



SUBMISSION FORM

All submission forms must include the following information. Separate submission forms must be turned in for each eligible program. **Deadline: July 1, 2023.** Please include this submission form with the electronic entry. If you do not receive an email confirming receipt of your entry within 3 days of submission, please contact [Gage Harter](#).

PROGRAM INFORMATION

County: Loudoun County

Program Title: Sidewalk and Trails Program - Equity Lens

Program Category: Transportation

CONTACT INFORMATION

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SIGNATURE OF COUNTY ADMINISTRATOR OR DEPUTY/ASSISTANT COUNTY ADMINISTRATOR

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Executive Summary

Loudoun County developed an innovative framework and approach to perform equity analysis when planning and prioritizing future sidewalk and trail projects. Loudoun County's Sidewalk and Trail Program was initiated in the County's Capital Improvement Program (CIP) with funding available to plan, design and implement 3 to 5 miles of sidewalk, shared use path or regional trail per year over the next six years. The County's FY 2024 Adopted Budget includes a total six-year planned appropriation of \$61,651,000 for planning, design, and construction of improvements in the County's Sidewalk and Trail Program and identifies the first 23 projects in ascending priority order. It is supported by a total of 7 Full Time Employees (FTE's) who devote some of their work time to the program.

To determine which missing bicycle and pedestrian links to address first, the project team consisting of 3 FTE's with consultant support, and input from representatives of various county departments, advocacy groups, and partner agencies, initially developed a data-driven method to evaluate all missing sidewalk and trail links based mostly on demand and safety metrics. To incorporate equity considerations into the prioritized list, an innovative equity lens framework was developed. Loudoun County developed the innovative framework using available public health indexes and the average percent of sidewalk and trail network completed within a census tract. This framework establishes a set of objective standards, analyzes missing sidewalk and trail links in the County against those standards, and implements an outcome-based corrective action plan to modify the program's priority list of segments, which in turn adjusts future project priorities. The highest scoring missing segments were used to identify sidewalk and shared use path projects for feasibility assessments, development of concept drawings, and planning level cost estimates. These items support grant funding applications, and the identified sidewalk and trail projects are proposed for inclusion in the CIP in ascending priority order. This framework and approach provide a model for other programs and localities to perform equity analysis when planning their future projects.

Brief Overview

Loudoun County's significant population growth and corresponding development has resulted in implementation of much of the County's planned network of walkways and bikeways. To address gaps in the existing network, the Sidewalk and Trail Program was initiated in the County's Capital Improvement Program, with funding available to plan, design and implement 3 to 5 miles of sidewalk, shared use path or regional trail per year over the next six years. To determine which missing bicycle and pedestrian links to address first, the project team, with input from representatives of various county departments, advocacy groups, and partner agencies, developed a data-driven method to evaluate all missing sidewalk and trail links based mostly on demand and safety. The highest scoring missing segments are used to identify sidewalk and shared use path projects for feasibility assessments, development of concept drawings, and planning level cost estimates. These items support grant funding applications, and the identified sidewalk and trail projects are proposed for inclusion in Loudoun County's Capital Improvement Program (CIP) in ascending priority order. In the County's FY 2024 Adopted Budget, 23 identified Sidewalk and Trail Projects have been included.

An innovative framework using available public health indexes and the average percent of sidewalk and trail network completion was then developed to analyze the County's Sidewalk and Trail network and the Sidewalk and Trail Program's priority list of segments through an equity lens. This innovative framework establishes a set of objective standards, analyzes missing sidewalk and trail links in the County against those standards, and implements an outcome-based corrective action plan to modify the program's priority list of segments, which in turn adjusts future project priorities. This framework and approach provide a model for other programs and localities to perform equity analysis when planning their future projects.

