HEALTH IMPACT ASSESSMENT

MN-197 NORTHERN CORRIDOR
BEMIDJI, MN
2016

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INTRODUCTION

Executive Summary

The built environment can directly affect the health of a community through physical barriers as well as indirectly affecting health through influencing behavioral choices. MN-197 Northern Corridor functions as the main highway within Bemidji; when compared to similar roadways in Minnesota, it is both the busiest and widest road that holds above average crash rates when compared to other similar roadways within Minnesota. Bemidji neighborhoods promote good walking and biking with the exception of MN-197 Northern Corridor. This road is known to be a physical barrier to active transportation (walking, biking, and transit use) opportunities for the population living in and around this corridor. Students, families and low-income resident in these neighborhoods are disproportionally affected due to the location of schools, homes, shops, as well as local businesses in and along this highway. In January 2016, Headwaters Regional Development Commission (HRDC), a regional planning and development organization that serves local governments, development organizations, community leaders and others received a rapid Health Impact Assessment (HIA) grant to address the MN-197 Northern Corridor concerns and how to best improve physical activity and safety for the adjacent neighborhoods (Image 1).

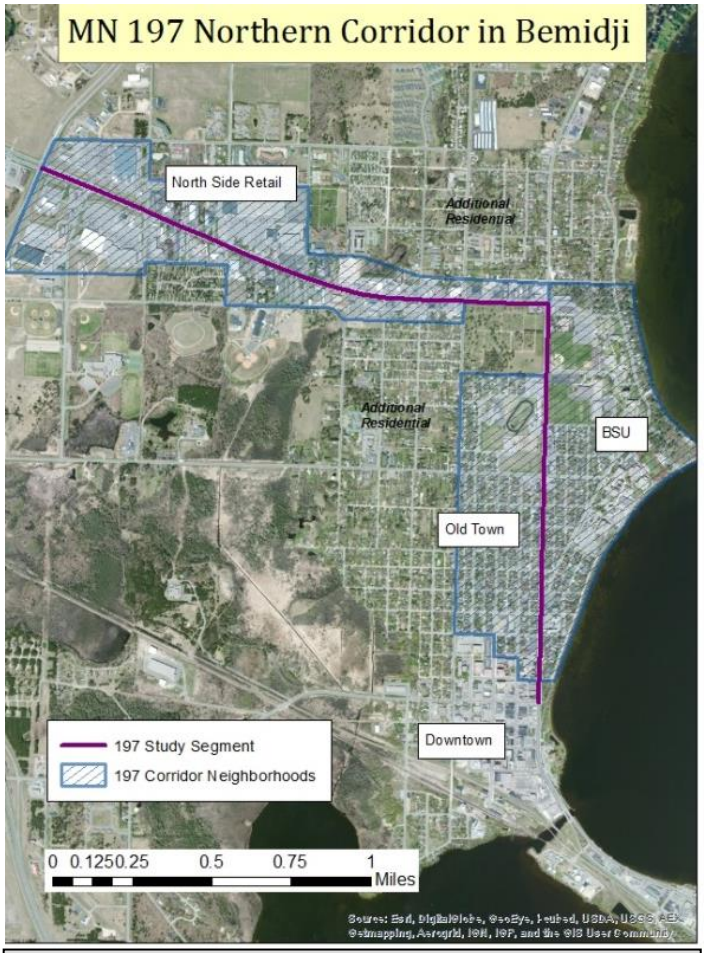


Image 1: Project Area MN-197 Northern Corridor

Minnesota Department of Transportation (MnDOT) District 2 reached out to the HRDC seeking input on how to create a more complete street that will promote better multimodal access along this corridor and prioritize health, safety and physical activity within future transportation and community design changes.

The goals of this HIA are as follows:

- **to identify** the top health priorities for future transportation projects and provide recommendations to key decision makers for future road designs that aim to protect and promote active transportation and safety along MN197 Northern Corridor
- **to focus on the health impacts** that MN-197 Northern Corridor has on Bemidji residents, starting downtown and reaching north side retail (see study corridor image above) . The current transportation infrastructure in and around this study corridor impacts the ease of physical activity access in the community, the safety of transportation users of any mode, and the quality of the air in Bemidji. Although MnDOT District 2 maintains this roadway and makes final decisions regarding changes to its infrastructure, the HRDC, and many other partners express interest to work collaboratively with MnDOT District 2 to assess this transportation corridor for health impacts and thus participated in this rapid HIA.
- **to provide recommend changes** that promote community health and better transportation development between MnDOT and its local partners.

Health Priorities Identified along Mn-197 Northern Corridor

The top three health priorities that were identified included: physical activity, traffic safety and air quality. These health priorities were established through the collaboration of the HIA Project Team and the Advisory Group through an extensive review of the literature and baseline assessment of the population's health in and around MN-197.

This HIA has the ability to improve the community's health through providing recommendations that will seek to eliminate known barriers on this roadway to make this corridor more appealing for all users.

This HIA will help guide decision makers, local partners, planners, developers, policymakers, and public health professionals to make well informed decisions and provide a more sustainable and healthy approach for future transportation design on the MN-197 Northern Corridor and the Greater Bemidji Area. This HIA has allowed multidisciplinary collaborations to identify specific street scape and road design features that will allow MN-197 to continue to function and serve as a main highway, while enhancing the health of all who live in and around this corridor. This HIA has informed key decision makers outside the public health sector on how the built environment can affect the public's health. The Healthy Community Design Initiative (HCDI) from the Centers for Disease Control and Prevention (CDC) works to improve the public's health through funding health impact assessments (HIA) Nationwide (CDC Health Impact Assessment Funding, 2016). MDH funded the HRDC to conduct a rapid HIA on the MN-197 Northern Corridor located in the heart of Bemidji (Minnesota Department of Health, 2016).

WHAT IS AN HIA?

A Health Impact Assessment (HIA) is a systematic process that examines potential health effects of a proposed project utilizing evidence-based best practices to engage key decision makers on how to mitigate potential adverse health impacts. HIA's are used as a tool to promote health in all polices and projects and to

make sure health is considered through daily decisions made by stakeholders outside of the public health sector, such as, transportation, environmental design, housings, employment & labor, and education (HIA, 2016). HIA's consists of a 6-step process which includes: Screening, Scoping, Assessment, Recommendations, Reporting, Evaluation and Monitoring. Theses six stages focus on potential human health effects to increase health within a proposed policy or plan. HIA's utilize evidence- based best practice tools and data to highlight health concerns. HIA's engage local community members as well as key decision makers within the entire process to provide recommendations that will address health priorities**.**

Paradigm Shift for Road Design and the Built Environment in Bemidji, Minnesota

While HIAs seek to integrate health considerations into future plans and processes, they also look for new approaches as well as community and demographic trends that will enhance future projects and best serve a population. This rapid HIA is consistent with a relatively new paradigm shift that explores the interconnection between the design of the built environment and the health of a community. The CDC has defined the built environment as "all the physical parts of where we live and work" (CDC, 2011) and consists of places designed, created, and maintained by human efforts (Dannenberg, 2011). As such this HIA will attempt to prioritize and value active transportation, street connectivity, the health and wellbeing of all users of the road, and aesthetics as essential infrastructure modifications along this corridor.

Rapid HIA Results and Final Recommendations

Results of this rapid HIA provides key decision makers in the Bemidji area with evidenced-based design recommendations tailored to this corridor which places both travel and health as a priorities. This HIA also serves as a model for future community infrastructure changes that includes the public's health as a priority outcome.

Overarching recommendations and Health Priority Goals

(Adapted from the CDC Recommendation for Improving Health through Transportation Policy; Complete Street and Smart Growth strategies; and other sources)

Physical Activity Goal is to develop new opportunities along MN-197 to influence physical activity through built environment changes, creating a more healthier, active and sustainable community

Traffic Safety Goal is to implement traffic calming features that increase safety for all users and abilities of MN-197

Air Quality Goal is to improve air quality through implementing complete street design

Specific final HIA recommendations.

- **Recommendation #1:** Prioritize policies, enhancements, and maintenance of MN-197 Northern Corridor and broader Bemidji area transportation systems that enable safe access for all users including pedestrians, bicyclists, and transit riders of all ages and abilities. Future design can improve the health of low-income residents, residents with low/no access to a personal car, college students, population with disabilities, and residents with short commute times to work or services.

- **Recommendation #2**: Implement traffic calming features along MN-197 that will offer safer crossings for pedestrians and bicyclists and promote reduction of traffic speed.
- **Recommendation #3:** Track and report key environmental health indicators that will identify concerns for active modes of transportation related to air quality, safety, access, comfort and convenience.
- **Recommendation #4**: Collaborate with MnDOT and Bemidji State University to implement automated bike counters and establish strategic locations to track daily bicyclist's usage within Bemidji in the fall of 2017.
- **Recommendation #5:** Designate bike boulevards on adjacent streets to MN-197 using street design enhancements from Complete Streets

Health in All Policies Approach (HIAP)

Public Health professionals have agreed that the health care system is only one of many factors that determine individual and community health. Social conditions as well as the **built** environment are important assets for health. Some of these conditions include "the layout of neighborhoods, the availability of healthy foods, access to jobs, and educational and recreational opportunities" (STRIDE toward Health Equity, 2016). Improving these conditions will allow for people to make the healthy choice the possible choice. For example, improving street connectivity along MN-197 through well marked crossings and traffic calming features could allow bikers and pedestrians a more safe and convenient place to integrate and prioritize active transportation within their normal daily routine. Since the social and physical conditions are important to address to increase the health of a community, the Health in All Policies (HiAP) approach implements health into key decision making and planning initiatives from all sectors. HiAP has built a core set of key ideas which are listed below (Image 2) (Rudolph, 2013; STRIDE toward Health Equity, 2016).

Image 2: Health in All Policy (HIAP) Key Concepts

HiAP approach is based on the functionality of improving community health that requires "continuously considering the health-equity implications of all government actions" (STRIDE towards Health Equity, 2016). The common approach of HiAP seeks to integrate health into all projects, plans or policies that may have not been considered before. This approach identifies with policymakers, and informs key decision makers across all sectors. These sectors include: education, energy, planning, commerce, transportation, housing, employment, and agriculture (State Guide, 2006; STRIDE towards Health Equity, 2016; Collins et al., 2009). Health impact assessments (HIA) is one tool used to address health within the decision making process. Minnesota has been a leader amongst the states for HIA as well as the highest rated complete streets policies in the nation (Seskin & Murphy, supra note 49). Minnesota's HIAs have mainly addressed decisions on transportation and land use (HIA in Minnesota). The statistics show that about 40% of Minnesotans do not drive, 60% are overweight. This rapid HIA is one example that seeks to integrate health and health equity into decisions made outside of the normal health sector (HIA, 2015).

CHAPTER 1: SCREENING

The screening step in the HIA process should clearly identify all the decision alternatives under consideration by decision-makers at the time the HIA is considered. This step should determine whether an HIA would add value to the decision-making process (Bhatia et al, 2014). The following screening questions (left column) and answers (right column) were used to describe the decisions that were informed by the HIA and the timeline for these decisions, and a summary of the final reasons for selecting these decisions for the HIA.

Project and Timing 1. Has a project, plan, or policy been proposed? 2. Is there sufficient time to conduct an analysis before the final decision is made?	1. MnDOT has a new complete streets policy that is agency-wide, adopted in 2015. One project has been proposed and included in MnDOT's STIP (4 year plan) – installation of a pedestrian refuge island at Bemidji Ave and 18th St. Another resurfacing project is slated 5-10 years out within the corridor. Other repave or reconstruct projects are not currently proposed, but only because of funding and roadway life-cycle costs. 2. For projects included in the STIP, decisions are made around the end of a calendar year/beginning of the next. The pedestrian refuge island is already scoped in the STIP, but not finalized in its design.
Health Impacts 1. Does the decision have the potential to affect environmental or social determinants that impact health outcomes? If so, which determinants and which health outcomes? 2. Would health inequities be impacted? In what ways?	1. A MnDOT built environment decision will affect environmental determinants directly. Safety improvements in sidewalks/bikeways/ crossings (the environmental determinants) potentially encourage more daily physical activity, lower the rate of serious accidents on the roadway, and improve air quality. Social determinants, such as bike/ped education and encouragement will indirectly be addressed as well – included in the HIA but not a part of the MnDOT decision. 2. We believe health inequities will be addressed in this HIA by concentrating on neighborhoods adjacent to the roadway. Stakeholders in this zone include multiple elementary schools, the Boys & Girls Club, Bemidji State University students & faculty, and larger concentrations of multi-family housing and low-income residents compared to the Greater Bemidji

3. Are the proposal's impacts to health likely to be significant in terms of the number of people impacted, the magnitude, breadth, and/or immediacy of impacts? 4. If applied, would HIA findings and recommendations potentially improve the impact that the proposal has on health?	area. These stakeholders may have greater barriers to physical activity access and greater need for bike/ped safety options compared to others in this study corridor. 3. The number of people impacted will be relatively significant. There are 5,000 – 10,000 residents that live/work in adjacent neighborhoods, and thousands more use services along the route daily. Considering the Greater Bemidji area has at most 30,000 residents, this HIA can impact a relatively large portion of the population. 4. Recommendations that MnDOT implements should have a significant impact on community health. This HIA aims to improve safety conditions for cyclists/pedestrians via improvements to the transportation built environment at & around MN-197. If built, these changes should decrease the risk of severe crashes, improve desirability of walking/biking in adjacent neighborhoods, and make walking/biking a convenient option for transportation. These desired outcomes will improve physical activity access and therefore community health, especially in populations that are underserved (see above).
Potential Impacts of the HIA Process 1. What are the potential impacts of the HIA? (building relationships, empowering community members, demonstrating how health can be used in decision-making)	1. We see three main impacts of this HIA process: improved environment for health, building relationships, and creating a new blueprint for MnDOT's public input process on complete streets projects. a) Improved built environment: b) Building relationships: c) Better public input for MnDOT:
Stakeholder Interest and Capacity 1. Have public concerns about the health impacts of the decision been voiced or documented? 2. Who are the stakeholders and interest groups involved in the decision-making process?	1. Public concerns on the main topic have been voiced. The Bike Bemidji group includes League Cycling Instructors that can attest to the difficulty of even skilled cyclists in crossing or riding along the roadway. Further documentation exists in the Bemidji Bike Plan of 2015, gathering resident input on bike conditions all over town. One common barrier to physical activity was MN-197. 2. The main stakeholders in the decision making process are MnDOT District 2 and, in the case of decisions on streets that cross MN-197, the City of Bemidji. Other stakeholder groups include Bemidji State University, SHIP, Bike Bemidji, Nice Ride Bemidji, ISD 31, Boys and Girls Club of Bemidji, Beltrami County HHS, and

	residents/businesses/churches along the roadway.
3. Do stakeholders have the interest to participate in the HIA?	3. There is an interest from stakeholders. MnDOT is eager to have the HRDC conduct this HIA and will be a willing participant. Other entities such as Bike Bemidji and SHIP have expressed an interest in participating.
4. Do stakeholders have the capacity (resources, skills, etc.) to participate in the HIA?	4. We believe that stakeholders will have the capacity to participate if we are thorough in our engagement planning. Resources such as time could be a barrier, but we hope to include surveys as part of our stakeholder outreach. If skills are a barrier, our meetings and outreach materials will serve to mitigate that.
5. Would stakeholders use the HIA to inform or influence the decision-making process? How?	5. MnDOT District 2 has stated that this HIA will inform how they view new construction projects along this corridor. Whether they follow all HIA recommendations is and can not be determined yet. The City of Bemidji has also shown interest in informing their future transportation decisions. Both entities would use HIA findings and data to decide how best to make roadway improvements and reconstructions as part of their multi-year transportation improvement plans. These improvements are to MN-197 and critical crossings that are used by pedestrians and cyclists regularly.

CHAPTER 2: STAKEHOLDER ENGAGEMENT PLAN

This stakeholder engagement plan exists to identify key stakeholders that will be engaged in the HIA process, a discussion of how stakeholders and decision-makers will be involved in the HIA, and a discussion of how HIA progress and results will be disseminated to stakeholders and decision-makers.

To accomplish this HIA and implement built environment changes with health as a main priority, this HIA has engaged stakeholders that represent as many affected groups as possible. The role of stakeholders is to "foster input, participation, and power-sharing among those persons who have an investment in the conduct of the evaluation and the findings; it is especially important to engage primary users of the evaluation" (Engaging Stakeholders, 1994). This HIA focusses on transportation in the built environment; as such, anyone who uses the MN-197 corridor to travel home, to work, to school, or for services, regardless of mode or route, is a stakeholder. Because stakeholder participation is an important component of effective, equitable, and ethical decision making, a critical part of this HIA process has supported these core values through a comprehensive engagement plan that has included multiple affected groups in sound decision making (HIA Society, 2010; Appendix A)

This HIA engaged stakeholders as advisors in the HIA Advisory Group, and as sources of local information from reports, and dissemination through the scoping and assessment stages of the HIA.

HIA Advisory Group

The HIA Advisory Group was led by the HRDC and met three times during the HIA process. The primary roles of the HIA Advisory Group were to assist the HRDC (facilitators of the Bemidji MN-197 HIA) in prioritizing measurable issues, gathering data and evidence on health impacts, and providing recommendations to MnDOT on built environment changes that impact health along the MN-197 Northern Corridor.

The HRDC recognized that some stakeholders would not fit best in the HIA Advisory Group due to schedule constraints, understanding of the HIA process, or willingness to attend advisory meetings. It was also in this HIA's best interest that engagement with these stakeholders was a two-way conversation: gathering qualitative information from local stakeholders while disseminating information on how the HIA, MnDOT, and others all work together on safety and health.

CHAPTER 3: SCOPING

The scoping step in the HIA process should establish the individual or team responsible for conducting the HIA and should define roles for the HIA team, funders, technical advisors, stakeholders, and other partners. During scoping, the goals and anticipated outcomes of the HIA should be clearly established and documented. Also during scoping, the range of health issues to be examined in the HIA should be clearly defined (Bhatia et al, 2014).

Geographic Scope and Location

IMAGE 1. This photo identifies the specific location (black), the residents living within the scope of the project area (tan), adjacent corridors to consider (black), and potential areas that should be addressed within future assessments (red).

Specific project location:

The MN-197 Northern corridor extends north from Downtown Bemidji (in blue), to the intersection with 23rd St, to the intersection with US 71 (Image 1: all highlighted in yellow). This immediate project area includes downtown businesses, several city parks, Bemidji State University, single and multi-family residences, multiple schools and churches, and both small and large commercial retailers. Recommendations from this Rapid HIA focused on the health impacts of populations living and/or utilizing this corridor. However, if implemented they have the potential to affect other adjacent areas and populations in the community. As such, the following factors will need to be addressed before consideration of the recommendations generated by this HIA:

- ***Populations living adjacent to alternative routes of 197:*** Design recommendations to 197 may cause changes in auto traffic behavior that affect other parallel routes, such as Irvine Avenue. Therefore this HIA considered how changes to 197 may affect health/safety outcomes in other neighborhoods due to overall traffic system changes.
- **Users of businesses along the isthmus (in red)**: Because the timeline for this rapid HIA was constrained, this HIA did not specifically address pedestrian & bike crossing issues for business patrons along the isthmus. However, based on similar safety implications, some of the recommendations for MnDOT could apply directly or with adaptations to future bike/ped safety projects in this area as well.
- ***Broader populations in and around Bemidji***: Design changes along MN-197 Northern Corridor have been anticipated to have positive health outcomes that would ripple beyond the neighborhoods adjacent to the roadway. While children, college students, and families who live or go to school right next to MN-197 utilize this corridor for utilitarian transportation, others use this corridor for recreational purposes. This road is the primary access for people in a 50-mile radius to access food, retail, and services by car. Residents of Bemidji and outlying areas access the neighborhoods by the corridor and use MN-197 (you need to link the neighborhoods to the corridor here) for biking, jogging, or skating recreation along with the trails and lakefront adjacent to MN-197. Tourists explore areas between downtown, the lakefront, and other points, and use the roadway and crossings with varying modes of transportation (This sentence is not clear). Recommendations for the roadway design of MN-197 will have health and safety impacts on these populations as well.
- ***Underserved populations:*** As part of the HIA scoping and stakeholder identification process, we identified multiple underserved populations that will be affected by the design of this roadway. These populations are at greater risk due to air quality issues, low access to physical activity, or safety in walking/biking within their own neighborhoods. Our baseline data indicated that there are a higher percentage of these populations residing within the corridor or city limits compared to the region and state:

1) Residents with low/no access to a personal car	Low income residents
2) Elderly (assisted living homes) 3) Mothers and infants	Children and college students that live within walking distance of schools
4) People with disabilities	Residents with short commute times to work or to access businesses for resources or services
5) Vision, hearing, and cognitive impaired	

Defining and Identifying Health Priorities

The scoping phase of this rapid HIA engaged the Advisory Group as well as the Project Team to construct and identify the three major health priorities that examine and inform the HIA for the MN-197 Northern Corridor. The three top health priorities encompass components of the built environment and how they are linked to health. The three top *health priorities are as follows.*

1. Physical Activity
2. Traffic Safety
3. Air Quality

Road Design modifications focused on the 197 right-of-way, and considered a network of improved Complete Street design characteristics that seek to enhance and protect the health of the community. This encompassed multimodal connections between the MN-197 Northern Corridor and the adjacent built environment neighborhoods and included increasing traffic safety through streetscape features such as, street lights, trees and landscaping, bike racks and benches, and encouraging increased physical activity through completing safe sidewalks and installing additional cross walks that are safe. The next section will provide an overview of the health priorities that have been established for disadvantaged and vulnerable neighborhoods residing in and around this corridor. It is anticipated that better transportation development between MnDOT and local partners neighboring this main roadway will increase the performance of the public health system and promote a healthier community. The process of this HIA utilizes evidence-based best practices that will encourage accessible and equitable community development.

Healthy People 2020 Initiative

Built Environment

The built environment can be defined as the physical infrastructure of a community and its impact on the health of residents (Brownson et al, 2009). The built environment shapes access, land-use patterns, exposure to natural elements (such as green space), and transportation- all of which influence usage and physical activity (Brownson et al, 2009). The structure of the built environment is associated with influence upon human health and behavior patterns such as physical activity, social networks and connections to facilitate access to resources (Srinivasan et al, 2003; Healthy People 2020 Environmental Health, 2016). Intentionally designing and developing communities to promote health and equity will provide opportunities for

individuals to live a more active lifestyle on a regular basis (National Physical Activity Plan [NPAP], p. 48, 2016). Some examples in shaping the built environment to facilitate active modes of transportation include bicycle and pedestrian facilities such as, bike lanes, bike racks, and sidewalks for all users, and safe pedestrian crossings, along with improved access to affordable public transportation (NPAP, 2016). In addition, Healthy People 2020 places an emphasis on access to green space, such as trails and parks as a strategy to increase physical activity (Healthy People 2020 Physical Activity). Over all, improving and implementing transportation networks, crosswalks, bike paths, trail widths, and signage etc., along with the distance of buildings from the corridor, and the balance of the community layout with respect to park access and landscaping are all important factors that when combined with decisions on a larger scale, create opportunities "for the greatest number of people to be active" (NPAP, p 48, 2016).

For the purpose of this HIA, the major health indicators that shape health within the built environment at the individual, community, and population levels are physical activity, traffic safety and air quality. Universal design emphasizes the development of public goods in the community to enable access for all populations, including the elderly, the young and the disabled. Universal design is defined as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaption or specialized design" (Center for Universal Design, 1997). Determinants of universal design impacts on health include equal access to infrastructure; the safety of the built environment such as, building design, parking placement, location of workplace and schools and access to sidewalks, bike paths, and crosswalks, trees and aesthetics; economic security; and quality of social interaction such as, social isolation, social cohesion, social support and social capital. Health is shaped by a combination of these behavioral, social, economic, political and environmental factors (NRCCHIA, 2011; Sallis et al, 2006) and is consistent with the social determinants of health identified by Healthy People 2020. This HIA looked at specific built environment improvements that may enhance the health of the community living near MN-197.

Known barriers exist within and along this corridor that inhibit access to active modes of transportation. MnDOT's interest is finding solutions to change the built environment around this roadway through future transportation and road design to create a positive impact on health for all who reside in and around MN-197. Efforts to design for the most vulnerable populations can address solutions to mitigate health threats within a community. Vulnerable populations commonly impacted include the elderly; mothers and infants; people with disabilities that affect mobility, vision, hearing, and cognition; those of low socioeconomic status; and children residing in and around this 197 corridor (Kochtitzky, et al. 2011). When the threshold is placed to design for the most vulnerable populations within a community, only then can communities achieve the greatest health outcomes and quality of life for all residents (Kochtitzky, et al. 2011).

