Pedestrian Behavior and Preference Survey

Abstract

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Abstract
Walkable and pedestrian friendly community planning receives much attention from policy makers, government officials and urban planners. Walkable communities have a network of sidewalks and trails that connect residential and commercial activities. This paper describes results of a survey of citizen walking habits and preferences for pedestrian paths in Lindstrom, Minnesota. Lindstrom citizens walk for exercise, socialization and to shop and prefer paths to have landscaping, lights and garbage cans. Pedestrian paths promote healthy activities and pedestrian safety, but researchers question their relationship to neighborhood socialization.

Introduction
Walking is simple and is our original means of transportation. Innovations in transportation technology have reduced the role of walking as a means of transport. Urban planners and policy makers design and promote pedestrian paths to increase pedestrian safety, promote exercise and contact with neighbors, and provide infrastructure for an alternative mode of transportation. The idea of a pedestrian friendly and walkable community is not new, however negative effects from automobile dependency for example, poor health from lack of exercise, air pollution and congestion have launched movements to create and endorse walkable communities.

The “neo-traditional” Smart Growth, New Urbanist, Transportation-Oriented Development (TOD) Pedestrian-Oriented Development (POD) and Traditional Neighborhood Design (TND) movements promote and encourage the use of pedestrian paths through community design. Information to create a walkable community exists in planning literature, interest group design recommendations and in public policy. Knowledge of the types of citizens who use pedestrian paths and reasons why they use paths provide support and information for planners and policy makers to promote and create pedestrian paths in new development areas or within existing areas that lack paths.

This paper illustrates results of a pedestrian survey of residents who live in Lindstrom, Minnesota. The paper includes review of literature that promotes walking through design and studies of greenway surveys. This paper also includes a description of Lindstrom pedestrian paths, survey details and survey results. Final conclusions describe recommendations for further analysis and discussion of improvements to the Lindstrom pedestrian system.
Walkable Communities

Pedestrian Friendly and Walkable Communities

Walkable Communities Defined
The US Department of Transportation Federal Highway Administration (FHWA) defines a “walkable community” as safe and accessible (1). Safety exists where traffic-calming measures reduce speeds and where pedestrians understand traffic risks and feel safe from motorists. Accessibility increases with a “complete sidewalk system” that connects to businesses within walking distance and contains wheelchair access and safe crosswalk intersections (1). The encouragement of a safe, walkable community is found in a variety of literature, interest group and public policy publications. Walking co-exists with all other forms of transportation and is the least expensive type of transportation. We walk to cars, transit stations, schools, work, stores, public spaces and businesses. Walking can improve our overall health, but also poses risks. Many central city urban regions contain networks of pedestrian paths like sidewalks and paved, mowed nature trails or “greenways.” Suburban developments, however, often lack trails and even sidewalks. Lack of sidewalk and trail networks create safety risks as pedestrians are forced to walk on street shoulders, or create health risks from lack of exercise and walking (1).

The Mid-America Regional Council, which consists of over 100 local governments in the Kansas City region, has adapted nine walkable community guidelines from the “Campaign to Make America Walkable: A Vision of a Walkable Community.” The nine guidelines promote accessibility for all ages, safe, healthy and friendly communities, active children, children’s safety, pedestrian focused street and highway design, pedestrian priority in neighborhoods, adequate traffic-calming measures, responsible drivers and healthy water and air (2). Walkable communities therefore have “coherence, continuity, equilibrium, safety, comfort, sociability, accessibility, efficiency and attractiveness.” A pleasant walk in a safe neighborhood with maintained sidewalks and paths, easy to cross streets and attentive drivers is one way to measure a walkable community (3, 4). Mid-America identifies specific pedestrian obstructions often found in communities, poor trail and sidewalk structures and maintenance, lack of access to transit, no sidewalks in communities and along bridges, absence of sidewalks and curb cuts, narrow sidewalks, lack of traffic-calming in residential, business, school and public areas and physical impediments (2).

The Smart Growth community, which includes “neo-traditional” design, New Urbanist, Transportation-Oriented Development (TOD), Pedestrian-Oriented Development (POD) and Traditional Neighborhood Design (TND) movements, promote mixed, high density residential and commercial uses with focus on pedestrian, bike and transit networks and street design. The POD movement endorse “a mixed-use community within an average one-fourth mile walking distance of transit stop and core commercial areas,” or a five minute walk from business areas. Focus on the pedestrian with the creation of networks of sidewalks and trails for walking and biking may not increase walking rates in all
communities. Research states US citizens will typically walk for “daily trips from 400 feet to ¼ mile.” (5). Untermann and Barber found most citizens walk 500 feet for “daily errands” and 400 to 1,200 feet for trips, respectively (5).

