



City of Fort Collins

Sidewalk Prioritization Model

Version 2.1

December 8, 2017

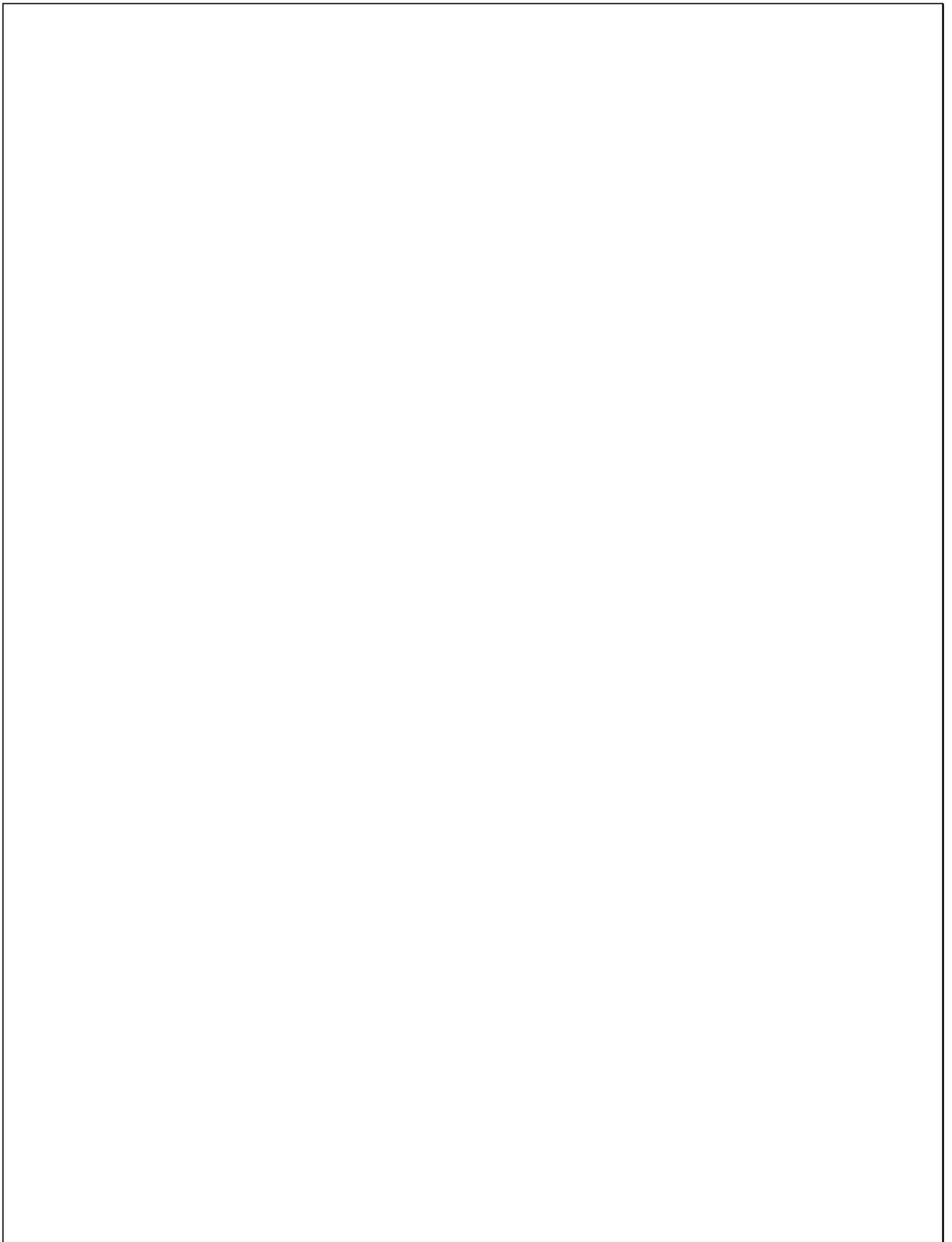


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Introduction and Background

Relationship to other plans

The Sidewalk Prioritization Model stems from work performed for the *Fort Collins Pedestrian Plan* completed in 2011. The Pedestrian Plan relates to the *City Plan* and the *Transportation Master Plan* which provides a vision over the next 20 years and defines long-term multimodal transportation system for Fort Collins' future. Overall, the plans provide the framework that serves as a reference guide for transportation issues in Fort Collins.¹

History of the sidewalk program

The City of Fort Collins *Pedestrian Plan* addresses citywide pedestrian needs. However, there was not an inventory of existing sidewalks or sidewalk deficiencies. In May of 2012, the Engineering Department began the *Citywide Pedestrian Access Project* (a.k.a. Pedestrian Needs Assessment) which provides a complete sidewalk inventory, as well as identifies sidewalk inadequacies, and also identifies inadequate handicap accessibilities according to Americans with Disabilities Act (ADA) requirements. The initial assessment was complete in May of 2013.

As a result of the data collection, over 1,000 miles of sidewalk-appropriate locations and 30,000 ramp-appropriate locations were inventoried. These locations include existing facilities, as well as areas where facilities are not present but are warranted based on initial observation.

