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Completing Sidewalk Networks: Benefits and Costs

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Abstract

Most communities have incomplete sidewalk networks: many streets lack sidewalks and many existing sidewalks fail to meet design standards. This is unfair to people who want to walk and increases various costs by suppressing non-auto travel and increasing motor vehicle traffic. Recent case studies provide estimates of sidewalk expenditures and the additional investments needed to complete sidewalk networks. This indicates that typical North American communities spend $30 to $60 annually per capita on sidewalks, and would need to double or triple these levels to complete their networks. This is a large increase compared with current pedestrian spending but small compared with what governments and businesses spend on roads and parking facilities, and what motorists spend on their vehicles. Sidewalk funding increases are justified to satisfy ethical and legal requirements, and to achieve various economic, social and environmental goals. There are several possible ways to finance sidewalk improvements. These usually repay their costs through savings and benefits.

Keywords: Walkability, Pedestrian Planning, Sidewalks

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Introduction

Walking (including variants such as wheelchair, scooter and handcart use) is the most basic and universal form of travel. Even astronauts walk in space. Improving walking conditions can provide many benefits, and incur various costs, as summarized in Table 1.

Table 1 **Walkability Improvement Benefits and Costs** (Litman 2022)

	Improved Walking Conditions	More Walking Activity	Reduced Automobile Travel	More Compact Communities
Benefits	• Improved user convenience, comfort and safety. • Improved accessibility for non-drivers, which supports equity objectives. • Higher property values. • Improved public realm (more attractive streets). • Improved public transit access.	• User enjoyment. • Improved public fitness and health. • More local economic activity. • Increased community cohesion (positive interactions among neighbors). • More neighborhood security ("eyes on the street").	• Reduced traffic congestion. • Road and parking facility cost savings. • Consumer savings. • Reduced chauffeuring burdens. • Increased traffic safety. • Energy conservation. • Pollution reductions. • Economic development.	• Improved accessibility, particularly for non-drivers. • Transport cost savings. • Reduced sprawl costs. • Openspace preservation. • More livable communities. • Higher property values. • Increased security.
Costs	• Facility costs. • Lower traffic speeds.	• Equipment costs (shoes). • Increased crash risk.	• Slower travel.	• Increases some development costs.

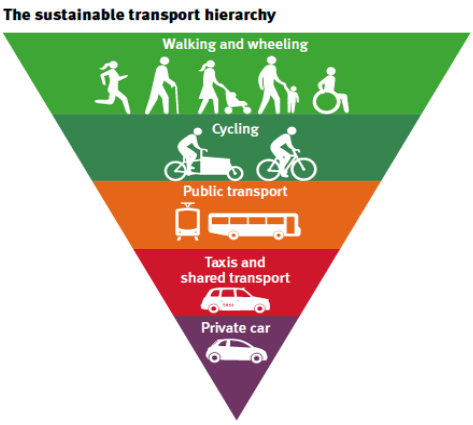
Walkability improvements can provide numerous benefits and incur some costs.

Sidewalks are the most basic walking infrastructure. Virtually everybody uses them including transit passengers when accessing stops, and motorists and bicyclists when travelling between parked vehicles and destinations. Sidewalk network improvements tend to increase utilitarian walking trips (Yu 2024). Physically, economically and socially disadvantaged people are particularly reliant on walking so completing sidewalk networks helps achieve social equity goals (Dunn 2023).

However, unlike other transport infrastructure, sidewalks often lack basic data, planning and funding. In most communities sidewalk networks are developed ad hoc, built as part of new developments with no mechanism for filling gaps, correcting mistakes, or upgrading to meet current design standards, and there is often little enforcement of maintenance requirements (ITE 2023; Messier 2025; Pollack 2023). As a result, most communities have incomplete and inadequate sidewalk networks.