Background of the Sidewalk and Trail Program

Loudoun County is in Northern Virginia with a population of more than 400,000 residents featuring both rural, suburban, and urban centers. The County has seen significant population growth resulting in the expansion of businesses and roadway networks. Taking this into account, the [2019 Countywide Transportation Plan](#) (2019 CTP) promotes a multimodal transportation system, including walking and bicycling as a safe, secure, and convenient alternative transportation option. The County's planned network of walkways and bikeways enables residents and visitors to move efficiently to and from work, schools, transit access, shopping centers, libraries, and local and regional parks. In particular, sidewalk and trail connectivity to previously planned (and now realized) Metrorail Stations and other significant land use attractions is essential to reduce vehicle congestion and emissions on our roadways. To achieve a safe and efficient multi-modal transportation system countywide, the 2019 CTP policies call for bicycle and pedestrian access to be included in the planning, design, and implementation process of all roadway projects by both the public and private sectors.

In 2018, Loudoun County established the Sidewalk and Trails Program which funds the planning, design, and construction activities for 3 to 5 miles of sidewalk and trails (shared use paths) each year. With input from representatives of various county departments, advocacy groups, and partner agencies, the project team developed a data-driven method to rank all missing sidewalk and trail links based mostly on demand and safety. Prioritization criteria applicable to Urban/Suburban and Rural parts of the County are summarized in Table 1 (Page 4) and Table 2 (Page 5), respectively. Using these criteria, the highest scoring missing segments are used to identify sidewalk and shared use path projects for feasibility assessments, development of concept drawings, and planning level cost estimates. These items support grant funding applications, and the identified sidewalk and trail projects are proposed for inclusion in Loudoun County's Capital Improvement Program (CIP) in ascending priority order. In the County's FY 2024 Adopted Budget, 23 identified Sidewalk and Trail Projects have been included. Two additional projects have been awarded [Smart Scale](#) funding in June 2023. As funding becomes available, the projects are advanced to design and implementation phases.

Table 1: Prioritization Criteria for Missing Links in Urban/Suburban Areas

Major Theme	Criteria
Public School Generators	Proximity to Loudoun County Public Schools
Other Activity Generators	Proximity to Loudoun County Recreational Centers and Community Centers
	Proximity to Colleges and Universities
	Proximity to Major Sport Facilities
	Proximity to Major Commercial Centers
	Proximity to Loudoun County Regional Parks
Land Use	Adjacent Land Use Type
Regional Network	Proximity to the Washington & Old Dominion Railroad Regional Trail Park
Metrorail Stations	Proximity to Washington Metropolitan Area Transit Authority
Proximity to Transit	Proximity to Loudoun County Transit Stops
	Proximity to Loudoun County Commuter Bus Stops
Adjacent Roadway Characteristics	Adjacent Roadway Traffic Volume
	Adjacent Roadway Speed Limit
Safety	Proximity to Historical Crash involving a Pedestrian or Bicyclist
Network Characteristics	Ability of the Segment to Facilitate Crossing Limited Access Facilities and Natural Barriers
	Ability of the Segment to Provide Access to limited Access Facility and Natural Barrier Crossings
	Ability of the Segment to Directly Connect to the Existing Pedestrian and Bicyclist Infrastructure

Overview of Sidewalk and Trail Program Equity Analysis: An Innovative Approach

In February 2021, the Loudoun County Board of Supervisors Transportation and Land Use Committee requested that equity considerations be incorporated into the Sidewalk and Trail Program’s prioritized list. Due to the lack of a substantive body of precedent to achieve the Board’s desired outcome, it was determined that a new methodology would need to be developed to apply an equity “lens” to the County’s Sidewalk and Trail Program. To analyze the Sidewalk and Trail network and the priority list of segments through an equity lens, Loudoun County developed an innovative framework using public health indexes to establish a set of objective standards, analyze missing sidewalk and trail links in the County against those standards, and implement a corrective action plan that adjusts project priorities accordingly. This framework and approach provide a model for other programs and localities to perform equity analysis when planning their future projects.