Healthy People 2020 highlights the importance of addressing the social determinants of health in their overarching goal of creating "social and physical environments that promote good health for all" (CDC, 2015). Evidence-based best practices from the Community Guide, CDC transportation recommendations, as well as Complete Street strategies were used in the scoping phase of the HIA. These informed and prioritized the identified health determinants and established recommendations for the corridor throughout the HIA

process and more specifically in the recommendation phase of the rapid HIA. These respected sources were in the recommendation phase of this rapid HIA.

Active Transportation incorporates the three identified health priorities along MN-197: traffic safety, physical activity, air quality. The Healthy People 2020 initiative has identified physical activity as one of their 12 leading health indicators (LDH). Consistent with Healthy People 2020 goals, this HIA seeks to reduce health disparities, promote health for all groups, create social and physical environments that encourage active transportation and thereby, promote quality of life (Healthy People 2020 Framework). Major benefits of physical activity include: achieving and maintaining a healthy weight, reducing risks for heart disease and certain types of cancer, and improving psychological and physical well-being. The CDC has found that policies which support active transportation have positively impacted the health of communities. Major outcomes are as follows:

- reductions in motor vehicle crashes
- reductions in air pollutants which create adverse health effects to underserved populations
- enhancements in active transportation infrastructure design (CDC Transportation Recommendations, 2016) with increased physical activity.

Methods Utilized within the Scoping Phase

This HIA focused on the top three health priorities of physical activity, traffic safety, and air quality, within *Road Design* change. These changes and the ranked health priorities selected for this HIA are discussed in more detail below.

Road Design closely examines the built environment as the primary element that MnDOT and the City of Bemidji may influence. Methods used to explicate *Road Design* included: the Smart Growth model, constructs utilized in the Pedestrian Environmental Quality Index (PEQI) tool, coupled with qualitative information collected from key decision makers at scheduled HIA advisory meetings. Based upon these methods *Road Design modifications* prioritize and identify characteristics along MN-197 that best promote the top three health priorities.

Smart Growth is an effective approach to plan and connect neighborhoods, communities and cities through low-cost designs and transportation infrastructure options which support local economic, community health development and healthy design (Smart Growth, 2016; Ewing et al. 2011). Common characteristics of Smart Growth and other planning reform movements include mixed land use, job-housing balance, transit access or multiple transit options, walkable streets, open space, and a bicycle network (Ewing et al. 2011). The principles of Smart Growth are consistent with the approach that this HIA Project Team utilized with respect to Road Design. This HIA *Road Design* seeks to classify and prioritize research questions by using Smart Growth standards as a guide to optimize the identified health priorities examined in this HIA.

Constructs from the Pedestrian Environmental Quality Index (PEQI) tool were utilized as a second approach to inform Road Design change along MN-197. This tool has been used by multiple stakeholders nationwide for evaluating barriers to walking and bicycling safety along with the overall quality of the pedestrian built

environment, and has shown good validity and reliability.. The PEQI tool contains a total of 30 identified impact indicators from which key indicators have been selected to assess the Bemidji MN-197 corridor (PEQI,2008). The Project Team used the PEQI tool to guide the assessment of the built environment and neighborhoods that are within one block of the corridor with special emphasis on accessibility along the corridor and parallel and perpendicular streets that could be used to promote active transportation.

Indicators selected from the PEQI to assess this corridor included intersection Safety which consists of the following features: crosswalks, ladder crosswalks, pedestrian signals, traffic signals, crossing speed, crosswalk scramble, no turn on red signs, traffic calming features. The tool also contains additional signs for pedestrian traffic, which includes the number of lanes, two-way traffic, vehicle speed limits, traffic volume, traffic calming features, and street designs that assess sidewalk widths, impediments, trees, public seating, presence of buffers, and the presence of curbs. The final two PEQI street segment indicators that were assessed for *Road Design changes included:* land use, which highlights street aesthetics, public and private sites, retail use and other attractions that can be accessed with non-motorized vehicles, and street interplay; and perceived safety, which is the perception of safety by community members. It has been found that perceived safety is influenced by conditions in the physical environment such as the presence of litter, abandoned buildings, construction sites and other physical environment change (PEQI, 2008).

These indicators are related to the top health priorities evaluated along this corridor. For example, the PEQI tool identifies streets and intersections that may be at a greater risk for safety and how to improve and address these transportation health concerns. The PEQI was used primarily as a guide to assess possible changes along MN-197. In consonance with the purpose of this rapid HIA changes in road design should enhance the health of this community.

This HIA seeks to incorporate the promotion of health as a primary goal along with new transportation or community design recommendations. Through the use of the PEQI recommendations for road design changes were made that may facilitate safe, efficient transportation while improving the quality of life and positive health outcomes for Bemidji residents. This rapid HIA prioritized relevant factors to create an environment that promotes health within future transportation and community design on the HWY 197; these factors included pedestrian and bicycling accessibility, improved green development, monitored traffic collisions, and decreased motor vehicle travel.

***Road Design* and *Multimodal Connection* recommendations from our Advisory Group and HIA project team that may influence healthy community design are included in Appendix of this document.**

***A compilation of all the initial research questions, pathway diagrams, and goals of the initial 4 Domains: Crosswalks, Road Design, Multimodal Connection, and the built environment; are included in Appendix of this document.**

Final Research Questions

Tools are needed throughout the decision making process in assessing and communicating healthier and sustainable community design. The identified health priorities (physical activity, traffic safety, and air quality) considered in the scoping phase of the HIA were formulated by the Advisory Group and placed into pathway diagrams to guide *existing conditions, research questions* and *impact research questions*. The Project Team formulated appropriate research questions pertinent to the health priorities addressed in this document.

Physical Activity

Existing Conditions Research Questions

- What percentage of Bemidji residents live within ½ mile (walking distance) of MN 197?
- How long does it take to cross intersections for residents and vulnerable populations residing along this 197 corridor?

Impact Research Questions

- What road design features could increase the frequency of students walking and biking to schools and campuses within 3 miles of MN 197?
- What road design features would increase active transportation opportunities for residents and vulnerable populations in Bemidji (i.e. residents with low/no access to personal car, low income residents, mothers and infants, elderly, children, chronically ill and disabled, hearing and seeing impaired)?

Traffic Safety

Existing Conditions Research Questions

- How many crashes have been reported within the past 3 years in Minnesota due to pedestrian and bicycling accidents? How many crashes have been reported within in the past 3 years in Bemidji due to pedestrian and bicycling accidents?
- What are current road design recommendations that have been studied and implemented on HWY 197 to improve traffic safety for all users?

Impact Research Questions

- What road design features would decrease auto/pedestrian and bicyclist crashes along this MN 197?
- What road design features identified in previous plans along this corridor would be placed at highest priority to increase traffic safety?

Air Quality

Existing Conditions Research Questions

- How many residences, schools, day care and senior facilities are within 300 meters of the roadway?
- What are the current asthma and COPD rates in the city of Bemidji? Beltrami County? Compared to Minnesota as a whole?

Impact Research Questions

- How does improving walkability and active transportation improve air quality?
- Does the implementation of green infrastructure improve air quality?

CHAPTER 4: ASSESSMENT

The assessment phase in the HIA process should include, at a minimum, a summary of existing (baseline) conditions and an assessment of health impacts. Existing conditions should present a profile of relevant health status and health determinants among the affected communities. The existing conditions should also document known population health vulnerabilities including evidence of poor health status among affected communities (Bhatia et al, 2014).

Introduction

The purpose of this chapter is to provide projections about health impacts that align with the current baseline assessment of Bemidji. Determining Bemidji's demographics, socio-economic status, transportation behaviors, health conditions and vulnerable populations will facilitate identification of effective approaches for measurement of the selected health priorities (physical activity, traffic safety and air quality) identified by the HIA Project Team and Advisory Group. Chapter 4 includes **two** sections.

Part 1 provides the existing conditions which will include community demographic information, transportation behaviors, health conditions, and identified vulnerable populations.

Part 2 will assess potential future changes to the MN-197 corridor health impacts with a focus on the three health priorities of physical activity, traffic safety and air quality. These impacts, although specific to MN-197, can be generally applied to the broader Bemidji area transportation system.

Part 1: Existing Conditions

This section provides an overview of the demographics and transportation behaviors of the population impacted by MN-197 and a summary of the key findings.

Community Demographics

The American Community Survey (2010-2014) provides the most recent estimates on the demographics of Bemidji (Appendix B). According to the 2010 US Census, Bemidji is home to 14,319 residents. Between the years 2000 and 2014 Bemidji has undergone a steady population increase from 11,917 to 14,319 residents. Bemidji has had the largest estimated relative change in population at a rate of 20.2%, which is almost twice the rate of the growth seen in the U.S population (11.6%). According to the 2014 American Community Survey (ACS), Bemidji has a very large young adult population. From 2000-2014; 18-34 year olds made up 37% of the population. There is also a large elder population (14.4% 65 and older) within this community that should not go unnoticed (Minnesota State and County US Census 2014). In addition, 34% of adults in Bemidji 65 and older have one or more disabilities which may include: deficits in hearing, vision, and cognitive abilities; and difficulty performing self-care, ambulation, and living independently (ACS, 2015). From 2009-2014, compared to the U.S, Bemidji had a higher percentage of the population that self-identified as

American Indian and Alaskan Native (12.4%) or 1,770 people compared to Beltrami County (6.0%) or 3,134 number of people (American Fact Finder, Race and Ethnicity, GCT-P3,2010). However, the vast majority (80.6% or 11,539) of Bemidji residents are white.

Housing and Income Inequality

In Bemidji there are 5,711 total occupied households with an average household size of 2.19 and an average family size of 2.86. The median household income in Bemidji is $33,197, which is significantly lower than Beltrami County at $43,990. In Beltrami County, 41.8% of people live at or below 200% of the poverty threshold (2010-2014 ACS Census). Bemidji is even higher than Beltrami County with 46.6% of the individuals live below the federal poverty level (ACS 2010 -2014 S1701). Below (Table 1) is a summary of the demographics for the City of Bemidji and Beltrami County from the 2014 American Community Survey.

2014 Demographic Information									
Geographic Area	**Total Pop.**	**Median income**	**% below poverty**	**% over 65**	**% over 65 w/ 1 or more disability**	**Racial Makeup**			
City of Bemidji	**14,319**	**$33,197**	**23.9%**	**16.9%**	**34%**	**Cauc- 80.6%**	**AM/IN- 12.4%**	**Af/Am- 1.1%**	**Other**
Beltrami County	**45,664**	**$43,990**	**21.2%**	**12.8%**	**31.9%**	**X**	**X**	**X**	

Data Sources: American Community Survey annual surveys conducted during 2009-2014 and are representative of average characteristic during this period

Table 1: 2014 Demographics for Bemidji City and Beltrami County in Minnesota

Racial and ethnic minority and low socioeconomic status groups are at a disadvantage with respect to the areas in which they live. Minnesota's American Indian population have the highest percent of people living in high-poverty neighborhoods at 13.74% (Image 2) (National Equity Atlas; US Census 2012). Since 2000, the share of population living in high-poverty neighborhoods has increased in each region of the country (Appendix B). While all regions have seen an increase in the amount of people living in poverty, the Midwestern states have shown a far larger jump, from 11.7% in 2000 to 21.5% in 2010 (9.8% percentage points) (Think Progress, 2014). The amount of people living in high-poverty neighborhoods have increased from 7.2 million to 13.8 million since 2000 (ACS 2009-2013). High-poverty neighborhoods are defined by the U.S census tract as at least 40% of residents living below the federal poverty threshold (NLIHC, 2015). Within Beltrami County, 41.8% of individuals live at or below the 200% poverty level which is higher than the federal poverty threshold (Table 2). It is important to recognize that not all families living in high-poverty neighborhoods are in poverty. Those faced with a "double disadvantage" of living at the poverty level as well as living in a high poverty neighborhood are at greater risk for health disparities, and at a disadvantage for improved quality of life, defined as " the degree of satisfaction an individual has regarding a particular style of

life" (QOL, 2017;NLIHC, 2015). There are many factors that play a role in the improvement in ones quality of life, which include but not limited to, financial security, job satisfaction, family life, health and safety. According to US Census, 17.6% of Bemidji residents are below the poverty line which is more than double the rate of the state of Minnesota 7.9%. A total of 3,027 residents (all races) living in Bemidji are in poverty. Low-

Image 2: Percent living in high-poverty neighborhoods by race/ethnicity: Minnesota 2012

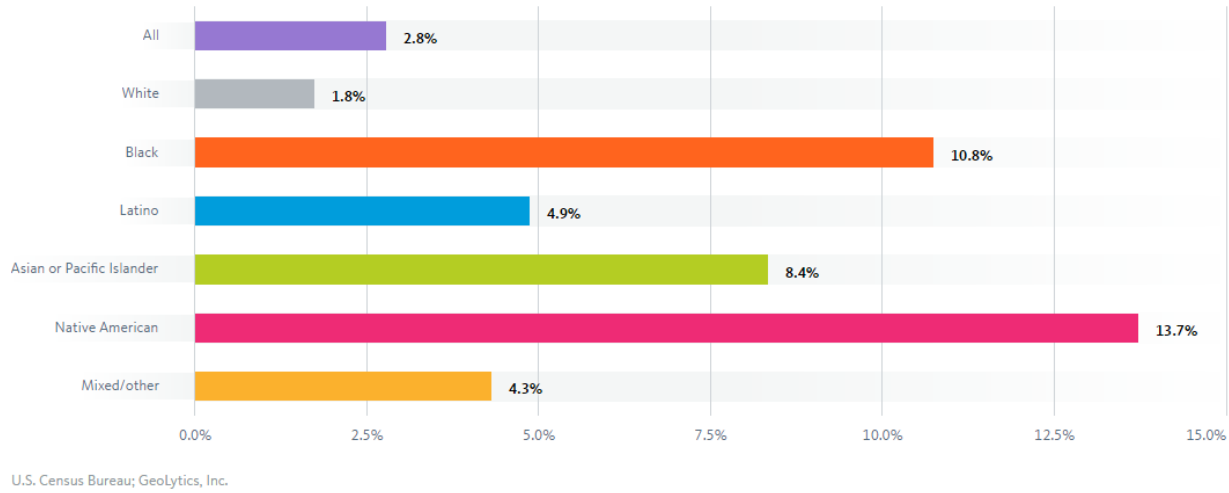


Table 2: Demographic data selected Minnesota socioeconomic statistics by County 2010-2014 American Community Survey (ACS)

County	Population aged 25 years and older with less than or equal to high school education or equivalent	People of all ages living at or below 200% of poverty	Housing occupied by owner	Children under 18 living in single parent headed households
Beltrami	36.80%	41.80%	71.10%	39.60%

income and minority populations tend to be isolated from affluent neighborhood resources and have limited access to jobs, services, high quality education, parks, and safe streets.

In the past year, 20.3% of whites were living below the poverty level, while 42.0% of American Indians, and 21.7% of African American populations were below the poverty level (US Census 2010-2014 ACS 5 year estimates). In Beltrami County, 25% of children (0-18) live in poverty compared to 15% in Minnesota (Image 3) (CHSI County Rankings, 2016).

In addition, 11.81 % of children age 18 and under are living in single-parent families, (CHSI, 2016) . The median range for peer counties is 9.7% and with a U.S median of 8.5%.(ACS,2008-2012). An estimated 85% of

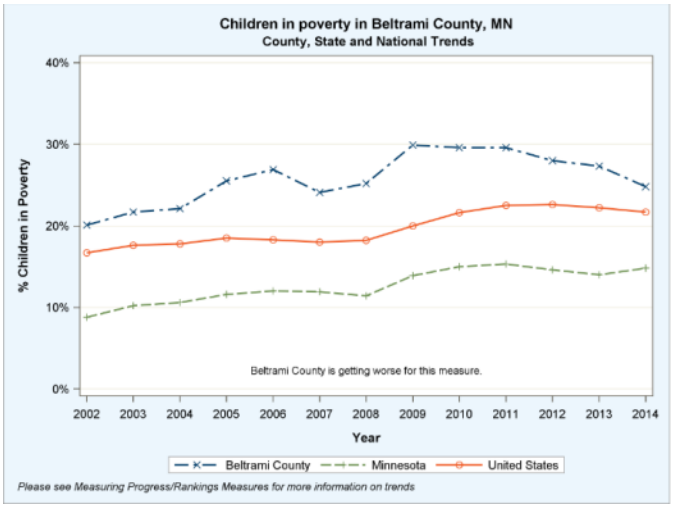


Image 3: Children in poverty in Beltrami County, MN 2002-2014

single-parent American Indian households are in poverty, compared to 36.5% of single-parent white households are in poverty (2010-2014 ACS Census). Children in single-parent households are at higher risk for adverse health outcomes such as unhealthy behaviors, mental health concerns (substance abuse, depression, and suicide) and lower quality of life compared to parents living as a couple (CHSI, 2015). Single female head of households with children less than 18 within Beltrami County have a 43.3% poverty rate (U.S. Department of Commerce US Census Bureau 2015).

People in low-income neighborhoods who are living in poverty, (double disadvantage) have much higher levels of health problems such as respiratory illness, asthma and crime (Flourneoy, 2004). MN-197 is a barrier for many families living in close proximity of this corridor.

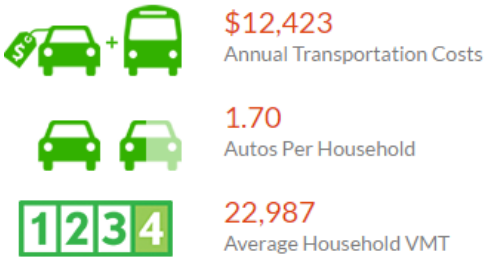


Image 4: annual household costs In Bemidji, MN

People who live in towns with underdeveloped transportation systems similar to Bemidji tend to have higher transportation costs and spend more time in their car (Flourneoy, 2004). Current conditions around MN-197 suggest that a motor vehicle is needed to safely navigate throughout the city due to MN-197 bisecting the community. Often, a household's second largest expenditure is transportation cost. Factoring both the average housing and transportation costs can provide a comprehensive way of thinking about the cost of housing and the true affordability for a household (HT Fact Sheet, 2016).

Transportation costs increase the cost of living due to the need for vehicles. In Bemidji, an average of 29% of each resident's income is spent on transportation and 25% is spent on housing resulting in a combined total of 53%. The total annual transportation costs for Bemidji residents is $12,423 with an average of 22,987 vehicle miles traveled (VMT) (Image 4) (HT Fact Sheet, 2016). In general, for low-income families earning less than $13,908 (after taxes) per year, 40.2% is spent on transportation, often due to a lack of affordable transportation alternatives (Transportation Costs and the American Dream, 2003).

A paradigm shift that prioritizes active transportation as an essential built environment modification to accommodate more transportation choices can reduce the household costs of transportation spending for a family as well as decrease the burden of overall cost

-Transportation Costs and the American Dream, 2003; CDC Transportation Recommendations, 2016.

The MN-197 Northern Corridor creates an economic burden for lower income residents. The built environment can encourage active modes of transportation through designing "places that are compact, close to jobs, and services with a variety of transportation choices…" which allows people to spend less time, energy and money on transportation and thereby, eliminating a significant financial burden for low income families in and around this corridor (HT Fact Sheet, 2016).

Table 3: Commuter/Mode of Transportation in Bemidji City, Beltrami County and the State of Minnesota (2010-2014)

Commuter/Mode of Transportation	City of Bemidji	Beltrami County	State of Minnesota
Vehicle	81.20%	85.70%	86.90%
Public Transit	2.20%	2.70%	3.50%
Walk	6.20%	3.20%	2.80%
Bicycle	1.80%	1.10%	0.80%
Travel time to work: (30 min or more)	14.20%	20.70%	30.70%

Unemployment in Bemidji Minnesota

In 2014, 6,490 residents age 16 and over had been employed within Bemidji. MN-197 may be limiting access to employment opportunities and to quality goods and services which contribute to health disparities for low-income families, single parent families, and the elderly. In Beltrami County the unemployment rate is 5.2%, which is higher than in the state rate for Minnesota at 4.7% rate. Unemployed populations experience an increase in health disparities and higher mortality rates than those who are employed (Unemployment, 2014). Within Bemidji, the African American population has an unemployment rate of 64.5% followed by American Indians of 13.8% (US Census 2010-2014)

Current Transportation Behaviors

The most common measure of travel mode comes from the U.S. Census, which asks responders about their primary mode of transportation to work. While the U.S Census data for commuting and transportation characteristics within Bemidji is the best available source to use, two important limitations from theses metrics are explained below in blue "*Limitation on Mode of Transportation U.S. Census Data*" (**Note**).

The U.S Census reports that most residents drive to work (81.2%) while modes of active transportation (public transit, walking, biking) combined only add up to 10.2% in Bemidji. Within Minnesota, only approximately 6% of white households did not have access to a car compared to approximately 27% black households and around 20% Native American households. Within Bemidji, 59% of those employed live and work in Bemidji, which suggests that walking and biking may potentially be possible for a substantial segment of these residents who are employed (On The Map US Census, 2014). 6,415 Bemidji residents commuting to

LIMITATION ON MODE OF TRANSPORTATION U.S CENSUS DATA

***NOTE: While the U.S Census data for commuting and transportation characteristics within Bemidji are the best available source to use, there are two main limitations from these census metrics. First, respondents are only asked what their primary mode of transportation to work is, which undercounts trips taken by walking or biking. For example, if you bike twice a week and drive three days a week, your primary mode of transportation is by car. The winter weather in Minnesota often prevents biking and walking; while people may bike often for 3-4 summer months, they are still driving 8-9 months out of the year, which continues to have the primary mode of transportation by car. Another limitation with this census metric is ignoring all the trips that people make that are not work related, especially those*

work drove alone, 624 carpooled, 142 took public transportation, 397 walked and 146 had other means to get to work. An estimated 33.2% of residents take less than 10 minutes of travel time to get to work. The mean travel time to get to work is fifteen minutes in Bemidji, which is five minutes less than Beltrami County (20.1 min) and eight minutes less than the Minnesota state travel time (23.0 min) (2010-2014 Census). Table 3 includes commuter/mode of transportation in Bemidji, Beltrami County and the State of Minnesota.

Currently, the U.S transportation system has prioritized motor vehicles over other modes of transportation. The transportation system is designed to "move people and goods efficiently" (CDC Transportation Recommendations). Many Americans view walking and biking as unsafe due to high traffic volumes, lack of sidewalks, crosswalks and bicycle facilities (CDC, 2010). The CDC has identified transportation policies to enhance awareness of the impacts of transportation on the quality of life and health of a community (CDC Transportation Recommendations, 2016). People in Bemidji drive to their destinations rather than use other modes of transportation. Some identified barriers for walking to destinations from Bemidji's Safe Route to School Plan included: distance (too far from school to walk or bike); weather (too cold and snowy for most of the school year); traffic (the volume and the speed); and intersections (not safe enough;-needed more crossing guards).

Bemidji has high traffic volume roads which make crossing in various parts along MN-197 unsafe and difficult to cross (SRTS, 2010). The current conditions facing MN-197 include high speed traffic, unsafe crossings and intersections, poor lighting, limited street connectivity and lack of street aesthetics (i.e. street scape, bicycle racks, green infrastructure, and signage). These conditions were identified through the PEQI assessment tool as well as key decision makers input and previous written plans.

According to the 2010-2014 data on transportation usage within Bemidji, 5,565 (86.7%) residents work in their county of residence and 850 (13.3%) residents work outside of their county of residence. As such, this indicates that the vast majority of residents, 59%, within Bemidji live and work within walking or biking distance. While MN-197 serves as a vital main street for all users; it also has the potential to encourage residents to take shorter trips to school, work, home and to access services, through active transportation. There is (empty clause) also potential growth when considering how location of businesses and organizations, modes of travel and housing can all influences physical activity.

Image 5 shows that over 80% of Bemidji's population lives within one half mile of the corridor-- a reasonable walking distance to destinations. Kligerman et al suggests communities that have destinations that are within .5 miles has been related to an increase in physical activity. This is coupled with streets that are well connected with higher density are also related to higher physical activity levels (Frank et al. 2005). (Use a dash for emphasis here. Also, you might want a citation behind this assertion since this is a research finding. Dannenberg's physical activity chapter contains this information.) Within the United States, most daily trips taken are within walking and biking distances. Furthermore, the manner in which a community is built impacts modes of active transportation. Poor design of the built environment is associated with low levels of walking and bicycling, transit use for work, shopping and daily activities (Ewing et al. 2011).
Currently, the population (14,319 residents) and households (5,711) used for this map includes the entire Bemidji city limits. Image 5 identifies the study corridor marked in blue and the current existing destinations

that are within the buffered boundaries of this corridor (300 meters, ½ mile, 3 miles) that show existing services along this corridor that residents utilize daily. The American Community Survey US Census Data (2000-2010) provided a low and high estimate for both population and households living within the selected buffer boundaries of this corridor, for these research questions, the high estimate for both the total population and household have been selected to provide the percentages. Image 5 shows that 80% of Bemidji's population lives within a buffer of one half mile of the corridor, which is known to be a reasonable walking distance to determine access to destinations. Within the United States, it is known that most daily trips taken are within walking and biking distances. In addition, the planning, infrastructure design and community impacts modes of active transportation.

