to Prioritize Health Impacts	• Hold a Steering Committee Meeting to Review all Information Collected on Impacts and Put in Assessment Matrix • Assess Positive and Negative Impacts and Sources of Information

Decision Making and Recommendations

Purpose	Tasks
Make Decisions to Reach a set of Final Recommendations for Acting on HIA Findings	• Develop a Draft Set of Recommendations • Develop a Report • Present to Stakeholders

Evaluation and Follow Up

Purpose	Tasks
Evaluate the Process Involved in the HIA and its Impact, and Follow up the HIA Through Monitoring and a Health Impact Management Plan	• Process Evaluation Held by Steering Committee • Impact Evaluation, Find What Changes Resulted from the HIA

Appendix 2A • HIA Residential Survey Form

Bridge survey used for interviewing residents within HIA study area

March 2011 HIA- 99202 Bridge

I am _____ from the Spokane Regional Health District. We are doing a survey for a Health Impact Assessment. Hopefully you received our letter about the project. Are you or someone at home over the age of 18 years old? There is a proposal to build a bridge from the south portion of the Riverpoint Campus where EWU and WSU are located over the railroad tracks and landing at S. Sherman Street N. of Sprague. This bridge is proposed to have small green/recreational areas at both ends. We would like to find out how the proposed project would affect you and your health. Based on the information we collect, recommendations will be made to the city council about the proposed project. The survey is anonymous.

We would greatly appreciate your help by taking five minutes to answer some questions about walking and biking in the area, safety, security and about the project.

Q1 **Have you heard anything about the proposed bridge project before today?** ☐ *Yes* ☐ *No*

Q2 **For the first few questions, please tell me whether you strongly agree, agree, disagree or strongly disagree with the following statements or if you are unsure.**

	Strongly Agree	*Agree*	*Neutral*	*Disagree*	*Strongly Disagree*	*N/A*
When biking and walking in my neighborhood during the day I feel safe.	☐	☐	☐	☐	☐	☐
When biking and walking in my neighborhood in the evening or at night I feel safe.	☐	☐	☐	☐	☐	☐
I feel safe hanging out in my yard or in front of my home.	☐	☐	☐	☐	☐	☐
My personal property is safe from vandalism in my neighborhood.	☐	☐	☐	☐	☐	☐
My personal property is safe from theft in my neighborhood.	☐	☐	☐	☐	☐	☐
Litter and trash is a major issue in my neighborhood.	☐	☐	☐	☐	☐	☐
Neighboring businesses and residences are maintained well. (windows replaced, lawns cared for)	☐	☐	☐	☐	☐	☐

Q3 **Comments on safety** (write these as they answer questions)

Q4 **What kinds of improvement would you like to see (or see more of) in your neighborhood? (services, activities, facilities?)**

Q5 **How do you primarily get to and from different destinations/ activities around town?**

☐ *Drive alone* ☐ *Bus/vanpool* ☐ *Walk*
☐ *Carpool* ☐ *Bike* ☐ *Skateboard/Long board*

Other

Q6 **What makes it difficult to bike, walk or use transit more to get to destinations/ activities?**

Q7 **What would make it easier to bike, walk or use transit more to get to destinations/ activities?**

Q8 **How many miles did you drive last week?** (not passenger)

Appendix 2B • HIA Residential Survey Form

Bridge survey used for interviewing residents within HIA study area

Q9 **For the next few questions, please tell me whether you strongly agree, agree, disagree or strongly disagree with the following statements or if you are unsure.**

	Strongly Agree	*Agree*	*Neutral*	*Disagree*	*Strongly Disagree*
The roads in my neighborhood are in good shape.	☐	☐	☐	☐	☐
There are enough sidewalks in my neighboood.	☐	☐	☐	☐	☐
The sidewalks in my neighborhood are in good shape.	☐	☐	☐	☐	☐
There are enough bike lanes or marked shared roads in my neighborhood.	☐	☐	☐	☐	☐
The bike lanes and marked roads are in good shape.	☐	☐	☐	☐	☐
When walking across intersections I feel safe from traffic.	☐	☐	☐	☐	☐
It is convenient to access transit in my neighborhood.	☐	☐	☐	☐	☐

Q10 **How often have members in your neighborhood come together to address common concerns?**

☐ *Do not meet* ☐ *1-2/ year* ☐ *5-12/ year* ☐ *3-4/ month*
☐ *Have met at least once* ☐ *3-4/ year* ☐ *1-2/ month*

Q11 **How much influence do you think people like yourself can have in making this neighborhood a better place to live?**

☐ *A lot* ☐ *A Fair amount* ☐ *Some* ☐ *Not very much* ☐ *None*

Q12 **Do you think that in this neighborhood people generally trust one another in matters of lending and borrowing?** ☐ *Yes (trust)* ☐ *No (do not trust)*