Table 2: Prioritization Criteria for Missing Links in Rural Areas

Major Theme	Criteria
Safety and Comfort	Bike /Pedestrian Crash Occurred Within 250 Linear Feet of Segment
	Bike / Pedestrian Crash was Severe
	Shoulder Width
	Paved / Unpaved Roadway Facility
	Adjacent Roadway Posted Speed
Network Barriers	Adjacent Roadway Traffic Volume
	Segment Passes Through Natural Body of Water or Forest
Network Connectivity	Segment within 500 feet of Major Intersection
	Connectivity of Multimodal Facilities between Towns and Villages
	Connectivity to W&OD, Appalachian, and C&O Canal Trails
	Overlap with Linear Parks and Trails and Gravel Routes
	Connectivity to Linear Parks and Trails and Gravel Routes
	Existing Non-Motorist Usage
Activity Generators	Connectivity to Town Projects
	Proximity to a Community Center
	Proximity to a Food Pantry
	Proximity to a General Store
	Proximity to a Post Office
	Proximity to a Park
	Proximity to a School
	Proximity to a Farmers Market
	Proximity to Retail
	Proximity to a Supermarket
Proximity to Office	
Transit Access	Proximity to Park and Ride Locations
	Proximity to Bus Stops
	Proximity to MARC Stations

From winter 2021 to spring 2023, Loudoun County’s Department of Transportation and Capital Infrastructure (DTCI), with consultant support, conducted two phases of equity analysis. Phase 1 focused on understanding how equitably the existing network and prioritized list served concentrations of socially vulnerable populations and establishing a set of objective standards. Phase 2 focused on developing the corrective action plan which incorporated outcome-based equity considerations into the Sidewalk and Trail Program’s Prioritized Segment List. In both phases census tracts were used as the basis of the analysis to compare sidewalk completion percentages, calculated using spatial analysis, against the [Centers for Disease Control and](#)

[Preventions \(CDC\)/Agency for Toxic Substances and Disease Registry \(ATSDR\) Social Vulnerability Index \(SVI\)](#)

(CDC/ATSDR SVI) which measures the vulnerability of a population. This index sums underlying criteria into four themes with 15 social factors:

- **Socioeconomic Status:** Below Poverty, Unemployed, Income, No High School Diploma
- **Household Composition and Disability:** Aged 65 or Older, Aged 17 or Younger, Civilian with Disability, Single-Parent Households
- **Minority Status and Language:** Minority, Speaks English "Less than Well"
- **Housing Type and Transportation:** Multi-Unit Structures, Mobile Homes, Crowding, No Vehicle, Group Quarters

The study team also evaluated sidewalk completion rates against the CDC/ATSDR SVI overall social vulnerability score. CDC/ATSDR SVI data was used to classify census tracts into three groups: Below Average Vulnerability Group, Medium Vulnerability Group, and Higher Vulnerability Group.

The current sidewalk and trail network was compared to the 2019 CTP planned network to determine an average sidewalk and trail completion percentage for each vulnerability group. Overall, the analysis showed that upon completion of the 23 projects currently programmed in the Loudoun County's CIP, the sidewalk and trail network will serve Loudoun County residents with a slight preference to socially vulnerable populations.

As the availability of sidewalk and trails are very different for urban/suburban parts of Loudoun County as compared to rural parts of the County, the project team classified census tracts roughly according to the planning policy areas identified in Loudoun County's General Plan. Analyzing these areas separately revealed that there is opportunity for improved service delivery related to several CDC/ATSDR SVI themes. Table 3 summarizes some of the findings of the Phase 1 study, indicating with a checkmark the CDC/ATSDR SVI themes for which the sidewalk and trail network already achieved equal percentage completion across vulnerability groups.

Percentages provided in Table 3 indicate how much more investment in the sidewalk and trail network in a group of census tracts is needed to achieve a service delivery equal to the Below Average vulnerability group. For

example, for the Household Composition and Disability theme rural census tracts belonging to the medium vulnerability group need a 25.74% increase in the average completion rate to equal the completion rate of rural census tracts in the below average vulnerability group.