This is inequitable and inefficient. Inadequate sidewalks are unfair to travellers who walk for necessity or preference including many disadvantaged groups such as people with disabilities (PwD) and low incomes (Gonzalez 2023; Hong 2023; Litman 2024). Inadequate walking conditions increase crash risk, suppress walking, and increase driving and associated costs. Having sidewalks on both sides of a street reduce pedestrian crash rates by half (Abou-Senna, Radwan and Mohamed 2022; FHWA 2012). Motorists also benefit if sidewalk improvements by allowing non-drivers to travel independently, reducing their chauffeuring burdens, and expand the range of parking spaces that serve their destinations.

To guide planning decisions many transportation organizations apply a sustainable transport hierarchy, as illustrated to the right, that prioritizes higher value trips and resource-efficient modes over lower value trips and resource-intensive modes (TS 2020). This favors walkability improvements.



This report investigates these issues. It uses recent case studies to estimate current sidewalk spending levels and the additional investments needed to complete sidewalk networks, and discusses the benefits that would result. It describes some funding options. This information should be useful to pedestrian advocates, transport practitioners and anybody interested in improving walking conditions.

Sidewalk Responsibilities

Two recent studies explore current sidewalk planning and funding responsibilities. The Institute of Transportation Engineers' *Residential Local Street Sidewalk Survey* found that these responsibilities are often unclear and poorly enforced. The study "Complete Streets Meet Fragmented Policies" (Messier 2025), analyzed sidewalk ownership, planning and financing in 30 large U.S. cities with Complete Streets and Vision Zero policies that ostensibly prioritize walkability, but most assign sidewalk responsibility to abutting property owners which results in incomplete sidewalk networks and unfair cost burdens.

Sidewalk Cost Studies

Some recent data sources and case studies provide information on sidewalk construction costs.

- According to popular sources such as the *Home Advisor* (HA 2023) and *How Much* (2023), a typical concrete walkway costs $6 to $12 per square foot, with higher costs for additional prep work, thickness, design and finish. This totals $1,200 to $2,400 for a typical 5-foot walkway on a 40-foot urban frontage or $2,400 to $5,000 for an 80-foot suburban frontage. Assuming that sidewalks have 20-year average operating lives and homes have 2.5 occupants, these facilities cost $24 to $100 annually per resident.
- Using detailed field data, Corning-Padilla and Rowangould (2020) estimated that improving all Albuquerque, NM sidewalks to optimum standards would cost approximately $54 million, averaging $60 per capita or about $6 annual per capita if implemented over ten years.
- Approximately 40% of Denver, Colorado's sidewalks are missing or substandard, and filling these gaps will cost $385 to $1,550 per capita or about $40 to $150 annual per capita over a decade (DE 2019). As a result of a 2022 referendum the City will collect approximately $150 annually per property owner (about $60 annual per capita), with higher rates for larger properties (Tauber 2024; Zipper 2025).
- Ithaca, New York charges $70 annually per household (about $30 annual per capita) and $185 per business to build and maintain city sidewalks (Ithaca 2014).
- The Seattle Department of Transportation found that 27% of streets lack sidewalks (Moreno 2024), and 46% of the city's 2,300 miles of sidewalks are rated to be in fair, poor or very poor condition and so are difficult and dangerous to use (Korman 2023). In 2019 the city received nearly 3,000 complaints and paid $1.4 million in settlements due to sidewalk trips and falls. Fixing all of the city's sidewalks could cost between $500 million and $1.3 billion, or between $140 and $370 per capita.
- Los Angeles has approximately 10,750 miles of sidewalks of which 40% are rated inadequate. A 2016 class-action lawsuit by disability rights advocates requires the city to spend $1.4 billion over 30 years to fix its sidewalks, which averages about $12 annual per city resident (Shoup 2023).

