Minneapolis
City of Lakes

Shared Streets Study

Final Report
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Chapter 1: Study Background

1.1 Introduction

The City of Minneapolis is well known and recognized for its commitment to building a complete and integrated street network to ensure that everyone can travel safety and comfortably. In recent years, the City of Minneapolis has experimented with the potential to improve safety, mobility, increase economic vitality, and quality of life through the design and implementation of shared streets. The City undertook this study to assess current best practices and help guide future potential investments in shared streets.

The concept of shared streets, which originally stemmed from Europe, focuses on removing traffic signals and the curb to enable the street to function as a plaza or shared space for all users. On a high vehicle volume street, the separation of modes is still essential and done via contrasting pavement, tactile warning strips, and vertical streetscape elements such as trees or lighting. On a lower vehicle volume street, a curbless street essentially functions as a shared space where all modes are integrated and users have equal priority over the shared space through increased interaction and slower speeds.

Shared streets have recently seen a resurgence in popularity in Europe, Asia and Australia, and have become increasingly popular in North America as numerous cities have constructed some type of shared street or are in the planning and implementation stages of doing so. In Minneapolis, West 29th Street from Lyndale to Bryant Avenues became the first intentionally constructed public shared street, built in 2016-2017. In addition to West 29th shared street, Minneapolis has other non-traditional streets where people can move along a path that is not easily defined as either a city street or a multi-use trail where cars may or may not be part of the mix. These examples of non-traditional streets are located in various parts of the city and are detailed in chapter 2.5.

1.2 Purpose

Despite several local examples, Minneapolis does not currently have a process for identifying, prioritizing and implementing shared streets. In Minneapolis, there is no singular definition of shared street, and local examples have different characteristics, which does not help to narrow the definition. The findings of this study will provide a future framework for planning and implementing shared streets in Minneapolis. This study is not intended to identify capital improvement projects or develop new or revised policy related to the development of any specific shared street project.

The purpose of this study is three-fold:

1. Explore the history, benefits and existing national and local guidance for shared streets (Chapters 2 and 3);
2. Document current examples of shared streets around the nation (Chapter 4); and
3. Summarize best practices and lessons learned for shared streets and strategies for future implementation (Chapter 5).

This information will help inform the development of the Street Design Guide of the Minneapolis Transportation Action Plan.

1.3 Study Organization

This study is organized into the following chapters.

Chapter 1: Study Background – Page 2
Shared streets are not a novel concept, internationally nor locally. This chapter provides brief context for shared streets and purpose for undertaking this study.

Chapter 2: Understanding Shared Streets – Page 4
To understand the concept of shared streets, it is important to understand how shared spaces have evolved over the years and the context of shared streets within the City of Minneapolis. Various terminologies and typologies associated with shared streets are outlined, as well as locations of known non-traditional streets in Minneapolis that have similar characteristics as shared streets.

Chapter 3: Best Practices and Characteristics of Shared Streets – Page 12
Although there is no one way to design a shared street, there are typical elements associated with most shared streets, which are outlined in this chapter. In addition, emerging documentation around guidance, implementation and challenges associated with shared streets in North America are discussed.

Chapter 4: Case Studies – Page 19
Many North American cities have implemented various forms of shared streets and their designs reflect local street networks and land use characteristics of the surrounding areas. Some examples are presented in this chapter.

Chapter 5: Future Framework for Minneapolis – Page 25
Following the research and evaluation of various design guidelines and best practices, this final chapter provides traits, opportunities and challenges to be considered for future implementation of shared streets, as well as potential next steps for moving forward as a means of establishing shared streets in Minneapolis.

References – Page 28
Included in the references are sources cited in this study.

Chapter 2: Understanding Shared Streets

2.1 History

To fully understand the potential future framework of shared streets in Minneapolis, it is important to examine the historical context and the various definitions used and applied to shared streets.

Shared streets are not a novel idea. Many early streets were shared by many different modes such as horse-drawn carriages, people walking and bicycling, streetcars, and they were used for activities such as gathering spaces and play areas (Image 1).

Image 1. Minneapolis – 7th & Hennepin – 1920

In North America, streets in the late 1890's had a similar operation to those of Europe and essentially served as shared streets. The mid-20th century saw the expansion of the automobile, the rise of suburbanization and the Highways Act. As a result, the personal vehicle took priority as a dominant form of travel in many American cities, changing the design of streets and engineering standards. This more

car-oriented street design emphasized separating people walking from people driving, often ignoring other historically traditional street uses such as social interaction and play.

It was the early 1970's that saw the emergence of formal approaches to creating more balanced streets and environments, through the passage of policies such as Complete Streets[1], which emphasized the importance of safe access for all users, not just automobiles.

As a concept, shared streets took root as a way to meet the needs of people walking, bicycling and playing and originated in the late 1960s in the city of Delft, Netherlands[2] in the form of the Woonerf (literal meaning: *residential yard, Hass-Klau, 1990*[3]), enabling the street to serve all modes and social interplay, not simply vehicle throughput.

The evolution of shared streets is outlined in the following timeline:

- **1900** – Most streets were inherently shared, including in Minneapolis, in which all users – horse-drawn carriages, people walking, bicycling, and taking streetcars – navigated the space without much physical separation.
- **1920s** – Primary function of a street became to move greater volumes of cars at higher speeds.
- **1925** – The development of the Municipal Traffic Code, first adopted by the City of Los Angeles, began to segregate car traffic from pedestrians by restricting pedestrian street crossings to marked crosswalks and requiring foot traffic to yield to automobiles.
- Conventional traffic engineering approaches including curbs, traffic signs and signals, pavement markings and signage became the standards of street design and were refined throughout the 20th Century in an effort to make vehicular travel safer and more efficient.
- **1960s –** As a response to the automobile-centric design and society, the *livable streets* movement stressed the importance of streets as public space.[4]
- **1970s** – The Netherlands began looking for ways to reduce the speed and volume of traffic on neighborhood streets and to reclaim the street as a space for residents and children. Dutch traffic engineer Hans Monderman is credited with developing the concept of a woonerf.
- **1976** –The Dutch government formally recognized woonerfs by establishing guidelines and regulations such as restricting vehicle speeds. To date, more than 7,000 woonerfs have been built in the Netherlands.