History of Design Requirements

The Americans with Disabilities Act (ADA) was enacted by the United States Congress and signed into law by President George H.W. Bush in 1990². Intent of the ADA “was to create a civil rights law protecting people with disabilities from discrimination on the basis of their disabilities².” Situations addressed in the ADA include discrimination by employers, public facilities, transit, businesses, and pedestrian facilities.

Today, the ADA is regulated by several governmental agencies. At the federal level, the Department of Justice enforces the ADA standards³. Many design standards for accessibility are set forth in the ADA and best design practices are issued by the Federal Highway Administration⁴.

¹ (Fort Collins Pedestrian Plan, 2011)

² (Feldblum, Barry, & Benfer, 2008, p. 1)

³ (United States Department of Justice, n.d.)

⁴ (Federal Highway Administration, 2000)

Pedestrian facilities are addressed by the ADA Accessibility Guidelines (ADAAG), and include design standards for handicap curb ramps and sidewalks that were developed primarily for buildings and on-site facilities and are not easily applicable to sidewalks, street crossings, and pedestrian facilities in the public right-of-way⁵. Original ADA standards adopted in 1991 specify the minimum width for an accessible route, or sidewalk, as 36 inches⁶. Maximum cross slope for a sidewalk was 2%, and maximum running slope for a sidewalk was 5%, with any facility having a greater slope being considered a ramp.

ADA design standards were revised and published again in 2010. Updated standards provide greater detail in the requirements for curb ramps, specifying a maximum slope for the adjoining surface (usually the roadway at the exit of the ramp) of 5%, and a maximum slope for curb ramp flares of 10%⁷. Updated standards also maintain the minimum width of sidewalks as 36 inches⁷. Detectible warning devices, commonly referred to as truncated domes, are also required on handicap ramps within the public right-of-way.

Not having specific guidelines for public right-of-way facilities, the Public Right-of-Way Accessibility Guidelines (PROWAG) were developed and were originally intended to supplement the ADAAG. The Public Right-of-Way Accessibility Guidelines have most recently been formatted as a stand-alone document applicable to new construction and alterations of existing facilities⁸. PROWAG has similar requirements as ADAAG with regards to maximum cross slope of 2% for sidewalks and ramps, ramp slope of 8.3%; however, the minimum width for an accessible route, or sidewalk, is 48 inches. Following are a few additional items considered in PROWAG not adequately addressed in ADAAG:

- Pedestrian Access Route (allows sidewalk running grade to match roadway grade)
- Additional curb ramp design options
- Detectable warnings
- Crosswalks
- Accessible Pedestrian Signals
- On-street Parking
- Roundabouts

The Federal Highway Administration recommended planning, designing, and constructing from only one set of guidelines. The City of Fort Collins Engineering department policy is to implement the PROWAG guidelines.

Prioritization Model Background

The Sidewalk Prioritization Model (“Model”) was developed in order to provide a data driven and logical methodology for the prioritization of specific pedestrian facilities in need of rehabilitation. Because of

⁵ (Special Report: Accessible Public Rights-of-way Planning and Designing for Alterations, 2007, p. 2)

⁶ (ADA Accessibility Guidelines for Buildings and Facilities, 1991, p. 4.3.3)

⁷ (2010 ADA Standards for Accessible Design, 2010)

⁸ (United States Access Board, n.d.)

finite annual funding, as well as limited personnel and materials, it was necessary to prioritize certain projects in order to achieve the highest level of return for funding spent.

The Model provides a numerical score for each pedestrian facility. Facility scores are based on several factors discussed later in this report. Methodology for development of the Model is loosely based on a similar system implemented by the City of Seattle, Washington in their Pedestrian Master Plan⁹.

⁹ (Pedestrian Master Plan - Seattle's Strategy for Prioritizing Pedestrian Projects, 2014)

Inventory and Scoring System

Inventory Process

Members of the City of Fort Collins Engineering department have conducted a thorough inventory of the cities sidewalks and ramps. Using GPS and GIS software a comprehensive map was created containing information about the condition of all of the sidewalks within city limits, as well as the condition of access ramps and whether or not these meet Americans with Disabilities Act (ADA) Requirements. The data contains sidewalks ranging from good to missing as well as other important attributes that will allow us to determine which sections should be constructed or replaced first in order to best suit pedestrians' needs.

Scoring System

Whether walking to a destination from a home, car, or even a bike rack everyone navigating the city is at some point a pedestrian. The common use of walking as a way of travel leads to the need for a safe and complete sidewalk network. This is particularly important near popular pedestrian trip generators such as:

- Downtown
- University or College
- Mason Corridor
- Trail System
- Schools
- Parks
- Public Buildings
- Hospitals
- Shops