Walking Trends
US Census data for 2000 report 3,142,899 million, or 2.68 percent of US citizens over age 16 walk to work, a decline from 4.5 million citizens who walked to work in 1990 (6). Potential for walking exists as 1995 Packwood Research Associates report walking and biking rates increased from five percent to 13 percent, while driving dropped 20 percentage points to 56 percent (7). The 1994 American Lives survey discovered 74 percent feel bike and pedestrian paths enhance home location (7). Survey respondents also favor (77 percent) funding sidewalks and trail signs, as found in the 1990 Surface Transportation Policy Project (7). The Emerging Trends in Real Estate 1998 study named Traditional Neighborhood Developments (TND) as “market to watch.” (2).

Opportunities to walk exist in many communities and support for pedestrian friendly locations is increasing; however people walk for specific purposes. Knowledge of why citizens walk provides communities with tools to enhance networks of pedestrian paths and trails. The 1995 National Personal Transportation Survey discovered 43 percent of walking trips include personal or family business, 34 percent for social/recreational, 14 percent for school/church/civic trips, and seven percent to earn a living (7). Rodale Press 1995 concludes 80 percent walk for enjoyment, 75 percent for exercise, 37 percent for transportation and 17 percent to commute (7).

Preliminary national data from the 2001 National Household Travel Survey (NHTS) found an increase in Vehicle Miles Traveled (VMT) has a correlation with a decrease in walking rates (8). NHTS preliminary data of mode share for biking and walking show over 60 percent of all trips is to “walk dogs,” 49 percent for exercise, 21 percent to relax, 17 percent for social activities and eleven percent for entertainment or to enjoy friends. Less than five percent of walk and bike trips are to work, church, hospitals, hair shops, and less than ten percent to schools, libraries, shopping, for services, family and meeting activities and meals. The NHTS data also show decrease in US walking and biking mode shares, which correlates with VMT increases (8).

Calthorpe and Fulton (9) promote walkable communities to enhance neighborhoods with safe, slow-speeds, attractive and walkable streets, buildings oriented towards the street, sidewalks lined with trees and public open space to support pedestrians (9). The Transportation-Oriented Development (TOD) approach also sustains pedestrians with mixed-use high-density neighborhoods or nodes centered along transit routes with walking access to residential and commercial areas. Walkable communities connect sidewalks and trails to places of work, schools and businesses. Trails and sidewalks in suburban neighborhoods without close proximity to schools, work and commercial entities only promote exercise

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and not accessibility. Many suburban areas have a mix of residential and commercial amenities, but lack areas for pedestrians to walk (9). A pedestrian system increases accessibility and connects residential areas and commercial amenities. A variety of design guidelines and literature assist and inform communities about design of walkable neighborhoods and cities.

Walking Through Design
Cities and urban planners apply standards for street and sidewalk design as found in city ordinances. These standards are almost exclusively uniform, specific for all types of developments and most often designed to increase vehicle traffic flow, speed and movement or reduce speeds, as in the case of winding cul-de-sacs. The 1965 Institute of Transportation Engineers (ITE) publication set standards for subdivisions to improve livability and safe accessibility for vehicles and pedestrians. ITE recommends sidewalks on each side of streets at a minimum of five feet in width. The 1984 and 1991 ITE publications duplicate provisions found in the 1965 standards (10). The US Federal Highway Administration and Portland Pedestrian Design Guide assist communities with the design of streets and sidewalks to promote pedestrian activity. A variety of research and evidence, however, support or undermine the role of neo-traditional neighborhoods have to increase pedestrian activity.

Research (by Crane) discovers neo-traditional neighborhoods both "promote and discourage auto use." Studies by Calthorpe (1993) show a decrease in VMT in grid-like, neo-traditional street patterns, while Handy (1992) found grid-like street patterns in San Francisco promote auto trips. Crane states improvements to transportation system accessibility, including transit or pedestrian, decrease the cost of travel and “may not reduce auto travel.” However, a connected, easy to walk pedestrian system may increase “walking trips substituted by car,” but this relationship is not well researched (11). Regardless, many cities and governments promote and focus on the role of pedestrians within transportation systems and guidelines.

The Minnesota Department of Transportation (Mn/DOT) promotes planning for pedestrians in all transportation construction, engineering and design phases through its Five Elements of the pedestrian program, Planning, Facilities, Funding and Programming, Safety Education and Enforcement and Research (12). The US Department of Transportation Federal Highway Administration pedestrian Design Guidance of the Transportation Equity Act for the 21st Century (TEA-21) states, “bicycling and walking facilities will be incorporated into all transportation projects unless exceptional circumstances exist.” (13)

The City of Portland Pedestrian Design Guide outlines standards for sidewalk corridors, crosswalks, pathways and stairs. “Good Sidewalk Corridors” are accessible, have adequate width, are safe, continuous, have landscaping, social areas and quality. The Sidewalk Corridors address frontage, rights-of-way, Americans with Disability Act (ADA), design criteria, amenities, surfaces and driveway
issues and requirements (14). Walkinginfo.org Pedestrian Facilities Users Guide and Bikewalk.org contain pedestrian information and pedestrian “Signs and Markings” provisions, respectively (15, 16).