[1] Shinkle, Douglas. "Complete Streets," National Conference of State Legislatures, Legisbrief, Vol. 15, No. 47. December 2007. Accessed from http://www.ncsl.org/documents/transportation/completestreets.pdf
[2] Collarte, Natalia. "The Woonerf Concept: Rethinking a Residential Street in Somerville," Tufts University, December 2012. Accessed from https://nacto.org/docs/usdg/woonerf_concept_collarte.pdf
[3] Voorhees, Alan M. Transportation Center, "Home Zone Concepts and New Jersey", New Jersey Department of Transportation, November 2004.
[4] Delaware Valley Regional Commission. "Curbless Streets: Evaluating Curbless and Shared Space Concepts for Use on City of Philadelphia Streets," January 2018. Accessed from https://www.dvrpc.org/Reports/16044.pdf

- The Dutch woonerf regulations were the basis of the guidelines for shared streets adopted shortly thereafter in many other countries – Germany (1976), England, Sweden and Denmark (1977), France and Japan (1979), Israel (1981), and Switzerland (1982).[5]

- **1970s and 1980s** – A new approach to the design of streets began to emerge in the United States as the awareness of the needs of all users gained support within the transportation and urban design fields through policies such as Complete Streets.

- **1980s** – In the US, some cities began to experiment with shared streets. One of the earliest examples of incorporating woonerf-like design principles in the United States is Wall Street in Ashville, North Carolina. The development of Wall Street was part of a larger effort to revitalize the city's aging downtown, which was starting to emerge from a long period of decline. Other examples are found in San Francisco, CA (Linden Street) and Cambridge, MA (Palmer and Winthrop Street). Since that time interest has grown in improved and enhanced streets that better meet the needs of people walking and bicycling.

- **2000s –** Shared streets as a design movement continued to expand internationally. Several countries, including the Netherlands, Denmark, Germany, and Israel, renewed or established regulations and design guidelines for shared streets.[6] Within the U.S., several cities like Seattle; Washington D.C., Chicago, Philadelphia, and Minneapolis begin to implement shared streets.

2.2 Terminology

There are many variations in how the term "shared street" is applied across literature and different countries. Some literature uses terms such as shared spaces, shared streets, woonerfs, home zones, curbless streets, pedestrian priority streets, festival streets and other terms interchangeably.

The term "shared street" seems to be the most commonly used, all-encompassing, and simplest of these terms and will be used throughout this document to describe the application of the shared space concept.

Traffic movement is left purposely vague on shared streets through the removal of signage and physical separation between different modes, however, one study warns against applying the same vagueness to the terminology itself. Instead, it is recommended to abandon the term "shared space" and replace it with more specific terminology that better describes the philosophy behind specific designs. For example, "pedestrian-prioritized streets" would refer to those designed for people to move about freely, with cars designated as guests; "informal streets" would be absent of all traffic controls but still have sidewalks and streets for people and cars; and "enhanced streets" would be where pedestrians can be anywhere, but where the traffic control systems remain. The designations would be chosen based on the estimated daily traffic flow, with enhanced streets being the least impactful.[7]

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[5] Southworth, M and Ben-Joseph, E. "Streets for People Too," Architecture Week. Excerpted from Streets and the Shaping of Towns and Cities, Island Press, 2003. Accessed from http://www.architectureweek.com/2004/0505/building_1-2.html

[6] Delaware Valley Regional Commission. "Curbless Streets: Evaluating Curbless and Shared Space Concepts for Use on City of Philadelphia Streets," January 2018. Accessed from https://www.dvrpc.org/Reports/16044.pdf

[7] Chartered Institution of Highways & Transportation (CIHT). "Creating better streets: Inclusive and accessible places – Reviewing shared space," January 2018. Accessed from https://www.ciht.org.uk/media/4463/ciht_shared_streets_a4_v6_all_combined_1.pdf

Shared street types can also be categorized by function, adjacent land uses and allocation of space for people walking, bicycling, driving and parking. For example, the Delaware Valley Regional Planning Commission, serving the Philadelphia region, identified the following shared street types based on an evaluation of peer cities:

- Curbless traditional street
- Retail or pedestrian-only street
- Alley
- Shared, flexible, or festival street; and
- Residential, woonerf, or home zones
- Raised intersections.

2.3 Elements of Shared Streets

Shared streets combine walking, bicycling, social activities, parking, and car traffic to create a shared public space. People walking and bicycling can use all the area all the time, while people driving can use some of the area some of the time. Cars are not allowed in the traditional sidewalk areas. Conventional devices such as curbs, signs and signals are replaced with an integrated, people-oriented public space that encourages social interaction, walking, bicycling, universal accessibility, and reduced traffic speeds. A shared street can be comprised of a single street, a square or a combination of connecting streets.[8]

Most existing shared streets generally contain similar characteristics, including but not limited to:

- A street shared by people walking, bicycling and driving
- Motorists give way to people walking, bicycling and playing
- Removal of traditional street elements like signage and signals
- Restricted loading
- Restricted motor vehicle parking
- Lack of curbs
- Clearly defined and market entrances with a transition element or gateway at each end that encourages speed reductions and reduced traffic speeds
- Tactile paving to delineate uses
- Visual street narrowing via strategically placed vertical elements and alternative paving materials beyond concrete/asphalt
- Low vehicle volume of less than 100 cars per hour or roughly 1,000-1,500 vehicles per day. If pedestrian activity is very high, then it may be possible to accommodate 2,000-3,000 vehicles per day
- Traffic calming measures

[8] Architecture 2030. "Shared Streets: Concepts," 2030 Palette. Accessed from http://archive.2030palette.org/swatches/view/shared-streets/shared-streets-concepts

- Enhanced landscaping, trees, furnishings, and other elements of comfort for people walking and playing
- Adequate street lighting to ensure that the features referred to above are fully visible at night
- Car access to houses is provided, and parking spaces are included as needed

A more detailed summary of these universal traits is described in Chapter 3.3.

2.4 Benefits of Shared Streets

Shared streets typically serve as destinations, placing emphasis on comfort and social interaction rather than vehicle throughput. Cities such as Seattle, Asheville and Pittsburgh provide programming and activate the space with large scale events. The design of the spaces contributes to natural social interaction by compelling the different users to interact via eye-contact to navigate their way through the space. By designing the street to integrate a variety of uses and users, the predominance of motor vehicles is downgraded in importance but not completely removed. People walking have right of way to the entire street, and with a slight advantage over motorized traffic they are able to establish the pace of street activity.

Shared streets have been shown to improve safety, quality of life, economic vitality, and mobility. If a city builds a shared street in a conducive location, all four qualities described are likely to improve. Shared streets in Germany, Japan and Israel have shown improvements to the appearance of roads, social interaction and even in some cases reduced traffic crashes.