Vulnerable Populations and Destinations along MN-197

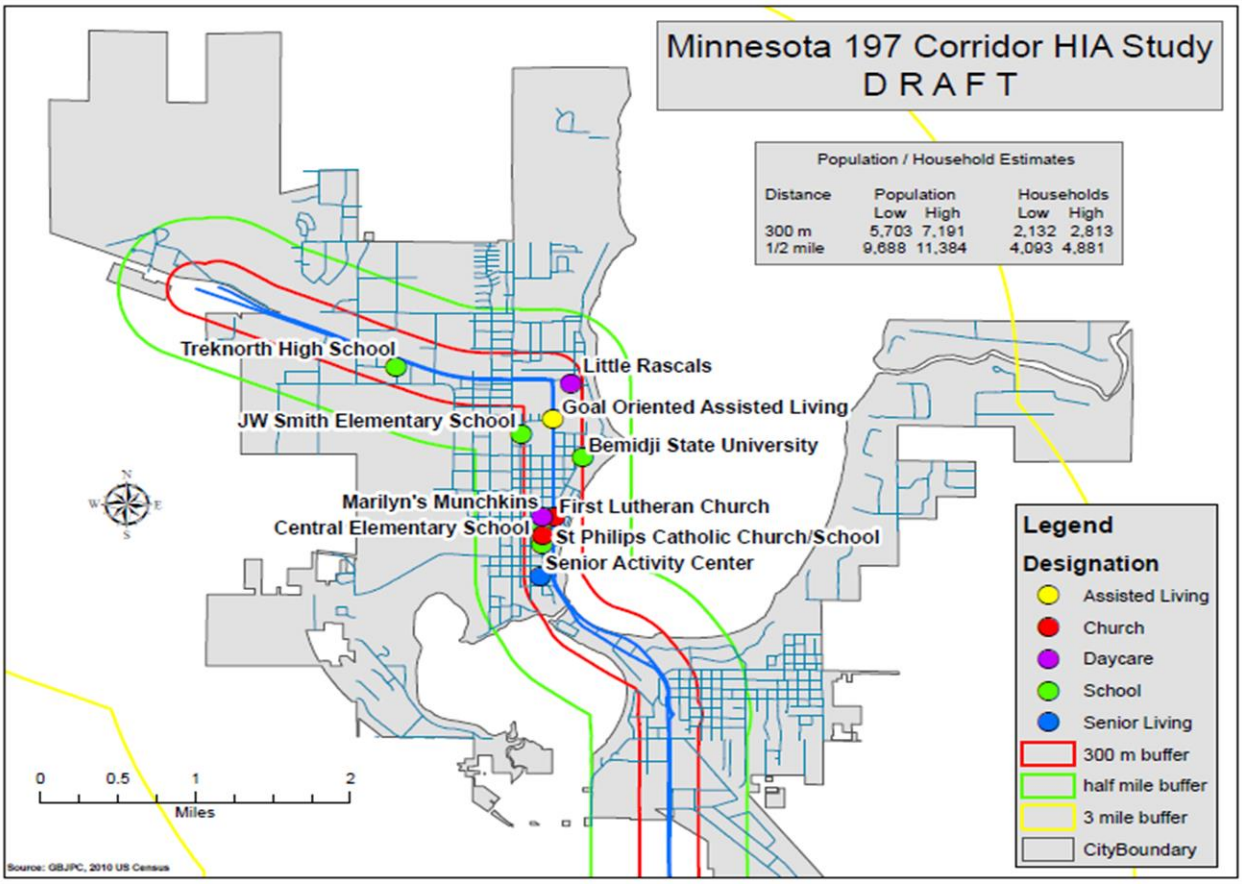


Image 5: MN-197 HIA population and household estimates

Vulnerable Populations along MN-197

This map (image 5) shows that about half of Bemidji's population lives within 300 meters of MN-197 (marked in red). This roadway also includes several destinations, such as child care facilities, assisted living centers, schools, and churches that attract many children, students, and elderly populations to the area. These destinations are commonly assessed by members that are at high risks due to their vulnerable disposition. Living near this corridor increases the risk of harmful health effects to these vulnerable populations utilizing the services along this corridor due to air pollution from high concentrated vehicles traveling along MN-197, limited physical activity access, and traffic safety concerns.

Community services along this roadway were mapped to point out vulnerable populations that have greater risk for health disparities. This map shows the existing services along this corridor that residents utilize daily. Some of these destinations include: child care, assisted living centers, schools, churches as well as low-income families. These individuals live within a distance that places them at greater risk creating health disparities, creating health disparities amongst vulnerable populations living, working, playing and going to school around MN-197. Health disparities exist when certain populations differ in their burden of disease, injury, disability and access to health care. Literature has shown that living a greater distance than 300 meters from a roadway, air pollutant concentrations generally decrease as well as the risk of the level of exposure of air pollution can reduce through providing pedestrian and bicycling environments throughout a community.

The Agency for Health Care Policy and Research (1998) has defined vulnerable populations as "those made vulnerable by financial circumstances, places of residence, health, age, or functional/development status; ability to communicate effectively; presence of chronic or terminal illness or disability; or personal characteristics."

Our baseline assessment solidified that underserved population existing along this roadway will be most affected by future road designs. Populations who live near MN-197 are at greater risk due to air quality issues, low access to physical activity, safety, and access to walking/biking within their own neighborhoods. Vulnerable populations are at greater risk because they have fewer resources (i.e., no car or health insurance) and more barriers (i.e. environmental exposures) to deal with these issues. Our baseline data have indicated that there are a higher percentage of these populations within the corridor and city limits compared to the region and state:

- Residents with limited/no access to a personal car
- Low-income residents
- Children and college students that live within walking and biking distance of schools
- Residents with short commute times to work or services
- Child care providers, senior centers and schools that are within 300 meters of this corridor (Image 5)
- Elder population with a disability

Bemidji School District reported 5,090 students enrolled in the 2015-2016 school year with a 48.9% poverty rate. The two schools that are in Safe Routes To School (SRTS) programs and within close proximity to MN-197 include Central Elementary School which had an enrollment of 246 students and 69.9% poverty rate, and J.W Smith Elementary School which had an enrolment of 364 with a 78.6% poverty rate. In April 2015 teachers from the K-5th grades from both schools tracked how students got to and from school. For Central Elementary School 12.2% of student walked and 1.6% biked on average. For J.W Smith Elementary, the average walking rate was 7.6% and the biking rate was similar to Central Elementary at 1.3% (SRTS, 2010). There was a pattern for Central students who walked in the afternoon (12.2%) that was higher than in the morning (3.1%) (SRTS, 2010). The highest percentage of enrollment for grade categories within Bemidji is undergraduate college students with a total of about 3,000 students or 21.5% (US Census 2014).

Key *Demographic* Findings

- **Higher poverty rates in Bemidji than the statewide rates:** According to US Census 17.6% of residents are below the poverty line (more than double the rate in Minnesota; 7.9%)
- **Children's (0-18) poverty rates are getting better:** In 2012 childhood poverty rates in Beltrami County were up to 30%, in 2015 it had dropped to 27% and now in 2016 it is at 25%; however, compared to Minnesota at 15% the disparity is still much higher (CHSI, 2016).
- **Low Diversity in Bemidji:** 80.6% of the population are white alone; 12.4% of Bemidji's population self-identified as American Indian and Alaskan Native
- **Older adult population with one or more disability:** Amongst the aging population in Bemidji, 34% residents age 65 and older have a disability (ACS, 2015)
- **Young adult population**; In Bemidji, the median age in 2014 was 28.7 years old
- **Residents who live within close proximity to MN-197:** 11,400 residents live within ½ mile; 7,200 residents live within 300 meter
- **More than half (59%) of people live within walking/biking distance to work** which suggest opportunity for more active transportation commutes
- **Barriers exist along MN-197 for walking and biking;** surveys from parents and local community feedback

Health Conditions

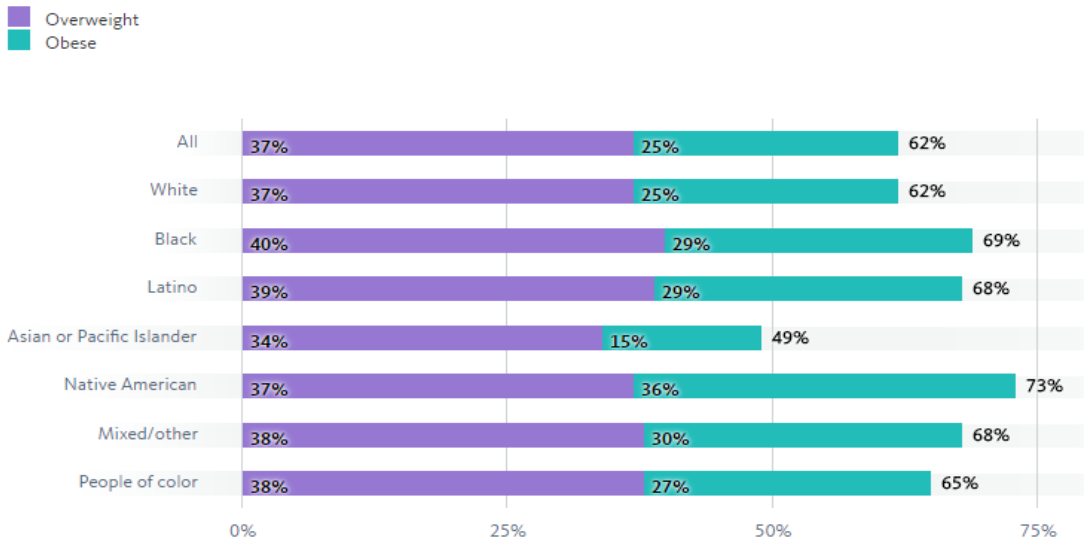
Health status data is not readily available for the City of Bemidji; as such, Beltrami County's Health Indicators and Rankings have been selected to provide the best available data source for this study area's health profile.

Beltrami County has one of the lowest overall health rankings in Minnesota of 86 out of 87. It has room for improvements in each of the eight areas of identified health outcomes which include length and quality of life, health behavior, clinical care, social and economic factors as well as the physical environment (County Health Rankings, 2015). Beltrami County has a higher premature death rate (6%) exceeding Minnesota's. Physical inactivity is a major risk factor that contributes to 9% or over 5 million premature deaths worldwide (CHSI, 2015; Active Living Research, 2016). Premature death is the years of potential life lost (YPLL) before the age of 75. Beltrami County's age-adjusted premature mortality rate for 2011-2013 is 390 residents per 100,000 compared to Minnesota 260 residents per 100,000. This common health outcome measure provides information that a greater proportion of residents die before the age of 75 compared to the rest of Minnesota. Measuring premature mortality allows the focus to be on prevention measures and how we can continue to provide the appropriate resources for at-risk people.

Overweight and Obesity

In 2012, 37% of Minnesotans were overweight and 25% were obese with major differences by race and ethnicity. The National Equity Atlas which is a unique growth indicator that incorporates many data sources which broke down the different percentages of adult overweight and obesity within Minnesota (Image 6) (PolicyLink and the USC Program, 2016). Native Americans had the highest rate in Minnesota with a combined rate of 73%. In Beltrami County 15.9% of the residents reported no physical activity during the past month (BRFSS, 2014).

Image 6: Percent of adults that are overweight and obese: Minnesota, 2012



Children are recommended to have at least 60 minutes per day of moderate-to-vigorous physical activity, which is not being met in Bemidji (Physical Activity Guidelines, 2008). According to the Minnesota Student Survey for 2013 Bemidji School District (5th-11th grade) 9.2% of the total students reported not being physically active at all and only 20.3% of students were meeting the 2008 Physical Activity Guideline for Americans. Not meeting the recommended amount of daily physical activity has contributed to the obesity epidemic in our country (CDC, 2015).

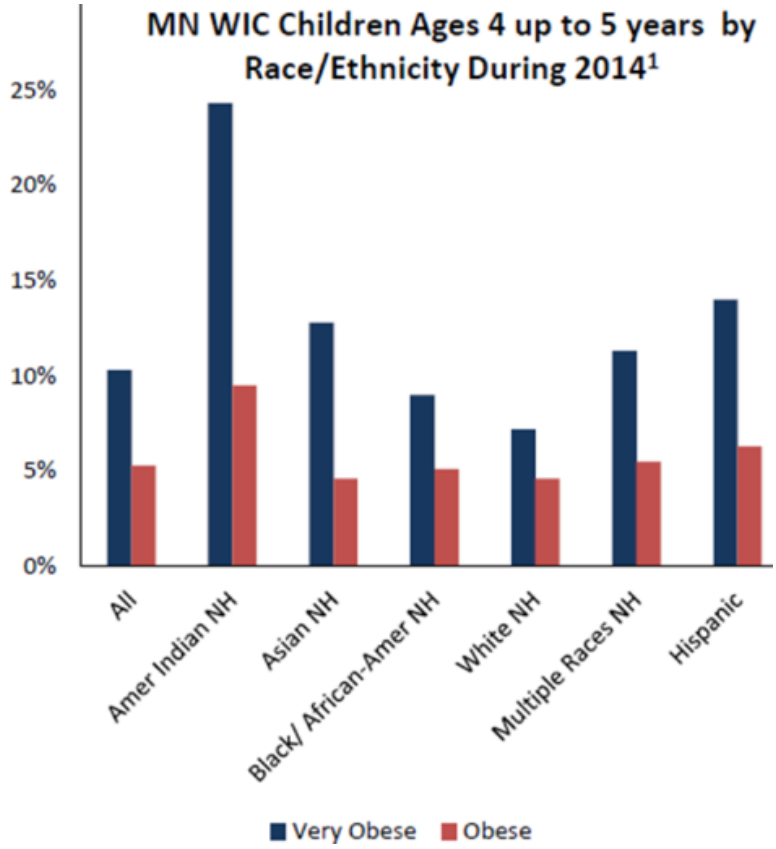


Image 7: Minnesota WIC Children Ages 4 -5 years by Race/ Ethnicity During 2014

In Minnesota, children ages 2-5 years participating in the Women and Infants and Children (WIC) program found that obesity rates were highest among American Indian children reaching 30.2% of children 4-5 years old. When children are obese, they have immediate and long lasting health effects. The WIC Children graph (Image 7) shows that there are health disparities among race/ethnic groups within Minnesota. Some health disparities that exist include asthma, joint problems, high blood pressure, and psychological stress (MN-WIC, 2015).

Bemidji School District Student Survey reported that in 2013, 25.3% of 8th-11th graders self-reported to be overweight or obese. Starting in 2007 Beltrami County has seen an increase in obesity rate from 7.8% to 12.4% in 2013 which is significantly higher than the statewide average (9.6%). According to the Minnesota Student Survey from 2007- 2013 youth in Beltrami County were reporting to be overweight (16.7%) compared to the statewide average (12.5%).

Air Pollution

Air Pollution in Beltrami County has continued to increase since 2003 (Image 8) (Community Health Indicators). Air pollution from fossil fuel combustion, dust, forest fires, and motor vehicles are associated with a wide array of negative health impacts including: respiratory tract infections, respiratory diseases (such as asthma or COPD), cancer, fatigue, and neurological damage. More than 44 million Americans live in an area where there are unhealthy levels of particulate pollution (How Healthy Is your Air, 2013). Asthma hospitalizations were looked at by Bemidji's zip code of 56601 from 2010 to 2014. Asthma emergency visits for children 18 and under was 224 children.

The United States Environmental Protection Agency (EPA) found that for non-cancer risk, people of color were 17.9 % of the total population; however their share of air pollution burden was 23.9%. This is an equity concern within Minnesota that exists within Bemidji (U.S Census; EPA, 2014). Over 9 million children in the United States suffer from asthma and millions more Americans die each year due to high levels of air pollution.

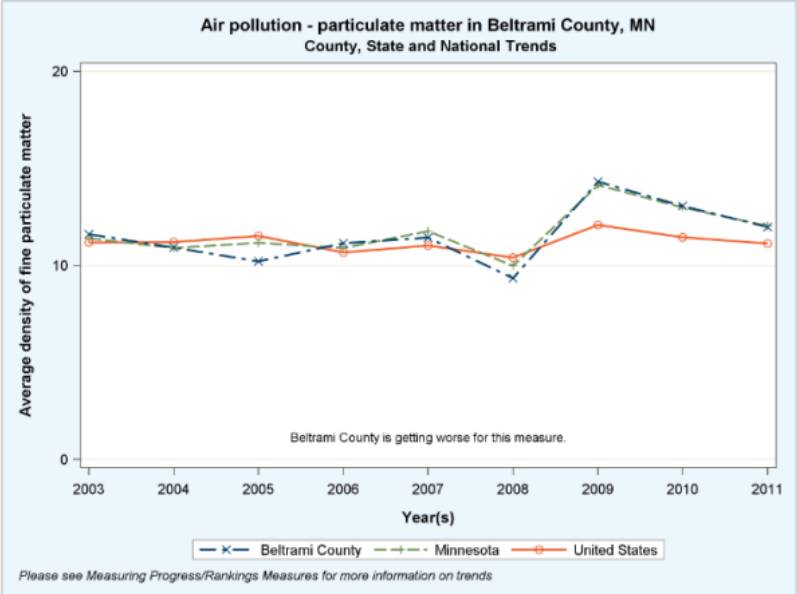


Image 8: Air Pollution –particulate matter in Beltrami County, MN 2003-2011

The 2013 Minnesota Student Survey for the Bemidji School District, 15.2% of students had been told by a doctor that they had asthma. Only 22.8% of these students with asthma were meeting the recommended physical activity guidelines of 60 min per day. 6.6% of these students were not physically active. Below is a summary of the comparison of the State of Minnesota and Beltrami County's Behavioral Risk Factors of adults from the 2009 Minnesota Behavioral Risk Factors (Table 4) (Appendix B for Risk Factors Definitions; BRFSS, 2009).

Table 4: Minnesota Behavioral Risk Factors of Adults Beltrami Synthetic Estimates and State Estimates 2009

	Health Status (fair or poor)*	Reporting Limitations**	No Exercise	Hypertension	Overweight (Not Obese)	Obese	Current Smokers
State of Minnesota	**10.2%**	**19.5%**	**15.8%**	**21.6%**	**38.1%**	**24.7%**	**16.8%**
Beltrami County	**10%**	**19.2%**	**15.9%**	**21.3%**	**37.1%**	**24.5%**	**17.0%**

*estimate percent of those who perceive their health status to be fair or poor
**in any activities because of any impairment or health problem
Synthetic Estimates: County level estimated percentages for behavioral risk factors represent the percent of adults considered to be at risk for those behaviors in that county. These estimated percentages were derived through a synthetic estimation method, which adjusts statewide BRFSS percentages by the age and gender distributions of adult in each county.

Key Health Findings along MN-197 Northern Corridor

- **Beltrami County has the second to lowest County Health Ranking in Minnesota;** 86 out of 87
- **Both overweight and obesity rates are high;** 62% of Beltrami County residents were overweight (37.1%) or obese (24.5%)
- **Percent of Bemidji School District students** who were meeting the 2008 Physical Activity Guidelines in 2013 was 20.3%
- **Premature** mortality rate (age-adjusted) for residents in Beltrami County is 390 per 10,000 residents under the age of 75 compared to Minnesota which is 260 residents per 10,000.
- **Physical Inactivity for adults** is above the statewide average in Beltrami County at (23%). 15.9% of residents reported no physical activity
- **Physical Activity for students**; Minnesota Student Survey for Bemidji School Distract reported in 2013 that 79.7% of the total students grades 8th-11th were not meeting the recommended physical activity guidelines (at least 60 min per day)
- **Minnesot Student Survey 2007-2013** reported obesity trends in Beltrami county increased from 7.8% in 2007 to 12.4% in 2013 which is much higher than the statewide average (9.6%).
- **Bemidji School District Student Survey** reported that 25.3% of students 5th through 11th grade were reporting to be overweight or obese
- **Asthma continues to be a concern in Minnesota**; however, in Beltrami County, the age adjusted rates and health outcomes for all ages compared between zip codes 56601 and Minnesota were similar

Destinations of Concern

The identified destinations within 300 meters of MN-197 are putting people at greater risk for exposure to air pollution, limited access to safe physical activity areas, higher risks of chronic disease, traffic injuries, and other environmental threats (Image 5). Destinations of concern along MN-197 where vulnerable populations might frequent include:

1) Treknorth High School
2) JW Smith Elementary School
3) Central Elementary School
4) Bemidji State University
5) Little Rascal (DayCare)
6) Marilyn's Munchkins
7) St Phillips Church/School
8) First Lutheran Church
9) Goal oriented Assisted Living
10) Senior Active Center

Bemidji Safe Routes to School Plan identified the walk zone for JW Smith and Central Elementary School (Image 9)). As the map suggest, families who live across MN-197, are placed at a disadvantage in being able to walk and bike, due to the road barrier. Children are placed at a disadvantage in low income communities with health vulnerabilities such as environmental pollutants, pedestrian and cyclist injury risks, and limited physical activity opportunities. Older adults are also more disadvantaged due to social isolation, pedestrian injuries, as well as reduced driving amount. Poverty also contributes to social isolation and higher amounts of environmental risks.

Image 9: walk zone; sidewalks, crossings, and schools - Safe Routes to School (SRTS), 2008

Current Crash Data and Conditions on MN-197

An examination of Bemidji traffic accident reports for 2011-2013 revealed were 13 nonmotorist accidents occurred along this stretch of road (Image 10) (Mn-DOT nonmortorist crashes 2011-2013) . A 2004-2006 traffic study on MN-197 was conducted by Mn-DOT to enhance the mobility and safety of this corridor as well as improve connectivity (AMA, 2008). This study found that by the year 2030 the motor vehicle traffic volume per day is estimated to be 20,000-38,000 (AMA, 2008). Currently, MN-197 carries approximately 13,000-18,000 vehicles per day (Appendix B for a map on the current 2016 traffic volume data). Roads adjacent to this corridor, such as Irvine Ave, have high traffic volume reaching anywhere from 7,000-9,200 vehicles per day. Some factors that may influence fluctuating numbers of daily traffic volume include access points, seasonal variations and surrounding infrastructure construction (AMA, 2009). The current conditions facing MN-197 include high speed traffic, frequent accidents, lack of pedestrian and bicycle lanes, unsafe crossings and intersections(making it risky for residents who do not own vehicles to cross safely), poor lighting, and limited street connectivity and street aesthetics (e.g. street scape, bicycle racks, green infrastructure, and signage). This roadway is in the top 25 deadliest Minnesota counties for impaired driving (Minnesota Toward Zero Deaths, 2015). MN-197 is both the busiest and the widest road in Bemidji, creating a major barrier to physical activity opportunities and bike & pedestrian access for the low income populations living in and around the corridor. Furthermore, the northwest part of the corridor (Image 11: Segment 2) contains numerous businesses that high school and university students, families, and other resident's access regularly. Because of the location of this corridor it has the potential to promote residents to take short trips to get to school, work, services, and home. Combined with the additional need (economic or age-related) to take trips by walking or biking, MN-197 may be preventing physical activity in neighborhood trips.