Table 3: Average Completion Percentage Differences from Baseline

SVI Theme	Urban/Suburban Census Tracts		Rural Census Tracts	
	Medium Vulnerability Group	Higher Vulnerability Group	Medium Vulnerability Group	Higher Vulnerability Group
Socioeconomic Status	6.30%	8.47%	3.34%	✓
Household Composition and Disability	✓	0.47%	25.74%	11.96%
Minority Status and Language	5.94%	5.50%	✓	✓
Housing Type and Transportation	7.88%	✓	✓	✓

Note: ✓ These groups already have an average completion percentage equal to, or greater than, the baseline.

Initiated in September 2022, Phase 2 built on the findings of the Phase 1 study and developed a corrective action plan following a four-step process shown in Figure 1.

- **Step 1:** Map differences between average completion percentages of the three vulnerability groups. The summary map in Figure 2 illustrates that new sidewalks and trails projects in 66% of the County's census tracts could improve equitable service delivery for at least one CDC/ATSDR SVI theme.
- **Step 2:** Apply the average completion percentage differences listed in Table 3 to the missing sidewalk and trail segments in/near the corresponding census tracts.
- **Step 3:** Apply the largest average completion percentage difference to each segment to adjust the priority score of that segment and re-rank the Prioritized Segment List. For example, a segment with an initial score of 75 percent received an adjustment of 25 percent, resulting in a total score of 100 percent.

- **Step 4:** Evaluate the performance of the revised list. This step revealed that the revised list serves areas of greatest access opportunity while providing infrastructure close to socially vulnerable census tracts.

For Loudoun County, utilizing this groundbreaking approach to add an equity analysis to the County's Sidewalk and Trail Program, enables Loudoun County to be well positioned for state and federal grants to implement the design and construction of missing sidewalk and trail segments countywide.

Figure 1: Four-Step Process of the Applied Corrective Action Plan

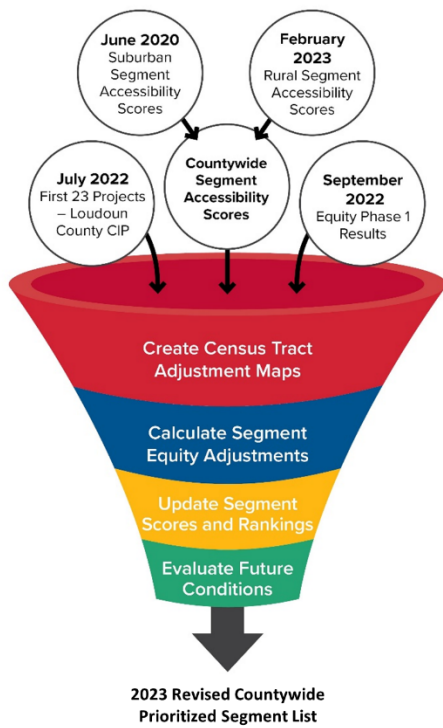
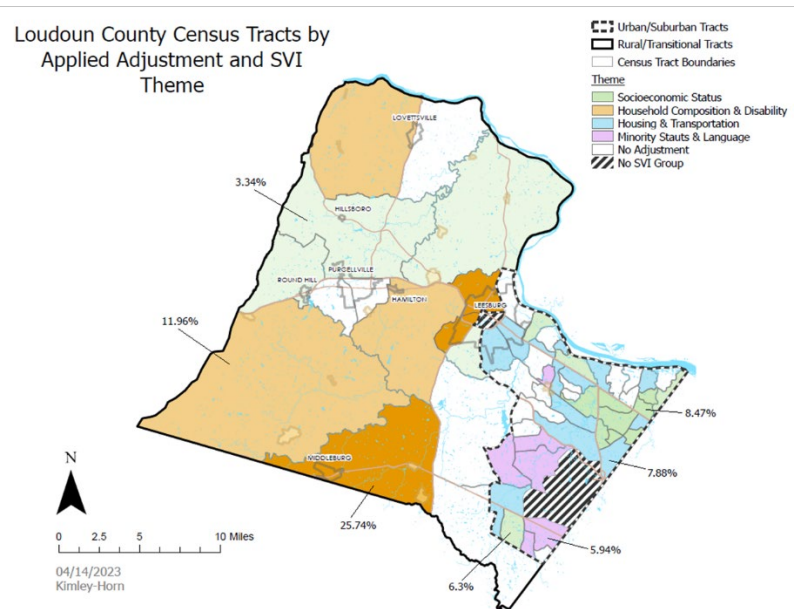