Some direct and indirect benefits of shared streets include but are not limited to:

Safety

- Increased perceived safety by having more "eyes on the street"[9]
- Reduced speed – in the U.S., typical vehicle speeds posted for shared streets were 15 to 20 miles per hour (MPH)[10], versus the typical posted speed of 30 to 35 miles per hour (MPH)
- Fewer crashes – in residential settings, crash rates on shared streets were found to be 20 percent lower than on similar non-shared streets[11]
- On Dutch streets, studies have found that crashes had dropped by 40 percent following the conversion to shared streets[12]
- Interested but concerned bicyclists are likely to feel safe given that pedestrians are also mixing with car traffic
- Traffic calming
- Lower crime[13]

[9] Voorhees, Alan M. Transportation Center, "Home Zone Concepts and New Jersey", New Jersey Department of Transportation, November 2004.
[10] Delaware Valley Regional Commission.
[11] Ibid.
[12] Hockenos, Paul. "Where 'Share the Road' Is Taken Literally," the New York Times, April 2013. Accessed from https://www.nytimes.com/2013/04/28/automobiles/where-share-the-road-is-taken-literally.html
[13] Delaware Valley Regional Commission.

Quality of Life

- Increased social interaction
- Improved environmental quality by reducing carbon emissions and air pollution as an outcome of encouraging and improving access to people walking and bicycling
- Opportunities to incorporate trees and other green infrastructure to reduce the heat island effect and provide access to green space
- Increased community perception due to the aesthetics of the street

Economic

- Catalyst for increased retail activity by serving as a destination street in dense, walkable neighborhoods[14]
- Increased property values[15]
- Decreased vacancy[16]

Mobility

- Enhanced pedestrian environment through reduced street clutter, signage, markings and signals[17]
- Integrate rather than separate users, making the space simultaneously accessible to all on an equal basis
- Reduced delay for people walking and driving by giving both modes more fluidity of movement than on conventional streets[18]

2.5 Non-Traditional Streets in Minneapolis

Minneapolis has a history of non-traditional streets where people can move along a path that is not easily defined as either a city street or multi-use trail where cars may or may not be part of the mix. The list below documents all the known non-traditional streets in Minneapolis.

Downtown

- Nicollet Mall
- Loring Greenway
- Samatar Crossing
- Abiitan Woonerf (Between South 2nd Street and West River Parkway)
- Waterworks Woonerf
- 4th Avenue North/Cesar Chavez (between Border and Royalston (proposed)
- Chicago Avenue (between South 2nd Street and West River Parkway)
- 1st Avenue North (between North 1st Street and West River Parkway) – closed since 9/11

[14] Delaware Valley Regional Commission.
[15] Ibid.
[16] Ibid.
[17] Gillies, Andrew. "Is the road there to share? Shared space in an Australian Context," Thesis project, University of New South Wales, October 2009. Accessed from https://www.be.unsw.edu.au/sites/default/files/upload/pdf/schools_and_engagement/resources/_notes/5A2_44.pdf
[18] Delaware Valley Regional Commission.

Southwest

- West 29th Street (adjacent to the Greenway)
- Former Harriet Como Streetcar right-of-way between Upton and Xerxes and 44th and 43rd St W. Most of this a narrow right-of-way, but midway it goes to 50 ft. Not classified as an alley or street by Public Works. See Linden Hills Small Area Plan (pages 61-63)[19] of document

South

- 19th Avenue South (between South 5th Street and South 6th Street)
- South 21st Avenue (between South 4th Street and South 5th Street) – at University of Minnesota West Bank Arts District
- Milwaukee Avenue
- 29th Avenue South and East 27th Street – at the Midtown Greenway
- 27th Avenue South between East 29th Street and East Lake Street
- 16th Avenue South between 6th Street South and Hiawatha LRT Trail

East

- Pillsbury A Mill Woonerf (runs between Main and SE 2nd Street from 3rd Avenue SE to 6th Avenue SE)
- Oberpriller Way on Nicollet Island
- Merriam Street between Main Street SE and Lourdes Place
- Washington Avenue SE Transit way
- NE Tyler Street
- Quincy St NE, north of Broadway
- 18th Avenue NE, between University Ave NE and 6th Street NE

North

- 37th Avenue North, between Penn and Knox Avenues North
- North South Greenway/Humboldt-Irving Avenue North (proposed)

[19] "Small Area Plan: Linden Hills Neighborhood," Approved by the Minneapolis City Council, December 2013. Accessed from http://www.minneapolismn.gov/www/groups/public/@cped/documents/webcontent/wcms1p-126733.pdf

Chapter 3: Best Practices and Characteristics of Shared Streets

3.1 Identifying Issues and Challenges with Shared Streets

While Shared Streets may provide various direct and indirect benefits as described earlier, they also present some challenges, particularly for specific user groups, such as people with visual, hearing or mobility difficulties, older people and children. A British survey among hearing, sight and mobility-impaired pedestrians revealed a general level of reluctance to use shared streets because they are regarded as unsafe.[20] The major contributing factor is that the typical shared street design eliminates the curbs, signage and other traditional, physical street attributes that people with visual impairments have come to expect when navigating a typical street.

Several challenges for shared streets include:

Accessibility

- Eye contact and hand signals are a major tool for navigating shared streets; people with visual impairments may not be able to acknowledge the presence of other street users using eye contact
- Lack of delineators such as curbs that are often used by children, long cane users, or guide dogs to understand where and where not to position oneself in a space; without a curb, people with limited vision and guide dogs may have difficulties transitioning from the pedestrian path to the shared area

Maintenance

- The traditional curb lines provide clear indication between municipal and property owned responsibilities such as sidewalk maintenance; without a curb, there is uncertainty as to who is responsible for issues such as sidewalk clearing and maintenance
- The traditional curb also serves as water flow and storm water; valley gutters or trench drains should be used to direct runoff to bioretention planters[21]

Mobility

- Difficulty navigating directionally and finding designated crossings for many users[22]
- The ambiguity and negotiation involved with shared streets that have high volumes of people walking may not suit enthused and confident bicyclists who prefer minimal delays

[20] Chartered Institution of Highways & Transportation (CIHT).
[21] NACTO. "urban Street Stormwater Guide: Commercial Shared Street," Accessed from https://nacto.org/publication/urban-street-stormwater-guide/stormwater-streets/commercial-shared-street/
[22] Federal Highway Administration. "Accessible Shared Streets: Notable Practices and Considerations for Accommodating Pedestrians with Vision Disabilities," U.S. Department of Transportation, October 2017. Accessed from https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/accessible_shared_streets/index.cfm

Land use

- Shared streets work best as destinations and should include active commercial presence and other placemaking opportunities to generate pedestrian traffic; otherwise the street will not be used as designed or intended for

High vehicle volume

- Shared streets with high-vehicle volume streets of more than 100 vehicles per hour[23] or 2,500 ADT do not provide the comfort and safety necessary for a successful shared street