Image 10: Nonmotorists crashes on MN-197

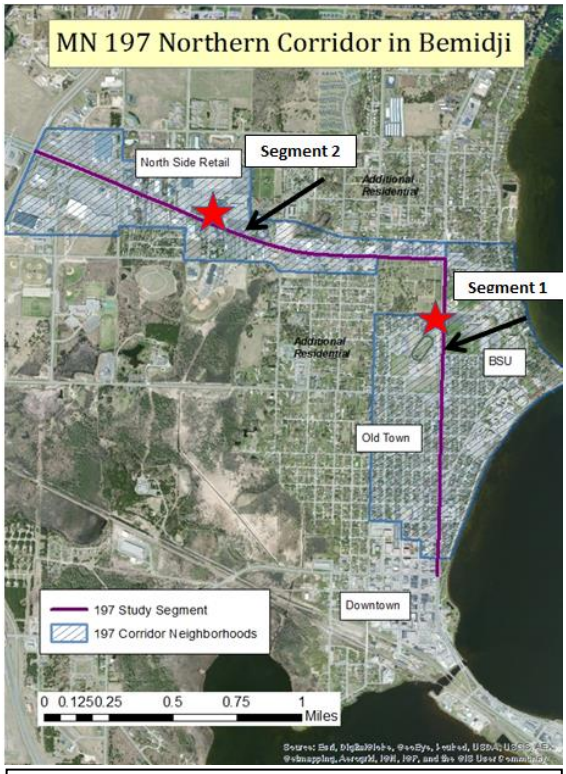


Image 11: Segments 1 and 2 on MN-197 Northern Corridor

1

2

3

4

Segment 1 (Images 1,2,3) is approximately 1.6 miles in length stretching from the Mississippi River Bridge to Downtown (2nd street to 5th street) all the way to the 23rd street intersection on a north/south alignment. This is a five-lane undivided cross-section (two-way center left turn lane) corridor with a posted speed limit of 30 mph. This section has six traffic signals (2nd Street, 3rd Street, 5th Street, 10th Street, 15th Street and 23rd Street) and varies with services stretching from the downtown district (2nd street to 5th street) to residential and private driveways, Bemidji State University, and day care centers (Marilyn's Munchkins and Apple Blossom Childcare).

Segment 2 (Image 4) begins at the Highway 197/ 23rd intersection which turns to an East/West alignment extending to Hannah Avenue approximately 1.3 miles in length. This section is also a five-lane undivided and four lanes divided with exclusive left turn lanes. Two of the intersections have short segments of concrete median that signalize and define the left turn bays. This area has a high density multi-family residential development north of Paul Bunyan Drive. There are very few places to access the Paul Bunyan Mall, grocery stores, or other destinations without having to drive (Active Living in Bemidji, 2009). This section of the 197 corridor has a posted speed limit of 35 mph and is considered the Shopping District- consisting of service retail and small commercial establishments.

Part 2: Assessment of the Health Impacts

This section will integrate research and a review of the literature to provide evidence-based recommendations that will positively impact physical activity, traffic safety and air quality to all users along MN-197. This rapid HIA seeks to assess what future road design infrastructure can improve the quality of life for all residents who live, work, play and attend school in and around this corridor. Three overarching themes have been identified from the existing scientific literature review that supports the health priorities identified by the HIA Project Team and Advisory Group. The themes are all interconnected, essential assets for a healthier and sustainable community, supporting the health priorities and guiding responses for each existing research questions and impact research question which have shaped recommendations to improve the health and safety of all users of this corridor. The 3 overarching themes that have been identified through the scientific literature include (Appendix B for an overview of each theme):

1) Promote Active Transportation
2) Improve Street Crossings (street network)
3) Improve Built Environment Aesthetics

Physical Activity

Promote Active Transportation

Lack of physical activity is an important public health problem that is increasing in the United States. There is strong evidence to suggest that the built environment characteristics and community design significantly affects physical activity and the major health impacts associated with quality of life (Sallis et al., 2011; Dannenberg, pg. 33- 49, 2011; Sallis et al. 2012). It has been estimated that meeting the national physical activity guidelines can reduce the risk of all causes of death by 30% (PAGA, 2008). Poor design of the built environment decreases walking, bicycling, and other transportation modes for work, shopping, school and other recreational activities (Dannenberg pg. 155, 2011).

Improvements to the built environment and road design will create more economical and appropriate opportunities for residents within Bemidji. For example, supporting a pedestrian and bicycle infrastructure has been associated with higher rates of walking to school (Davison et al, 2008). Currently, MN-197 is a physical barrier for walking and biking to school. Two reviews found that close proximity to destinations along with paths have shown to increase walking and biking for youth (Pont et al., 2009; Faulkner GEJ et al, 2009). Access to amenities within one mile radius of a community has shown to improve healthy behaviors such as physical activity and active transportation (Carr, 2010). Existing conditions of Bemidji has found that most of the residents live within ½ mile of MN-197. Providing safer access is critical to support the health of this community. Another way to encourage active transportation is to lower the speed limit which causes cars to be more aware for cyclists and pedestrians (Pucher, 2010). Behavior-change programs that educate already motivated groups to walk or bike shift transportation trips from cars to walking or biking by 5% (Ogilvie et al, 2004).

As communities are recognizing the importance of addressing health concerns associated with the built environment, promoting policies within communities that encourage active transportation will generate pedestrian-friendly infrastructure design and destination accessibility. Literature has found that active transportation is greater in places where the built environment infrastructure promotes safety, provides convenient access (bike parking, shower and locker facilities at work) and connected infrastructure (street network and crosswalks) (Jacobsen PL, et al. 2015; Buehler R, 2012). The perception of dangerous roads, much like MN-197, limits accessibility to the sidewalks therefore limiting physical activity (McCann et al, 2012). Some national initiatives that support high densities, diversity of land use, pedestrian friendly street designs, convenient and accessible destinations include Smart Growth and Active Living by Design (Dannenberg et al, pg. 165, 2011).

Smart Growth strategies focus on how to improve the sense of place within a community advocating to provide people different modes of transportation options. Some examples include creating a walkable neighborhood, collaborating with key decision makers on how best to grow a community, providing a variety of transportation choices, and encouraging architectural beauty and distinctiveness (Dannenberg et al. 153, 2011). Smart Growth strategies support Complete Streets policies which encompass changes to the built environment, transportation planning, road design, maintenance and funding to design roadways that enable safe access for all users (Sesken et al, 2012; Smart Growth 2015). According to the Smart Growth American-National Complete Street Coalition, Smart Growth strategies make streets safer and easier to use for pedestrians, bicyclist, motorists, as well as children, elderly and those with disabilities. The Complete Street Implementation Action Plan lists the following for why a complete street is essential for a community:

- Increased transportation choices
- Provides people more adoptions and avoids congestion which avoids efficient accessibility between residents, schools, parks, retail destination
- Support local business and encourage job growth in communities with revitalizes economy
- improve safety by accommodating bicyclist, and pedestrians, which reduce the incidence of crashes
- Moreover, walking and bicycling increase physical exercise which is vital response to obesity and other chronic diseases
- Streets that provide room for bicycling and walking, also encourage walking to adults and children
- More commute options also reduces the greenhouse gasses and improve air quality by reducing vehicle emissions (Smart Growth America, 2015).

"Complete street policies help communities make a clear commitment to planning all future transportation projects to provide for the safe travel for everyone using the road, once that commitment is made, planners and engineers have a clear direction to develop new processes, design manuals, and on the ground solutions that welcome everyone" –Director of the National Complete Streets Coalition Barbara McCann Smith, 2010

Complete street policy promotes active travel through providing safe crossings, well-connected walking and bicycling infrastructure, installing medians, adding buffered bike lanes, presence of sidewalks, crosswalks, and paths which can reduce crash risk for pedestrians and can increases convenience and comfort (Krizek et al. 2009; Smart Growth, 2015).

5 "D's" of Development

The way neighborhoods and communities are built affects the level of active travel. The three core dimensions of development (3D's), which were initially proposed by Cervero and Kockelman (1997) include density, diversity, design and later expanded into five core dimensions (5D's) adding destination and distance (Dannenberg et al, 2011; Shi et al, 2012; Active Living Research, 2016). These five dimensions are all interconnected and support the health benefits associated with a more pedestrian and bicycle community (See Appendix B for 5D Explanation from Shi et al, 2012). Efforts to build communities with an emphasis on the physical, social and mental health of a community have shown to decrease car usage and promote active transportation (Active Living Research, 2016).

A meta-analyses of more than 50 built environment studies were conducted showing the relationship between land planning and urban design on travel (Ewing et al, 2010). Findings from this search included vehicle miles traveled (VMT) being negatively associated with job access by motor vehicle, the distance it takes to central businesses, intersection density , and the proportion of four way intersections, as such, walking trips are positively correlated with intersection density and street connectivity (Ewing et al., 2010). Dense and diverse land use locations encourage active transportation trips. Providing more opportunities to cross roadways has been associated with increased walking (Ewing et al., 2010).

Research has shown the relationship between the built environment and individual's health (Carr et al., 2010). For example, physical activity can be supportive through the social and physical built environment, which includes access to amenities, residential density, land-use diversity, street connectivity, safety of people and public transit (Carr et al., 2010). Perceptions of dangerous roads due to traffic speed, traffic flow, poor signage and infrastructure for pedestrians and bicyclists can limit accessibility to sidewalks and therefore discourage physical activity (McCann et al., 2012).

Driving is a significant source of physical inactivity and is associated with obesity. 8 out of 10 studies from evidence based research showed that driving was associated with increase weight gain (McCormack GR, Virk JS, 2014). Lack of physical activity is also shown through the high health care costs within the United States. It is estimated that the financial burden of limited physical activity is $117 billion dollars which is 9-11% of the total health care costs in the U.S. (CDC, 2015; Carlson et al., 2015). Obesity is often due to the "overall energy imbalance due to poor diet and limited physical activity" (CHRR, 2016).

There is a high population density along MN-197 which contains many businesses that older adults, students, families and other residents access regularly. Population density is defined as the number of individuals or households living in an area and associated with higher active modes of transportation (Durand et al., 2011). Places with high density often are well connected, built with near destinations and promote active transportation (e.g. walking and bicycling) and public transit (Sallis et at, 2012). The greater population

densities within an area, the fewer residents in that area tend to drive (Smart Growth Our built and Natural Environments US EPA 2016). “High-speed roadways have hurt and prevented the economic rejuvenation of countless Main Streets by making these communities’ downtowns into unattractive and even dangerous thoroughfares” (McCann et al, 2012). Because of this existing physical barrier of MN- 197, active transportation is not always feasible, causing an economic burden.

A neighborhood that has good road design and seeks to achieve a better place to live have street network characteristics that are attractive and connected, supportive of integrating mix-land uses which provides more walkable and bikeable destinations. Design characteristics also are emphasized through street widths, pedestrian crossings, presence of street trees and other green infrastructure that separates pedestrians and cyclists from vehicles (Ewing et al., 2011). Interventions that promote walking and biking as a single strategy have found little effect within a community, while those interventions that used multiple strategies (protected bicycle facilities, bicycle sharing, policies favoring cyclists) were significantly more effective (Pucher et al., 2010).

Physical Activity Trends

There is an interest in making American communities less car-dependent which has opened new light on how the built environment can influence travel behavior (Sallis et al., 2006). Because many people don’t feel safe, they drive to their destinations rather than use other active modes of transportation (Complete Street Local ToolKit). A local downtown business owner stated that due to the traffic volume on MN-197, they had to drive their kids to school even though they live across the road from the school. A local health practitioner, who has their own practice half a block away from the MN-197 Northern Corridor, sees the physical burden that this roadway places for all bicyclist and pedestrians.

The United States transportation system has become aware that although roads are designed to move people and goods efficiently, health and the quality of life are directly affected through the built environment and road design infrastructure and can indirectly affect health by influencing behavioral choices (Schneider, 2011; CDC, 2010). Road design features can support healthy lifestyles within a community or be a major barrier and often unsafe for vulnerable populations such as, seniors, children, people with disabilities and other walking, biking or taking transit. In order to change car-dependent communities into more walkable and bikable communities, it is necessary to change the political will and to a paradigm shift for land-use and transportation priorities and policies, along with public consciousness and behaviors must change (Leyden et al., 2003).

Urban planning and transportation design experts have sought to conceptualize and measure the built environment to understand the interaction between pedestrian, bicyclists and the impact on the road design (Sallis et al, 2006). Underserved populations such as hearing and vision impaired, disabled, mothers and infants and the elderly are at greater risk. Underserved populations, pedestrian and bicyclists often times are addressed at the end of transportation planning.

Complete Streets are reestablishing the way in which we design roads. Complete Streets see active modes of transportation (walking, biking, and transit) as an essential core element of road design and to be included in

the initial phases of the planning process. Roads that are designed for people as well as for cars and other vehicles can enhance quality of life, increase access to community services and increase physical activity. The US Census shows that in Bemidji, 9,461 people work in Bemidji but live elsewhere. 2,234 live in Bemidji but work elsewhere. 3,235 live and work in Bemidji which as stated before is about 59% of all those employed work and live in Bemidji. Complete Streets promote walkable and bikable neighborhoods and Bemidji has more than half of their workforce in a distance to walk or bike. Interventions will be most effective when they operate on multiple levels of influence (Sallis et al, 2006). An ecological model can provide a way to visualize the different levels of change. Effective interventions should include the individual, the social environment, the built environment and policies (Sallis et al, 2012).

Barriers to Active Transportation

It is known that most daily trips taken are within walking and biking distances (Image 12). Obstacles associated with walking and biking that are negatively associated with the level of influence of active transportation include: traffic volume, highway density, and traffic speed, lack of sidewalks, crosswalks, and bikeways; lack of connectivity of pedestrian and bike infrastructure; residents perception of safety. Block size, access to public transit, retail, neighborhood shops, and street connectivity are factors that are positively associated with levels of physical activity (Active Living Research, 2016; U.S Department of Transportation, Federal Highway Administration, 2010).

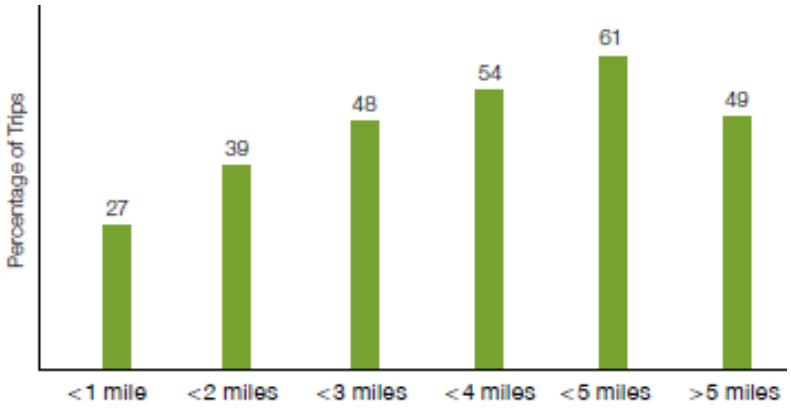


Image 12: Most Daily Trips in U.S Are Within Easy Walking or Biking Distance

Providing active transportation options (access to buses, car sharing and street designed for safe walking and biking) for residence in Bemidji will promote physical activity. Creating a built environment that foster behavioral choices aimed at both health and the environment goals (such as walking instead of driving) (Dannenberg et al, 2011; Ewing et al., 2011).

"…there is a general consensus among individuals and groups that there is a lack of safe connections between destinations." -Active Living in Bemidji 2009-

Traffic Safety

Improve Street Connections and Crossings

Street connectivity is one common way to measure the built environment. A lack of safe connections and crossings to and between destinations in and around MN-197 is a barrier for active modes of transportation (Active Living in Bemidji Plan, 2009). The connectivity of a street and the street network design within a neighborhood is what makes an area attractive (sidewalks, street trees, buildings setback, pedestrian crossings etc.), promotes physical activity, and provide a sense of place (Ewing et al.,2011).

Image 13 represents a safe and convenient crosswalk for residents of all ages and abilities to use using active modes of transportation options

There are three major street crossing sections that affect traffic safety: street width; on street parking; and pedestrian facilities (Ewing et al., pg. 126. 2006). The average through-travel lane is 12-13 feet wide, however it can be as narrow as 9 feet. Research suggests that the width of the street is a high determinant of accident rates; that fewer traffic lanes are better for safety. The way the built environment is designed affects the amount people are involved within their community (Leyden, 2003). High connectivity, residential density, and access to public transit are associated with active transportation (Carr, 2010).

The layout of a street network impacts the directness and quality of travel as well as behavioral choice and travel activities (Frank & Engelke, 2001). Having low intersection density and street networks that combine high network density with low connectivity or low density with high connectivity have found to be unsafe designs having fatal and severe crashes occur more often (Marshall & Garrick 2010, 2011). Safe features need to be considered to improve street connectivity which encourages active transportation such as narrowing streets to slow traffic speed (Gattis and Watts, 1999). Ewing et al did a review of the built environment and traffic safety and found that less car travel per capita, slower car travel speeds, narrow lanes, and traffic calming features in dense urban areas help increase traffic safety (Active Living Research, 2016; Ewing et al, 2009). Another example to consider is placing fixed objects along the roadway edge to cause drivers to not speed. It has been found that drivers are less carful when they have open road to travel on than if they had street objects (Dumbaugh, 2005).

Traffic Calming Features

Traffic calming features have shown to reduce collision frequency. A report published by the Institute of Transportation Engineers and Federal Highway Administrative concluded that traffic circles and chicanes both reduced traffic collisions by 82% followed closely by a 74% change in collision frequency when narrowing the roadway. Other traffic calming features that showed to have a significant affect included stop signs (70%), refuges (57%) and speed limit reductions (30%) (Geddes et al., 1996). Motor vehicles, bicyclist and pedestrian injuries and deaths are associated with traffic volume, vehicle speed and the surrounding street environment (i.e. built environment along the corridor) (Ewing, 1999; Ewing and Dumbaugh, 2009). MN-197 is known to have much higher volumes of traffic and is increasing. Reducing the amount of vehicle miles traveled (VMT) will result in a reduction of total crash cost, traffic injuries and deaths as well as improve air quality.

A study was implemented that showed crashes between motorists and pedestrians or bicyclist are less prevalent when there are more people out using sidewalks and trails. Motorists start to expect more active modes of transportation and adjust their behaviors to allow the pedestrians and bicyclist to feel safe (Jacobson, 2003). Future design should enhance the comfort, enjoyment and safety of pedestrians and bicyclists and support Complete Street and Smart Growth approaches (Sleet et al., 2011). For example, modifications along MN-197 can be effective in reducing pedestrian and bicyclist injuries. Complete Street designs include: separating pedestrian from motor vehicles overpasses, installing traffic signals, in pavement flashing lights, four-way stops and sidewalks (Retting, Fergusion, and Mccartt, 2003).

Designing for the most vulnerable populations can provide access to all users. Crossings where there are not traffic signals can increase risk for elder pedestrians (Koepesell et al. 2002). The road planning process often tends to neglect the health impacts on local residents and businesses along a main roadway including MN-197. It is also important to recognize that the "intensity of traffic calming measures and the degree to which they are integrated into the overall street network has an impact on the effectiveness of traffic calming devices (Ewing, pg. 125, 2006)."

The Pedestrian Environmental Quality Index (PEQI), a tool used to evaluate and measure barriers to walking and bicycling safety and the quality of the pedestrian built environment, distinguishes two traffic calming features: traffic calming features at intersections verses street traffic calming features. Traffic calming intersections include: curb extensions or bulbouts that create shorter crossing distances for pedestrians, partial mini circles, partial street closures, speed tables, roundabouts, pavement treatment and semi diverters (Alta Planning & Design, 2005). Traffic calming features along the roadway include visual cues to slow down traffic which is an important aspect for encouraging walking and biking and promoting safety along a roadway (Clifton et al., 2007).

Safe Crossing along MN-197

Pedestrian countermeasures are designs that improve the safety of pedestrians through engineering. Some design features that add to a sense of security for pedestrians include sidewalk clearances, vertical curbs, street trees between street and sidewalk, green infrastructure and parked cars. Marked crosswalks at uncontrolled intersections and midblock locations are a concern on MN-197. A study was conducted on uncontrolled locations concluding that drivers slowed down approaching pedestrians as well as pedestrians used the crosswalks when markings were installed (Knoblauch et al., 2001). Crosswalk markings are a low cost and an important safety practice that reduces traffic speed and causes drivers to be more aware of pedestrians (Ewing, pg. 128, 2006).

Pedestrian crosswalks at mid-block locations also have been found to enhance safety. Adding marked crossings combined with raised medians at un-signalized intersections on multi-lane roads can reduce pedestrian crash rates.

Engineering design approaches can reduce traffic speed and increase safety in and around the road environment (Leaf &Preusser, 1999). These designs include road features (road width, crosswalks), traffic calming designs (physical structures that enforce traffic speeds, are cost efficient, and applied in high pedestrian exposed areas ie. speed humps, roundabouts and medians), and speed warning infrastructure (stop/give way signs, camera, flashing lights) (U.S. Department of Transport, 2012).

Studies show that pedestrian injuries and deaths are more than twice as likely to occur in places without sidewalks and more than 40% of pedestrian fatalities occur where no crosswalks is available (Eitler et al., 2013). As stated above, implementing Complete Street policies along MN-197 will be beneficial in aiding to decrease accidents that have occurred due to high volumes of traffic and traffic speed as well as non-pedestrian friendly crosswalks.

Bemidji's Bicycle Plan (2015) suggest high visibility crosswalks which would help to create a continuous route network for pedestrian and bicyclist, altering motorist to their potential presence at crossings and intersections. See Appendix for other suggested designs for adjacent roads from the Bemidji's Bike Plan conducted in the year 2015.

High-Visibility Crosswalks

By creating clearly marked crosswalks along routes for pedestrians and bicyclists, forces motorists to be alert for possible crossings at intersections where there are marked crossways (Bemidji Bike Plan, 2015). The application of marked crosswalks needs to be considered intently to increase the safety and encourage proper usage.

Bemidji Bike Plan has devised applications ideals in order to properly implement a crosswalk with safety being the main concern.

1. A crosswalk should be implemented where there are sidewalks, stop signs, and traffic lights.
2. When trails intersect with a roadway, crosswalks should be clearly marked and implemented.

3. Discouraging marked crosswalks where there is heavy speeds, multiple lanes, and 'standalone devices'.

As we take into consideration MN-197 and the concern for heavy traffic with high speeds, Bemidji Bike Plan promotes the usage of Advanced Stop Bars to "minimize the risk of "hidden threats" crashes" (Bemidji Bike Plan, 2015). The main concern is making sure the crosswalks are highly visible by the motorists. By creating clearly marked crosswalks with "high visibility" (Bemidji Bike Plan, 2015) and thickening the lines of the crosswalk will increase safety by both active users and motorists.

Vulnerable populations *Bemidji Bike Plan*

According to the U.S. census demographics data, 51-80 million Americans, by the year 2050 will have a disability. Design projects that have shown to mitigate vulnerabilities include Safe Routes to School plans and Complete Street policies. Roads often are built primarily for vehicles and the needs for vulnerable underserved populations (children, elders, low income, and people with disabilities) have not been seriously considered.

The World Health Organization (W.H.O) has described disabilities not as a "condition" but as a "function outcome of interactions between health conditions (diseases, disorders, injuries) and contextual factors such as environmental factors (architecture, climate etc.) and personal factors (age, education)". The identified vulnerable population within Bemidji living in and around MN-197 include: children, elementary, high school and undergraduate students, low income families, older adults, American Indians and people with disabilities. As such, disproportionate levels of people living in poverty have greater health risks and problems which can include: asthma and respiratory illness, lack of affordable food and health care.

Children are at greater risk when living, working and attending school near a major roadway due to the higher concentrations of air pollutants (PM, CO, Nox, and other emitted chemicals), elevated rates of asthma, cardiovascular disease, pre-term and low-birth weight infants, impaired lung development in children, and premature death (EPA,2016). People with a disability need sidewalks and paths to be wide enough and paved, as well as maintained for easy access. Elder adults are vulnerable due to undeveloped pedestrian infrastructure, air pollution, weather as well as the absence of social capital (Kochtitzky et al, 2011).

Research suggests social networks and social engagements in communities promotes health and the built environment is a "promising avenue for building social capital" (Eicher et al., 2011). Low income families are often exposed to environmental hazards such as air pollution, tobacco smoke, other environmental barriers and other undesirable land uses; exposed to higher crime rates, and limited access to community resources. Residence who live in and around MN-197 have to be able to cross in order to gain all the benefit from the communities resources such as transportation service, parks, lake front, downtown amenities, paths and shops.

AIR QUALITY

Improve Built Environment Aesthetics

Air Quality has been linked to four major negative health impacts which include: increased mortality, respiratory illnesses, impaired cardiovascular disease and higher risk of cancer (Frumkin et al, 2004). Air quality was first recognized in causing health threats through the Clean Air Act of 1970 and continues to be researched. Greater life expectancy is associated with improved air quality, while, those who live within higher levels of air pollution increase the risk of death (Dockery, 2009; EPA. 2009). The World Health Organization (W.H.O) and the Environmental Protection Agency (EPA) have updated standards and regulations for most of the pollutants emitted into the air.