Benefits of Pedestrian Paths and Walkable Communities

Pedestrian Safety and Heath Issues
The 2000 bureau of Transportation Statistics Omnibus Survey reports 30 percent of respondents “felt very unsafe or unsafe” when walking (7). Pedestrian traffic fatalities in the United States have decreased over the past decade, however pedestrians account for 11 percent of total traffic accidents. In 2000 the National Highway Traffic Safety Administration reported 4,739 pedestrians died and 78,000 injured in traffic accidents (7). Pedestrian fatalities increased in 2001 to 4,995 killed. Correlations may exist between the decrease in those who walk and the increase in pedestrian fatalities (6).

Safety issues are very important for pedestrians, especially in neighborhoods with public parks and areas without pedestrian facilities. Young children ages zero to four and five to nine account for 22 percent and 23 percent of all pedestrian fatalities, respectively (7). Most pedestrians killed are men, killed at night and in urban locations at non-intersections (7). Streets designed to increase traffic flow and speed in residential neighborhoods that lack pedestrian paths create safety issues. Survival rates for pedestrians decrease when speeds of vehicles increase, for example an increase in vehicle speed of 10 mph reduces survival rates by 50 percent (2).

Pedestrians can increase personal safety with knowledge of local laws and attentiveness to surroundings. Minnesota 2000 Statutes, Section 169.21, Subdivision 1, state pedestrians must “obey-traffic control signals” and have right-of-way in streets with crosswalk markers or without traffic signals (Subdivision 2). Pedestrians do not have right-of-way at intersections without crosswalk markers or signals and must use the “right half of crosswalks.” (Subdivision 3 and 4) (17). Simple actions like light colored clothing, look before crossing streets, walk against traffic flow, walk in crosswalks, obey traffic lights, and teaching rules increase pedestrian safety (18).

Pedestrian safety is crucial for communities and citizens, however lack of exercise poses extreme health risks for a large majority of US citizens. The US Centers for Disease Control (CDC) report 60 percent of adults have no physical activity. Obesity rates have increased 100 percent in children and 50 percent in adults. The CDC reports 10 to 15 percent of children are overweight and have at least one heart disease symptom (19). The CDC promotes increasing physical activity in children and adults to promote a healthy lifestyle and eating habits to curb obesity and negative health effects. Walking clearly is one way to improve citizen health. Communities have a direct interest in creating walkable communities in order to promote healthy lifestyles. Our “sedentary lifestyle costs 76 billion dollars and
more a year. Walking saves costs not only for governments and health care agencies, but citizens themselves (6)

**Trail Benefits**
The Minnesota Department of Natural Resources lists a variety of Economic, Social and Environmental Benefits of Trails as listed in their 1996 publication. The report cites increases in “spending behavior” at food and lodging businesses and sales in Lanesboro, MN, located along the Root River Trail. “Property value” increases in Seattle along the Burke-Gilman Trail found a six percent increase of home values located near the trail. “Social benefits” of trails include availability to increase and provide for safe physical activities and promote community pride. Environmental benefits include less pollution created by providing infrastructure to increase use of alternative modes of transportation, link trails with transit, protect vegetation and wildlife corridors and establish historic preservation routes like the “Minuteman Bikeway.” (20).

**Public Open Space and Socialization**
The influence of suburbanization and negative effects from sprawl or “low-density, auto dependent” development elicit debate on the value and loss of “public open space.” Public open space such as parks, playgrounds, open green space, city squares, public buildings and sidewalks and trails allow for social interaction for all citizens. Public open space can be increased with the creation and preservation of parks and parkland, through widening sidewalks and creating connected sidewalk and trail systems. Gordon and Richardson (1993) question the role and importance of public open space and parks. Other researchers, (such as Jane Jacobs and Robert Putnam) expose the decline of US “social capital” usually found in civic groups. The loss of the “public spirit” could be captured through Peattie’s “conviviality,” or creating social, civic bonds in communities through, for example, sidewalks, trails, and community clean-ups (21).

Focus on the design of streets to increase social activity could enhance pedestrian and community activity and interaction. Freeman however, found contradictory evidence that mixed-use pedestrian focused communities create socially knit neighborhoods and low-density sprawled suburbs hinder pedestrian social activity. Freeman’s research found pedestrian-friendly communities offer opportunities or “facilitate” neighborhood social interaction, while areas focused on cars decrease “face-to-face contact” and reduce chances to interact socially (22).

**Livable Streets**
The concept of a “livable street” also promotes socialization through design and protects residents from traffic issues while promoting traffic safety. A livable street includes mixed-uses of housing and focus on sidewalks with “front yards” to increase interaction. Promotion of boulevards in livable street planning
encourages connections of neighborhoods and safe crossing of arterials not often found in today’s suburban areas arterial networks (23).