Liability

- Liability is approached differently on a Dutch shared street than in the United States. For example, on a Dutch woonerf, people driving are legally required to yield the right of way to people walking and biking. If a crash occurs between the different modes, the motorist is automatically assumed to beat fault. In the United States, these legalities do not exist and the roles and responsibilities are more evenly spread[24]

3.2 Special Considerations

Based on the review conducted, there are five areas in particular that require special consideration and approaches to achieve desired outcomes of a shared street:

1. Accessibility and Americans with the Disabilities Act (ADA) accommodations
2. Roles and responsibilities around maintenance and operations
3. Robust community engagement process
4. Monitoring and evaluation
5. Addressing policy and legal considerations

Accessibility and American with the Disabilities Act accommodations

Shared streets must be designed to comfortably accommodate individuals with disabilities and meet Americans with Disabilities Act (ADA) requirements. Shared streets provide certain benefits to people in wheelchairs because the street is flush, making wheelchair ramps unnecessary and removing tripping hazards and allowing for greater area for movement. This accessible design is also valuable for people with physical or mobility impairments and people pushing strollers. However, shared streets can be more challenging for people who are visually impaired given the lack of curbs. Detectable edge treatments of zones can be applied for these users. For people with visual impairments to gain confidence using a shared street, the space for vehicle traffic must be distinctive enough from the rest of the street. This can be accomplished through careful placement of street furniture or planters and the use of textured materials delineating the travel path. The FHWA guide 'Accessible Shared Streets: Notable Practices and Considerations for Accommodating Pedestrians with Vision Disabilities' provides additional strategies to facilitate navigation and movement for people with visual disabilities.

[23] PEDSAFE, August 2013. Accessed from http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=67
[24] Alta Planning + Design. "Shared Streets and Alleyways White Paper," February 2011. Prepared for City of Ashland. Accessed from: https://nacto.org/wp-content/uploads/2015/04/shared_streets_and_alley_ways_witte.pdf

Roles and responsibilities around maintenance and operations

Traditionally, curb lines provide the delineation between public and private property owners in terms of roles and responsibilities around maintenance and operations. With a shared street, this delineation becomes less clear in terms of who is responsible for issues such as upkeep of the sidewalk zone, snow clearance and liability in the event of an injury. Additional ongoing maintenance concerns include street cleaning and trash collection. Therefore, it is imperative to identify and clarify roles and responsibilities of adjoining property owners and public entities early on in the planning and design phase.

Robust community engagement process

As with any project development process, community engagement is key for developing successful shared streets. Shared streets are not right for every community or every context, so it is best to initially have a broader conversation with a community on what their goals are for a given street and how they envision the space. In addition to making sure there is a robust engagement process, it is critical to ensure the involvement of a full range of stakeholders affected by the process such as business owners, nearby residents, and individuals with disabilities. Emergency responders should be engaged when it comes to designing traffic-calming elements.

In tandem with engagement, most people in the United States have limited experience with shared streets, so it is important to provide education around the goals and features of a shared street and how to navigate the space after construction. One example is to install signage to educate the public on how to use a shared street in the early stages of conversion. Another recommendation by NACTO is to temporarily close the street to cars prior to the application of a shared street or to test a conversion using temporary materials. While education should focus on users of all abilities, there should be special attention on people with visual disabilities by working with partners to provide guided, explanatory tours post construction.[25]

Monitoring and evaluation

Another consideration in gaining public support for what is often a new concept for street design in communities is data collection to inform pre-and post-construction evaluation of the street, including user experiences. After a shared street is constructed, it is important to monitor how well it works for all users, and identify any adjustments needed to ensure accessibility and meet overall project goals. A data collection and monitoring protocol is recommended for measuring the effectiveness of designs over time. It is also helpful to capture lessons learned, so they can be incorporated into future shared street planning efforts and designs, or to develop evidence-based guidelines.

The data collected can include qualitative measures of enjoyment and perceived sense of safety, as well as quantitative data such as number and types of users in the space, traffic speeds, and crashes. While shared streets are commonly applied outside of the United States, there seems to be minimal research of before and after evaluation in terms of public feedback, travel time, volumes, crashes, etc. in the States.

[25] Federal Highway Administration. "Accessible Shared Streets: Notable Practices and Considerations for Accommodating Pedestrians with Vision Disabilities," U.S. Department of Transportation, October 2017.

Addressing regulatory and legal considerations

An important consideration expressed by designers of shared streets is the current lack of a legislative framework to support shared spaces in terms of legal definitions, best practices and design guidelines.[26] In the United States, the dominance of vehicles is established on streets and in law. Conversely, acknowledging legal differences between the United States and European countries can also provide insight into how and why streets are designed certain ways. When a crash occurs between a person driving and a person walking on a Dutch woonerf, the motorist is automatically at fault.[27] Because the legal parameters are different in the United States, people walking are more likely to be cautious and people driving tend to be more inattentive.

In terms of regulatory considerations, the Manual on Uniform Traffic Control Devices (MUTCD), which serves as the national standard for all traffic control devices would not preclude a city from implementing a shared street as cities are able to apply to the Federal Highway Administration (FHWA) for an exception. The only other challenge may be if a particular city regulates street dimensions such as street width and corner radii, which may affect the design of a shared street.

There are cases where cities have passed an ordinance to support the design and construction of shared streets. An ordinance could give engineers, planners and designers increased legal protection, encourage more experimentation, advocate for documenting assumptions and different design decisions, and encourage evaluation and monitoring of shared streets. Cities that have introduced legal codes recognizing shared streets include, Seattle, WA, Cambridge, MA and Gresham, OR while Denver, CO permits people walking to cross diagonally through pedestrian and transit malls, so long as they yield to transit.[28]

3.3 Summary of Best Practices and Universal Traits of Shared Streets

While there are many commonalities among existing and emerging design guidelines from NACTO, FHWA and cities such as New York, San Francisco and Philadelphia, there is little uniformity in their format, breadth, and scope. The following section of this chapter looks to document best practices and universal traits, so that common themes, approaches, and gaps can be identified and documented.

Based on the summary of best practices and design guidelines, there are noticeable design elements as well as some common universal features among shared streets:

[26] Saviskas, Sarah. "Taking Back Our Streets: Demystifying Shared Space Streets in America," Master's Professional Report, University of California, Berkeley, May 2016. Accessed from http://hamilton-baillie.co.uk/wp-content/uploads/2017/12/hamilton-baillie-taking-back-our-streets.pdf

[27] Alta Planning + Design. "Shared Streets and Alleyways White Paper," February 2011.