Figure 2: Loudoun County Census Tracts by Applied Adjustment and SVI Theme



Challenge: Providing Equitable Sidewalk and Trail Access to Socially Vulnerable Residents

Based on the importance of providing walking and bicycling as a safe, secure, and convenient alternative transportation option, the 2019 CTP highlighted 6-foot-wide sidewalks, 10-foot-wide shared use paths, on-road bicycle lanes, or a combination of these facilities of arterial and collector roadways. However, roadway improvement projects that were planned, designed, and/or constructed prior to 2010 did not require that bicycle and pedestrian facilities be integrated as part of the process. This created sidewalk and trail gaps and

connectivity issues countywide. Initially Loudoun County addressed this problem on an ad-hoc basis and found this problematic in solving the missing sidewalk and trail links.

To address the sidewalk and trail missing links, the County first prioritized the missing links and then identified 23 sidewalk and trails projects countywide. While these 23 projects corresponded to equity emphasis areas and other areas with socially vulnerable populations, equity considerations were not explicitly incorporated into the initial prioritization effort. To make sure additional sidewalk and trail improvements were equitable countywide, the project team sought to use a data-driven, outcome-based equity analysis. In this case, data-driven means using measurable information, which enables progress toward a goal to be consistently measured and managed. Further, an outcome-based approach meant that future investments could be focused toward achieving equity goals set by the County's elected officials.

Developing an Innovative Framework to Use and Share

In researching best practices for transportation infrastructure, the project team did not find a comparable framework to look at this issue through an equity context. Using available resources through the CDC and in consultation with the Loudoun County Office of Equity and Inclusion, the project team created a pioneering framework to perform the equity analysis on the missing sidewalk and trail segments. As the 15 social factors comprising the CDC/ATSDR Social Vulnerability Index are generally consistent with pedestrian and bicyclist vulnerability, the CDC/ATSDR Social Vulnerability Index was selected because it simplified analysis of 15 social factors to four social themes. Since the initiation of the project, the U.S. Department of Transportation has also adopted use of the CDC/ATSDR Social Vulnerability Index to measure non-motorized user equity.

The project team also carefully selected the percentage of planned sidewalks and trails that have been completed to reflect application of the Sidewalk and Trail Program in a manner consistent with 2019 CTP policies. Slight changes to this definition may result in measuring a different program or plan. For example, the project team found that the number of sidewalk and trail miles within a census tract was a more accurate reflection of

the 2019 CTP Bicycle and Pedestrian planned network as opposed to application of the Sidewalk and Trail Program.

The project team identified three possible approaches to incorporating equity considerations into the Prioritized Segment List. Although an additive approach that adds a weighted CDC/ATSDR SVI score to the prioritization criteria identified in Table 1 and Table 2 is commonly found in similar equity analysis, the project team opted not to use this approach as it can limit the impact of the equity factor and lacks the ability to adjust as network completion increases. An alternative approach, resource allocation by geography, designates a portion of the program funding to be dedicated to specific areas. Although this approach is commonly used in allocating grant funding, the project team raised concerns in that it may de-emphasize the prioritization criteria identified in Table 1 and 2. Ultimately, an outcome-based approach was adopted that maintains the existing prioritization system for missing links but then applies an additional scoring metric to ensure final scores produce a more equitable program. If data-driven, the outcome-based approach can identify where and how much adjustment would be needed to create a more equitable distribution of resources. This approach results in increasing completion rates for census tracts in the County with above average CDC/ATSDR social vulnerability scores.