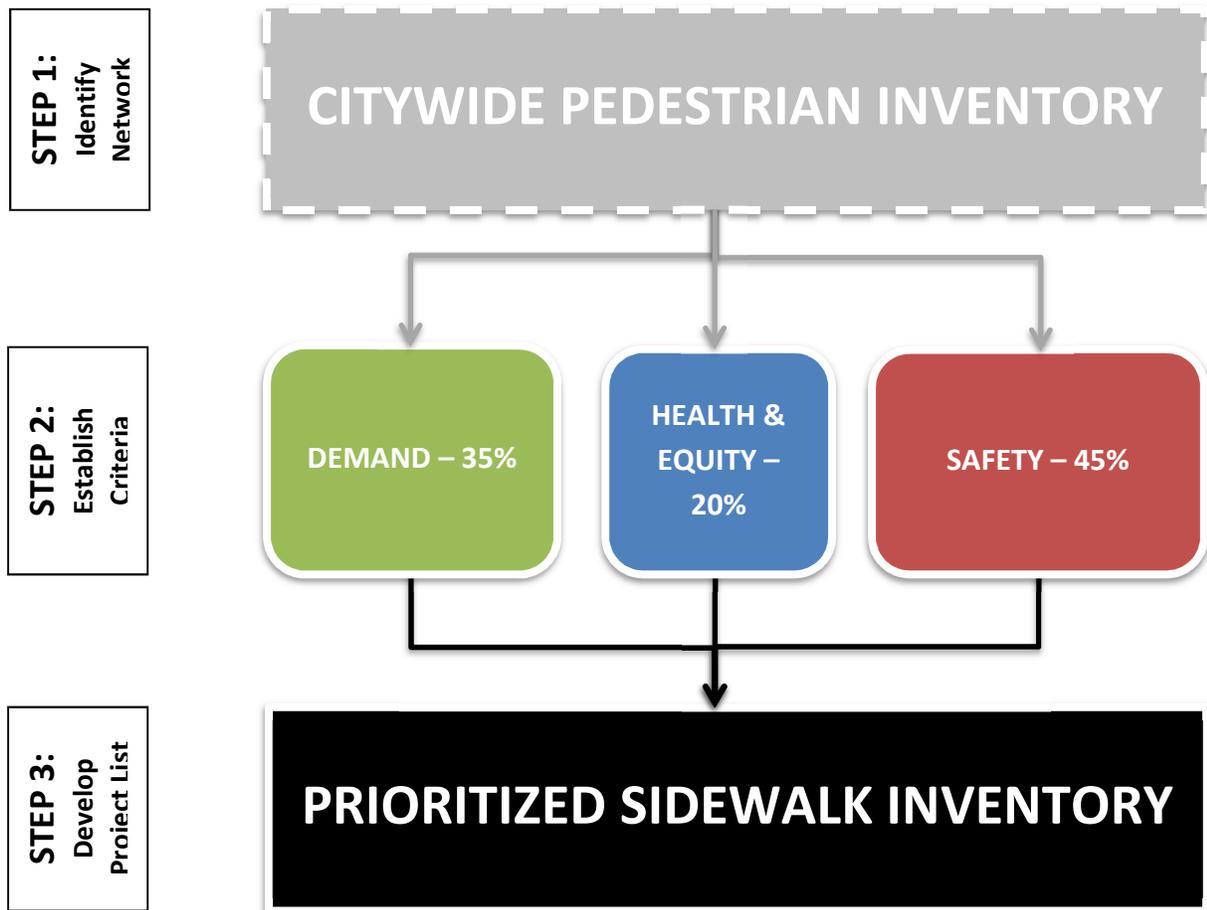
A scoring system was created using input from stakeholders in the form of a written survey. The distance the average person was willing to walk to a particular service was determined and various point values were assigned to several popular walking destinations. Points are based on relative importance and the number of people who access these services. Point values assigned to destinations can be seen in the following figures. Points were also awarded to items located in densely populated areas where walking is a viable mode of transportation and where the greatest number of people can benefit from sidewalks.

The scoring system also includes current sidewalk characteristics such as sidewalk condition, and the traffic volume of the street. Priority is given to larger, arterial roadways, where pedestrian traffic is heavier and there is a greater need to separate pedestrians from passing cars. Alternately, local streets see less foot traffic as well as slower vehicle speeds allowing for a safer environment for pedestrians. The scoring system was redesigned to be easy to use, but thorough in its assessment of need.

To help develop priority areas it is important to develop a framework for selecting priority projects. The process is based on analysis of factors related to pedestrian demand, health/equity, and safety. This analysis allows staff to identify more accurately locations in need of pedestrian improvements.

Following are the components used to develop the prioritization model:

Figure 1: Summary of Final Scoring System¹⁰



¹⁰ (Prioritization Model revised September 2017 to include Health/Equity and Safety criteria)