[28] Vega-Barachowitz, David. "Rights of Way: Shared Streets and the Evolving Municipal Traffic Code," A publication of the Architectural League of New York, May 2012. Accessed from https://urbanomnibus.net/2012/05/rights-of-way-shared-streets-and-the-evolving-municipal-traffic-code/

Traffic calming

Many shared streets include traffic calming elements such as curved pathways or chicanes, streetscape features or strategically placed furniture. These elements force people driving to maneuver slowly through the space creating non-linear travel path. National guidance recommends a maximum of 100 feet between traffic calming measures to maintain vehicles operating at pedestrian-level speeds.

Different textured pavement materials

Different type of pavement in terms of textures and contrasting color not only signifies to the driver that they are entering a different type of street, but it also serves as guidance for people with visual disabilities. Not only are the different textures aesthetically pleasing, they also serve to delineate areas without curbs or provide ambiguity, depending on the project goal. Bricks, pavers or stamped asphalt are common treatments for shared streets.

Well-defined entrances and transitions

Several guidance indicates the need for a gateway into a shared street to signify to people driving that they are entering a non-traditional street alerting them to slow down. This can be achieved through signs, gateways, different pavement color, texture or style.

Signs and line markings

Although signs and line markings should be kept to a minimum, a shared street sign should be used at the entrance to a shared street. In some cases, a modified YIELD TO PEDESTRIANS sign (MUTCD 2B-2) may be added to reinforce the conversion in early stages.

Accessible zone or comfort zone

If a comfort or accessible zone, which refers to the pedestrian exclusive area on a shared street is warranted (given high vehicle volume of more than 100 vehicles per hour at peak times or 2,500 ADT) and if right-of-way is greater than 15 feet in width, then a 6-foot clear protected path is recommended. The separated zone should be delineated using visual detectable cues such as planters, bollards, street furniture, detectable warning strips or textured pavers.

Activity zone or frontage zone

Located between the circulation (also referred to as the shared zone) and accessible zone, is where street furniture, street lights, trash bins, bicycle and scooter parking, landscaping and other amenities should be located so as not to impede with people walking.

Circulation zone

On shared streets with higher vehicle volumes where all modes are not intended to share the street, ADA law requires an unobstructed pedestrian route for tactile warning strips to be placed where this route borders a vehicle path. Use of truncated domes or rolling curbs (of two inches or less) is used to discourage people walking from entering the circulation zone.[29] The more pedestrians that use the circulation zone the more successful the space will be.

[29] Delaware Valley Regional Commission.

Furnishings

Street furniture such as bollards, benches, planters and bicycle parking help define a shared space and create edge friction by providing activities in the peripheral vision of people driving. Seating can also be provided to encourage people to use and stay in the street for other activities. Street lighting is another tool with added character that can ensure all features are fully visible at night while creating a safe and inviting environment.

Storm water management and drainage

Drainage is important to any street but especially a shared street due to absence of the curb. Many cities incorporate bio-swales, storm water management or other green streetscaping and landscaping in areas used to designate the travel path. These elements can also serve as an additional traffic calming method. Many cities noted the benefits of having a physical barrier between the vehicle path and any planting areas as plants tend to get damaged or run over without a barrier such as a curb. Drainage channels should be placed either at the center of the street or along the flush curb, depending on underground utilities and other existing conditions and away from buildings.

Needs of different users

- People walking:
    - Shared spaces need pedestrians to function and to thrive and they work best when large numbers of pedestrians are on the street. While not proven, the general rule for pedestrian volume for a successful shared street is greater than or equal to 1,000 pedestrians per hour or four pedestrians for every car.[30]
- People bicycling:
    - Shared streets often do not provide any specific provision for people bicycling as the low vehicle speeds make it easier for them to interact with other users. Bicycle parking can be an important part of shared street design. The use of different textures can provide challenges for bicyclists.
- Transit:
    - Commercial shared streets restrict transit access[31] while others may incorporate transit, including one-lane shared streets. If transit frequency is high (10-12 buses per hour), the pedestrian experience may diminish and a conventional transit mall design with large sidewalks may be preferred over a shared street.
- Cars, trucks and parking:
    - Unnecessary through-traffic function should be reduced by providing diverting vehicular traffic to other streets.
    - Shared streets are inherently flexible and can be used differently during different times of the day or week. They may be closed to through vehicle traffic for specific portions of

[30] Saviskas, Sarah.
[31] National Association of City Transportation Officials (NACTO). “Urban Street Design Guide”, September 2013.

the day or on the weekends for Farmer's Markets or other events using movable planters or time-of-day restrictions.

- Shared streets are designed to allow easy loading and unloading for trucks at designated hours. Designated loading and unloading zones may be defined through differences in pavement pattern or use of striping and signage.
- There is no standard for how automobile parking should be addressed but in many cases on-street parking is provided. On wider shared streets, staggered blocks of landscaping, head-in parking, back-in angled parking, or perpendicular parking can be used to create a chicane effect.

For the design elements to work on a shared street, there are several important considerations in tandem with the design of a shared street, including:

Speed limit and traffic volumes

Not every shared street provides marked speed limit, but a low motor vehicle speed and low vehicular volumes are essential for success. German play street is set at "walking speed" roughly translating to 3.1 miles per hour to demonstrate the equal priority of all users. Most North American cities that have specific speed limit recommendations for shared streets recommend a posted speed of 10-15 miles per hour or less. Shared streets are generally designed to produce motor vehicle operating speeds between 5 and 15 miles per hour. Traffic volume of less than 100 vehicles per hour is recommended for an ideal shared street.

Policy and legislation

Speed limit should be coupled with policy and legislation that protects people walking from being liable from being in a vehicular travel way. Since pedestrians are allowed anywhere in the space, this should be well interpreted in the laws and policies to eliminate ambiguity between enforcement and people walking and driving.

Maintenance

Shared streets often feature non-standard materials and treatments, which may require more care in installation and special upkeep. Utility work should be carried out before the new surface is laid, with subsequent street work to be prohibited for a period after completion. Selection of snowplow-compatible materials is recommended for colder climates.

Programming and placemaking

For a shared street to be successful, established partnerships with local neighborhood organizations or businesses to do programming and placemaking are crucial. Shared streets can provide a setting for farmers' markets, festivals, special events, and other public uses. On Federal Stared Street in Auckland, New Zealand, activation by nearby businesses was essential in creating a successful space. The adjacent complex owner which occupies an entire city block and was originally a large blank wall facing the street, helped fund 55% of the project cost so that it could open itself up to the street, which resulted in higher revenue and opening of additional businesses such as eateries along the street, which essentially

brought in additional foot traffic.[32] For additional activation, during the construction of the shared streets, the project managers worked to ensure the space was programmed and activated as soon as construction was finished by working with adjacent property owners to ensure permits for street dining and liquor licensing were in place. This resulted in five additional businesses choosing to open up to the street shortly after the shared street opened.