There is evidence that health effects from traffic emissions living in close proximity to major roadways increase the risk of all-cause and cardiorespiratory mortality, asthma and respiratory symptoms in children and adults, lung function level, allergies, birth outcomes and cancer (Samet, 2011). The traffic volume along MN-197 presents health concerns for the vulnerable populations. Health status of lower-income neighborhoods are at greater risk from exposures to environmental pollutants. A systematic review by the Health Effects Institute (2010) concluded that there was sufficient evidence to suggest traffic-related air pollution was associated to onset of children asthma, non-asthma respiratory symptoms, impaired lung function and total cardiovascular mortality. It is also known that minority communities are disproportionately affected by poor air quality (Erwin et al, 2011).

Smart Growth strategies help encourage people to drive less which means less vehicle pollutants are being emitted. 5,700- 7,200 population live within the 300 meters of MN-197 corridor which can have higher concentrations of air pollutants (PM, CO, Nox, and other emitted chemicals), elevated rates of asthma, cardiovascular disease, pre-term and low-birth weight infants, impaired lung development in children, and premature death (EPA,2016; Smart Growth Protects Air Quality,2016).

Green infrastructure has shown to offer many health benefits. A study done in Indianapolis, reported that neighborhoods with green infrastructure experiences less excess weight gain in children (Bell, Wilson, Liu, 2008). It is also known that green streets can provide many health benefits which include: pleasant environment for bicycling and walking, improves street crossing and reduces vehicle volume and speed and/or reduced crossing distance, improves air quality, when used as curb extensions, edge islands, medians, it can also reduce motor vehicle speeds along a corridor.

CHAPTER 5: RECOMMENDATIONS

Introduction

The recommendations were developed by the HIA Project Team and Advisory Group, with community input. The recommendations are high–level, allowing local transportation engineer experts (MnDOT, City, and County) to determine what specific applications (infrastructure modification) would work best along this corridor. Feasible recommendations have been grouped by an overarching goal for each identified health priority; physical activity, traffic safety and air quality. The future recommendations road design modifications will encourage active transportation, street connectivity and crossings, and built environment enhancements through adaptation of complete street polices.

This chapter will offer recommendations that will focus on enhancing the health in and around this corridor through findings from scientific literature reviews, best available primary and secondary data sources, as well as previous community plans and reports. Please see Appendix A for recommendations from existing reports that were utilized and that pertained to this corridor to help guide this HIA process.

SOCIAL ECOLOGICAL MODEL

The recommendations for this HIA are consistent with the Social Ecological Model (SEM). Health determinants shape the health of a population; this can be demonstrated within the Social Ecological Model (SEM), which is a framework consisting of five domains (McGinnis et al, 2002). The SEM domains include: Individual Factors, Individual Behaviors, Public Services & Infrastructure, Living & Working Conditions and Social, Economic & Political Factors. (See Image 14 SEM based on Dahlgren and Whitehead's 1991 model of the social determinants

Image 14 provides a framework of the Social Ecological model domains

Recommendations and Health Priority Goals

(Adapted from the CDC Recommendation for Improving Health through Transportation Policy; Complete Street and Smart Growth strategies; and other sources)

- **Physical Activity Goal**

Develop new opportunities along MN-197 to influence physical activity through built environment changes, creating a more healthier, active and sustainable community

- **Traffic Safety Goal**

Implement traffic calming features that increase safety for all users and abilities of MN-197

- **Air Quality Goal**

Improve air quality through implementing complete street design

The built environment affects the way in which people work, play and live their lives which also shapes their health directly through choices and their behaviors (Braveman, Egerter & Williams, supra note 5). Certain population groups are at higher risks for poor health. Social and environmental factors that influence health include race, income, education as well as transportation choices and safety of a community. These issues need to be addressed to attain health equity (see definition below) where all people are able to live as healthy as they can possibly be.

Focus on redesigning MN-197

This rapid HIA has identified road design modifications through complete street strategies to help eliminate the physical barrier and economic burden that MN-197 places on many people living in and around this neighborhood. Although a bike boulevard or a road diet (Appendix B) along MN-197 would help eliminate the physical barrier and could provide a more walkable and bikable community, these recommendations would decrease the functionality of the road and are not feasible when considering the traffic volume along this corridor, the projected population growth and the retail sales trends. The population increase within Beltrami County by the year 2030 is 15.12% growth with an increase of 16,820 people (Mapping America's Future 2015). In 2006, a study was conducted on HWY 197 and found that by the year 2030 the motor vehicle traffic volume per day will be estimated to hold 20,000-38,000 (AMA, 2008). Currently the road ranges from 12,000-19,000 vehicles per day which places this corridor at maximum capacity in some areas already.

MNDOT engineer stated that "MN-197 is a very high volume road with no shoulders and numerous high volume entrances. An off system trail along MN-197 may be viable in areas where development is setback from the highway, but users will still need to navigate entrances and public street crossings."

HEALTH EQUITY—achieving a "high standard of health" for everyone in a community while at the same time concentrating on populations within that community that are at a disproportionate risk for poor health because of social factors (Braveman, supra note 24)

The most current U.S Census studies show evidence that not just Bemidji's population is growing, but the Greater Bemidji area is as well. A community profile was done for Greater Bemidji and shows to be steadily increasing with expected numbers for the year 2021 to have 40,545 within a 15 mile radius and 64,604 at 30 miles (See Appendix C of a Map and projected population within Greater Bemidji) (Bemidji Pioneer, 2016). Since 197 MN-197 is a main arterial road bisecting the City of Bemidji. Bemidji is also known as a regional hub for many other towns within Greater Minnesota. These recommendations for this HIA have focused on how to best apply Complete Street strategies and concepts along MN-197. These recommendations will encourage developers to design adjacent street to have better marked crossings, and traffic calming features, bike boulevards which can increase traffic safety by alerting motorists as well as encourage walking and biking.

Benefits of Complete Street:

Complete Streets are in place to assure that future design is safe, accessible for all users and abilities, including pedestrians, bicyclists, seniors, children, low-income residents and persons with disabilities (Minnesota Physical Activity Survey, 2007). This policy works with communities and stakeholders to "ensure all needs are considered for state road projects, removing barriers and simplifying road design to allow local cities and towns the flexibility to create safer roads for all of their users" (Minnesota Physical Activity Survey, 2007). The U.S Centers for Disease Control and Prevention have recommended that communities and states pass laws that encourage built environment modifications that encourage physical activity. The evidence suggests creating easier transportation options through developing places that encourage walking and biking for transportation.

The possibilities for improving the health through transportation can expand the "availability of, safety for, and access to a variety of transportation options and integrate health enhancing choices into transportation policy…" to save lives and promote quality of live (CDC Recommendations 2010).

The main key benefits of complete streets include but not limited to:

Safety: It is the goal of complete street standards to increase the safety of all users. The state of Minnesota alone has had more than 500 pedestrians and bicyclist have been killed and over 20,000 have been injured (Complete Street Coalition). Complete Streets help calm traffic on residential streets; create a more walkable and bikeable neighborhood and community interaction (Complete Street Toolkit).

Public Health: Future designs that create a more walkable and bikeable community will generate more opportunities for people to be more physically active, which can improve the health of a community as well as eliminate health care costs over time.

Access and Transportation Equity: 40% of Minnesotans do not drive (children, seniors, people with disabilities, and people who cannot afford a car). In Bemidji the annual transportation cost for a household is over $12,000. This is about 1/3 of a household expense is placed on transportation.

Affordable Transportation Choices: 28% of residents in Bemidji have low/no car access. Complete streets help foster the idea to provide other modes of transportation options (biking, walking, and transit) to help

cut down transportation expenses. Transportation costs can be decreased through encouraging local infrastructure to support active transportation, which helps replace car trips with active transportation options. It is important to understand that although families need alternative options, inadequate bus stops, dangerous street crossings and high traffic speeds can discourage living active.

Environment: Complete streets support many transportation options that help lessen dependence on oil and promote cleaner air.

Cost Effectiveness: Perception of convenient, safe and connected walking and bicycling infrastructure has shown to not only promote health but suggests that complete street design is cost effective (Cavill et al,. 2009).

Recommendation #1: Prioritize policies, enhancements, and maintenance of MN-197 northern corridor and broader Bemidji area transportation system that enable safe access for all users including pedestrians, bicyclists, and transit riders of all ages and abilities. Future design can improve the health of low-income residents, residents with limited/no access to a personal car, college students, population with disabilities, and resident with short commute times to work or services.

This recommendation is based on the scientific literature showing street connectivity (streets with higher connectivity offer smaller shorter blocks, more places to cross roadways, and provide shorter or more pleasing routes (Active Living Research)) is associated with more active travel to school and work (Ewing et al., 2010; Galvez MP et al., 2010). Traffic calming features along MN-197 can offer safer access to lead active and independent lives while also complying with the American with Disabilities Act (ADA)**. Active Living research suggest that the less car travel per capita, the slower the traffic speed, the narrow the lanes as well as the density of the area with traffic calming features increases the safety of pedestrians and bicyclists (Litman T, 2004).

Main Street Highways are based on complete street strategies, which can increase safety and accessibility. Components of Main Streets enable communities to maintain “historical and community identity, encourage economic growth and environment stewardship, and ensure infrastructure accessibility for all users of all ages, all abilities, and all modes of transportation” (Nicholls et al., 2011).

Components of Main Streets that could be applied along Mn-197 and adjacent streets include:

1. Improve crosswalks and sidewalks on MN-197
2. Additional signage and traffic calming measures
3. Parking racks placed on selected corners
4. Street furniture, trees, and landscaping elements implemented on adjacent streets
5. Native landscaping and buffered sidewalks which could have a traffic calming effect

The following images were captured from google streetview to provide a sample of what the existing conditions on MN-197 look like. These images point out the lack of connecting sidewalks and poor street connection.

Existing Conditions of Sidewalks on Paul Bunyan Drive near the Mall captured from Google Streetview (2016)

Recommendation #2: Implement traffic calming features along MN-197 that will offer safer crossings for pedestrians and bicyclist and promote reduction of traffic speed.

This recommendation is based on lowering the traffic speed, reducing traffic injuries and deaths, through traffic calming features along MN-197. While, lowering the speed limit is one solution, it is not the only way to reduce traffic speeds and promote active transportation. Studies show that pedestrian injuries and deaths are more than twice as likely to occur in places without sidewalks and more than 40% of pedestrian fatalities occur where no crosswalks are available (Eitler et al., 2013). Currently, Bemidji Ave (Segment 1) has few traffic calming features to raise awareness of pedestrians and bicyclist who may be using this corridor. Implementing complete street strategies along MN-197 will be beneficial in aiding to decreased accidents that have occurred due to high volumes of traffic and traffic speed as well as promote active transportation through improving the non-pedestrian friendly crosswalks on this corridor. Traffic management can also be obtained through traffic calming features through diverting active transportation options to other adjacent facilities (ex. bike boulevards). Structural changes along MN-197 such as marked crossings could increase positive health outcomes and direct ped/bike traffic in a safe way across MN-197. Some structural changes include:

- Explore bike boulevards** on adjacent streets; examples include color painted bike lanes, pavement markings, and bike/ped signage. For more information http://altaplanning.com/resources/small-town-rural-multimodal-networks-guide/
- Accommodate all roadway users with comprehensive "complete streets" design measures such as: complete sidewalks, share the road signs, well-defined crosswalks.

Bike Boulevard

****Bicycle boulevards** are streets with low motorized traffic volumes and speeds, designated and designed to give bicycle travel priority (See Picture below on the left). Bicycle Boulevards use signs, pavement markings, and speed and volume management measures to discourages through trips by motor vehicles and create safe, convenient bicycle crossings of busy arterial streets" (NACTO; Bicycle Boulevards)

Consider adding clear pedestrian and bicyclist signage along MN-197

Consider implementing Bike Blvds. on adjacent streets of MN-197

Photos above are from the Bicycle Boulevard Guidebook. The purpose of signage on bicycle boulevards is to identify routes to other bicyclist and motorists as well as warn users about changes in road conditions.

http://www.pdx.edu/ibpi/sites/www.pdx.edu.ibpi/files/BicycleBoulevardGuidebook%28optimized%29.pdf

- Create a more welcoming environment with green infrastructure that will enhance the built environment for pedestrians and bicyclists which reduces the speed of traffic on MN-197 and adjacent streets. Provide streetscape amenities such as benches, landscaping, lighting, and public art along Bemidji Ave N.

Maintenance and Adoption of Bike Boulevards

- Bike Boulevards includes replacement of signage due to wear and up keep on pavement markings
- Minneapolis, MN, Berkeley, CA, and Vancouver, BC, use a modified street name sign with distinctive coloration and a bicycle symbol to indicate bicycle boulevards (NACTO; Bicycle Boulevards).

Signage	Identification Signs Wayfinding Signs Warning Signs
Prioritize Bicycle Travel on Bicycle Boulevard	Pavement Markings Stop/Yield Signs
Intersection Treatment	Bicycle Boxes/Advanced Stop Bar Bicycle Activated Signals Bicycle Activated Signals - Scramble Bicycle Activated Signals -Other Signals High Visibility Raised Crosswalk/Crossbike Crossing Islands Crossing at Off-Set Intersections
Traffic Calming	Traffic Circles Speed Tables Painted and Patterned Surfaces Chicanes Curb Extensions Residential Speed Limit Advisory Bicycle Lane Contraflow Bicycle Lane
Traffic Reduction	Non-Motorized Only Crossings Partial Non-Motorized Only Crossings

Figure 1 above explains the Bicycle Boulevard Design Elements from the Bicycle Boulevard Guidelines http://www.pdx.edu/ibpi/sites/www.pdx.edu.ibpi/files/BicycleBoulevardGuidebook%28optimized%29.pdf

Maintenance and Adoption of Green Infrastructure

- Place street trees and plantings in medians, chicanes, and other speed or volume management treatments
- Plants used in green street treatments should be selected to the local environment. Design should consider local conditions such as freezing, salt spray, flooding, and drought as well as pollutant and debris accumulation (NACTO; Green Infrastructure).

"When done properly, traffic calming balances the needs of all users of a street: drivers, bicyclists, pedestrians, and others, helping to restore the safety and peace in neighborhoods that have been overwhelmed with speeding and/or cut-through traffic. Many traffic-calming enhancements have the added benefit of providing attractive landscaping for the street, establishing a greater sense of place, which entices residents to spend more time outside enjoying their neighborhood" (US Department of Transportation, 2002).

Recommendation #3: Track and report key environmental health indicators that will identify concerns for active modes of transportation related to air quality, safety, access, comfort and convenience.

In order to design most effectively and mitigate health risk as well as the risk of a proposed transportation project, it is important to track and report key environmental health indicators. Indicators are needed to help monitor and identify trends happening within health and the environment. This recommendation is to raise awareness about the need to monitor and track health indicators. Indicators help investigate potential links

between the built environment and health as a way to inform new projects and policies. Some specific tracking indicators that should be considered along MN-197 include:

- Monitor bicycling and walking rates and injuries by age and race and ethnicity. This will help provide a better understanding on who is walking and biking and how to best serve this community,
- Track and monitor ambient concentrations of air pollutants in and around MN-197. Mean annual concentrations of ozone, CO, particulates (PM10, PM 2.5, SPM) SO2, NO2, O3. This indicator suggests that outdoor levels of air pollution in certain areas represent a main source of exposure and health risk. Those residents who live along MN-197 have higher levels of exposures which can cause respiratory illness. Distinguishing the variation of levels of potential exposures for certain populations and households. Currently, there are no air monitors within Bemidji.
- Track and monitor respiratory illness in children due to acute respiratory** infection in children under five years of age (hospital discharge data). For this indicator you will need the number of cases of acute respiratory infection in children under five years of age and the total number of children under five years of age (this is a long term indicator).
- Continue to track average annual daily traffic
- Consider policies that reduce vehicle miles traveled (VMT); these policies can include vehicle miles traveled tax, tolls, or congestion pricing in downtown areas.
- Continue to track bike/ped crashes along MN-197

** **Acute respiratory infection** (ARI): an acute infection of the ear, nose, throat, epiglottis, larynx, trachea, bronchi, bronchioles or lung.

Case Study in Columbia, MO: The Active Living Research Health Impact Assessment reviewed the impact of a signalized crosswalk in Columbia, MO concluded:

"An at-grade signalized pedestrian crosswalk and landscaped median significantly impacted both pedestrian crossing behaviors and vehicular traffic behaviors. Specifically, the installation of the pedestrian crosswalk yielded reduced proportions of illegal crossings (especially among children), and reduced the percentage of vehicles speeding on the highway through the neighborhood at the Intervention site" (Active Living Research, 2012).

Recommendation #4: Collaborate with MNDOT and Bemidji State University to set up automated bike counters and establish strategic locations to track daily bicyclist's usage within Bemidji in the fall of 2017.

Bike Counts

In order for transportation planners and engineers to respond properly to the demands for bicycle and pedestrian improvements, it is important to generate information about traffic volume patterns. This can be used to inform state, regional and local planning and engineering initiatives to look at what policies and programs would work best. The purposes of the permanent monitoring stations are to:

1) track trends in traffic over time, to provide insight into exposure to risk for safety analyses,

2) to identify patterns in traffic that can be used to interpret and extrapolate short-duration counts into annual traffic estimates, and
3) to develop performance indicators to track progress relative to MnDOT goals and objectives (Bicycle and Pedestrian Traffic Counts MNDOT).

Some additional information on how counts are currently being done by MnDOT

How are counts being done?

• Manual – some communities organize manual counts in the fall during peak periods.

• Automated portable equipment – used to periodically measure traffic in a location. The extrapolation factors are applied to this data to estimate average daily traffic (ADT). Portable equipment is also used to get before and after volumes.

• Automated permanent equipment – set up at index sites statewide to develop factors that can be applied to short duration counts to estimate ADT and show statewide trends.

How will the data be used?

• Traffic Safety Engineers will compare increases/decreases in biking and walking to the number of crashes to get a crash rate and report on safety trends.

• Transportation Engineers will determine average pedestrian or bicycle traffic to decide the best design to use and if the location meets the required warrants.

• Planners will compare before and after volumes to learn more about what facilities and locations are the most successful. This will also help prioritize where to make investments.

- Work with MnDOT District 2 offices, Bemidji State University students and Bike Bemidji to install permanent index monitoring sites (bike counters) throughout the city near MN-197 to track and monitoring effectively bike infrastructure improvements.
- Measure levels of walking and biking among community resident before and after implementation of road design changes along MN-197. It is important to track non work related active transportation trips within Bemidji. Below provides an overview of why it is important.

Why Count in the Community?

- To receive a better understanding of how many people ride and walk in Bemidji
- To determine where are they riding the most " hot spots"
- To determine if there are any areas where they are riding or walking which do not have adequate facilities
- To help MnDOT understand bicyclist and pedestrians and assist them in planning and model for their activities

- To determine a baseline count for MDH for their performance measuring of the effectiveness of CTG Active Transportation Grant Funding

Who will do the counts? The bicycle counts require a minimum commitment of 2 hours. Potential groups to reach out to for volunteers include:

- Active Living Bemidji Group
- Sustainability Committee
- BSU Phy Ed Students
- BSU Geography Students
- Bike Club
- Harmony Co-op
- Fitness Groups
- Park and Rec Participants
- Bike Bemidji Members

Where will the counts be taken? See Appendix C of previous site locations which were in 14 locations and one location on the north side of Lake Bemidji.

What information will be collected?

- Number of men, women, boys, and girls bicycling
- Number of men, women, boys, and girls walking
- Number of men, women, boys, and girls walking with an assisted device such as wheel chair, incline skating, skateboarding, etc

When will the counts be conducted? The counts will be completed on 4 different dates starting in the spring of 2017**;** there may be one site downtown Bemidji where there is a 12 hour count from 7 am – 7 pm.

How will the counts be taken?

The counts will be taken by volunteers at the specific times and sites chosen for the count.

Recommendation #5: Designate bike boulevards on adjacent streets to MN-197 using street design enhancements from Complete Street standards.

The Centers for Disease Control and Prevention suggest that bicycle-supporting infrastructure promotes active transportation. Some examples of these modifications on adjacent streets would include shared-use paths, protected bikeways, cycle tracks and programs that reduce motor vehicle traffic and vehicle speed on neighborhood streets. Designating bike boulevards creates a safer environment for vulnerable populations to connect to schools, public transportation and parks. This can support Safe Routes To school (SRTS) programs by eliminating barriers of unsafe connections and increasing convenience and comfort (Krizek KJ et al., 2009).

This photo provides an example of what a bike boulevard could look like. Improving street crossings, widening sidewalks, and implementing other traffic calming enhancements can lower the speed of vehicles which can improve the feel of the built environment for bicycling, walking and sitting.

"Identifying a bike route along adjacent streets that have a much lower traffic volume would be safer to the users, more viable to construct (may only require striping a bike lane) and can still provide the connectivity desired"- MNDOT Engineer 2016

Physical Activity Interventions for MN-197 Northern Corridor

The Community Guide is a credible source to plan and adopt the proper interventions that address health risks within a community and to promote physical activity and prevent and control obesity. These Task Force recommendations can support communitywide campaigns, point-of-decision prompts to encourage using stairs, school-based physical education, social support interventions in community settings, individually adapted health behavior change, and creation of or enhanced access to places for physical activity combined with informational outreach activities (Guide to Community Preventive Service, 2016; MMWR,2001). Below is a list of interventions that could be considered to promote physical activity as well as obesity prevention and control.

Promoting physical activity	Obesity prevention and control
• Creation of or enhanced access to places for physical activity combined with informational outreach activities	• Technology-supported, multicomponent coaching or counseling interventions to reduce weight
• Mass media*	• Technology-supported, multicomponent coaching or counseling interventions to maintain weight loss
• Street-scale urban design and land use policies	• Worksite nutrition and physical activity programs
• Community-scale urban design and land use policies	• School-based programs promoting nutrition and physical activity*
• Point-of-decision prompts to encourage use of stairs	*The Task Force issued "insufficient evidence" findings for mass media and school based programs promoting nutrition and increased physical activity. This does not mean that these interventions do not work. It means that more research is needed for the Task Force to determine if they are effective. The Task Force encourages those who use insufficient evidence findings to evaluate their programs. Findings and recommendations from the Community Preventive Services Task Force (Task Force) in The Guide to Community Preventive Services (The Community Guide).
• Social support interventions in community settings	

CHAPTER 6: EVALUATION AND ON-GOING MONITORING

The main two purposes of Chapter 6 is to 1) evaluate the rapid HIA process and identify any challenges and enabling factors that may have occurred and 2) monitor the decision outcomes as well as the health impacts addressed. This rapid HIA has had multidisciplinary collaboration which has allowed for new opportunities amongst different sectors within Bemidji to connect.

Process Evaluation

The process evaluation is used to assess how the HIA was designed and executed.

Process Evaluation Question	Process Evaluation Answer
Did the HIA meet its established goals?	This HIA has met the established goals to impact the health through: 1) Built environment recommendations, 2) Building relationships through collaborating with many decision makers within the community, raising awareness about health impact assessments , and 3) Provided more public input for MnDOT that will encourage health to be prioritized as a main determinate for future road design
Were the right people involved in the HIA?	Most. We had stakeholders from MNDOT, City of Bemidji, MDH, Minnesota Air Pollution, local businesses, Bemidji State University students and faculty, and public schools teachers. It would have been helpful to have more input from the schools and daycares along this corridor
What are the results from the Evaluation surveys your steering committee members completed?	Results of the post evaluation survey showed that this HIA was an effective tool. One respondent concluded that they would have liked to look at all the options concerning improvements to MN-197 infrastructure before making a decision. Another respondent stated "MNDOT will look for low cost, short term solutions to address recommendations that are viable. The HIA will be used during the project scoping process that will occur in the next 5 years."

It is important to develop appropriate communication strategies for specific population groups when speaking about this HIA. For example, it is necessary to find the most effective strategies to communicate to specific groups of people such as: community residents, planers, policymakers and other key decision makers within the community. Some examples of communicating this rapid HIA on MN-197 include: presentation, press release, testimony, website and/or a newsletter.

Rapid HIA Goals on MN-197 Northern Corridor

Goal 1: Complete HIA scope of work which includes: 1) Introduction; 2) Fact sheet 3) Screening and the stakeholders engagement plan 4) Scoping 5) Baseline assessment 6) write recommendations and 7) Evaluation and on/going monitoring

Goal 2: Build relationships through collaborating with multidiscipline within the community; Engage and partner with community members in hopes to bring a complete understanding of why an HIA is important for future road design and the health of a community. Facilitating dialogue between stakeholder can established built-in support for moving the process forward as well as other future planned projects within a community.

Goal 3: Recommend the built environment modifications along MN-197 and present key findings to key decision makers

Goal 4: Provide more public input for MNDOT that will encourage health to be prioritized as a main determinate for future road design.