Greenway Surveys
A series of urban Greenway studies by Greg Lindsey, et al. from the Center for Urban Policy and the Environment at Indiana University provided foundation and support for the development of the Lindstrom Pedestrian Survey. Lindsey et al. surveyed property owners and renters located in the Crooked Creek Greenway and residents of Marion County, Indiana to determine use and opinions of the Crooked Creek Greenway, willingness to contribute to the Greenway Foundation and rates of participation in outdoor activities (24, 25). The second study of the greenway series counted and surveyed three specific Indianapolis urban Greenways to determine greenway users, levels and “patterns of use” in the greenway system, “perceptions” of trail maintenance” and propensity to fund Greenways (26). The final of the survey series determined preferences for parks, rail-to-trail planning and attitudes towards outdoor activities in Hendricks County, located west of Marion County and Indianapolis (27). Results of the Indianapolis and Marion County Greenway surveys and the types of questions in the survey instrument were used as a foundation and reference for the Lindstrom Pedestrian Survey.

Lindsey et al. and a team of Indiana University graduate students physically counted the number of users of three Indianapolis urban greenways during the month of October 1996 at various observation locations along the trails and at specific times of day (26). These counts provided estimates of the overall levels of use and number of trips on the greenways. The highest number of trips occurred on Monon Trail, with 30,000 to 40,000 trips, while Canal Towpath and White River received less than 3,000 trips. The types of users of the trails (runners, bikers, walkers, etc.) varied per greenway and may be dependent upon greenway location.

The graduate students interviewed 269 total random greenway users on the weekend of October 26-27, 1996 (149 on Monon and 120 on Towpath). Greenway users provided information on types of users, preferences of the paths, use of the trails and demographic information. Both paths had majority female users, Caucasian users, those with bachelor’s degrees, between the ages of 19 to 44 and live in one or two person household. Walkers comprised the majority of users on Towpath (45 percent), while Monon had a smaller walk share of 32 percent. The majority of people used the Monon Trail one to three times a month (35 percent), while Canal Towpath was used three to five times a week (35 percent).

Distance from residences to the paths varied with less than one-fourth mile for Towpath (25 percent) and one to three miles for Monon (36 percent). Towpath users walk to the path (50 percent) while Monon Trail users drive (62 percent). Trail users were asked to rate the level of maintenance of the path and majority of citizens surveyed rated trash and snow removal, trail width and surface maintenance
as excellent or satisfactory. Trail amenities preference questions found citizens surveyed want drinking fountains, garbage cans and restrooms. Trail users were also asked about funding options. Most users preferred government funds, donations, volunteer and fundraising activities rather than user fees or commercial funds to fund greenways. The specific questions regarding demographics, “frequency of use,” “time spent on trails,” “times of trail use,” “distance and mode of travel to trails,” maintenance of trails and amenities preferences were referenced and modified for the Lindstrom Pedestrian Survey (26).

Lindsey et al. also surveyed three groups of residents who own property and rent within the Crooked Creek Greenway and a sample of Marion County, Indiana residents (24). Questioners were mailed to 879 property owners, 785 apartment renters and 1,100 Marion County residents. The overall response rate of 43 percent resulted with the lowest rates from the renters and Marion County residents. The following Crooked Creek Greenway questions were modified for use in the Lindstrom Pedestrian Survey. The majority of residents in Marion County and property owners felt greenways are “somewhat likely” to improve neighborhood quality, while renters felt they “very likely” improved quality. Willingness to pay for greenway improvements found renters and residents are not willing to fund the Greenways Foundation, while property owners are willing. Greenway owners and renters surveyed feel “government should pay”, while country residents feel “greenway users” should pay for greenways.

All owners, renters and County residents agreed future generations should enjoy Crooked Creek Greenway and renters and county residents were undecided of the use of Indianapolis city funds for greenways, while owners agree to the use of city funds. Owners and renters disagree that too much money is spent on parks and trails, while County residents are ambivalent. All residents surveyed participate in a variety of outdoor activities at various frequencies. Property owners observe wildlife, renters jog, and county residents bike more than five times a year. The majority of all groups surveyed have lived in their location for more than five years, while more property owners have graduate degrees, renters some college and county residents college graduates (24). The Indianapolis Greenway survey series and “Household Technology and Travel Survey” of the University of Minnesota provided format for development and style for the Lindstrom Pedestrian survey instrument (28, Appendix A).

Pedestrian Path and Survey Description

Lindstrom Pedestrian Paths
Lindstrom is located along Trunk Highway 8 in southern Chisago County, Minnesota and is one of several communities in the Chisago Lakes Area. An estimated 17,370 persons live in the Chisago Lakes Area, which includes the communities of Chisago Lake Township, parts of Franconia and Wyoming Township, Chisago City, Lindstrom, Center City and Shafer. Lindstrom is located along TH 8 in between the cities of Chisago City and Center City. The community was incorporated in the year 1894, but
established by Swedish settlers in the 1850s. Lindstrom population grew from 2,461 persons in the 1990 Census to 3,015 persons in the Census of 2000. Chisago County population gained 10,580 citizens from 1990 (30,521) to the year 2000 (41,101) and ranks fourth in county population growth in Minnesota (29).