Q13 **People here look out mainly for the welfare of their own families and they are not much concerned with community welfare.**

☐ *Strongly agree* ☐ *Agree* ☐ *Neutral* ☐ *Disagree* ☐ *Strongly Disagree*

Q14 **Once the bridge is built, how likely are you to use the bridge?**

☐ *Very likely* ☐ *Moderately likely* ☐ *Somewhat likely* ☐ *Slightly likely* ☐ *Not likely*

Q15 **Once the bridge is built, what would you use it to get to?**

☐ *Work* ☐ *Parks/trails* ☐ *Day care* ☐ *Entertainment* ☐ *Education*

Q16 **Once the bridge is built, how often do you think you will use the bridge to get to your destinations/ activities?**

☐ *1-2 /day* ☐ *2-6/ week* ☐ *2-4/ month* ☐ *1-3/ season* ☐ *1-3/ year*

Q17 **There will be two small recreation areas on either end of the bridge, how often do you think you will go to these areas?**

☐ *1-2 /day* ☐ *2-6/ week* ☐ *2-4/ month* ☐ *1-3/ season* ☐ *1-3/ year*

Q18 **If often why, or if infrequently why not?**

Q19 **What do you think will be the other impacts that this bridge will have on you and/or on your neighborhood?**

On the map, indicate the places you traveled to in the last week. How did you get to each place (mode of transportation: DriveWalkBikeTransitCarpoolSkateboardOther)? Be sure to include work or school location even if not within the map area.

Appendix 3A • HIA Business Survey Form

Bridge survey used for interviewing businesses within HIA study area

March 2011 HIA- 99202 Bridge

I am _____ from the Spokane Regional Health District. We are doing a survey for a Health Impact Assessment. Hopefully you received our letter about the project. Are you or someone at home over the age of 18 years old? There is a proposal to build a bridge from the south portion of the Riverpoint Campus where EWU and WSU are located over the railroad tracks and landing at S. Sherman Street N. of Sprague. This bridge is proposed to have small green/recreational areas at both ends. We would like to find out how the proposed project would affect you and your health. Based on the information we collect, recommendations will be made to the city council about the proposed project. The survey is anonymous.

We would greatly appreciate your help by taking five minutes to answer some questions about walking and biking in the area, safety, security and about the project.

Q1 **Have you heard anything about the proposed bridge project before today?** ☐ *Yes* ☐ *No*

Q2 **For the first few questions, please tell me whether you strongly agree, agree, disagree or strongly disagree with the following statements or if you are unsure.**

	Strongly Agree	*Agree*	*Neutral*	*Disagree*	*Strongly Disagree*	*N/A*
When biking and walking in my business neighborhood during the day I feel safe.	☐	☐	☐	☐	☐	☐
When biking and walking in my businesses neighborhood in the evening or at night I feel safe.	☐	☐	☐	☐	☐	☐
I feel safe hanging out in front of my place of work.	☐	☐	☐	☐	☐	☐
My personal property is safe from vandalism in my business neighborhood.	☐	☐	☐	☐	☐	☐
My personal property is safe from theft in my business neighborhood.	☐	☐	☐	☐	☐	☐
Litter and trash is a major issue in this neighborhood.	☐	☐	☐	☐	☐	☐
Neighboring businesses and residences are maintained well. (windows replaced, lawns cared for)	☐	☐	☐	☐	☐	☐

Q3 **Comments on safety** (write these as they answer questions)

Q4 **What kinds of improvement would you like to see (or see more of) in your business neighborhood? (services, activities, facilities?)**

Q5 **How do you primarily get to and from your place of work and other locations during your work day?**

☐ *Drive alone* ☐ *Bus/vanpool* ☐ *Walk*

☐ *Carpool* ☐ *Bike* ☐ *Skateboard/Long board*

Other

Q6 **What makes it difficult to bike, walk or use transit more to get to destinations during your work day?**

Q7 **What would make it easier to bike, walk or use transit more to get to destinations during your work day?**

Q8 **How many miles did you drive last week?** (not passenger)

Appendix 3B • HIA Business Survey Form

Bridge survey used for interviewing businesses within HIA study area

Q9 **For the next few questions, please tell me whether you strongly agree, agree, disagree or strongly disagree with the following statements or if you are unsure.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The roads in my business neighborhood are in good shape.	☐	☐	☐	☐	☐
There are enough sidewalks in my business neighboood.	☐	☐	☐	☐	☐
The sidewalks in this neighborhood are in good shape.	☐	☐	☐	☐	☐
There are enough bike lanes or marked shared roads in my business neighborhood.	☐	☐	☐	☐	☐
The bike lanes and marked roads are in good shape.	☐	☐	☐	☐	☐
When walking across intersections I feel safe from traffic.	☐	☐	☐	☐	☐
It is convenient to access transit in this neighborhood.	☐	☐	☐	☐	☐

Q10 **Don't Ask!**

☐ *Do not meet* ☐ *1-2/ year* ☐ *5-12/ year* ☐ *3-4/ month*
☐ *Have met at least once* ☐ *3-4/ year* ☐ *1-2/ month*

Q11 **How much influence do you think people like yourself can have in making this neighborhood a better place to live?**

☐ *A lot* ☐ *A Fair amount* ☐ *Some* ☐ *Not very much* ☐ *None*

Q12 **Don't ask**
.