Goal 5: Commit to creating awareness about Health Impact Assessments through presentations and ongoing communication with key decision makers

Input from participants and stakeholders

A post evaluation survey was distributed to the Advisory Group and Project Team to gather input on their experience with Bemidji MN-197 HIA. The post evaluation survey questions and responses overall identified that this rapid HIA was a positive and well informative experience for most of the Advisory Committee. The survey was administered at the end of August 2016 to collect input on how the HIA process was perceived by the stakeholders.

Below are the included responses from the survey questions..

1. **What setting best describes your work?**

Respondents were from: 1) State government and 2) private sector

2. **What best describes the sector you represent?**

The respondents were from the following sectors:

- transportation,
- health, and
- private business

3. **After participating in this HIA, how would you rate your level of knowledge of an HIA?**

On a scale from 1 (none) to 5 (excellent), about 50% of the responses suggested they had a moderate (4) level of understanding of what an HIA was after participating in the MN-197 rapid HIA.

4. **Check any of the following that you achieved by participating in this HIA?**

All responders checked:

- Better understanding of the connection between health and the design of MN-197
- Networking opportunities with other people interested in MN-197
- Learning about the HIA process

Other participants were able to check:

- Provided comments and suggestions to inform the redesign of the MN-197
- Ensuring that the redesign of MN-197 benefits the health of Bemidji's residents
- Identifying more resources for designing and reconstructing MN-197

5. **Is there anyone else that should have been invited to participate in the HIA?**

Some other key decision makers that could have been invited to participate include: Representatives from Beltrami County, Chamber of Commerce, School officials (principals, teachers, aids, crossing guards), and other organizations and businesses along MN-197.

6. **Based on your experience, do you think this HIA was an effective tool for this project? Why or why not?**

The majority of the Advisory group members responded that this HIA was an effective tool that focused on the health of residents along MN-197. Below are some quotes from the Advisory Group:

- "Yes, it was effective in focusing on the health of Bemidji residents who are affected by many factors associated with MN-197 such as safety and air quality. In some ways it might have been helpful to hear all possible designs before discussing other issues. On the other hand, that may have stifled some of the possible solutions."
- "Very helpful tool to expand the planning and collaboration process to include more of the considerations and impacts of health factors for our community, since MN-197 is the main artery of the town, on so many different levels. It was great to have the facilitation and background work done and to be shared for further discussion throughout the process also."
- "It was helpful networking with local stakeholders; it opens the door for alternative solutions that may have gotten overlooked. It looks at design from a different lens than MNDOT typically looks at. Pending recommendations, I believe it was an effective process."

7. **Please share any additional comments about participating in this HIA and/or plans for implementing the HIA recommendation or other activities that came out of the HIA.**

- "This HIA provided a big picture of the issues surrounding MN-197. Perhaps this process should precede any major road construction so that the difficulties of Mn-197 are not repeated."
- "After learning more about the HIA process, it is easier to envision the value of the application of the process and diversity of partners to other decisions that impact health in our communities in the area also."
- "MNDOT will look for low cost, short term solutions to address recommendations that are viable. The HIA will be used during the project scoping project that will occur in the next 5 years.
- "What I appreciated, perhaps for selfish reasons, was learning more about the various local government units and state agencies involved in a project like this."
- "I was pleased to see how interested MNDOT is in making their corridors more bicycle and pedestrian friendly. This seems to be a departure from previous administration philosophies. I look forward in follow up discussions."

Impact Evaluation

An impact evaluation addresses to what degree the recommendations were adopted and implemented within the scope of the HIA as well as what role the HIA played in influencing the decision-making process.

The impacts of the recommendations are unknown at this time because of the scope of the rapid HIA. This HIA's focus was on future road design modifications along MN-197 right-of-way. The recommendations are to be considered to improve complete street design characteristics that seek to enhance and protect the health of the community in future plans and projects. One decision maker within our Advisory Group stated, "MNDOT will look for low cost, short term solutions to address recommendations that are viable. The HIA will be used during the project scoping project that will occur in the next 5 years." One important impact noted within this HIA was the change in attitudes towards incorporating health within decision making process and plans. An Advisory Group member stated in the post evaluation survey, "I was pleased to see how interested MNDOT is in making their corridors more bicycle and pedestrian friendly. This seems to be a departure from previous administration philosophies. I look forward in follow up discussions." There is documentation of key stakeholders expressing interest and willingness to explore and address health into decisions making process and plans.

This HIA has helped leverage this new paradigm shift to commit to placing health as priorities within all decision making efforts.

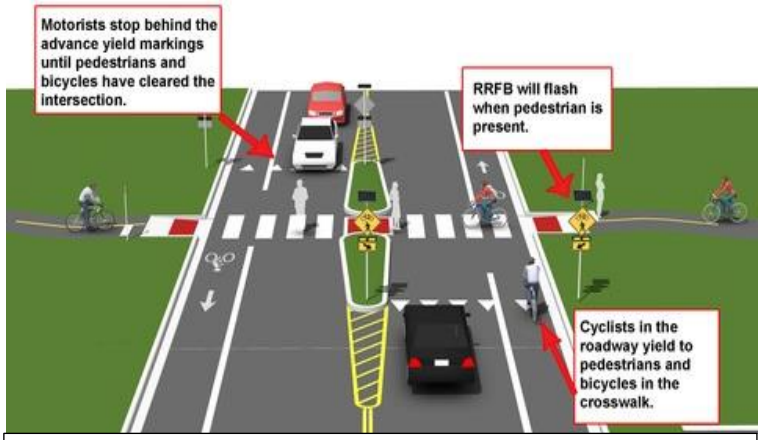
Story from Advisory Group Meeting #3

The Advisory Group meeting held in July provided key decision makers to share input on future road design changes along MN-197. This meeting brought up the new Gene Dillon Elementary school that will be built within the next few years. This school will be located off of Division Street and Becida Road west of Bemidji High School. The concerns of placing a new school building at this site filled the room. Although this rapid HIA on MN-197 is not directly related to this specific concern, the decision makers around the table suggested that the HIA findings and recommendations be given to County Engineers to address all traffic issues raised by increased activity and how one may implant health into the future design of this school. The Bemidji Pioneer wrote an article about the environmental impact of the new school and provided some input on walking and biking to school. "The district is open to working with the community to incorporate a plan for adequate trails for students to walk and bike to school" Currently Division street is in need of improvements because as Bruce Hasbargen a County engineer stated "the roads current condition and have to be addressed regardless of the school project." This story offers an example of one of the HIA intended goals to raise awareness to further explore other opportunities to integrate health within future infrastructure and design projects within Bemidji and the greater Bemidji area.

Outcome Evaluation

Monitoring

Monitoring is an essential component of tracking the decision outcomes as well as the effect of the health impacts along MN-197. Monitoring plans are important to make sure that the HIA recommendations are being implemented as well as being effective.



An RRFB at a mid-block crossing alerts drivers when a pedestrian or bicyclist is crossing.

Currently, MNDOT has already started to incorporate traffic calming features along MN-197. A Rectangular Rapid Flashing Beacon System (RRFB) has been placed along Bemidji Ave near Bemidji State University and a new residential complex building (16th street). The implementation of this started in the summer of 2016 which supports recommendation #1 and #2. The photo to the right shows what this RRFB looks like along MN-197. This shows how the HIA has directly impacted the decision making processes and supports the interest in safer bike and walking infrastructure; improve built the environment to increase positive health of all users.

These images show the existing conditions along Bemidji Ave on the MN-197 Northern Corridor

Another project that will be implemented along Mn-197 in the Spring/Summer 2018 will enhance the visual appeal of downtown Bemidji, reduc crosswalk maintenance, and increase pedestrian safety. This project will be carried out by project manager and City engineer, Craig Gray, who is on our HIA Advisory board. Crosswalk reconstruction will be done at the intersections of 2nd S NW, 3rd St NW, and 5th St NW with TH 197 (see Image). The existing crosswalks will be replaced with a decorative Duratherm Thermoplastic material, placed

in certain designs chosen by the City of Bemidji. This durable material will last longer, reducing maintenance costs over the long-term. The brighter and larger crosswalks will also enhance safety for active modes of transportation (walking, biking, and transit). As motorists approach the improved crosswalks, it will draw their attention to be more aware of non-motorized transportation and pedestrians. The total estimated cost for this project includes $245,200 (196,000 (FHWA) and 49,000 (local). MnDOT is in the design stages of a Mill & Overlay with ADA improvement project along MN-197 which is to be constructed in 2017. After this project is finished, the proposed crosswalk improvements will begin. The thermoplastic pavement marking product requires pavement temperatures to be 45 degrees Fahrenheit and rising for best installation results which is why the City of Bemidji has opted to plan for a fall of 2017 letting and 2018 construction in order to eliminate threats due to the mill and overlay project being constructed in 2017.

In the spring of 2017, I hope to continue to work with key decision makers and planners towards implementing these HIA recommendations along MN-197. The timeframe for tasks to be implemented as well as to be communicated are outlined below.

- Once this rapid HIA report is finalized, check in with MnDOT to review recommendations in early 2017 to establish a timeline for the implementation process.

- Within the 2017-2018 school year track and report usage of pedestrian and bicyclist who use this RRFB. Track and report pedestrian and bicyclist safety issues using the RRFB. Examine before and after person-hours of walking and biking and per capita vehicle miles traveled along this corridor with this new RRFB. Conduct a survey to gather information about pedestrian and bicycle usage of this RRFB to see if it may be useful in the future to build another one closer to downtown.
- Within the 2017-2018 school year identify Bemidji State students to set up permanent bike count monitoring stations. Collaborate with MnDOT to train and monitor these stations.
- In September 2016, I had the opportunity to present key findings and recommendations at the Northwest Environmental Health Association (OEHA) meeting which will contribute to advancing the field of HIA work.
- Early 2017, present to key stakeholders and community members on the main findings and recommendations.
- Spring of 2017, Continue to work with local bike advocacy groups (BikeMN and Nice Ride) to identify ways to support ongoing implementation efforts along the MN-197 northern corridor and the broader Bemidji area transportation system . Identify volunteers from these local bike advocacy groups to help conduct a bicyclist audit to formulate a baseline assessment of this area. Use the CDC
- Continue to establish a working relationship with City and County Engineers to investigate what complete street designs would work best for bike boulevards on adjacent streets to MN-197. This would work to implement Recommendation # 5. Work to find underutilized roads that could be converted into bike boulevards. For more information on technical ideas see the Institute of *Transportation Engineers guide Designing Walkable Urban Thoroughfares: A Context Sensitive Approach.* Work to create communication about implementing bike and trail infrastructure within the initial planning for the Gene Dillon Elementary school.
- Collaborate with MNDOT to conduct a pilot study that was proposed by the Bemidji Bicyclist plan that would explore placing buffered bicycle lanes adjacent to MN-197. Identify funding opportunities and when this pilot project could be implemented. This would be working towards Recommendation #5.
- Within the next 6 months write a summary on the success of participation amongst the stakeholders and why Bemidji's HIA found success.
- Write an updated status report in 2018 that will incorporate updated built environment changes along MN-197. This report will establish what has been done and include update on the work that has been accomplished. The CDC's Built Environment and Health Initiative report which will include: human health indicators update and built environment indicators address on MN-197. This report will utilize data as a base to be responsive to how the improvements on this roadway have impacted the quality of life for all users of this roadway. This annual report will provide a way to communicate the impact these recommendations have had on the community as well as communicate success stories. This report will be updated every year to keep decision makers and stakeholders engage and up to date with the success of this HIA.

Rapid HIA Tracking: Impact and Outcome indicators

Impact Indicators	**Measure (how will you capture whether the impact was achieved?)**	**Person Responsible for tracking (i.e. HIA practitioner, collaborating partner, etc.)**	**Method of follow-up (phone, email stakeholder, in-person, online search)**	**Timing of follow-up**
Evidence of HIA influencing policy decision	Write an annual report which creates a sense of ongoing purpose and accountability	HIA planner and collaborating with other partners	Email	1 year after the HIA report is released (January 2018)
Evidence that recommendations were implemented	Write in the annual report on what recommendations have been implemented or to what degree they have been adopted	HIA planner collaborating with MNDOT and other key decision makers	Email and phone Communicate with Project Team members on success stories of the implementation of recommendations	1 year after the HIA report is released (January 2018)
Evidence of increased collaboration with community stakeholders, agencies outside the traditional health sector	Continue to collaborate through email with stakeholders about best ways to implement recommendations	Key Stakeholders	Email to key decision makers and the HIA project team and advisory group	After report is released: March 2017

Appendix E has an updated report that was sent to Minnesota Department of Health for their CDC Annual Report.

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Appendix A

Full Details from Stakeholder Engagement Plan

Potential Stakeholders

Stakeholder Group (Description/Key Contact)	*Interest level in HIA or related decision*	*Current influence level on decision*	*How/when to engage*	*Potential role in HIA*	*Barriers to engagement*
MnDOT District 2 (Darren Laesch - planner, Bill Pirkl - traffic engineer, Craig Collison - DE)	High - They are supportive of the HIA process and pledge to be regular participants. They also believe this HIA can inform their long-term project selection.	High - They make built environment final decisions on MN 197 with repaving/ reconstruction projects, potentially including complete streets/traffic calming/safety improvements	Stakeholder development to HIA process end, including post-HIA evaluation	HIA Advisory Group member (multiple members), primary data source on traffic	Ability to remain neutral and disassociate recommendations from funding potential
City of Bemidji Staff (Craig Gray - city engineer)	Medium - Staff understand they are important to the HIA process but don't fully know how yet	High - Staff make changes to the auto/bike/ped built environment in the City's Capital Improvement Plan	Scoping to HIA process end, including post-HIA evaluation	HIA Advisory Group member, primary data source on traffic	Busy schedule & time commitment
City Council of Bemidji	High - Mayor and some councilmembers understand the need for the HIA and support the process	Medium - Can set policy for staff or approve/deny a built environment change to streets near/crossing MN 197	Stakeholder development to HIA process end	HIA Advisory Group invitee	Busy schedule & time commitment
Greater Bemidji JPB (Mayana Rice - Planning & Zoning Administrator)	High - Changes that MnDOT & the City make have implications on development and land use, and vice versa	Medium - Has an indirect role in better complete streets by making land use/zoning decisions	Scoping to HIA process end	HIA Advisory Group member, primary data source on land use & demographics	Busy schedule & time commitment
Bemidji State University Faculty	Medium - BSU is very close to MN 197, faculty travel along & across the roadway daily	Medium - BSU has no direct decision-making power, but they are a large organization with influence in Bemidji	Scoping to HIA process end	HIA Advisory Group member	Scheduling and an incomplete understanding of past & present MnDOT planning steps
Bemidji State University Students	High - Many students live west of the highway and must cross daily. Many students also walk/bike out of necessity, for health, or for environmental considerations.	Low - Debatable, but students have less influence than when BSU as an organization pushes for something	Scoping to HIA process end, with emphasis on scoping & assessment stages	HIA Advisory Group member, data source and research help	Busy schedule, and a lack of previous direct access to the MnDOT planning process

Bike Bemidji (Muriel Gilman)	High - A bike encouragement organization that has been pushing for better biking conditions via complete streets and engagement/education.	Low - Holds no decision-making or advisory power in city or regional bike affairs, but they know people who do.	Scoping to HIA process end	HIA Advisory Group member, qualitative data source	Scheduling - organizes a large bike event in June
North Country SHIP (Julie Flathers - coordinator)	High - HIA principles are in line with SHIP's statewide goals - better health for all through physical activity access, among other things.	Low - No decision-making power and very few funds for active living initiatives in this region.	Stakeholder development to process end	HIA Advisory Group member, qualitative data source	Scheduling & time commitment
Bemidji ISD 31 (Angie Lauderbaugh)	Medium - Two elementary schools are within blocks of MN 197, and the road marks the boundary of the school's walk zone.	Medium - Has many transportation needs related to the roadway & neighborhoods (bus, bike/ped, auto) and has some influence with MnDOT & the City	Scoping to HIA process end	HIA Advisory Group member (or invitee if B&G is member)	Scheduling - who can attend a day meeting; and an incomplete understanding of past & present MnDOT planning steps
Boys & Girls Club of Bemidji	Medium - Hundreds of students attend daily. Site near MN 197 has bike/ped transportation issues and a desire to include more safe biking as an activity	Medium - Like the schools, this is an organization that MnDOT and the City pay attention to on this issue.	Scoping to HIA process end	HIA Advisory Group invitee (or member if ISD 31 declines)	Scheduling - all staff oversee hundres of kids in the afternoon
Nice Ride Bemidji (Melinda Neville - coordinator)	High - MN 197 is a known barrier for this bike-sharing organization, separating the best facilities (lakeside trail) from most customers' homes or businesses.	Low - An organization new to Bemidji, influence is low but growing with each successful year for the bike-sharing system.	Scoping to HIA process end	HIA Advisory Group invitee, quantitative & qualitative data source (on Nice Ride usage)	Scheduling & time commitment
Health Practitioners (Diane Pittman)	Medium - Hypertension, heart disease, etc. are prevalent in our region. Health professionals have an interest in anything preventative for community health.	Low - Doctors, clinics, and hospitals have varying levels of influence better behaviors for health, but very little influence over the transportation built environment	Scoping to HIA process end	HIA Advisory Group invitee, qualitative data source	Scheduling & time commitment
Public Health (Wendy Kvale - MDH Bemidji)	Medium - Public health has an interest in physical activity access, especially in underserved communities where health risks are disproportionately higher	Low - Traditionally, public health have had a low amount of influence on transportation decisions.	Scoping to HIA process end	HIA Advisory Group member	Scheduling & time commitment
Beltrami County HHS	Low - Agency is interested in providing transportation options to services, focus is usually transit.	Low - A minor amount of influence as a county agency, but not specifically part of the decision-making process	Scoping to HIA process end	HIA Advisory Group invitee	Unfamiliarity with MnDOT planning, this HIA, and the HRDC; busy schedule

St. Phillips Church & Private School	High - Church and playground adjacent to MN 197 ROW. Children play and events held daily, drawing residents from all over Bemidji.	Medium - MnDOT District 2 has worked with St. Phillips in the past to include a crosswalk at the church across MN 197.	Scoping to HIA process end	HIA Advisory Group invitee, qualitative data source	Unfamiliarity with MnDOT planning, this HIA, and the HRDC; busy schedule
Business owners - downtown/old town	Medium - Businesses have an interest in balancing walkability & bikeability with all access to their businesses, including automobile traffic flow.	Medium - Collectively, businesses can influence a built environment decision through the public process.	Scoping (if interested), primary engagement at assessment and recommendations	Other primary engagement strategies (including surveys, interviews, etc.)	Unfamiliarity with MnDOT planning and this HIA; time commitment
Business owners - uptown auto-oriented	Low - May have interest in the HIA, but with an emphasis on not restricting access to their businesses.	Medium - Collectively, businesses can influence a built environment decision through the public process.	Scoping (if interested), primary engagement at assessment and recommendations	Other primary engagement strategies (including surveys, interviews, etc.)	Unfamiliarity with MnDOT planning, this HIA, and the HRDC; time commitments
Residents in adjacent neighborhoods	Medium - All residents are affected by the MN 197 built environment daily, whether on bike, foot, or in a car. Interest is in safety and neighborhood preservation.	Low - To the HRDC's knowledge, residents are not directly connected to a transportation decision-making process. Public meetings are held by MnDOT and the City with varying attendance.	Scoping (if interested), primary engagement at assessment and recommendations	Other primary engagement strategies (including surveys, interviews, etc.)	Unfamiliarity with MnDOT planning, this HIA, and the HRDC; time commitments
DNR or MPCA	Low - Interest exists on how air quality impacts health in this study area. Also, it's a grant requirement.	Medium - State agencies have some ability to influence MnDOT on built environment changes that affect air/water pollution.	Throughout the process, primarily as an assessment partner	HIA Advisory Group invitee, consultant	Scheduling
MnDOT Central Office	Medium - The most recent draft of the Statewide Multimodal Transportation Plan include complete streets and health in all policies concepts.	High - New statewide policies, guidelines, or design manual changes (which the SMTP influence) can heavily influence or even dictate what MnDOT District 2 decides with the built environment.	Informed at milestones of the HIA process, report and/or presentation after the HIA is completed	Inform key stakeholders of progress, possible invitee	Scheduling and time commitment; no direct need to participate if MnDOT District 2 participates
Other RDCs & Transportation Planners in MN	Medium - Other planners have an interest on how well this HIA can impact MnDOT project decisions regarding complete streets and bike/ped safety & access.	Low - At this point, planners outside of MnDOT have no direct way to influence these sorts of decisions. A successful HIA could change this.	Informed at milestones of the HIA process, report and/or presentation after the HIA is completed	Inform key stakeholders of progress, possible invitee	Scheduling and time commitment; no direct need to participate if MnDOT District 2 participates

The following information delineates the roles of participating stakeholders:

- HIA Advisory Group Members – stakeholders whose interests and potential influence in the HIA are relatively high. The term "member" means that this stakeholder's participation in the advisory process is very important. The HRDC can lean on this stakeholder for additional input, data, advice, and their participation at each Advisory Group meeting is important.
- HIA Advisory Group Invitees – stakeholders with varying levels of influence or interest. The term "invitee" means that the stakeholder's input into the Advisory Group is important and useful to the HIA and outcome decision making., thus, they have participated in all HIA Advisory Group meetings.
- Other primary engagement participants – stakeholders or groups that may not be able to make advisory meetings, but will be engaged as part of the HIA process. See the next section for other ways this group will be engaged.
- Informed parties – A group that the HRDC believes does not need to be an active participant in this HIA, but would benefit from updates and the final implications of this HIA.