[32] Vienncouver. "A Tale of Two Cities (2): Auckland's Shared Space programme turns streets into places," January 2015. Accessed from https://www.vienncouver.com/2015/01/aucklands-city-centre-shared-space-programme/

Chapter 4: Case Studies

The following case studies present more details and lessons learned from shared streets throughout the United States. They are each categorized by different type of shared street to showcase the differences and similarities found across the board. Information gathered is based on interviews with each City.

- **Residential Shared Street:** Longfellow Street, Santa Monica, CA
- **Commercial Shared Street:** Argyle Street, Chicago, IL
- **Narrow Shared Street and/or Alleyway:** Wall Street, Asheville, NC
- **Green Shared Street and/or Linear Park**: Bell Street, Seattle, WA

4.1 Residential Shared Street |Longfellow Street | Santa Monica, CA

Construction year: 2011 – 2012
Construction cost: $1.6 million – $2.1 million
Length: 446 feet
Right of way width: 40 feet
Traffic volume (ADT): N/A
Land use: Residential
Location: Borderline Neighborhood
City population: 92,478
Designer: Nelson/Nygaard Consulting Associates
Posted speed limit (MPH): 25
Goals: Improve safety

Overview: Longfellow Street, a short residential street in Santa Monica's Borderline neighborhood, connects the neighborhood retail corridor with Ozone Park. The project transformed the formerly narrow and unappealing Longfellow Street into a landscaped shared space for pedestrians, bicyclists and motorists, creating people-oriented community space.

Key features:

- Community front yard that promotes walkability
- Community gathering space
- Raised roadbed to eliminate vertical curbs
- Decorative pavers to delineate walking, driving, and socializing spaces
- Sustainable landscaping and features such as urban runoff retention elements, permeable concrete and pavers and solar lighting

ADA accommodations: Based on the United States Access Board's feedback on proposed design, the Borderline neighborhood street redesigns included a rollable curb indicating parking spaces, truncated dome pavers indicating the street's entrance, and smooth asphalt paving in the shared street space.

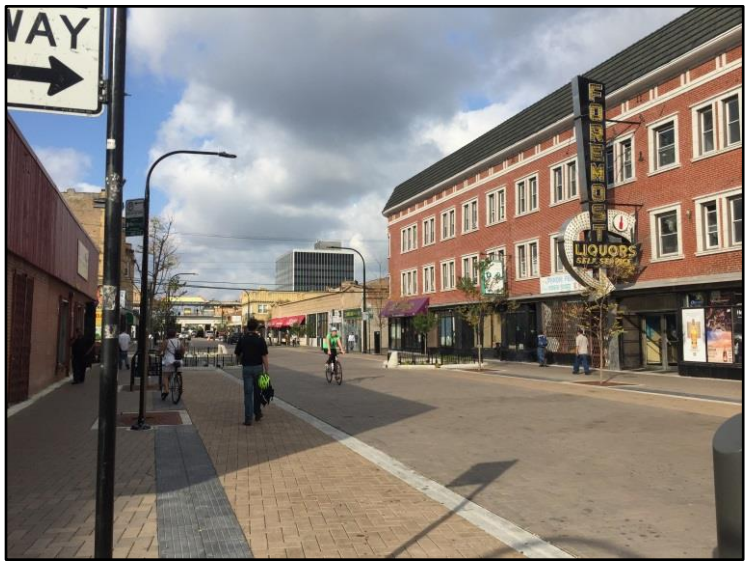
Programming: N/A

Lessons learned/takeaways:

- Installation of pedestrian scale lighting improved public perception of safety
- Resident frustration was minimized by providing education and guidance on where it is permissible to park
- Raised intersections haven't been effective in slowing down vehicle speeds. Stop sign would have been better
- Landscaping that has no curb separating it from vehicular traffic has high rate of replacement – the City has had to replace trees as they get scuffed up

Evaluation and monitoring: N/A

4.2 Commercial Shared Street | Argyle Street | Chicago, IL



Construction year: 2012 – 2015
Construction cost: $4.8 million
Length: 0.26 miles/4 blocks/1,350 feet
Right of way width: 66 feet
Traffic volume (ADT): N/A
Land use: Destination/Commercial Street/Mixed Use
Location: Uptown neighborhood known for its Vietnamese restaurants
Population: 2.705 million
Designer: Site Design Group ltd.
Speed limit (MPH): 15
Goals: Safety/economic, placemaking, stormwater management

Overview: Chicago's first shared street, designed to increase safety, provide the community with a plaza-like environment, and increase the attractiveness of the area for local business.

Key features:

- Plaza-like effect created by raising the street and eliminating curbs
- Pavers delineate wide sidewalks at street level
- Sidewalk planters
- Bike racks
- Large pedestrian areas that allow for sidewalk cafes, gathering and interacting

ADA accommodations: Raised the level of the roadway and eliminated curbs, creating a plaza-like effect, and making the street fully ADA accessible.

Programming: Night Markets in summer and Lunar New Year Parade in February organized by the neighborhood organization Uptown United.

Lessons learned:

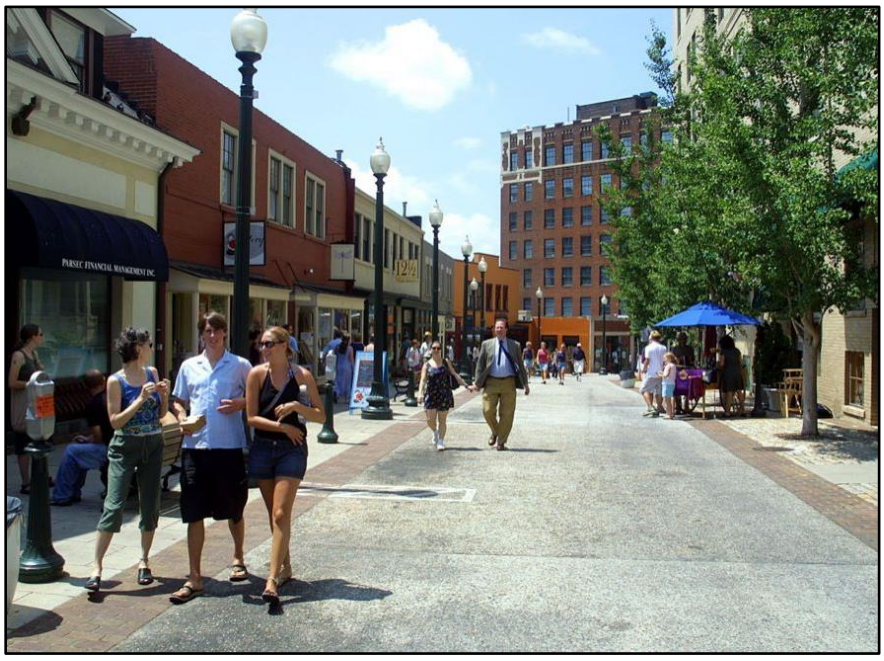
- Anticipate learning curve of users, with drivers experiencing confusion driving and parking on the shared street in the first few weeks that it was open