Figure 2: Summary of Demand Scoring

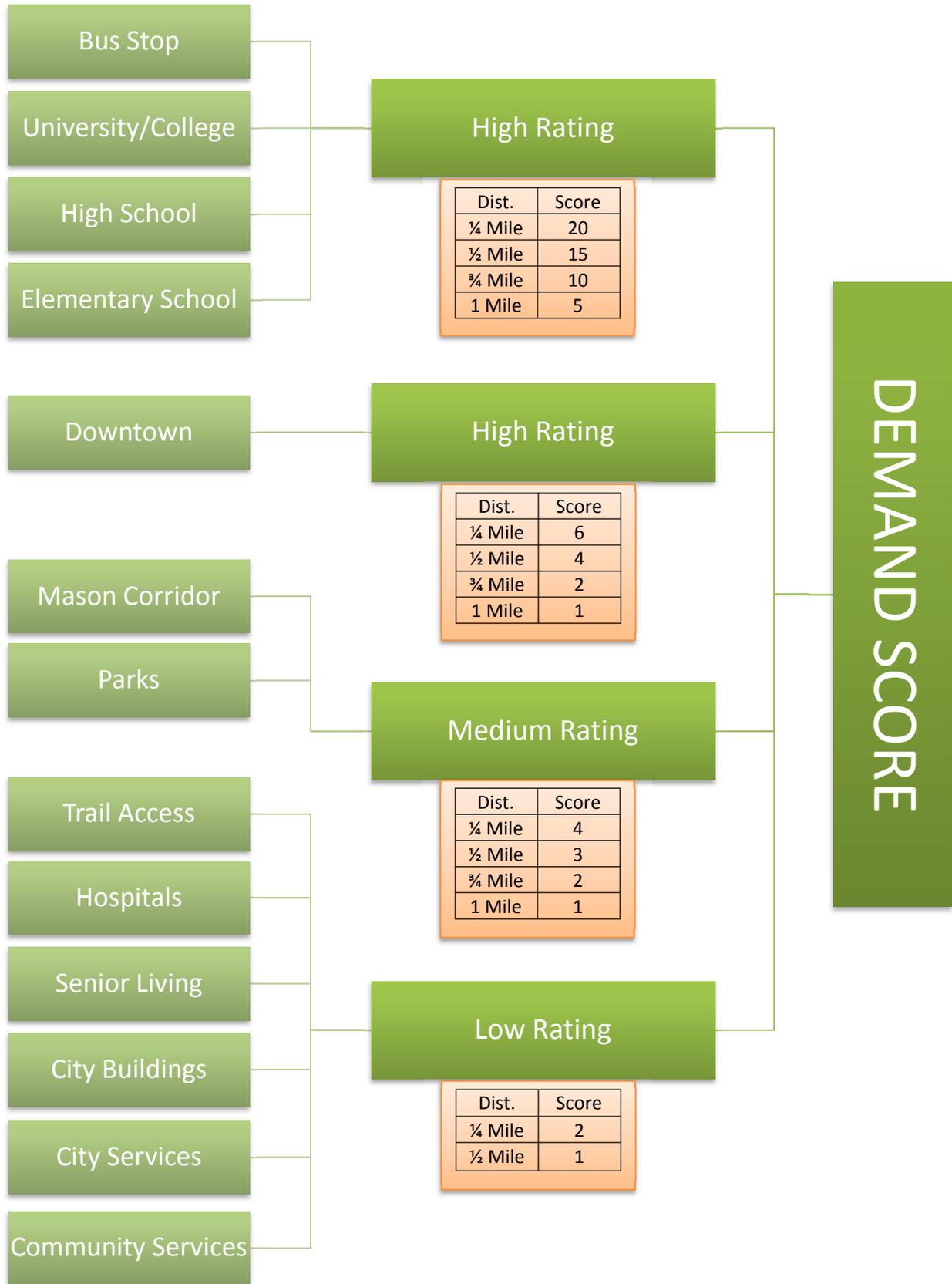


Figure 3: Summary of Health and Equity Scoring

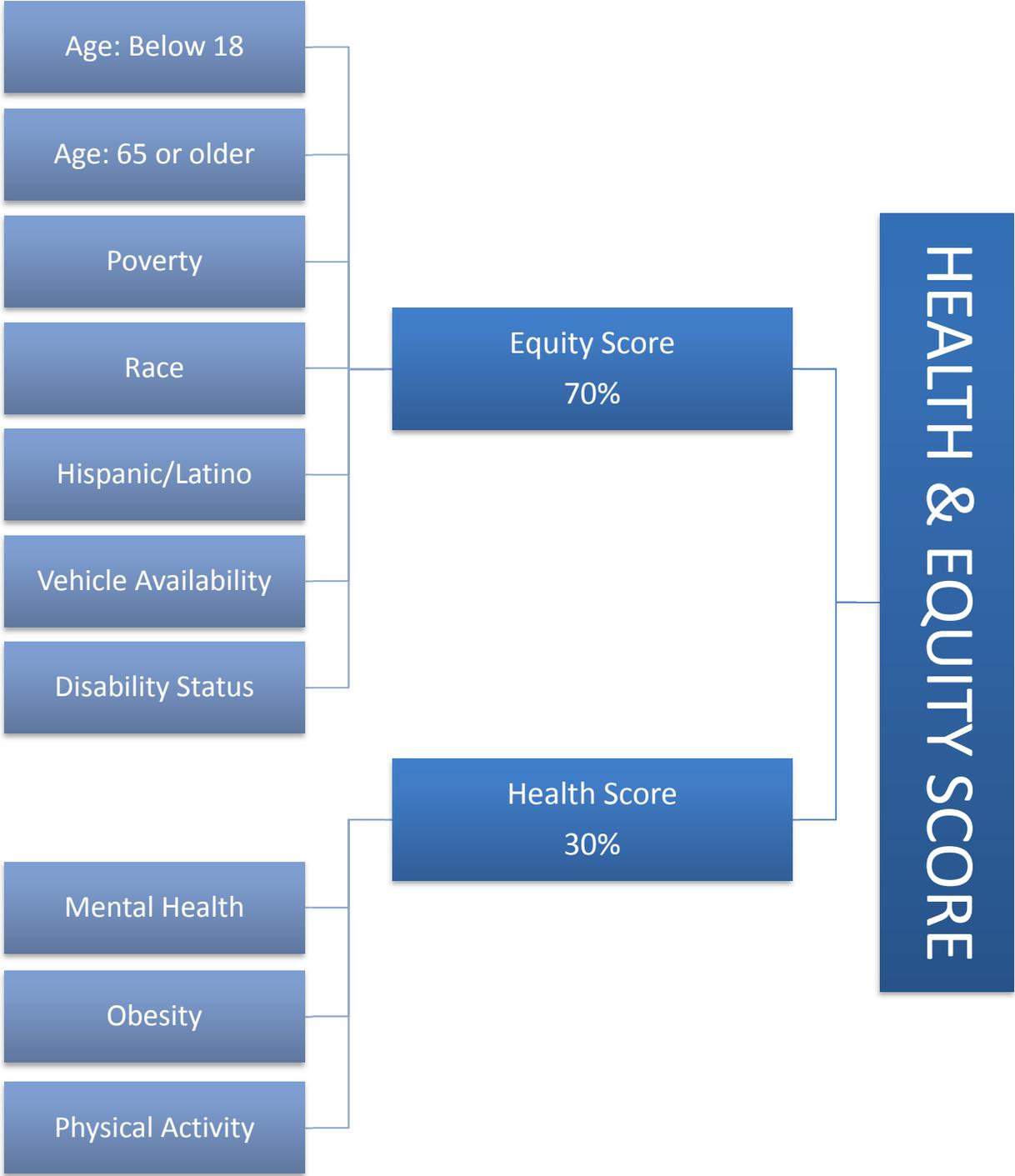


Figure 4: Summary of Safety Scoring

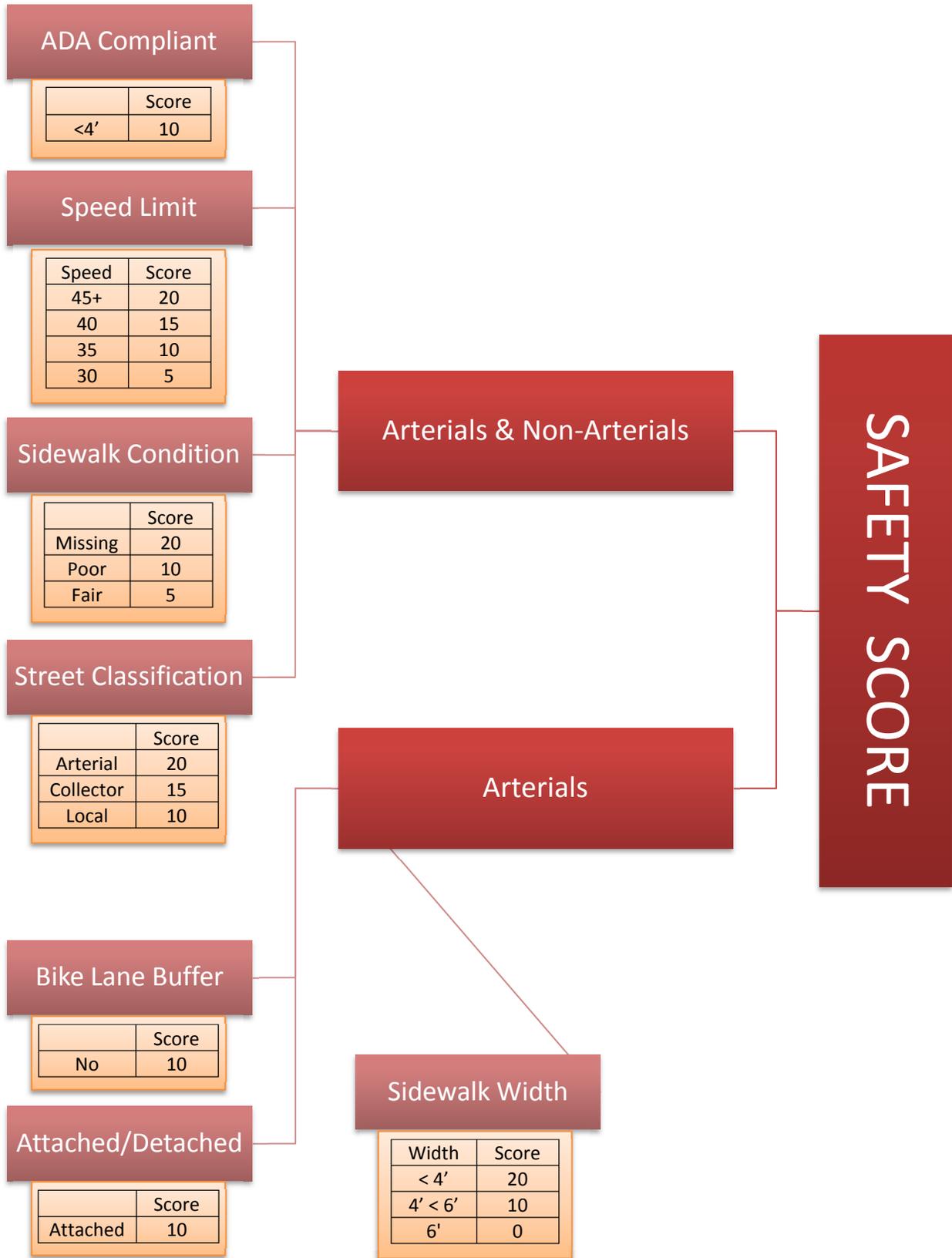
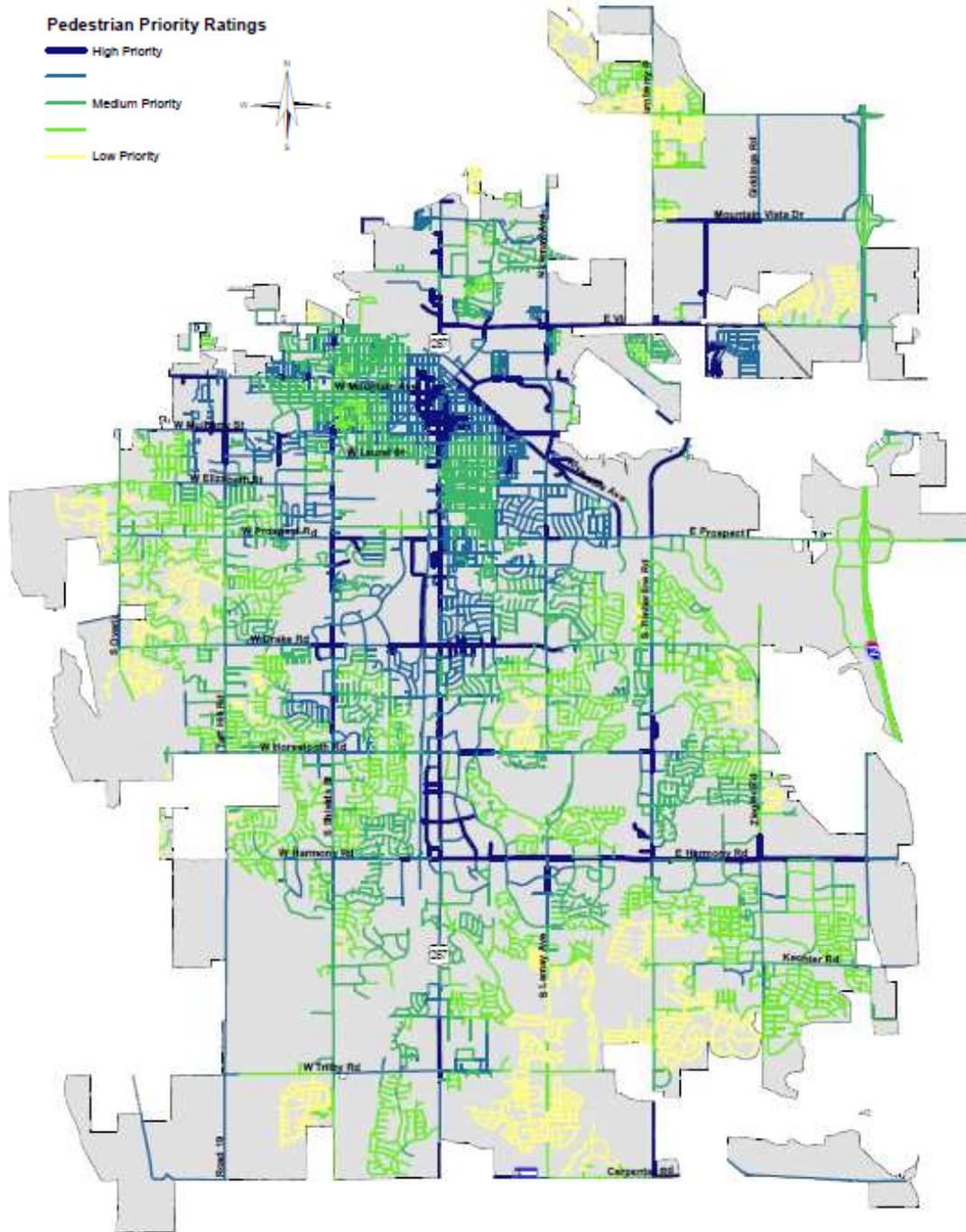


Figure 7: Block to Block Average Total Score



Implementation

Implementation considerations for this program will help to maintain a prioritized project list, provide detailed prioritization maps, increase staff's ability to generate rough construction estimates, evaluate construction techniques, and incorporate pedestrian infrastructure into transit and bicycle projects by collaborating with the Street Maintenance Program, FC Moves, Parking Services, and the Poudre School District to utilize workforces for cost savings and minimize impacts to the public.

Using and Maintaining the Project List

The project list will be a living document based in a GIS format that is updated on an annual basis. The list will serve as a resource to staff and is intended to provide the department with an extensive list of prioritized sidewalk needs. Some project shuffling is expected to occur in order to coordinate with other projects and opportunities. It is possible that a lower priority project may be built before a higher priority project because of an opportunity for construction and cost savings.

The completeness of a walking route in a particular area or corridor will be considered and may cause the projects in the list to be shuffled. If the effectiveness of a new sidewalk project is diminished by the absence of a particular section, incorporating the missing link in the route may be moved forward for construction ahead of other projects.

Changes to the list may occur at any time as roadway construction occurs or the construction of street frontage improvements as part of private development. In addition, changes to project scoring may occur as conditions change with the locations of schools, parks, or other items within the scoring table.