Recommendations already given by the advisory group

***Road Design* recommendations from our Advisory Group and HIA project team that may influence healthy community design include:**

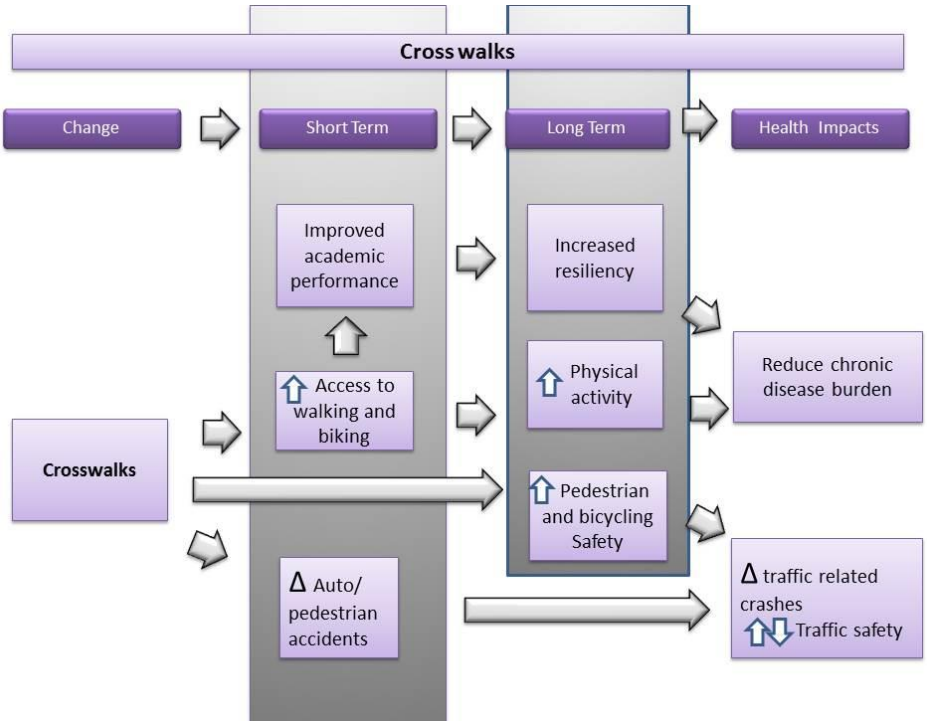
- Locate Specific crosswalk locations that would improve access and safety
- Placing the quality and safety of the pedestrian environment at highest priority.
- Create safe pedestrian and bicycling connections to schools and public parks and recreation areas through smart growth characteristic designs.
- Promote active transport through safe roadway crossings (intersections safety)
- Expand school walk zones
- Identify areas where crosswalks could be improved to address community safety and health concerns
- Handicap accessible crosswalks
- Presence of a buffer to protect pedestrian and bicyclists
- Literature from Community Guide and Complete Street
- Decrease the roadway width on HWY 197 to provide a safe refuge for pedestrians and bicyclists
- To provide a buffer with green infrastructure between the pedestrians and bicyclists and traffic on streets on block adjacent to MN-197
- Place a radar to help calm traffic
- Track traffic near-misses
- To separate pedestrians and bicyclists from motor vehicles
- Mitigate pedestrian and bicyclists hazards for residents living on the 197 corridor (ex: traffic- related air pollution)
- Narrow the width of the road; add 8 ft wide bike lanes on either side of the road; eliminating one of the lanes

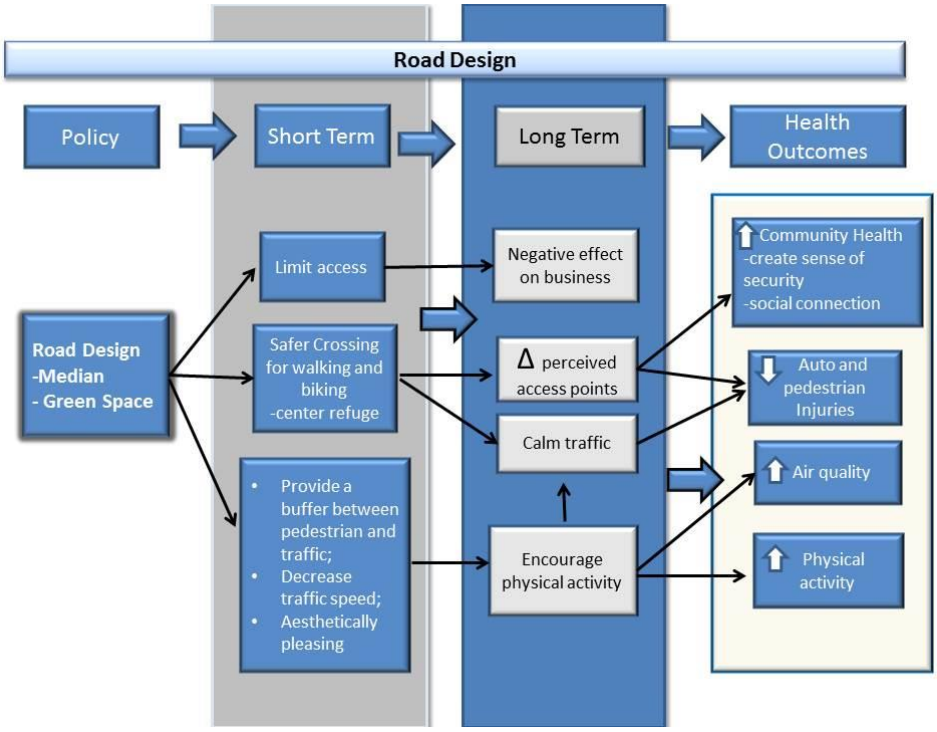
Some *Multimodal Connection* recommendations from our Advisory Group and HIA project team that may influence healthy community include:

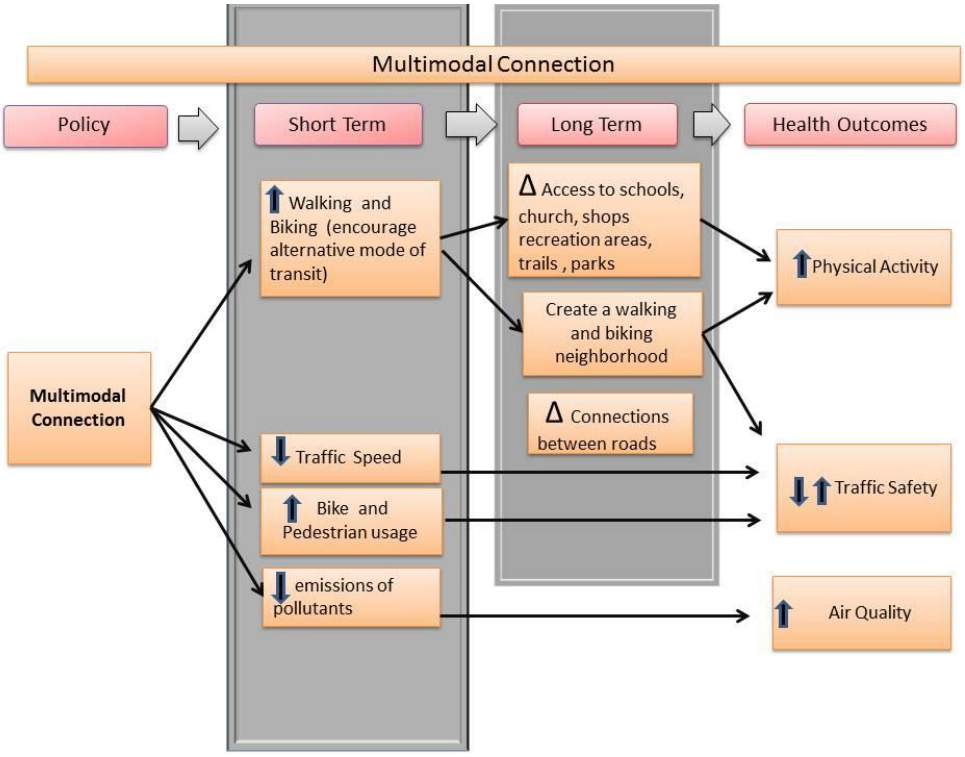
- Implement a multi-use pathway (MUP) on East-West Section of HWY 197
- Identify and mark existing low-traffic streets and add bicycle and pedestrian "cut-throughs" to the downtown, schools, parks, trails, and other recreational areas.(Bicycle Transportation Alliance (BTA))
- Create an interplay of active transportation routes;
- Room to build "third spaces" (first place is home and second place being work) ie. Coffee shops set of well-placed benches, community parks, and trails.
- Connection to the rail corridor; crosswalk and green infrastructure HWY 197
- Increase green infrastructure and aesthetics to decrease traffic speed

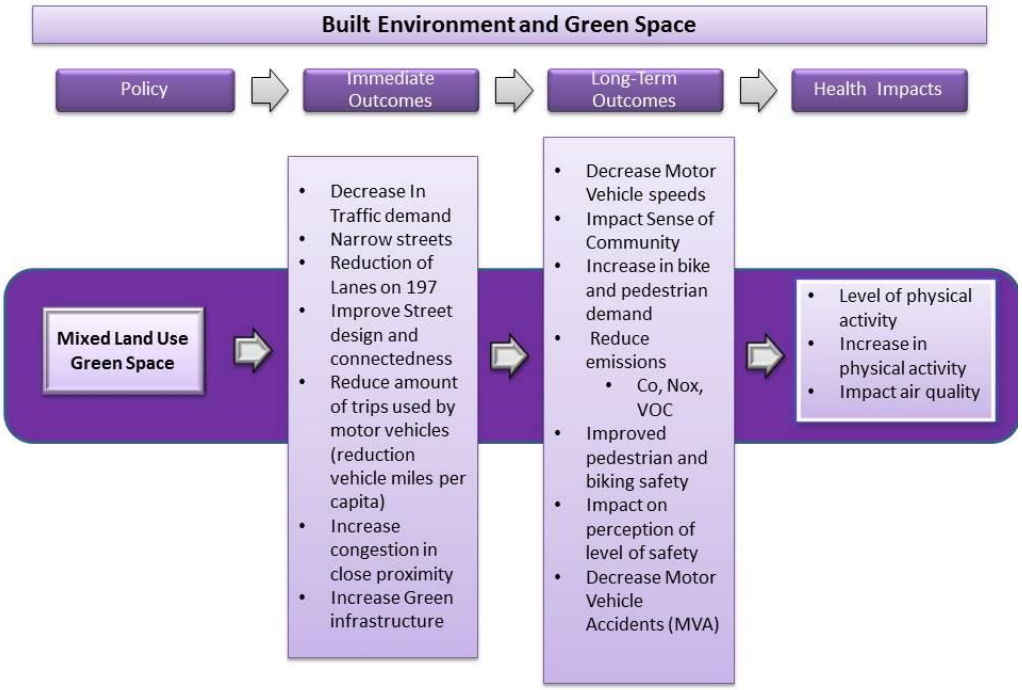
Pathway Diagrams

These 4 pathway diagrams helped formulate research questions as well as inform decision makers and key stakeholders on the scope of the HIA.




Road Design
Policy
Short Term
Long Term
Health Outcomes
Limit access
Road Design
-Median
- Green Space
Safer Crossing for walking and biking
-center refuge
Provide a buffer between pedestrian and traffic;
Decrease traffic speed;
Aesthetically pleasing
Negative effect on business
Δ perceived access points
Calm traffic
Encourage physical activity
Community Health
-create sense of security
-social connection
Auto and pedestrian Injuries
Air quality
Physical activity


Multimodal Connection
Policy
Short Term
Long Term
Health Outcomes
Walking and Biking (encourage alternative mode of transit)
Multimodal Connection
Traffic Speed
Bike and Pedestrian usage
emissions of pollutants
Δ Access to schools, church, shops recreation areas, trails , parks
Create a walking and biking neighborhood
Δ Connections between roads
Physical Activity
Traffic Safety
Air Quality


Built Environment and Green Space
Policy
Immediate Outcomes
Long-Term Outcomes
Health Impacts
Mixed Land Use Green Space
• Decrease In Traffic demand
• Narrow streets
• Reduction of Lanes on 197
• Improve Street design and connectedness
• Reduce amount of trips used by motor vehicles (reduction vehicle miles per capita)
• Increase congestion in close proximity
• Increase Green infrastructure
• Decrease Motor Vehicle speeds
• Impact Sense of Community
• Increase in bike and pedestrian demand
• Reduce emissions
• Co, Nox, VOC
• Improved pedestrian and biking safety
• Impact on perception of level of safety
• Decrease Motor Vehicle Accidents (MVA)
• Level of physical activity
• Increase in physical activity
• Impact air quality

Initial overarching goal statements for original 4 domains

The scoping phase of this rapid HIA has engaged the Advisory Group as well as the Project Team which initially identified four main domains: Crosswalks, Road Design, Multimodal Connection, and the Built Environment. This project seeks to make health a primary goal to protect and promote any new transportation or community design recommendations.

Crosswalks- Goal 1: To encourage active transportation through increasing pedestrian and bicyclist access points through improved crosswalk locations and design.

Recommendations from the HIA Advisory Group

- Locate Specific crosswalk locations that would improve access and safety
- Placing the quality and safety of the pedestrian environment at highest priority.
- Create safe pedestrian and bicycling connections to schools and public parks and recreation areas.
- Promote active transport through safe roadway crossings (intersections safety)
- Expand school walk zones
- Identify areas where crosswalks could be improved to address community safety and health concerns
- Handicap accessible crosswalks
- Presence of a buffer to protect pedestrian and bicyclists
- Literature from Community Guide and Complete Street

Road Design- Goal 2: Changing the road design to improve pedestrians and bicyclists perception of the safety and accessibility through design strategies such as street lighting, median, green infrastructure, and other street calming features,

Recommendations from the HIA Advisory Group:

- Decrease the roadway width on HWY 197 to provide a safe refuge for pedestrians and bicyclists
- To provide a buffer with green infrastructure between the pedestrians and bicyclists and traffic on HWY 197
- Place a radar to help calm traffic;
- Track traffic near-misses
- To separate pedestrians and bicyclists from motor vehicles
- Mitigate pedestrian and bicyclists hazards for residents living on the 197 corridor (ex: traffic- related air pollution)
- Narrow the width of the road; add 8 ft wide bike lanes on either side of the road; eliminating one of the lanes
- Identify streets where pedestrians and bicyclists could be improved (Advisory Group)

Multimodal Connection- Goal 3: To increase multimodal connection to provide safer bike and pedestrian access and promote active transportation.

Recommendations from the HIA Advisory Group

- Implement a multi-use pathway (MUP) on East-West Section of HWY 197
- Identify and mark existing low-traffic streets and add bicycle and pedestrian "cut-throughs" to the downtown, schools, parks, trails, and other recreational areas.(Bicycle Transportation Alliance (BTA))
- Create a network of new routes;
- Room to build "third spaces" (first place is home and second place being work) ie. Coffee shops, set of well-placed benches, community parks, trails.
- Connection to the rail corridor; crosswalk and green infrastructure

Built Environment- Goal 4: To improve physical activity, traffic safety and air quality through the enhancement of the built environment.

Recommendations from the HIA Advisory Group

- Improve street design and street connectivity
- Increase green infrastructure and aesthetics to decrease traffic speed
- Promote physical activity through 3rd spaces
- Collaborate with community organizations and local partners

Appendix B

Details from Assessment

Community Health Status Indicator Ranking System:

An interactive web tool designed to offer health profiles for all 3,143 counties in the United States. County Health Rankings are provided through the collaboration between Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute since the year 2003. The goal of establishing a rank for a particular county in any state helps raise awareness of the many interconnected parts that influence health. Counties are ranked relative to the health of other counties in the same state. The composite scores are calculated through these eight indicators which include:

1) Overall Health Outcomes

2) Health Outcomes (Length of life)

3) Health Outcomes (Quality of Life)

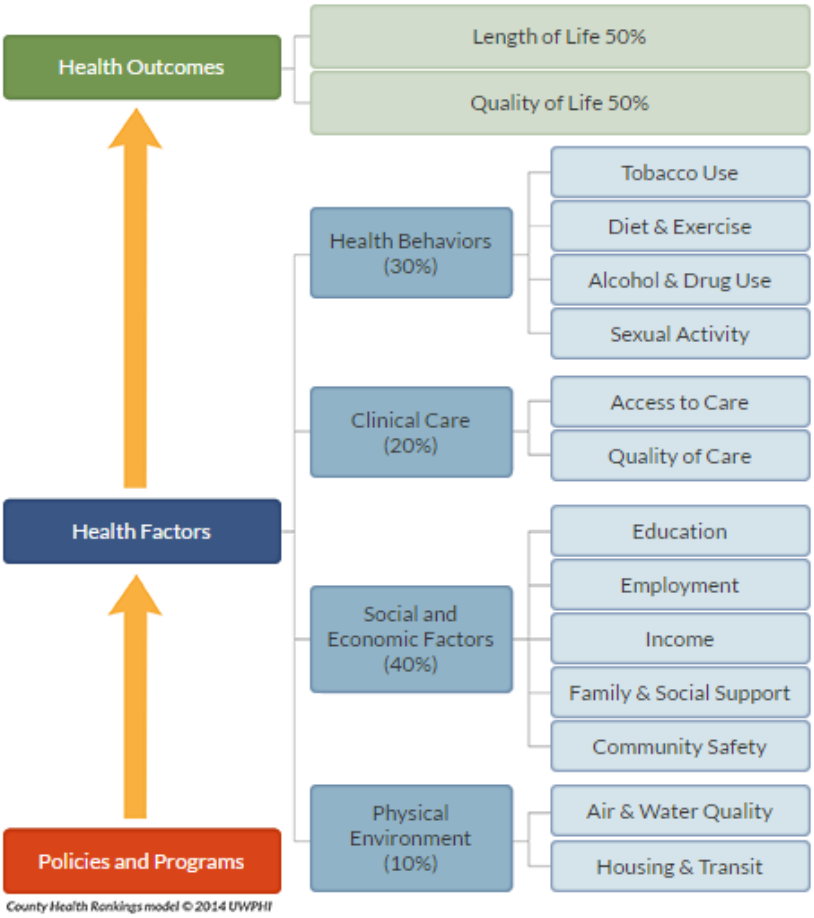
4) Overall Health Factors

5) Health Factors (Health behavior)

6) Health Factor (Clinical care)

7) Health Factor (Social and economic factors)

8) Health Factors (Physical environment).



5 D's of Development that Define a Healthy Community

Table 1. Five dimensions of built environment (Ewing & Cervero, 2010)

BE Dimensions	Definition
Density	Population density or employment density or housing units within a unit of area
Diversity	Number of different land uses in a given area and the degree to which they are represented in land area
Design	Street network characteristics within an area, includes the street network pattern, road geometric design and road safety countermeasures
Destination accessibility	Accessibility to trip attractions (normally the business districts or local stores)
Distance to transit	An average of the shortest routes from the residences or workplaces in an area to the nearest public transit location

Morbidity Tables 1 and 2: Definitions for Behavior Risk Factors of Adults in Minnesota and Beltrami County

Hypertension: Percent of respondents who have EVER been told by a doctor, nurse or other health professional that they have high blood pressure.

No Exercise: Percent of respondents who reported no physical activities during the past month, other than regular job.

Limitation of Activities: The percent of adults who are limited in any activities because of physical mental or emotional problems, OR those adults who have a health impairment that requires the use of special equipment, suchas cane, a wheelchair, a special bed or special telephone.

Behavioral Risk Factor Surveillance System (BRFSS): A continuous monthly telephone survey that monitors health risk behaviors that has impact on chronic diseases and disabilities. Approximately, 4800 interviews of adults 18 years and older are completed yearly.

Smoking: Current regular smoker (ever smoked 100 cigarettes and now smokes every day or some days).

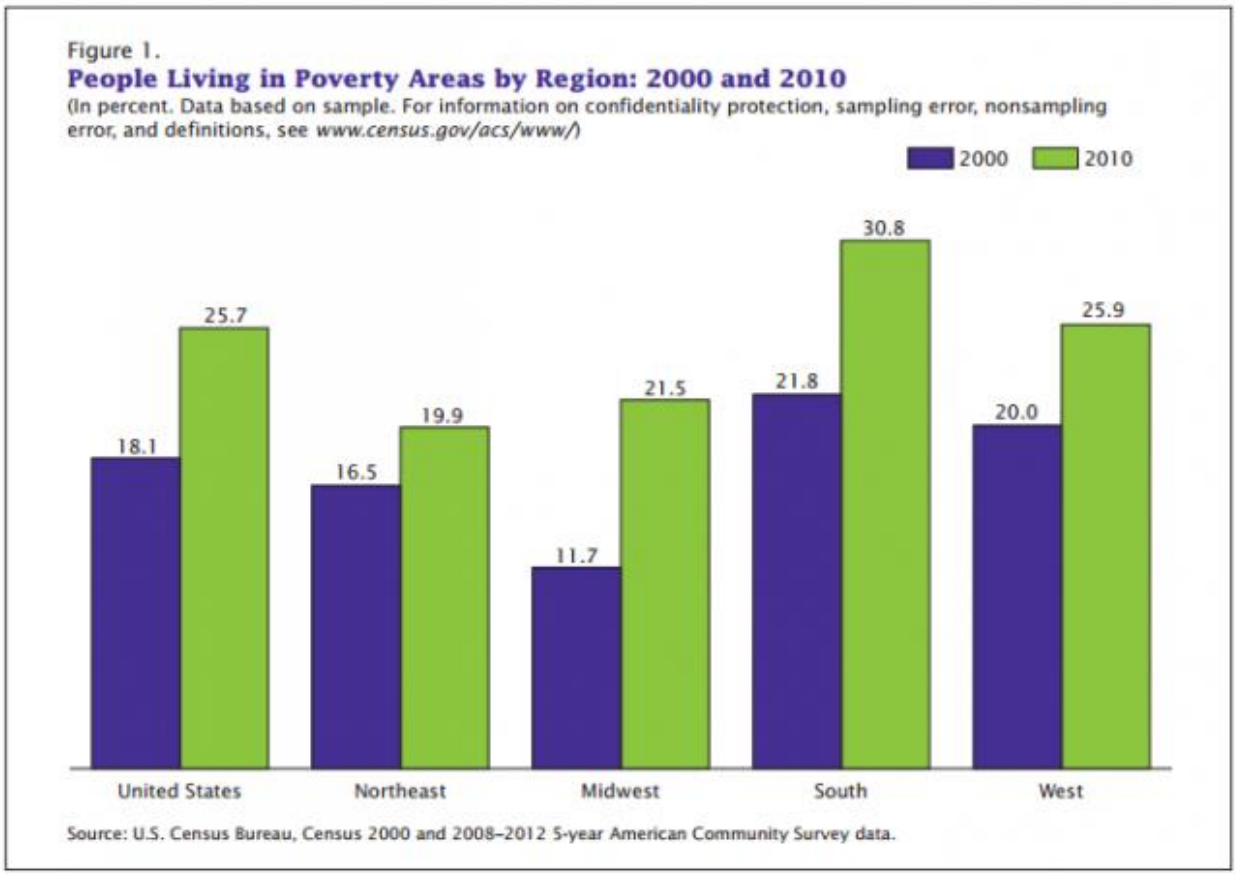
Overweight: The prevalence of overweight is defined as a Body Mass Index (BMI) [(weight in kilograms)/(height in meters)2] is between 25.0 to 29.9. Note this does not include obese as it did in previous years.

Binge (Acute) Drinking: Respondents who report they have consumed five or more drinks on an occasion for men or four or more drinks for women, one or more times in the month prior to the survey.

Heavy (Chronic) Drinking: Heavy drinking of adults is defined as the percent of male respondents 18 and older who report an average of more than two drinks per day and female respondents 18 and older who report an average of more than one drink per day.

Obese: The prevalence of obese is defined as a Body Mass Index (BMI) [(weight in kilograms)/(height in meters)2] greater than or equal to 30.0.

Income Inequality: People Living In Poverty by Region 2000 and 2010



CREDIT: Census Bureau

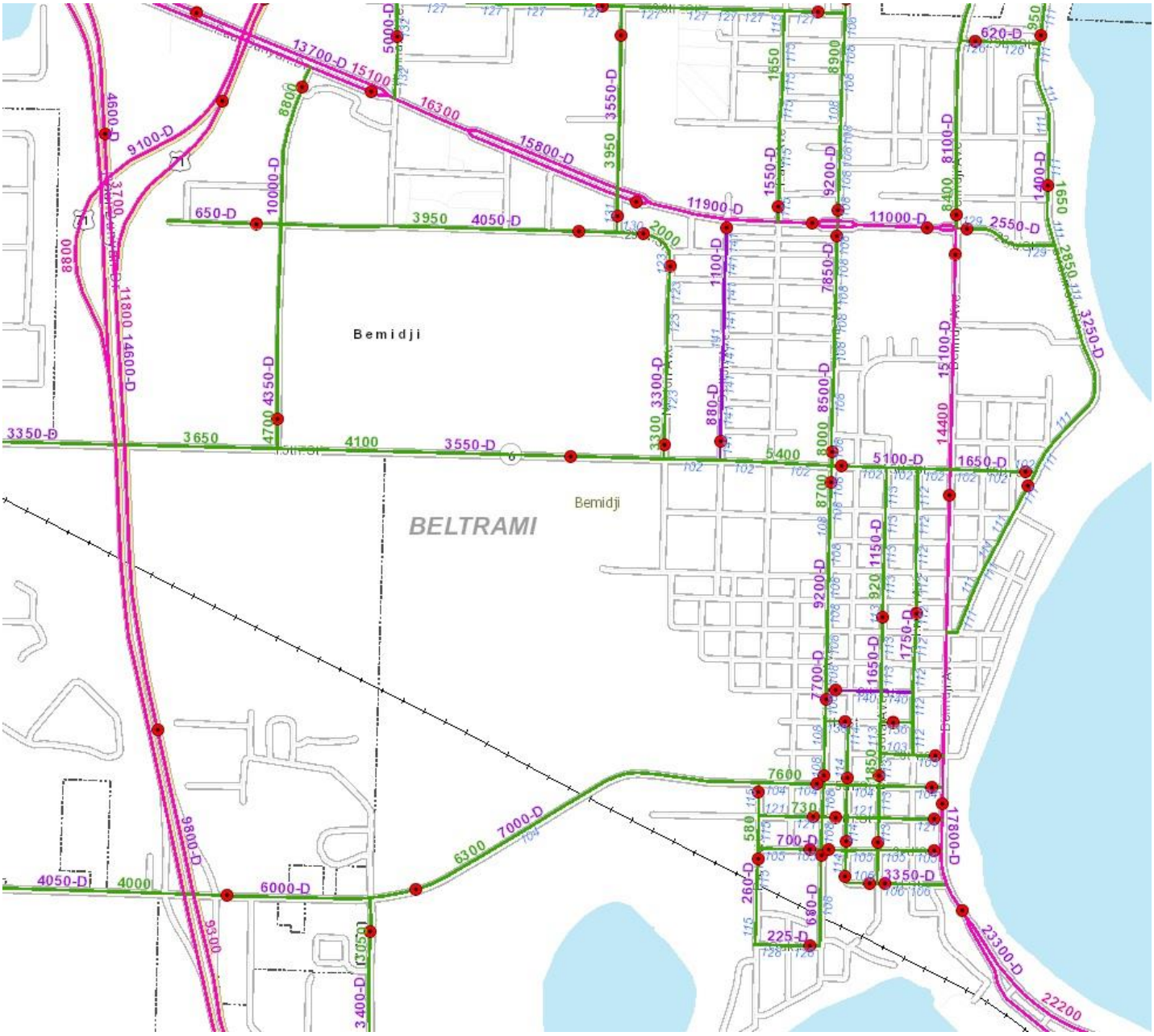
Initial 3 overarching themes identified within the scientific literature:

1) **Encourage Active Transportation** through road design and traffic calming features (sidewalks, crosswalks, paths, bicycle lanes; traffic calming features, signage, green infrastructure, and bike racks) to eliminate safety concerns, real and perceived, of residents along MN-197. Health Promotion within schools may attain a considerable shift towards active modes of transportation in youth. Active travel investment efforts are cost-effective and better accommodating for all users living, working, playing and going to school in and around this corridor.