☐ *Yes (trust)* ☐ *No (do not trust)*

Q13 **People here look out mainly for the welfare of their own business and they are not much concerned with community welfare.**

☐ *Strongly agree* ☐ *Agree* ☐ *Neutral* ☐ *Disagree* ☐ *Strongly Disagree*

Q14 **Once the bridge is built, how likely are you to use the bridge?**

☐ *Very likely* ☐ *Moderately likely* ☐ *Somewhat likely* ☐ *Slightly likely* ☐ *Not likely*

Q15 **Once the bridge is built, what would you use it to get to?**

☐ *Work* ☐ *Parks/trails* ☐ *Day care* ☐ *Entertainment* ☐ *Education*

Q16 **Once the bridge is built, how often do you think you will use the bridge to get to your destinations/ activities?**

☐ *1-2 /day* ☐ *2-6/ week* ☐ *2-4/ month* ☐ *1-3/ season* ☐ *1-3/ year*

Q17 **There will be two small recreation areas on either end of the bridge, how often do you think you will go to these areas?**

☐ *1-2 /day* ☐ *2-6/ week* ☐ *2-4/ month* ☐ *1-3/ season* ☐ *1-3/ year*

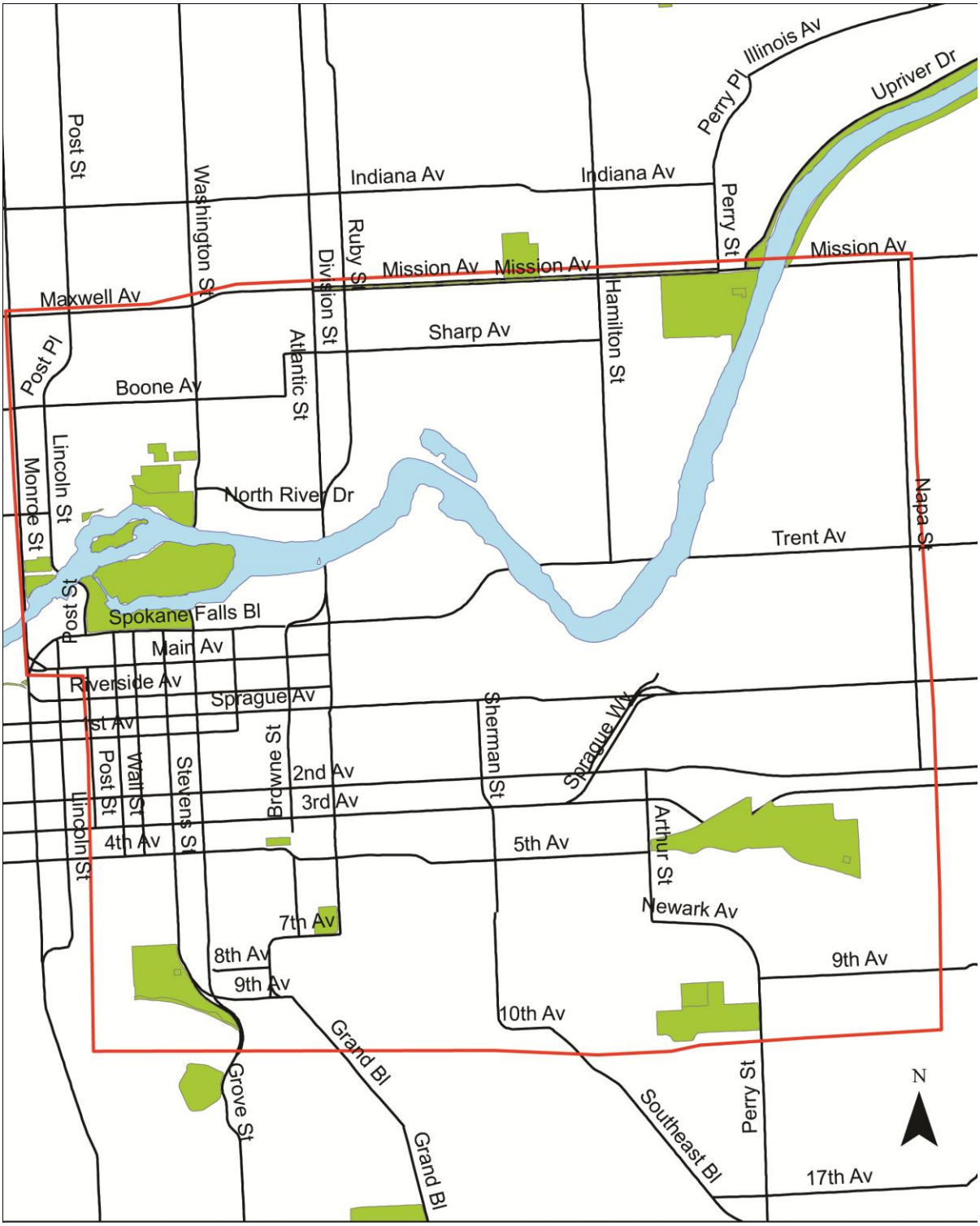
Q18 **If often why, or if infrequently why not?**