- Approximately 40% of Burnaby, British Columbia's streets lack sidewalks. It's current $4.5 million (about $20 per capita) annual expenditures add about seven kilometers of sidewalk per year, which would take more than fifty years to complete the network. To accelerate this to 10-15 years the city more than doubled the program's annual budget to $10 million ($40 per capita) in 2019 (Rantanen 2019).
- Nashville's *WalknBike* study estimates that new sidewalks cost $1,000 per linear foot, of which 82% is construction and 18% professional services (NDOT 2022). This is higher than most other estimates because it includes costs for property acquisition, curbs, stormwater infrastructure and landscaping.
- Washington State's 2020 *Draft Active Transportation Plan* estimates that upgrading its transportation system to maximize active travel safety would cost $5.7 billion, approximately $750 per capita or $75 annual per capita over a decade, about 13% of the state's transportation budget (WSDOT 2020).
- Table 2 summarizes active transportation facilities costs.

Table 2 **Active Transportation Facility Costs** (Bushell, et al. 2013; Zeeger 2002; Weigand, McNeil and Dill 2013)

Measure	Typical Costs (Updated to 2023 U.S. Dollars)
Sidewalks (5-foot width)	$25-85 per linear foot
Marked crosswalk	$200-400 for painted crosswalks, $5,000 for patterned concrete.
Pedestrian refuge island	$10,000-15,000, depending on materials and conditions.
Path (5-foot asphalt)	$50-70 per linear foot
Path (12-foot concrete)	$140-200 per linear foot
Bike lanes	$15,000-80,000 per mile to modify existing roadway (no new construction)
Center medians	$200-300 per linear foot
Curb bulbs	$15,000-35,000 per bulb
Curb ramps	$2,500 per ramp.
Chokers and chicanes	$14,000 on asphalt streets, $20,000 on concrete streets.
Curb bulbs	$15,000-30,000 per bulb.
Traffic circles	$7,000 for landscaped circle on asphalt street, $10,000 on concrete street.
Traffic signs	$100-200 per sign.
Speed humps	$3,000 per hump
Traffic signals	$20,000-100,000 for a new signal

This table summarizes examples of active transport facility costs.

- Adding shadeways (covered awnings that protect pedestrians from sun and rain) typically doubles or triples sidewalk costs (Litman 2023).
- U.S. federal and state departments of transportation typically spend $1 to $3 annually per capita on special walking and bicycling facilities (ABW 2018; Jones 2021).

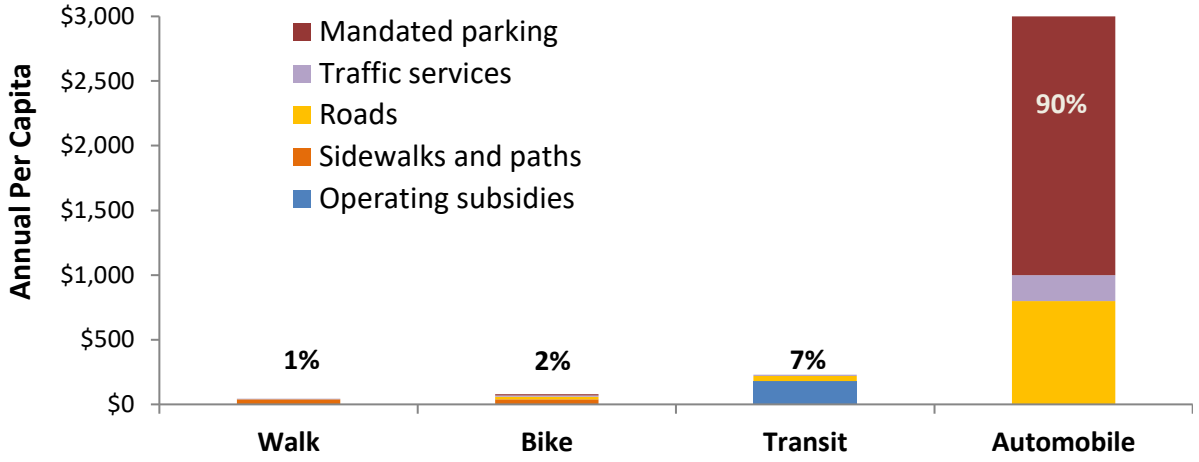
Summary

These studies indicate that total expenditures on sidewalks by property owners and governments currently average $30 to $60 annually per capita. This results in sidewalks on 25-50% of urban streets, with higher rates in older city neighborhoods and lower rates in suburbs. Completing sidewalk networks and achieving universal design standards typically requires doubling or tripling spending levels to $80 to $150 annually per capita. This estimate is specific to sidewalks and does not necessarily include curbs, traffic calming, streetscaping, landscaping, or recreational trail networks.