The City of Lindstrom is essentially surrounded by water and has the shape of the number “7.” (Appendix B) South Lindstrom Lake borders the city to the southwest, while North Lindstrom Lake borders to the northwest. North Center Lake and South Center Lake abut the city to the northeast and southeast, respectively. Other small lakes and ponds exist within the community boundary. TH 8 passes directly through Lindstrom Main Street and is the only arterial that connects Lindstrom to the other communities in the Chisago Lakes Area, Highway 61, Interstate 35 and Wisconsin at St. Croix Falls. Other county and city roads located to the north and south of Lindstrom proper connect Lindstrom to the Chisago Lakes communities.

Lindstrom has a variety of sidewalks, paved trails, a mowed nature trail and an exclusive shoulder pedestrian/bike lane that pedestrians can use for recreation, exercise, transportation or socialization (Appendix B and C). All historic neighborhoods established in the late 1800s and early 1900s and new developments established after 1997 contain sidewalks and trails. Subdivisions constructed in the community from 1960 to 1997 do not provide trails or sidewalks, which creates a lack of connection in the existing and new trail and sidewalk system (30).

The Lindstrom pedestrian system contains 15 total pedestrian paths, which includes ten sidewalks greater than one block in length (Newell Avenue, Pleasant Avenue, Maple Street, First Avenue N, Broadway, 297th Street, Nathan Avenue, 295th Street, North Meadow Curve, Marigold Lane), one mowed nature trail (Mentzer Nature Trail), two paved trails (Olinda Trail / County Road 25 and Stacy Trail), one exclusive shoulder pedestrian/bike lane (Lake Lane) and one mixed paved trail and sidewalk system (TH 8/Lake Boulevard) (Appendix C and D).

Sidewalks greater than one-block in length are located in both the older, historic and new subdivided neighborhoods. Lindstrom historic neighborhood streets with sidewalks include, Newell Avenue, Maple Street and First Avenue N., and have a mix of single-family residential and commercial amenities with a grid or web designed street system. The Newell Avenue sidewalk begins at the Lindstrom Beach Park and extends three-fourths mile and connects to Olinda Trail. The path is located in an historic neighborhood one block south of TH 8 and has many public amenities, including two public parks, which receives much pedestrian traffic especially during summer festivals. First Avenue N. is located one block north parallel to TH 8 and begins at County Road 20 and stops four blocks at Linden Street. A mix of historic residential homes and commercial uses like the post office, bank, and furniture store and dentist office exist along this street and path. Maple Street intersects with First Avenue North and ends at Third Avenue North. Historic homes with many front porches exist in this neighborhood.
New subdivided neighborhoods have tree-like design and are strictly single-family residential, aside from one located near public institutions. The Town and Country, Lake Country Estates, The Gardens and North Meadows new subdivisions built after the year 1997 have sidewalks and/or connect to paved trails or nature trails.

Town and Country is located ¾ mile south of TH 8 and east of Olinda trail and west of South Center Lake. Sidewalks exist on Broadway, from 295th to 299th Street; on 297th Street, from Neal Avenue to Broadway; and on Nathan Avenue, from 295th to Town and Country Park. The four acre Town and Country Park is under construction and will include two pavilions, paved paths, playground equipment, basketball court, climbing wall, three landscaped resting areas and landscaped trees and shrubs throughout the entire park (Appendix D).

Lake Country Estates is located one mile south of TH 8 and west of Olinda Trail. The subdivision borders the High School to the north, a Church to the east and South Lindstrom Lake to the west. The sidewalk begins on Olinda at 295th Street and connects with N. and S. Mentzer Trail, which connect to a tot park. An unpaved, mowed nature trail (Mentzer Nature Trail) begins at 295th Street and connects to Mentzer Trail and 299th Street located behind and beside of the High School. This nature trail passes through a wooded area and connects to Olinda Trail.

North Meadows subdivision, located in the northwest corner of Lindstrom contain sidewalks the entire length of the tree-like development, which begins and ends at Stacy Trail and extends along N. Meadow Curve. North Meadows is strictly residential, but connects to parkland in the subdivision via Orton Drive. A paved trail exists next to the North Meadows subdivision, north of the Stacy Trail road, and begins at N. Meadow curve and extends east towards County Road 14. The Gardens subdivision sidewalk begins on Marigold Lane at Lake Lane and ends on Stacy Trail, directly across the street from N. Meadow Curve.

An exclusive shoulder bike/pedestrian lane extends along Lake Lane and is located in the northwest portion of Lindstrom. The path begins at County Road 14 and ends at Marigold Lane within the City of Lindstrom boundary. The path continues along Lake Lane until it reaches County Road 77 in Chisago City. Residential trailer homes, townhomes, single-family homes, a spa and funeral home exist along the stretch of Lake Lane in Lindstrom.

The TH 8/Lake Boulevard Trail is a mixture of sidewalks and paved trails and traverses through single-family and multi-family homes and commercial entities. The sidewalk begins at Lake View Motel, which is located along TH 8 and North and South Lindstrom Lake, and follows TH 8 through the historic Lindstrom main street and ends at Olinda Trail. A variety of mixed-use residential and commercial businesses, a church, the Middle School and single-family homes are located along the corridor. Sidewalks are located on both the north and south edges of TH 8/Lake Boulevard. At Olinda Trail, the
sidewalk becomes a paved trail that extends west to the Middle School, where the trail terminates due to a marsh ditch and continues in Center City.