- Initially there were not any stop signs planned along the shared street, but were added after the fact to increase pedestrian safety at the request of the Alderman's office
- Care should be taken when placing site furniture, so they are not located in the door zone
- Perform outreach during and after implementation
- Minimize underground utility construction and/or coordinate early on

Evaluation and monitoring:

- Attracts more than 2,500 people to Argyle Street each week
- Intend to conduct a survey of the community and business owners in 2018
- A survey was undertaken in 2017 of the Argyle Night Market; key results include:
  - Most respondents aware of shared street improvements
  - The improvements did not influence people's decision to visit the night market
  - Respondents agree that shared street improvements improve their experience as Night Market Visitors
  - The response to the shared street and the Night Market in general is overwhelmingly positive
  - People appreciate the improvements because of the improved pedestrian environment
  - Overwhelming majority of respondents intend to visit the Night Market again

4.3 Narrow Shared Street and/or Alleyway | Wall Street | Asheville, NC



Construction year: 1988
Construction cost: $450,000 for landscaping, street & sidewalk improvements
Length: One block/740 feet
Right of way width: 38 feet
Traffic volume (ADT): 402
Land use: Adjacent land uses are a mix of commercial and retail on ground floor with residential and offices above
Location: Downtown Asheville Historic District
Population: 89,121
Designer: City of Asheville
Speed limit (MPH): 20 mph

Goals: Revitalize the downtown core; an alley turned "gold"

Overview: Wall Street is one of the earliest examples of incorporating woonerf-like design principles in the United States. Originally an access delivery alley behind the buildings on Patton Avenue, Wall Street was redeveloped in the 1970s when the City was looking for ways to revitalize its aging downtown that was starting to emerge from a long period of decline. The City was looking to take advantage of a one-

way street behind a major commercial street that was already evolving into a pedestrian-friendly space with both retail and commercial orientations. In the late 1980s, the City included it as a part of a larger program to preserve its historic buildings and streetscapes. As part of that revitalization project, a developer redeveloped the buildings along Wall Street. At that time, the City committed to reconstructing the street.

Key features:

- Streetscape improvements included new cobblestone paving
- Utilities were buried underground
- Bollards separate sidewalk and roadway areas, protect the wall and guide pedestrians towards the buildings where the shop entrances are located
- Red brick pavers, granite cobblestones and permanent bollards along the street distinguish the sidewalk and roadway spaces
- Metered on-street parking (added a few years after the redesign)

ADA accommodations: Initially, as part of the agreement between the City and the developer, as the City was to reconstruct the street in order to remove tripping hazards. A band 10 feet wide of cobblestones along the north side of the street at the buildings was originally placed to encourage people walking to the south side where the sidewalk is located. However, many of the buildings now provide access from the north side to restaurants and other pedestrian destinations, and the cobblestones are no longer conducive to people in wheelchairs.

Programming: Walkable Wall Street events, the third in a pilot series for Strive Not to Drive, hosted in partnership with Ashville on Bikes and Land of Sky Regional Council.

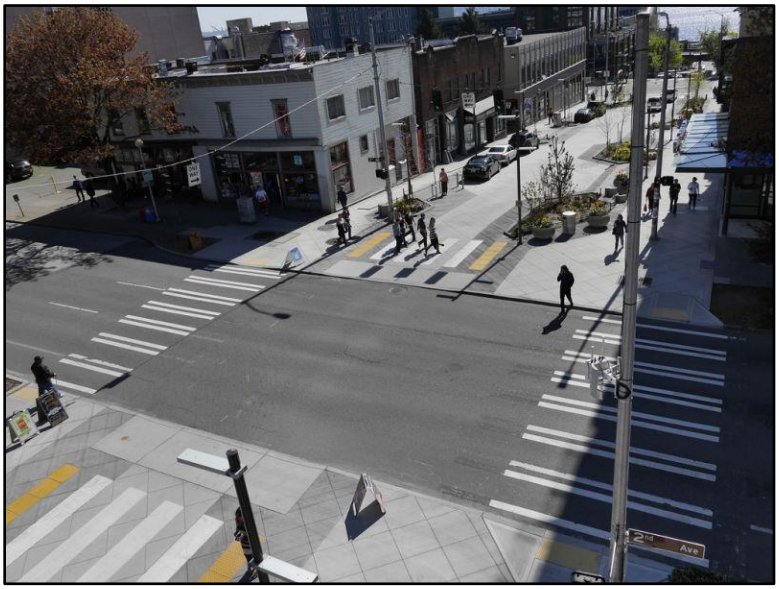
Lessons learned/takeaways:

- Cobblestones were put in to encourage people to walk on a particular side of the street, but are a problem now for people in wheelchairs
- The bollards are placed purposefully because underneath the sidewalk is a very narrow alley and there were concerns about the sidewalk holding the weight of vehicles
- The pigmented concrete roadway has cracked in some areas and been patched with asphalt and some of the cobble sets have become loose

Evaluation and monitoring:

- Asheville's woonerf-like design has proven to be successful and spearheaded the revitalization of the city's downtown core area
- Today, the street is a top destination for locals and tourists alike and has mixed uses including a variety of businesses, a climbing wall, restaurants and a church

4.4 Green Shared Street and/or Linear Park | Bell Street | Seattle, WA



Construction year: 2014
Construction cost: $2.5 million
Length: 4 blocks/1,056 feet
Right of way width: 66 feet
Traffic volume (ADT): 3,400
Land use: Mixed use; park, residential and commercial
Location: Belltown Neighborhood
Population: 704,352
Designer: SvR Design Co. and AGR Construction
Speed limit (MPH): 25
Goals: Reclaim, Elevate Grid, Twist, & Meander, Open space

Overview: Bell Street Park is the City of Seattle's first shared street project, establishing a new typology for streets as parks and open space. Proven as a successful shared street project based on the recent increase in development opportunities, its application provides cities with a model case to reimagine the right-of way as both a thriving open space and an important transit connection.

Key features:

- Removal of curbs to create a flat surface
- Street furniture to encourage social interaction and play
- Planters to provide green space and narrow the street

ADA accommodations: Design elements included bulb-outs, curb ramps, and truncated domes at crossings to bolster pedestrian position and sightlines, and provide accommodation for users with physical impairments.