Comparing Transportation Infrastructure Investments

Figure 1 compares current U.S. transportation infrastructure spending by mode, including sidewalks, public transit subsidies, roads and government mandated parking facilities. This indicates that only about 1% of transportation infrastructure spending is devoted to sidewalks and paths.

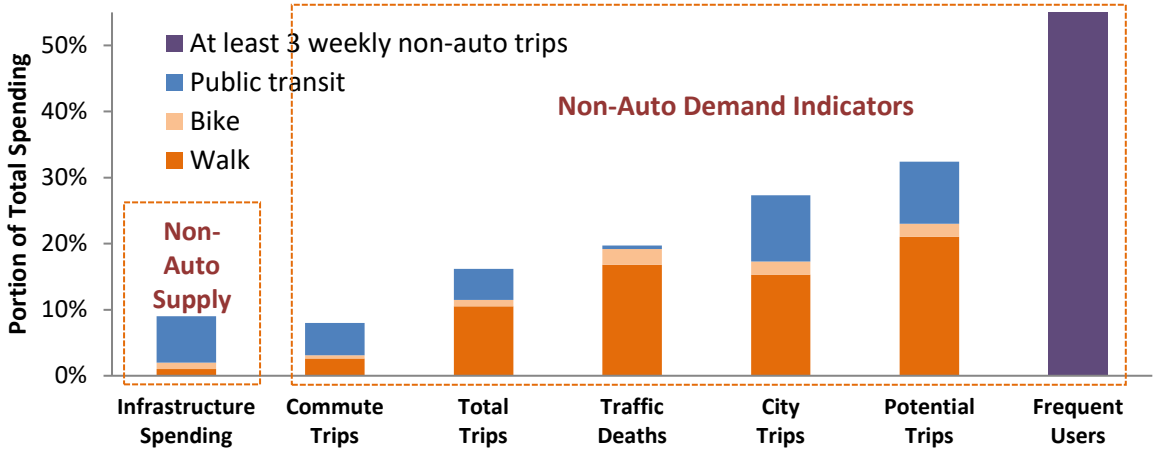
***Figure* 1** **Estimated Transportation Infrastructure Spending** (Litman 2024)



Currently only about 1% of total transportation infrastructure spending is devoted to walking facilities.

Figure 2 compares current expenditures on non-auto modes with indicators of their demands, including commute mode shares (based on Census Journey to Work data, which significantly undercounts walking since it ignores walking trips to access public transit or between parked vehicles and destinations), total trips (based on National Household Travel Survey Data), traffic deaths, city trips, potential trips (including latent demands), and residents who use non-auto modes at least three times per week. This indicates that most communities underinvest in non-auto modes relative to their demands.