**Lindstrom 1998 Bike and Walking Trails Report**

In the spring of 1996, the Minnesota Design Team visited the city and provided recommendations to improve planning and design in the community. The Minnesota Design Team, founded in the 1980s, consists of planners, architects and urban designers who visit communities and assist with city and community planning. The Design Team eleven community-based planning principles guide cities to improve and promote city individual resources and their “sense of place,” and encourage a variety of housing types, businesses, compact and infill development with respect for the local environment (31).

The Design Team recommended Lindstrom to improve and expand the city sidewalk and trail network. Lindstrom residents, as found through the Design Team suggestions and the 1997 Survey of Lindstrom Needs, support enhancements to the city pedestrian network. The 1998 City “Park Board Report on Bike and Walking Trails” recommended improving the city pedestrian system. The report proposes to complete the Olinda Trail paved path from Sylvan to TH 8/Lake Boulevard, create a walkway along side TH 8 from the Lake View Motel across the channel of North and South Lindstrom Lake, incorporate trails into the city Comprehensive Plan and new subdivisions and promote community trail expansion and development (23).

The City implemented many of the recommendations found in the Lindstrom Park Board Report. Expansion of the Olinda Trail, negotiable sidewalks on one-side of the street in new Planned Unit Developments, no snowmobile access on sidewalks and trails (32), trails in the Town and Country Park and the Mentzer Nature Trail and support for the County proposed Swedish Immigrant Trail, located along the old railroad bed from Wyoming to Taylors Falls, reflect the city goal to improve the trail system to connect community amenities, improve access and provide residents safe routes for biking, walking, in-line skating and skiing.

**MN-DOT Lindstrom Vehicle Traffic**

The TH 8 corridor presents unique policy challenges due to corridor growth and predicted increases in traffic congestions, safety issues and travel time delay. The TH 8 corridor in Lindstrom from County Road 14 to County Road 25 experience average daily traffic counts of 20,100 vehicles. The east corridor from Lindstrom at County Road 25 to Center City has average daily traffic of 17,900 vehicles (33). Lindstrom and the Chisago Lakes community have opportunities to improve the pedestrian and bike system. The TH 8 corridor is currently under environmental review and Environmental Impact Statement (EIS) review and comment period commences in the winter of 2003, with final EIS review 2004. Alternative 3 improves and expands TH 8 from a two-lane to a four-lane highway (34).
Modifications of TH 8 through Lindstrom West may include creation and extension of a path for biking, walking and in-line skating alongside or under the bridge located in the channel between N. and S. Lindstrom Lake.

Survey Purpose and Goals
This survey assessed and determined residents of Lindstrom, Minnesota walking behaviors, preferences for pedestrian path amenities and funding of paths and rate of path safety and path maintenance. The goal of the survey was to discover citizen opinion and use of the existing pedestrian network in Lindstrom. The survey determined citizen views and citizen use of pedestrian paths from survey questions based on five broad areas: Path Purpose and Use, Path Amenities and Preferences, Path Safety and Maintenance, Path Funding and Demographics.

The pedestrian survey addresses the following goals:
1. To identify who uses pedestrian paths.
2. To identify how often, why and for how long citizens use pedestrian paths.
3. To identify citizen preference of pedestrian path amenities.
4. To identify citizen value of pedestrian path safety and maintenance characteristics.
5. To identify citizen willingness to pay for paths.

Survey Hypothesis
Limited research on the effect of neo-traditional neighborhood design to increase pedestrian activity and preliminary 2001 National Household Travel Survey bike and walk mode share data suggest the hypothesis that the majority of those surveyed who walk in Lindstrom, walk for exercise, social interaction or to walk pets, rather than to walk for errands or to shop.

Survey Development
In 1997, Lindstrom conducted a Survey of Lindstrom Needs. Results of this survey indicate citizen support for improvements to the Lindstrom bike and pedestrian trail and sidewalk network (30). Specific results of the 1997 Survey of Lindstrom Needs and the survey instrument are missing and details of the survey development are incomplete and inaccessible. The Lindstrom Pedestrian Survey (Appendix A) involved four phases, survey instrument development, support from the Lindstrom Park Board and the City of Lindstrom, survey implementation and scoring and examination of survey results.

A variety of interest group and city surveys exist to measure the “walkability” of communities, however academic studies of the use and demand of trails or “greenways” did not exist prior to the series of Greenway analyses at Indiana University. Survey development framework and questions were based on previous survey questionnaires from the Center for Urban Policy and Environment at Indiana
University, the Center for Transportation Studies at the University of Minnesota, the Mid-America Regional Council “Creating Walkable Communities: A guide for local governments” report and the “Portland Pedestrian Design Guide.” The Path Funding section includes a question about the “willingness to contribute to a path improvement program.” The University of Indiana describes this process as the “contingent valuation” (CV). The CV questions citizen views of public goods, or the “choice context,” and their “willingness to pay for” public goods, the “elicitation question.” (24).