The project team has developed expertise and an innovative solution in incorporating an equity lens to prioritize, in this case, missing sidewalks and trails. Loudoun County realizes that there is still work to be done to better serve socially vulnerable populations by continuing to provide safe access to all transportation modes including bicycling and walking. In developing this equity analysis framework, Loudoun County hopes to share this information with other internal departments, localities, and other partner organizations. Loudoun County has already received interest in utilizing this framework from the County's Office of Mapping and Geographic Information and from a state agency.

Sidewalk and Trail Program Equity Analysis Details

Financing

The Sidewalk and Trail Program Equity Analysis was funded through Loudoun County's existing Sidewalk and Trail Program with funding designated for the program and staffing. On April 4, 2023, the Loudoun County Board of Supervisors adopted the FY 2024 budget, which includes a total six-year planned appropriation of \$61,651,000 for planning, design, and construction of improvements in the County's Sidewalk and Trail Program. The approved FY 2024 budget includes a prioritized sidewalk and trails projects list that identifies the first 23 projects. Looking to the future, the 2023 Revised Countywide Prioritized Segment List was used to identify the next set of proposed missing segments to be presented during future budget deliberations. The County is working to group together geographically proximate missing sidewalk and trail links to provide further cost efficiencies.

Staffing

A total of 7 Full Time Employees (FTE's) in the Loudoun County Department of Transportation and Capital Infrastructure (DTCI) devote some of their work time to the Sidewalk and Trail Program; 3 of these FTE's were specifically involved with Equity Analysis projects. Staff was supported by a consultant team consisting of 3 persons.

Program Results

Loudoun County continues to determine additional opportunities to better serve socially vulnerable populations. The Phase 1 data-driven equity analysis findings highlighted the need for increased buildout in certain census tracts from an equity standpoint, as reflected in Figure 2 and identified in Table 3. These opportunities are evident when considering Urban/Suburban census tracts and Rural census tracts separately.

The Phase 2 outcome-based correction plan incorporated equity considerations into the 2023 Revised Countywide Prioritized Segment List, which consists of segments analyzed using either the Urban/Suburban Prioritization Criteria (Table 1) or the Rural Prioritization Criteria (Table 2). This results in a balanced prioritization that can adapt to changing equity goals, changing concentrations of socially vulnerable populations, and ongoing

investments by other agencies and organizations such as the Virginia Department of Transportation and private sector developers. The 2023 Revised Countywide Prioritized Segment List will result in building new sidewalks and trails where there is the greatest need for access while improving service to socially vulnerable census tracts. Artifacts of the analysis, such as the map in Figure 2, have been used to facilitate proffer discussions pertaining to off-site sidewalk and trail improvements with legislative land development applications. Further, the Phase 2 findings highlight the need for increased program funding to accelerate the timeline to achieve equal sidewalk and trail completion percentages across vulnerability groups.

The next steps include considering the following issues:

- **Identifying and Programming Future Projects:** Changing demographic data and additions to the sidewalk and trail network built outside of the Sidewalk and Trail Program may necessitate consideration of periodic updates to the 2023 Revised Countywide Prioritized Segment List
- **Constructability:** Implementation of pedestrian sidewalks and trails may require significant roadway reconstruction to bring roadway grade and drainage up to current VDOT standards.
- **Project Timing:** The proposed projects may need to be scheduled to coincide with grant funding availability. Different levels of public outreach and project complexity may also influence timing.

With the development of this framework, Loudoun County has provided an opportunity to increase equitable access to sidewalks and trails in the County as well as offer an opportunity to use this framework for other programs in the County and the region. Thank you for the opportunity to submit Loudoun County's Sidewalk and Trail Program's Equity Analysis project for your consideration.