Integrating the Sidewalk Program with other City Plans and Programs

The objectives of coordination with other City plans and programs is to construct sidewalks as quickly and efficiently as possible to create an effective walking network.

On an annual basis the sidewalk program will be coordinated with the Streets Maintenance Program (SMP), FC Moves and Safe Routes to School, and Capital Projects to coordinate construction and adjust the sidewalk projects timing to complement and enhance the effectiveness of projects. Some components that may be taken into consideration are:

- Traffic Management Program
- Pedestrian Crossing Improvement Program
- Parks and Trails Planning
- Bicycle Facilities Planning
- Neighborhood Connections

Coordination between the groups will help identify these types of needs to make improvements to our overall transportation network.

Funding

Based on planning-level estimates we have quantified a total program cost as demonstrated in Table 2. The table is broken down into four main components that identify the overall need – missing sidewalks and ramps, non-compliant sidewalks and ramps. As the table shows, almost half of the cost of the program is associated with non-compliant sidewalks with each of the remaining components totaling the remaining half of the cost. The table also categorizes the individual components in a scalable format and has additional sub-categories (not shown) that enables more focused and effective decisions if funding unexpectedly becomes less or more available and projects need to be identified quickly. This is able to be done with the ability to prioritize any of the components for any number of years.

Table 2: Sidewalk Program Costs

	Sidewalk Program Components					
	Total Cost*	20 yrs.	25 yrs.	30 yrs.	35 yrs.	40 yrs.
Missing Sidewalks	\$21,000,000	\$1,100,000	\$800,000	\$700,000	\$600,000	\$500,000
Non-compliant Sidewalks	\$65,000,000	\$3,200,000	\$2,600,000	\$2,100,000	\$1,800,000	\$1,600,000
Missing Ramps	\$22,000,000	\$1,100,000	\$900,000	\$700,000	\$600,000	\$500,000
Non-compliant Ramps	\$26,300,000	\$1,300,000	\$1,100,000	\$900,000	\$800,000	\$700,000
Totals	\$134,300,000	\$6,700,000	\$5,400,000	\$4,400,000	\$3,800,000	\$3,300,000

* Current Total Cost estimated from 2014 data

Table 3 illustrates various funding levels as a scalable program. The table starts with a given number of years to bring the Sidewalk Program into compliance, then subtracts the current anticipated funding level, then showing the amount of funding required to accomplish the program in the provided number of years.

Program costs will change over time due to inflation, construction of sidewalks by private development, and potential construction efficiencies in materials and project scheduling.

Table 3: Sidewalk Program Funding Levels

	Scalable Sidewalk Program				
	20 yrs.	25 yrs.	*30 yrs.	35 yrs.	40 yrs.
Total Yearly Funding Need	\$6,700,000	\$5,400,000	\$4,400,000	\$3,800,000	\$3,300,000
Current Anticipated Funding	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000
Annual Funding Need	\$5,600,000	\$4,300,000	\$3,300,000	\$2,700,000	\$2,200,000
Est. Number of Projects Per Year	275	220	180	155	135
Est. Miles Completed Per Year (Includes Ramps)	28	23	19	16	14

* Current Proposed Funding Level

Sources

To date, funding for the Pedestrian Access Project that allowed for the data collection necessary for this analysis has come from the Keep Fort Collins Great (KFCG) program and Building on Basics (BOB). For the past few years the program has received \$350,000 annually for sidewalk repair and replacement projects.

The original Building on Basics Capital Improvement Projects (2006-2015) tax initiative was set to expire in 2015. In April 2015, voters approved a 10-year quarter cent tax renewal dedicated to community improvements – Community Capital Improvement Program (CCIP). A percentage of CCIP was established as Safe Routes to Everywhere which include transit, bicycle improvements, and pedestrian improvements. 14 million over the next 10 years has been programmed for pedestrian improvements and Table 4 illustrates those funding levels.

Table 4: Safe Routes to Everywhere (Pedestrian Improvements) Funding Levels

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
\$1 M	\$1 M	\$1.1 M	\$1.1 M	\$1.1 M	\$1.2 M	\$1.2 M	\$1.5 M	\$2.4 M	\$2.4 M

Additional funding continues to be sought through the budget for outcomes process to accelerate implementation of the program.

Conclusions and Recommendations

The Citywide Pedestrian Access Project pursues the Pedestrian Plan goals of promoting walking for transportation and recreation.

The program provides a comprehensive understanding of sidewalk needs for the City of Fort Collins. A long-term comprehensive program is necessary in order to:

- Address sidewalk needs objectively and comprehensively;
- Increase the Pedestrian Level of Service rating;
- Reduce the number of non-ADA compliant sidewalks and accessible ramps;
- Reduce injuries related to tripping hazards;
- Create connectivity along high volume pedestrian corridors and Safe Routes to School corridors;
- Insure efficient use of City funds; and
- Ultimately build more sidewalks more quickly to provide “complete” streets.

With a comprehensive prioritization program better coordination can occur, an appropriate funding strategy can be pursued, and will allow the City to address the most needed projects first.

Appendix A – Health and Equity Methodology

Annemarie Heinrich, Environmental Health Specialist II, of Larimer County Department of Health & Environment, Built Environment developed the original methodology for the prioritization model.