Survey Approach

The Lindstrom Pedestrian Survey includes 39 questions in five sections, Path Purpose and Use, Path Amenities and Preferences, Path Safety and Maintenance, Path Funding and Demographics. Survey questions essentially determine who walks, where and why citizens walk, how far they walk, preferences for path amenities and opinions of path safety, maintenance and funding options for paths.

Surveys were conducted during the week of April 17 to April 24. A total of thirty-one random citizens were solicited and twenty-seven individuals completed and returned the surveys, an 87 percent response rate. Survey method included nineteen door-to-door surveys, seven surveys at the Lindstrom Public Library and four surveys at St. Bridget’s church in Lindstrom. Citizens completed surveys onsite at their home, at the library, or completed them at a later occasion. The survey sample is random and may have “self-selection bias” and not be characteristic of Lindstrom citizens as the sample was not generated statistically through addresses or obtained through a marketing firm (26).

The CV question and all other pedestrian use and preference questions were scored and tallied with Excel. Some respondents did not complete the Path Purpose and Use section, but completed all other survey sections and questions. This lapse in Path Purpose and Use response rate is illustrated in the survey results tables and indicated as a measure of the percentage of those surveyed that do not walk in Lindstrom.

Survey Results

A total of twenty-seven citizens completed and returned the Lindstrom Pedestrian Survey. The majority of respondents (25 of 27 or 93 percent) completed questions in the Path Purpose and Use and Path Maintenance and Safety sections. Most respondents completed all questions; however incomplete response rates were scored based on the total response for partially completed questions as indicated in the survey tables (Appendix F). The survey tables are divided into three sections, response rates from pedestrian paths chosen in Question 1, as listed in Question 4; response rates from pedestrian paths chosen in Question 2, as listed in Question 4; and response rates from pedestrian paths chosen in Question 3, as listed in Question 4. Tables in the first section “Response rates from pedestrian paths chosen in
Question 1” also include totals for all pedestrian paths listed in Question 4 (25 of 27 respondents) and all Path Purpose and Use and Path Maintenance and Safety questions. This paper describes survey results for all pedestrian paths survey respondents chose to complete in the Path Purpose and Use and Path Maintenance and Safety question sections. Specific results for all sections and individual or groups of pedestrian paths are listed in Appendix F.

Demographics
The majority of respondents were between the ages of 41 and 64 (Table 32, Appendix F), while 56 percent were female (Table 33, Appendix F) and 48 percent employed full-time (Table 35, Appendix F). All survey respondents were Caucasian (Table 34, Appendix F). Most respondents had some college (28 percent) or a two-year degree (20 percent), however 41 percent were employed in white-collar positions or were retired (22 percent). The majority of respondents (60 percent) have a two or three size household (Table 38, Appendix F) and most own homes (81 percent). Dependent children only account for 27 percent of those surveyed (Table 41, Appendix F), while 37 percent own three to four vehicles (Table 43, Appendix F).

Path Purpose and Use
Those surveyed were asked to choose paths from Question 1 (Table 4, Appendix F) and state where they walked, how far and for how much time they walked and why they walked on the path and how far the pedestrian paths are located from their home. Survey respondents walked a variety of frequencies, however 36 percent walk once or twice a week and 16 percent walk every day or three to four days a week (Table 7, Appendix F). A majority of those surveyed walk after 4 PM (52 percent) and walk for 10 to 20 minutes (40 percent) (Table 8, 9, Appendix F).

Most surveyed walk to down town Lindstrom and other locations (28 percent) and also to the high school (20 percent) (Table 10, Appendix F). Survey response rates for reasons for walking in Lindstrom support the hypotheses that the majority of citizen surveyed in Lindstrom walk for exercise and social interaction, however the hypotheses does not correlate with the walking of pets (Table 11, Appendix F). A majority of those surveyed walk for exercise (44 percent), walk with family (32 percent) and walk with friends (32 percent). A significant percent surveyed walk for errands or shopping (24 percent), however only 12 percent surveyed walked to "walk pets." (Table 11, Appendix F). Most respondents walked one-half to one-mile (52 percent) on pedestrian paths and 68 percent live one-fourth to one-half mile from their home to the paths (Table 13, Appendix F). A significant percent of those surveyed walk to the pedestrian paths (92 percent), while only four percent biked or ran to the paths (Table 14, Appendix F).
Path Amenities and Preferences
Survey respondents rated preferences for a variety of path amenities, neighborhood and pedestrian path quality issues, types of trips and outdoor activities participation. Survey respondents cite landscaping, garbage cans, path information (22 percent) and lights (19 percent) as important and very important preferences for paths (Table 15, Appendix F). Lights were listed as the most important path amenity (Table 16, Appendix F). Parking (41 percent), restrooms, fountains and path signs (22 percent) are not important for paths. A majority of respondents agree paths should connect to other paths, parks and open space (41 percent), however they disagree paths should connect to businesses and shopping (30 percent) and neighbors (37 percent) (Table 17, Appendix F). Most respondents also feel pedestrian paths increase neighborhood quality, prefer to live in areas with paths and feel paths increase opportunities to socialize with neighbors (Table 19, 20, 21, Appendix F).