Q19 **What do you think will be the other impacts that this bridge will have on you and/or on your neighborhood?**

On the map, indicate the places you traveled to in the last week. How did you get to each place (mode of transportation: DriveWalkBikeTransitCarpoolSkateboardOther)? Be sure to include work or school location even if not within the map area.

Appendix 4 • HIA Residential Survey MAP

Map used with surveys for residents to identify where they commute to and how they commute



Appendix 5 • HIA Observation Form

Observation sheet used by survey team during the day of surveying residents within the HIA study area

March 2011 HIA 99202 Bridge Neighborhood Observations

Each team will be assigned a collection of blocks, which have been numbered on an attached map. Please begin your surveying and observing at the north east corner of every block and circle each block in a clockwise direction.

Q1 Street Name _____

Q2 Building Number _____

Q3 Block Number _____

Q4 Number of buildings (homes/ businesses) on the block _____

Vandalism: broken windows, graffiti, and other signs of property appearing to be damaged via malicious behavior.

Q5 Evidence of vandalism (types of vandalism seen) _____

Q6 # of instances of vandalism _____

Q7 # of buildings (homes/ businesses) with obvious vandalism _____

Eyes on the street: Inventory the number of windows on the first and second floors of buildings that provide an opportunity for eyes on the street. Note whether the window is on the first or second floor and if view is obstructed (i.e. fully bloomed tree may obstruct a view in the summer, tinted, painted etc.)

Q8 Number of unobstructed windows on the first floors _____

Q9 Number of unobstructed windows on the second floors _____

Q10 Number of unobstructed windows _____

Appendix 6 • HIA Recommendation Rankings

Recommendation rankings taken from priority matrices

Reduce the availability of on- and off-street parking to encourage alternate forms of transportation	1
Provide zoning that allows and provides incentives for mixed-use residential/retail/office	2
Ensure there are bike lanes to and from the bridge	3
Ensure regular bus service, and provide covered bus stops in the area to make bus transportation more appealing	4
Ensure that sidewalks are properly maintained and repaired	5
Provide bike lanes on bridge	6
Provide maps and signs that direct bicycle and pedestrian commuters to shortest and safest routes to destinations	7
Provide alternative transportation incentives	8
Implement traffic calming strategies such as chokers or raised crosswalks, for pedestrian safety	9
Continue to 'brand' the University District, especially the South University District Revitalization Area (SUDRA)	10
Bridge maintenance	11
Provide signage alerting car traffic about pedestrian and bicycle activity	12
Provide a bridge telephone/emergency line	13
Provide lighting that is a minimum of 20 lux across bridge and landings	14
Provide shade at landings	15
Use drought resistant vegetation at the landings	16
Provide fixtures that direct light to ground	17
Provide green space at landings	17
Ensure that there is visibility up to 50 ft on bridge and landings	18
Use visually appealing designs for the landings	19
Provide a bridge barrier (suicide prevention)	20

Spokane Regional Health District

Appendix 7 • Preferred Bridge Alignment

Option E, moved forward Preferred Alignment
http://udbridgestudy.blogspot.com/

This alignment connects with Sherman and then travels at an angle directly to the campus node defined by the intersection of pathways from the campus central spine or mall and Main Street. This is moving forward as Option 2.

The advantage of this alignment is the intersection of Sherman and Sprague is signalized thus providing a safe crossing for pedestrians. In addition, Sherman is also a through street traveling south to the medical district and connecting with the overall non-motorized plan of the City.

Vertical clearances requirements above the City roadways and transit corridors are less than those required for BNSF; consequently, once the bridge crosses the BNSF right-of-way, the bridge height can begin to come down.

Once the bridge reaches the Riverpoint campus, the bridge height is approximately 16 feet rather than the 26 feet in other options. In turn, this reduces the ADA ramp length by approximately 140 feet for a total length of approximately 230 feet. The shorter ramp requires less land area to construct and can fit within the parameters of the campus master plan.

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