2) **Improve Street Connectivity (street network)** which is commonly measured through how the built environment is designed for trips (length, directness, and alternative routes). This could increase rates of walking and biking to schools along this corridor as well as promote active transportation options.

3) **Improve Built Environment Aesthetics** which will provide a more pleasant environment for bicycling and walking along this corridor and a shift to a more Active Living Design. By creating a more aesthetic environment, it is our intention to facilitate a shift in perceptions regarding how the built environment is seen towards recognition that all components of the built environment are interconnected and play a role in improving the health of the community. An example is to create an environment that forces drivers to slow down through forgiving street and road design. Promoting active transportation and the use of public transit through built environment changes and land use patterns will promote physical activity and decrease air pollution. The benefits of green infrastructure are numerous and include: reducing motor vehicles speeds which improves the safety of street-crossing, reduces the distance of crossing and improves air quality. Other built environment aesthetics that are associated with active travel include: buffered bike lanes; bike parking facilities; safe streetscape amenities such as benches, trees, curb extensions, pedestrian refuge islands, signage, and lighting; and reduced traffic speed to increase active commuting to school, and enhance the safety of pedestrian and cyclists while simultaneously promoting physical activity along MN-197.

Current 2016 Traffic Volumes on MN-197



Map Key:

Pink

Red

Green

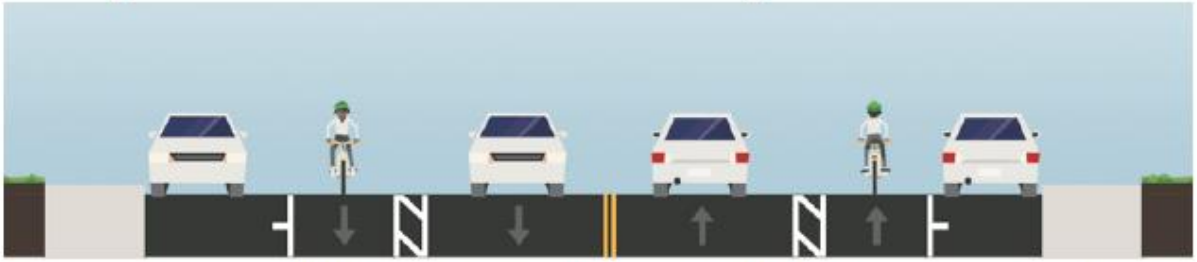
Due to the high volume of traffic along MN-197 , this HIA recommends bike boulevards on adjacent streets running parallel to this corridor for safe access.

Buffered Bicycle Lane: Bike Bemidji Plan, 2015

Example Cross-Section: Conventional Bicycle Lane

- Minimum recommended width of 5'
- Preferred recommended width of 6'
- Exclude gutter pans when calculating width of curbside bicycle lanes
- Apply green colored treatment at conflict areas including intersections, transit stops, and where bicycle lanes cross designated turning lanes

Example Cross-Section: Buffered Bicycle Lane



- Includes painted buffer (minimum 2') between bicycle lane and vehicle travel lane
- Minimum recommended width of 4' lane plus 2' painted buffer (total width of 6')
- Preferred width of 6' lane plus 2' painted buffer (total width of 8')
- Exclude gutter pans when calculating width of curbside bicycle lanes
- Consider additional painted buffer between bicycle lane and parking (when present)
- Apply green colored treatment at conflict areas including intersections, transit stops, and where bicycle lanes cross designated turning lanes

For more information about conventional and buffered bicycle lane, please see the Infrastructure Toolkit, provided in the Appendix of this report.

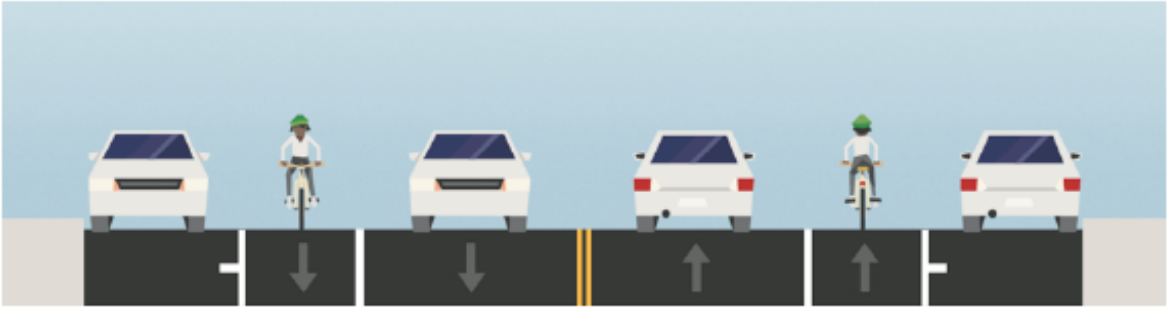
Route 1b – Irvine Avenue Northwest

3rd Street NW to 5th Street NW

Existing

In this area, Irvine Avenue NW is a two-way street with two travel lanes, a center-turn lane and parallel parking on both sides of the street. The posted speed limit is 30 miles per hour. There is no official traffic count on this stretch of Irvine Avenue NW. The traffic count is 610 AADT south of 3rd Street NW, and 7,700 north of 5th Street NW. Traffic counts of cross-streets range from 680–3,000 AADT.

Recommended



Alternative A (preferred)

Conventional bike lanes (pictured)

- Eliminate center-turn lane
- Two parallel parking lanes (maximum width of 8')
- Maintain two travel lanes (suggested width of 11')
- Install conventional bike lanes
  - 6' bike lanes preferred (5' minimum width)

Alternative B

Priority shared-lane markings

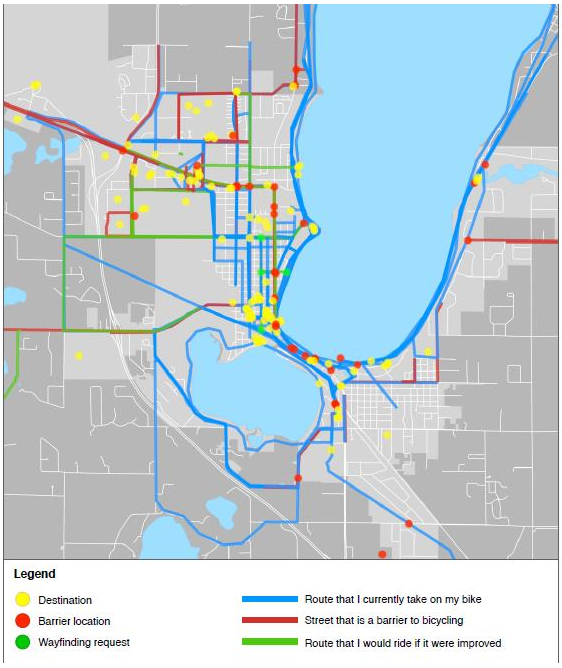
- Maintain existing travel lanes and center-turn lane
- Two parallel parking lanes (maximum width of 8')
- Install priority shared-lane markings
  - Place outside of the door zone (at least 3' from parking lane)
  - Enhance shared-lane markings with green paint, or by delineating with a dashed line within the travel lane

Appendix C

Details from Recommendations

Existing Plans and Reports that were utilized in conducting this HIA:

- **Active Living Bemidji, 2010**
- **Bemidji Bike Plan, 2015**



This plan aims to take bicycling in Bemidji to the next level by recommending a network of on- and off street facilities to make it easier for more people to bike in the city. An online and in person interactive map allowed residents to share destinations, routes, barriers, and ideas along MN-197 (See Map to the right).

- **Safe Route to School, 2010**
- **Trunk Highway 197 Access Management Assessment (AMA):**

Trunk Highway 197 Access Management Assessment (AMA) is a report from MnDOT that worked with Bemidji to develop a plan for this 197 corridor that would enhance the mobility and safety as well as provide reasonable and viable access to improve the connection of this roadway. (AMA, 2009). This document established highest priority of implementation, ways to developing the road system, location improvements, roadway realignments, and pressing safety problems along this corridor. Some common themes for alternative development and key issues included:

- Add raised center median to address safety issues associated with the left turn onto Highway 197
- Add right turn lanes on Highway 197 at key locations to improve capacity and to separate slower moving traffic
- Add supporting road system to provide options for safe and viable access
- Work towards reducing the amount of non-conforming private access on Highway 197
- Redirect non-conforming private access off of highway 197 and onto the supporting roadway system.

Because elements of this plan could take a long time to complete (such as re-direction of private access off of Highway 197 and the construction of the supporting roadway systems), an interim plan was developed that addresses specific driveway locations and the most pressing safety problems. Detailed layouts of the Interim Implementation Plan Recommendations are included in the appendix. Key features of the plan are described below.

1. Construct five-lane section from US 2 to Paul Bunyan Drive (already programmed by Mn/DOT).

2. Adopt this Access Management Assessment Plan (both Mn/DOT and the City) to serve as the long-range vision for the corridor

3. Work with City and GBAJPB to adopt a new Highway 197 Overlay Ordinance which includes the recommendations of the AMA Plan. Increase coverage of ordinance to be the whole length of 197 from the US 2/US71interchange on the south to the US 71 intersection on the west. A draft ordinance is included in the Appendix.

4. Conduct speed study to determine if the current posted speed limits still apply.

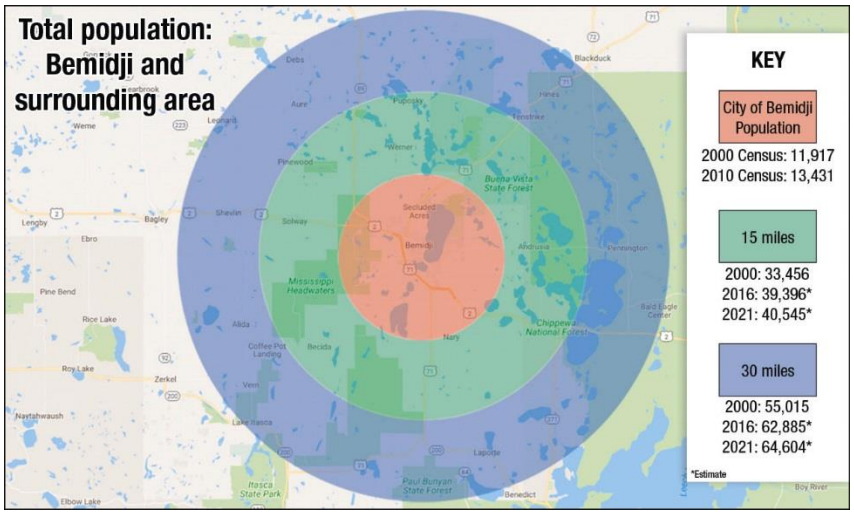
5. Plan for a future supporting roadway system by reserving and obtaining right-of- way as shown in recommended plan

6. Install center median from Hannah Avenue to Bemidji Avenue (Segment 5) per Concept 2A to address left turn safety issue.

7. Close the private driveways identified on the Interim Implementation Plan Layouts. All other existing non-conforming access points would be “grandfathered in” and would remain open until property re-develops or a change in access is requested.

8. Direct all new private access off of Highway 197 and on to the supporting roadway system, unless reasonably convenient and suitable alternative access to the property is not otherwise available

A Region of 60,000: New Community profile shows continued population growth in 30-mile radius of Bemidji:



Picture from the Bemidji Pioneer newspaper (2016)

Further Exploring Opportunities:

- **Identify Funding opportunities through**
    - Minnesota Department of Health
    - Minnesota Department of Transportation
    - McKnight Foundation
    - BikeMN
- **CDC 1603 Grant Award** looks into how to build a more walkable community for the disabled population.
- **Integrating Health In All Policy** (HiAP) within all decision making process to address the 6 Key "E" Strategies which include equity; engineering; education; encouragement; enforcement; and evaluation.
    - Some example would include community engagement that would address different subgroups of populations and specific strategies.
    - Another example is to develop a Health in All Policy Checklist to identify all areas of a planning process. For an example, the City of Redwing (Southeast MN) has developed a Health in All Policy Checklist.
- **Continue to work with local bike Advocacy groups to identify ways to support ongoing implementation efforts along the MN 197 northern corridor and the broader Bemidji area transportation system**
    - Bike Sharing System: Nice Ride

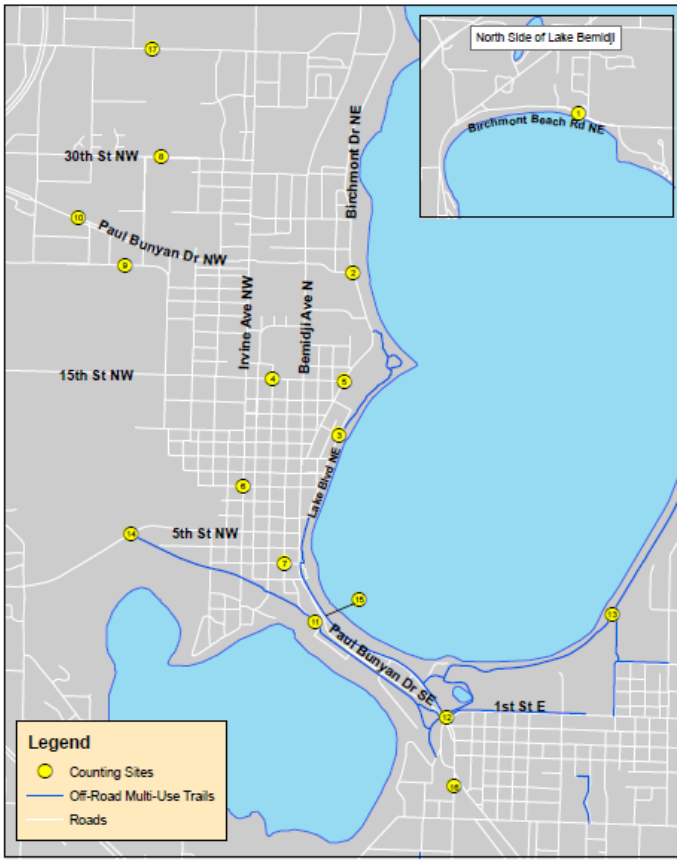
Nice Ride was originally intended to be a bike sharing system, getting people to use a bike instead of always using a vehicle. Nice Ride worked better within Bemidji as both a bike outreach/ encouragement tool for locals as well as a rental service for visitors. One of the ways Nice Ride bikes have been used is through a program called Wheel Being. This program allowed for patients who qualified to be a part of this program to have access to a free Nice Ride bike, which are prescribed by a health care professional. This Wheel Being program empowers individuals to take "next steps" for a better healthier life. Nice Ride has the potential to partner with middle to low income families and provide a way for them to reduce transportation cost by replacing car trips with a bike.

    - Explore pilot study for Nice Ride membership and low income residents
- **Creating ways to analyze demographics and/or equity** through incorporating health data; for example collecting sidewalks and roadway conditions; car ownership; low income families; focusing on populations at higher risk for health disparities.
    - An example would be to create an equity score map with layers of data that would help capture health equity within a community.

Previous Bike and Pedestrian Count Locations along MN-197

Location	Location Description
Site 1	Birchmont Beach Rd (West of County Club Raod NE)
Site 2	Birchmont Dr NE (South of 23rd St NE)
Site 3	Lake Bvld NE @ 12 St NE
Site 4	15th St NW @ Minnesota Ave
Site 5	Birchmont Dr NE @ 15th St NE
Site 6	Irvine Ave NW @ 8th St NW
Site 7	Beltrami Ave @ 3rd St NW
Site 8	30th St NW @ Ridgeway Ave NW
Site 9	23rd St NW @ Ridgeway Ave NW
Site 10	Paul Bunyan Dr @ Paul Bunyan Mall
Site 11	Paul Bunyan Dr NE @ Mississippi River
Site 12	Northside on Paul Bunyan Trail Bridge over Paul Bunyan Dr.
Site 13	Paul Bunyan Trail North of Sanford Center
Site 15	Roosevelt Rd SE @ Grant Ave SE

Bicycle and Pedestrian Count Locations in Bemidji



Appendix D

HIA MN-197 Northern Corridor Fact Sheet, 2016

MN-197 Health Impact Assessment

In 2016, the Headwaters Regional Development Commission conducted a rapid Health Impact Assessment (HIA)* on the MN-197 Northern Corridor to study how future road design modifications would impact the health of Bemidji's residents, workforce and visitors.

MN-197 goes through the heart of Bemidji, with many residents and businesses located adjacent to it. However, this corridor is designed primarily for the many cars and trucks that pass through Bemidji and impedes travel by walking or biking. As MnDOT District 2 considers the future redesign of this important corridor, this HIA seeks to model built environment modifications that will improve the health and well being of the community. Implementing complete street strategies on this corridor will encourage active transportation (walking, biking, using transit) amongst residents living in and around this corridor. This HIA used evidence-based best practice research for recommendation pertaining to the redesign of MN-197 to promote the health and safety of Bemidji residents. These recommendations will: reduce traffic collision and increase traffic safety; promote dense street networks, connectivity and traffic calming features which will; eliminate traffic collisions increasing traffic safety; encouraging physical activity through built environment enhancements; and reducing air pollutants through less car dependent neighborhoods.

A focus of this HIA is to address how this roadway can improve active modes of transportation so that residents of all ages and abilities can safely engage in physical activity. A limitation of MN-197 is the high traffic volume traveling at higher than posted speeds with few access points for crossings. This creates a major barrier for residents who want to walk or bike to work or other destinations (see below photos).

Community Demographics

47% of residents live below the federal poverty level in the City of Bemidji

11,400 residents live within 1/2 mile of MN-197

7,200 residents live within 300 meters of MN-197

28% of residents have low/ no access to a vehicle (one vehicle or less)

Transportation Behaviors

10% of residents use active modes of transportation

59% of those employed live and work in Bemidji

Health Status

62% of Beltrami County residents are overweight (37%) or obese (25%)

80% of 8th-11th grade students are not meeting physical activity guidelines

* Participants of the HIA included: MnDOT District 2, City of Bemidji, City Council of Bemidji, Bemidji State University, Bike-sharing organizations, Health practitioners, Public Health MDH Bemidji, Business owners

December 2016 Fact Sheet

What is an HIA?

An HIA is a tool that helps incorporate health into future design decisions and considers the direct and indirect health implications of community design choices for all populations

MN-197 is a five lane highway that cuts through the heart of Bemidji. While many destinations are located along this corridor, it is not safe or convenient to cross this corridor by active modes of transportation.

Paul Bunyan and Babe the Blue Ox are located on MN-197 as a major tourist attraction

HEADWATERS Regional Development Commission Leading the Way

HIA RECOMMENDATIONS AND FINDINGS

Traffic Safety

MN-197 is a physical barrier that is not safe or convenient to cross by walking or biking. This HIA found that traffic volume and speed are two concerns, which are important risks for traffic conflicts, crashes, and fatalities. Traffic calming features including, well marked crossings, bike and pedestrian signage, bike boulevards on adjacent streets and street scape design can improve traffic safety for all users of MN-197.

Air Quality

Transportation vehicles are a main contributor to air pollution. This HIA seeks to decrease vehicle miles traveled (VMT) through integrating built environment modifications that will encourage other modes of transportation. Increasing alternative modes of transportation may improve local air quality. Approximately 7,200 residents live within 300 meters of this corridor, who are at higher risk for health problems associated to the pollutants generated by vehicles traveling on MN-197.

Physical Activity

A new trend in community planning promotes physical activity and reduces car-dependency within neighborhoods. More than half of Bemidji residents live within walking and biking distance to destinations; improving the built environment can influence travel behavior while increasing physical activity. This HIA found that improvements to the built environment and road design can foster both health and environmental goals while increasing access to services and commerce, promoting appropriate opportunities for all residents living in and around this corridor.

Figure 1: Geographic Scope of MN-197 HIA

The following recommendations were developed for MNDOT to encourage active transportation, street connectivity, and built environment enhancements for the proposed 2020 revision of MN-197

Recommendation #1: Prioritize policies, enhancements, and maintenance of MN-197 Northern Corridor and broaden the Bemidji area transportation systems that enables safe access for all users including pedestrians, bicyclists, and transit riders of all ages and abilities. Future design can improve the health of low income families, residents with low/no access to a personal car, college students, and residents with short commute times to work or services

Recommendation #2: Implement traffic calming features along MN-197 that offer safer crossings for pedestrians and bicyclists and promote reduction of traffic speed.

Recommendation #3: Track and report key environmental public health indicators that will identify concerns for active modes of transportation related to air quality, safety, access, comfort and convenience.

Recommendation #4: Collaborate with MNDOT and Bemidji State University to implement automated bike counters and establish strategic locations to track daily bicyclist's usage within Bemidji in the Spring of 2017.

Recommendation #5: Designate bike boulevards on adjacent streets to MN-197 using street design enhancements from complete street standards.

To access the full report contact Naomi Carlson at ncarlson@hrdc.org or visit the HRDC website at hrdc.org

Appendix E

Naomi Carlson;

MDH REPORT, RAPID HIA I97 Northern Corridor

Success: This rapid HIA has identified road design modifications through comprehensive "Complete Street" strategies to help eliminate the physical barrier and economic burden that MN-197 places on: low income families, residents with low to no access to a vehicle, residents with short commute times to work, residents who work in and around this corridor, college students, and visitors.

This rapid HIA met the following established goals: 1) provided recommendations to MnDOT and key decision makers to encourage active transportation, street connectivity, and built environment enhancement for future proposed projects on MN-197; 2) engaged the community and built relationships through collaboration among key stakeholders and 3) provided public input for MnDOT to encourage the priority of health as a primary determinant for future road designs projects and proposals. These recommendations have the potential to promote dense street networks; implement connectivity and traffic calming features to reduce traffic collisions, improve traffic safety; encourage physical activity through built environment enhancements; and reduce air pollutant through less car dependent neighborhoods.

A fact sheet of the HIA's findings and proposed recommendations has been drafted to provide MnDOT and other key decision makers a quick overview on considerations for future road design plans and projects. The recommendations, enable local transportation engineer experts (MnDOT, City, and County) to determine what specific applications would be most effective along this corridor. Currently, MnDOT has already started to incorporate traffic calming features along MN-197. A Rectangular Rapid Flashing Beacon System (RRFB) has been built to support safer crossings for active modes of transportation.

Challenges: The Advisory committee shared that they would have liked to see the County engineers playing a bigger role in the process and expressing more interest since MN-197 heavily involves them.

Due to the time constraint, there were portions of the road that was unable to be addressed. For example, along Mn-197 there is a section that all users and businesses are affected along the isthmus (see photo in red): Because of the timeline for this rapid HIA, it did not specifically address pedestrian & bike crossing issues for business patrons along the isthmus. However, based on similar safety implications, some of the recommendations for MnDOT could apply directly or with adaptations too future bike/ped safety projects in this area as well.

Impact: The impact of the recommendations are unknown at this time because of the scope of the rapid HIA. This HIA's focus was on future road design modifications along MN-197 right of way. The recommendations are to be considered to improve complete street design characteristics that seek to enhance and protect the health of the community in future plans and projects.

Through the post evaluation survey that was distributed to the Advisory Group and Project Team, the major theme amongst the responses were that this rapid HIA was a positive and well informative experience. Because the rapid HIA was constrained by time, the impact of this HIA is unclear. However, one important impact noted within this HIA was the changes in attitudes towards incorporating health within transportation decision making process and plans.

An Advisory Group member stated in the post evaluation survey “I was pleased to see how interested MnDOT is in making their corridors more bicycle and pedestrian friendly. This seems to be a departure from previous administration philosophies. I look forward in follow up discussions.”

Another positive impact of this rapid HIA is the recommendation of a new approach with respect to the new Gene Dillon Elementary School that will be built in the 2017-2018; decision makers around the table suggested that the HIA findings and recommendations be given to County Engineers to address all traffic issues raised by increased activity, and how health could be implemented into the future design of this school. This story offers an example of how one of the HIA intended goals, to raise awareness to further explore other opportunities that integrate health within future infrastructure and design projects within Bemidji and the Greater Bemidji area, may be implemented by stakeholders developing the new Gene Dillon Elementary School.

Finally, Headwaters Regional Development Commissioner has provided guidance to leverage this new paradigm shift to commit to placing health as a priority within all decision making efforts.