Respondents were asked to list the trip they most often take from home, other than to work or school and most trips include travel to the grocery store (42 percent) or recreation and entertainment travel (35 percent) (Table 22, Appendix F). Respondents were also asked to rate preferences for shopping. Saving time and saving car trips (37 percent) and accessibility for cars and ample parking (44 percent) is very important and important for shoppers. Accessibility to shops by foot is neutral (30 percent) (Table 23, Appendix F). Residents rated their participation in outdoor activities and 78 percent overwhelmingly walked and 37 percent biked, watched nature or did photography more than ten times a year. Most respondents ran (37 percent) and rocked climbed (33 percent) only once a year (Table 24, Appendix F). It appears those surveyed enjoy outdoor activities and participate in activities pedestrian paths facilitate.

Path Maintenance and Safety
Survey respondents had mixed views of safety of pedestrian paths walked in Lindstrom. Respondents rated crosswalk signs (36 percent) and markers, sidewalks separated from local traffic (28 percent) and near slow traffic (40 percent) as fair or poor for safety. Respondents feel animal threats (40 percent), fast moving people and cyclists, and crime (36 percent) are not issues when walking on pedestrian paths and are more favorable towards path width (40 percent) and clear views of street and traffic (32 percent) when walking on paths (Table 25, Appendix F).

Maintenance of pedestrian paths also has a mixed response. Respondents feel paths are adequately cleared of brush (40 percent) and have minimal garbage (32 percent) on paths. Respondents had mixed views for path width and mowing of paths as 32 percent feel paths have excellent mowing and 36 percent cite paths widths as “good.” Respondents feel negative towards the maintenance of path surface and snow removal as 28 percent cite them as poorly maintained (Table 26, Appendix F). Paths
located along private boulevards may not receive adequate snow removal as homeowners have responsibility for winter path maintenance

**Path Funding**
Most respondents are favorable to the use of public funds for pedestrian paths. Those surveyed agree public funds should pay for pedestrian paths (32 percent, Table 27, Appendix F) and 40 percent are somewhat willing to contribute money, while 50 percent somewhat willing to volunteer for a pedestrian path improvement program (Table 28, Appendix F). Those not willing to contribute money to an improvement program, 28 percent cite government is responsible to provide path funding (Table 29, Appendix F). The majority of respondents “disagree” and strongly disagree the city spends too much on pedestrian paths, parks and trails (Table 30, Appendix F). The availability of pedestrian paths for future generations is a strong preference as 60 percent agree and 40 percent strongly agree with that statement (Table 31, Appendix F).

**Conclusions and Recommendations**
Survey results provide indications of walking habits and preferences for pedestrian paths in Lindstrom, Minnesota. Results may not adequately describe all opinions and walking practices as the sample lacked statistical generation. The responses however provide interesting correlations between the hypothesis and survey results.

The hypothesis stated most citizens report exercise, socialization and to walk pets as reasons for walking. The majority of those actually surveyed walk for exercise, walk with friends and walk with family members. A significant portion, 24 percent walk for errands or shopping, while only 12 percent walk pets. The 2001 National Household Travel (NHTS) reports 60 percent of all walking and biking trips is to walk dogs and 49 percent for exercise. The Lindstrom survey correlates with the NHTS survey for exercise rates, but walking pets is not a factor for Lindstrom walking habits. Specific NHTS information for walking and biking trips in Chisago County, Minnesota may provide direct comparisons between walking trips to “walk dogs” in the county and in Lindstrom. An additional question to determine the percentage of pet owners in Lindstrom would provide rationale for the low percentage of walking trips to “walk pets.” The large percent of walking trips for errands and shopping correlates with the majority of walking trip destinations to downtown Lindstrom and main street shops.

Survey respondents cite landscaping, lights, garbage cans and path information as important amenities for paths. An interesting correlation exists as respondents cited lights as the most important path amenity and the majority of those surveyed walk after 4 PM. Respondents feel paths should connect to other paths, parks and open space, rather than connect to businesses, shopping and neighbors. Most respondents are neutral for walking accessibility to shopping areas. Respondents also feel paths increase
neighborhood quality and prefer locations with pedestrian paths. The strongest outdoor activity is walking, which supports the community preference to connect missing segments along TH 8, establish pedestrian paths in community areas that lack paths and negotiate sidewalks in new subdivisions as citizens will and do utilize pedestrian paths. Citizens are willing to fund or volunteer to improve paths and want future generations to enjoy paths. Fast moving traffic, crosswalk signs, markers and signals and path maintenance and snow removal are safety and maintenance issues that can be addressed through pedestrian path improvement programs.

Recommendations include extending the survey to other communities in the Chisago Lakes Area to determine preferences for connecting walking and biking paths between area communities. Continued support for development of new pedestrian paths and links with existing paths and park dedication fees for park equipment and parkland is necessary to create a pedestrian path network in Lindstrom, Minnesota.
Literature