Summary:

A health and equity score at the block group level was created so that the City of Fort Collins can better prioritize sidewalk improvements. The score is based on proportion of the population affiliated with ten health and socio-economic factors: under 18, 65 or older, households at or below federal poverty level, Hispanic/Latino, non-white, households without a vehicle, disability status, obesity in adults, no leisure time physical activity in adults, and poor mental health for more than 14 days in adults. Final scores range from 0 to 100, with 100 being highest priority, in order to identify vulnerable communities who would likely benefit most from improved pedestrian infrastructure. This ranking is not to be used in isolation; rather it is combined with the City's pedestrian demand and safety factors.

Methods:

Equity

The equity score was derived from the following factors included in the 2011-2015 American Community Survey 5-year estimates: age (under 18 and 65 or older), households at or below federal poverty level, Hispanic/Latino, race (non-white), households without a vehicle, and disability status.

The disability dataset is the sole equity factor at the census tract level, while all other factors are at the block group level. In order to create determine count at the block group level, it was assumed that the disabled population was evenly spread throughout the census tract based on population. Thus, each block group received the proportionate number of disabled population based on population size.

Population count of each factor of interest were compiled for each block group and standardized by the total population of the block group. Block groups were ranked from highest to lowest standardized count by decile and each block group received an equity score between one and ten, ten being the highest.

Health

The health score was derived from the following indicators in the 500 Cities dataset: obesity in adults, no leisure time physical activity in adults, and poor mental health for more than 14 days in adults. In order to assign a health score, percent of each health factor were combined. Census tracts were sorted according to overall percent and for each quantile, tracts were then given a score between one and five.

Health & Equity Final Score

Census tracts 8069001601, 8069001709, and 8069001301 did not have a health score tied to them due to data limitations. For each of these, block groups with the same equity score were identified. An average health score was calculated for the like-equity score blocks and this average served as a health score estimate.

Block groups within the same tract were given the same health score. Equity was weighted 2.33 times more than health to create a health and equity score, or 70% of the total score. Health and equity scores were standardized to a 100-point scale.

Justification:

A total population count was calculated to determine a health and equity score as opposed to assigning each factor a score that contributes to the final score. This ensures no factor or person is valued more than another.

Equity was weighted more than health, simply because more factors contributed to its value.

Limitations:

While literature broadly shows associations between socio-economic and health factors and the built environment, it is nearly impossible to understand precisely how these factors influence sidewalk quality or need for pedestrian infrastructure. Because of this, there is no standardized methodology. This model assumes each factor contributes equally to the vulnerability and need of a community. Additionally, the model is not all inclusive of factors that could contribute to a community's vulnerability or potential benefit from improved pedestrian infrastructure.

Data Sources:

Equity

Age:

United States Census Bureau / American FactFinder. "B01001: Sex By Age." 2011-2015 American Community Survey 5-year estimates. U.S. Census Bureau's American Community Survey Office, 2016. Web. 4 May 2017. <<http://factfinder2.census.gov>>.

Poverty:

United States Census Bureau / American FactFinder. "B17017: Poverty Status in the Past 12 Months by Age of Householder." 2011-2015 American Community Survey 5-year estimates. U.S. Census Bureau's American Community Survey Office, 2016. Web. 4 May 2017. <<http://factfinder2.census.gov>>.

Race:

United States Census Bureau / American FactFinder. "B02001: Race." 2011-2015 American Community Survey 5-year estimates. U.S. Census Bureau's American Community Survey Office, 2016. Web. 4 May 2017. <<http://factfinder2.census.gov>>.

Hispanic or Latino Origin:

United States Census Bureau / American FactFinder. "B03003: Hispanic or Lation Origin." 2011-2015 American Community Survey 5-year estimates. U.S. Census Bureau's American Community Survey Office, 2016. Web. 4 May 2017. <<http://factfinder2.census.gov>>.

Vehicle Availability:

United States Census Bureau / American FactFinder. "B25044: Tenure by Vehicles Available." 2011-2015 American Community Survey 5-year estimates. U.S. Census Bureau's American Community Survey Office, 2016. Web. 4 May 2017. <<http://factfinder2.census.gov>>.

Disability:

United States Census Bureau / American FactFinder. "B18101: Sex By Age by Disability Status." 2011-2015 American Community Survey 5-year estimates. U.S. Census Bureau's American Community Survey Office, 2016. Web. 4 May 2017. <<http://factfinder2.census.gov>>.

Health

Mental Health:

Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. "Mental health not good for ≥14 days among adults aged ≥18 years." 500 Cities, 2017. Web. 4 May 2017. <<https://chronicdata.cdc.gov/500-Cities/500-Cities-Local-Data-for-Better-Health/6vp6-wxuq>>.

Physical Activity:

Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. "No leisure-time physical activity among adults aged ≥18 years." 500 Cities, 2017. Web. 4 May 2017. <<https://chronicdata.cdc.gov/500-Cities/500-Cities-Local-Data-for-Better-Health/6vp6-wxuq>>.

Obesity:

Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. "Obesity adults aged ≥18 years." 500 Cities, 2017. Web. 4 May 2017. <<https://chronicdata.cdc.gov/500-Cities/500-Cities-Local-Data-for-Better-Health/6vp6-wxuq>>.