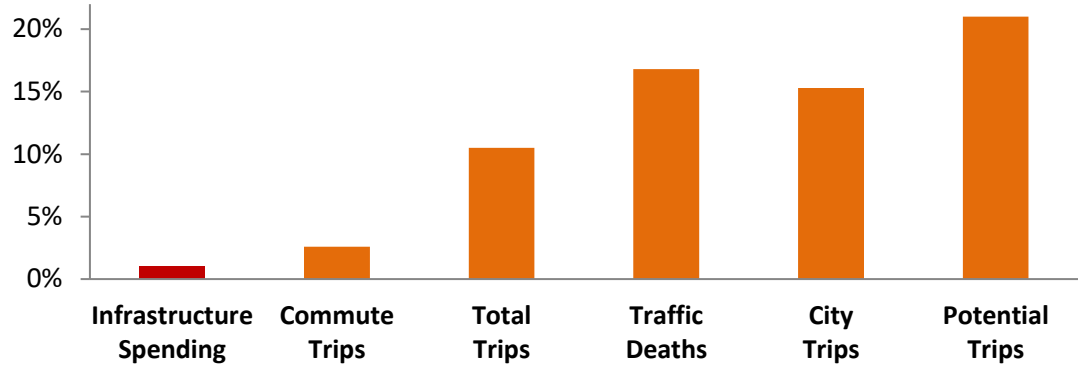
Figure 2 **Non-auto Infrastructure Spending and Demand Indicators** (Litman 2024)



Non-auto modes receive a smaller portion of infrastructure spending than their share of total trips, traffic deaths, potential trips, or users.

This disparity is particularly large for walking. Typical communities spend about 1% of their transportation infrastructure budgets on public walkways although walking represents 11% of total trips, 17% of traffic deaths, 15% of city trips, and 21% of potential trips if walking conditions were improved. This suggests that significant increases in sidewalk funding can be justified for fairness sake.

Figure 3 **Comparing Walking Infrastructure Investments with Demand** (Litman 2024)



Current sidewalk planning and funding practices tend to be unfair and regressive. Most jurisdictions require property owners to fund sidewalks which disproportionately burdens lower-income households. Some municipalities acknowledge this concern by minimizing enforcement of sidewalk maintenance requirements, which tends to harm disadvantaged people who rely on walking, particularly those with mobility impairments, and harms disadvantaged communities (Messier 2025).

Travel Impacts and Benefits

Pedestrian improvements can significantly increase walking and reduce driving, providing many benefits (CPSTF 2017; Messier 2025). The *Nonmotorized Transportation Pilot Program*, which invested about $100 per capita in walking and bicycling improvements in four typical U.S. communities (Columbia, MO; Marin County, CA.; Minneapolis, MN; and Sheboygan County, WI) increased walking trips 23% and bicycling trips 48%, reduced total vehicle-miles about 3%, and reduced active mode crash rates (FHWA 2014). Analysis by researchers Guo and Gandavarapu indicate that installing sidewalks on all streets in a typical North American community would increase 0.097 average daily walk- and bike-miles per capita and reduce 1.1 vehicle-miles, about 12 fewer vehicle-miles for each additional walk/bike-mile (Guo and Gandavarapu 2010). Neighborhoods with excellent walkability often have 20% to 50% active mode shares and much lower vehicle ownership and use than in auto-oriented areas (Buehler and Pucher 2023). Sidewalk and crosswalk improvements, complete streets and traffic calming can provide large benefits, including large reductions in pedestrian risk, plus various economic, social and environmental benefits when improved walkability reduce motor vehicle trips (ITDP 2024; Moran and Laefer 2024)

Of course, these impacts vary depending on specific conditions. Sidewalk improvements may have minimal benefits where few travellers want to walk but there is evidence of significant latent demands for walking. Approximately 11% of total U.S. trips are by walking and their potential is much greater (NHTS 2023). Approximately a quarter of all personal trips are one mile or less, suitable for a twenty-minute walk (Bhattacharya, Mills, and Mulally 2019). The National Association of Realtor's "National Community and Transportation Preference Survey" indicates a growing preference for living in walkable urban neighborhoods even if that requires attached housing, such as an apartment or townhouse (NAR

2023). Current demographic and economic trends (aging population, rising fuel prices, changing consumer preferences, and increasing health and environmental concerns) are likely to increase future demands for walking and the benefits of servicing those demands.

Serving these demands by completing sidewalk networks can provide large savings and benefits, which are likely to more than offset the additional costs. A FHWA report found that providing walkways separated from travel lanes can prevent up to 88% of crashes involving pedestrians walking along roadways, and reduces head-on, sideswipe, and fixed object crashes (FHWA 2002). Walkability improvements tend to increase nearby property values, but individual owners cannot capture the full benefits of a complete sidewalk network and so are likely to underinvest in these facilities (Boyar 2016).