Programming:

- Summer music and food festivals. Other activities and events include outdoor movies, markets, and live music by Friends of Bell Street
- Friends of Bell Street Park – Art and Activation Plan completed by SvR Design Company outlines annual budget, partnerships and schedule

Lessons learned:

- Diagonal/zig-zag design approach more costly than conventional straight line
- Creating a change from perpendicular oncoming streets via apron to slow down vehicle traffic
- Educational component needs to happen
- Include more resilient plants
- Policy and education directed towards enforcement needed, as police gave tickets to pedestrians crossing anywhere in the road

Evaluation and monitoring:

- Property values in the area have reportedly doubled[33]
- Seattle has plans for at least two more shared streets in the works

[33] Stiles, Marc. "It's a park. It's a street. Is it safe? (Slide show) (Video)," Puget Sound Business Journal, April 2014. Accessed from https://www.bizjournals.com/seattle/blog/2014/04/its-a-park-its-a-street-is-it-safe-slide-show.html?page=all

Chapter 5: Future Framework for Minneapolis

5.1 Implementing shared streets

Shared streets are successful when implemented as part of an integrated transportation policy and design approach and can have profound effects when done correctly. Based on a peer city review and findings, some traits and priorities in shared street siting are found to be universal, while other features are unique to the surrounding context. The following traits should be considered for future implementation of shared streets in Minneapolis:

- **Low traffic speeds and low traffic volumes:** lower traffic speeds and volumes equal higher safety and amenity for people walking which equals greater success of the shared street. It is suggested that candidate streets carry less than 100 vehicles per hour[34][35] or roughly 1,000-1,500 vehicles per day. If pedestrian activity is very high, then it may be possible to accommodate 2,000-3,000 vehicles per day. Most North American cities that have specific speed limit recommendations for shared streets recommend a posted speed of 10-15 miles per hour or less. Shared streets are generally designed to produce motor vehicle operating speeds between 5 and 15 miles per hour.
- **High pedestrian volumes:** A steady stream of people walking is helpful for getting people driving to slow down. Some literature suggests a general rule of thumb of 1,000 pedestrians per hour or four pedestrians for every car.[36] This metric would have to be scaled to the appropriate situation or city, as it is not a proven rule but one that cities could work toward as an outcome of implementing a shared street. Regardless of the metric, the ultimate takeaway is that a shared street needs to have significant pedestrian volumes to work as intended.
- **Dense land use patterns:** an appropriate level of activity on the street edges such as shops, cafes, restaurants, museums, parks, etc. is critical in supporting a high number of people walking and biking.
- **Active building frontage:** surrounding buildings influence the design of a shared street. A shared street that serves a school would be different than one that serves a park or a restaurant/bar. It is also important to look at pedestrian desire lines and how people are getting across the street. The street design needs to reflect what is happening in the surrounding environment.
- **Solution to safety, accessibility and deteriorating street conditions**: many shared streets were implemented in response to crime and traffic safety concerns and/or as a way to improve accessibility due to physical obstructions or narrow sidewalks.
- **Shorter distance in length:** even though there is no clear justification for determining the street limit, typically, a length of 300 to 600 meters (or 1,068 feet) is considered the maximum.[37]

[34] Zeeger, C; Nabor, D and Lagerway, P. "Pedestrian Safety Guide and Countermeasure Selection System: Shared Streets," PEDSAFE, August 2013. Accessed from http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=67

[35] Erickson, P and Caldwell, B. "Shared Street Guidance and ADA-related Research," Community Design + Architecture, December 2013. Accessed from http://olympiawa.gov/~/media/Files/CPD/Planning/Greening-Capitol/shared-streets-presentation.pdf

[36] Saviskas, Sarah.

[37] Collarte, Natalia.

Streets that have the following traits are good candidates to consider for shared street design:

- Private/public partnership in terms of maintenance, operations and programming
- Lack of surrounding green space and public gathering spaces
- Operates as a shared street already
- Access to, but not on, a transit route

5.2 Opportunities and challenges to implementation

There are several opportunities for moving forward with shared streets in the City of Minneapolis. The City has a strong vision and policy for complete streets and safety, as well as a history of developing non-traditional streets, which include shared streets (described in Chapter 2). The City is also updating the 10-year Transportation Action Plan, which will include the evaluation and update of an all ages and abilities bicycle network, pedestrian priority network and new street typologies for the Street Design Guide. This shared streets study provides considerations and traits that can help inform future candidates of shared street.

Implementing shared streets comes with some challenges as described in chapter 3 and will require setting goals and expectations early on in a project development process as each street is unique. It will also require coordination between the City, developers and the public, as well as the willingness to experiment with different design treatments. Understanding what constitutes a shared street compared to a pedestrian only street or other special street treatment will also be crucial in terms of design. As literature suggests, one recommendation is to abandon the term "shared space" and replace it with more specific terminology that better describes the philosophy behind specific designs or to categorize them by function, adjacent land uses and allocation of space for the different modes.[38]

Other challenges to consider and continue to evaluate when making shared streets include:

- How to best meet the needs of people with disabilities with non-standard street designs
- Roles and responsibilities in terms of maintenance, programming and operations
- Regulatory and policy framework to support shared streets in terms of legal definitions, best practices and design treatments
- Jurisdictional partners

5.3 Next steps

Moving forward, the City of Minneapolis should consider the following actions as a means of establishing shared streets in the city:

Capital project development

- Recognize shared streets as a tool to use in capital project implementation in situations where the following conditions are present:
    - Low traffic speeds and low traffic volumes

[38] Delaware Valley Regional Commission.

    - High pedestrian volumes
    - Dense land use patterns
    - Active building frontage
    - Identified investment need due to safety, accessibility or deteriorating street condition
    - Shorter distance in length, typically up to a few blocks
- Identify potential locations for shared streets in the city
- Experiment with shared street implementation on a variety of street types
- Update the Complete Streets checklist to document traits and design elements conducive to shared streets, so it is apparent when a shared street should be considered

Transportation Action Plan

- Integrate specific language to support the design and construction of shared streets in the Minneapolis Transportation Action Plan and include shared streets as a potential design treatment for applicable streets in the Street Design Guide.

Evaluation

- Continue to monitor and evaluate existing shared street (29th Street).
- Collect pre- and post-data, conduct engagement and actively monitor any shared street pilots to evaluate design and process.
- Given new and emerging technological advances in transportation such as scooters and bikeshare, and the lack of research and best practices of their impacts on shared streets, monitor and evaluate future impacts of shared, electric, connected and automated vehicles on shared streets.

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