For example, completing sidewalk networks is estimated to typically cost about $100 annually per capita. Using Guo and Gandavarapu's estimate that completing sidewalk networks would reduce average annual vehicle miles and associated costs about 3%, this would provide about $30 in annual roadway savings, $60 in annual parking cost savings, $180 in vehicle cost savings, plus significant health benefits and reductions in traffic congestion, crash risk and pollution emissions. These are lower-bound estimates because they do not account for all walkability travel impacts and benefits. For example, completing sidewalk networks improves public transit access and expands the number of parking spaces that serve a destination, increasing traffic and parking system efficiency. This indicates that sidewalk network improvements provide at least a 2.7 benefit/cost ratio ($270/$100), and probably far more.

Completing sidewalk networks also helps achieve social equity goals. As previously described, most jurisdictions currently underinvest in walking facilities relative to their demands, and since physically and economically disadvantaged groups tend to rely on walking, completing sidewalk networks tends to be progressive – it helps disadvantaged groups. This is indicated by efforts by disability advocacy organizations to complete and improve sidewalk networks based on universal design standards.

Walkability Audits and Sidewalk Inventories

Sidewalk planning should begin with a walkability audit that evaluates existing conditions, problems and gaps (Hasan, Oh and Kwigizile 2021; Frank, et al. 2021) using tools such as the *Walk Audit Tool Kit* (AARP 2022) and the *National Walkability Index* (tinyurl.com/vj87y3mu). The *Measuring Walking* (www.measuring-walking.org) website provides guidance for collecting standardized walkability data.

The next step is to create a detailed sidewalk and crosswalk inventory that includes dimensions, conditions, universal design features (such as ramps), hazards and gaps. This information should be incorporated into a GIS (geographic information system) mapping system. New tools can help standardize and automate this process:

- GIS programs such as *ArcGIS* can incorporate sidewalk maps that are updated over time; survey crews in the field for any purpose can collect detailed sidewalk and crosswalk data.
- *Dax* (https://daxbot.com) uses small robots to collect detailed pedestrian network data.
- *DeepWalk* (www.deepwalk.com) uses an iPhone's LiDAR system to automatically inspects sidewalk systems for ADA compliance.
- *Ecopia* (www.ecopiatech.com) uses high-resolution geospatial data to create detailed municipal maps.
- *TILE2NET* (https://urbantk.org/tile2net) is an open-source tool that uses aerial imagery and image-recognition to create complete sidewalk and crosswalk maps.

Potential Funding Options

Many jurisdictions are developing pedestrian or active transportation plans which evaluate current walking and bicycling facilities and identify and prioritize improvements. To be fully implemented they usually require new funding. Currently, most jurisdictions develop their sidewalk networks by requiring owners to build sidewalks when their properties are developed and repair sidewalks that fail. Currently, most U.S. jurisdictions require property owners to pay for sidewalk construction and maintenance, often with exemptions and poor enforcement (ITE 2023; Messier 2025). Relying on property owners results in sidewalk network gaps, fails to improve sidewalks to meet current standards, and imposes occasional large and regressive costs on property owners. A few municipal governments plan and fund sidewalk networks directly (Boyer 2018; Messier 2025; Shoup 2010).

The city of Seattle requires developers to provide sidewalks if ten or more parcels are subdivided, if six or more housing units are built, or when any new homes are built within urban villages (denser neighborhood). A study by Garza and Goldman (2023), *Housing Supply and Development Contributions: A Case Study of Sidewalks in Seattle*, found that the financial burden of requiring sidewalk construction on developers reduces the number of housing units built in those areas – developers often build just below the threshold to avoid paying for sidewalks - which reduces the total number of sidewalks built.

Funding options include general funds, special community-wide assessments, tax increment financing, sales taxes, and grants from other levels of government (Minnesota Walks 2018). Some jurisdictions fund pedestrian improvements as part of parks and recreation, but these are mainly special trails rather than sidewalk networks. Ithaca, New York charges household and business annual fees to build and maintain city sidewalks (Ithaca 2014). Denver's Ordinance 307, approved by referendum, will collect special property taxes to upgrade and complete the city's sidewalk and recreational trail network (Ballotpedia 2022). In response to a lawsuit, the city of Sacramento agreed to dedicate 20% of its annual transportation budget to make public sidewalks accessible (Shoup 2010).

Federal, state and local safe route to school programs can help fund sidewalk improvements in order to increase students' safety and health, reduce road and parking facility costs, and achieve other community goals including emission reductions. One comprehensive study found that increasing sidewalk coverage and proximity between homes and schools in a typical suburban community can nearly triple active mode shares from 7.9% to 21.4% (Ewing, Forinash, and Schroeer 2005).

In the article, "Fixing Broken Sidewalks," Donald Shoup recommends that municipalities require sidewalks to be inspected and inadequacies repaired when properties are sold (Shoup 2010 and 2024). To accelerate this process, cities can offer to repair sidewalks and receive payment when the property is sold in the future; the city effectively lends funds for sidewalk repairs, with owners paying market interest rates so governments recover their costs. The article, "Sidewalk Government," by Michael Pollack (2023), examines the fragmented property law of sidewalks. It describes how current legal practices result in unclear accountability for sidewalk quality and accessibility. To address these problems it recommends development of new agencies to administer sidewalks.

Local and regional governments can also improve sidewalk data, inspection and enforcement. They can develop GIS sidewalk inventories that identify conditions and gaps, encourage residents to report problems, and hire trained inspectors – wheelchair users are particularly qualified – to collect field data, such as *Tile 2 Net*.

Regional and state/provincial transportation agencies traditionally invest little in sidewalks based on the assumption that their mandate is to serve longer distance motorized traffic, not active travel. However, that division is a fallacy. In fact, many of their facilities, such as urban arterials and interregional highways, serve many local trips and are affected by walkability. Sidewalk improvements can reduce traffic volumes and congestion on those facilities, directly and by improving transit access.

Regional and state/provincial transportation agencies can significantly improve pedestrian facilities on their highway and public transit projects, such as sidewalks on bridges and pedestrian crossings over highways, and provide grants to local governments to improve pedestrian facilities including sidewalks.

Regional and state/provincial agencies can also provide information to facilitate sidewalk development. For example, they can provide guidance and funding for local governments to develop comprehensive GIS sidewalk inventories that can be used to identify network gaps and inadequacies, evaluate walking and bicycling levels-of-service, and set targets for improvement (of example, that 95% of streets will have ADA compliant sidewalks within a decade). This is a critical first step in sidewalk network planning that benefits from regional standardization, so methods and data sets are consistent between jurisdictions.

Conclusions

Walking is the most basic travel mode and sidewalks are the most basic transport infrastructure, but they are often overlooked and undervalued. Most communities have incomplete sidewalk networks: many streets lack sidewalks and many sidewalks are inadequate. This is unfair to walkers and increases various costs by suppressing non-auto travel and increasing motor vehicle traffic. Current demographic and economic trends are increasing walking and the benefits of serving those demands. Completing sidewalk networks can help achieve many economic, social and environmental goals.

Recent case studies indicate that typical North American communities spend $30 to $60 annually per capita on sidewalks, and would need to double or triple these spending levels to complete their networks. This is a large increase compared with current pedestrian spending but small compared with what governments and businesses spend on automobile infrastructure, and what motorists spend on their vehicles. Increased sidewalk investments are justified to satisfy ethical and legal requirements, and to achieve various economic, social and environmental goals. There are several possible ways to finance sidewalk improvements. These usually repay their costs thorough savings and benefits.

Acknowledgments

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