TAKING BACK OUR STREETS:
Demystifying Shared Space Streets in America

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# Table of Contents

**Chapter 1: Introduction** ............................................................................................ 1  
  Research Motivation  
  Methodology  

**Chapter 2: Background on Shared Streets** ........................................................... 3  
  What is a Shared Space Street?  
  History  
  Design Techniques for Reducing Speed  
  Terminology Clarification  

**Chapter 3: Shared Streets Benefits** ........................................................................ 11  
  Safety and Slowness  
  Livability and Sense of Community  
  Economics  

**Chapter 4: Best Practices** .................................................................................... 19  
  Land Use and Density of Pedestrians  
  Robust Public Participation Process  
  Delineation of Zones  
  Americans with Disabilities Act (ADA)  
  Transitions into Shared Streets  
  Placemaking  

**Chapter 5: Case Studies** ...................................................................................... 25  
  New Road: Brighton, England  
  Exhibition Road: London, England  
  Market Square: Pittsburgh, PA  
  Table of Shared Streets in America  

**Chapter 6: Challenges and Conclusions** ............................................................. 35  
  Challenges to American Implementation  
  Strategies for Implementation  
  Conclusions  

**References** ............................................................................................................. 39
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American streets were once a place where neighbors socialized and children played. This all changed with the rise of the automobile.

Motorists who ventured into city streets in the first quarter of the twentieth century were expected to conform to the street as it was: a place chiefly for pedestrians, horse-drawn vehicles, and streetcars. But in the 1920s, motorists threw off such constraints and fought for a new kind of city street—a place chiefly for motor vehicles. With their success came a new kind of city—a city that conforms to the needs of motorists (Norton 2011).

From this point forward, the majority of our streets were no longer designed for all street users; they were intended and designed for cars. The primary objective of streets became moving motor vehicles at greater speeds and in greater volumes, so governments increasingly regulated streets “through the use of consistent, standardized mechanisms of highway rules, control systems, and markings” (Hamilton-Baillie 2008, Towards Shared Space). It became conventional wisdom in the United States that the primary purpose of streets is to serve cars and get people from Point A to Point B, and therefore, streets should be designed for cars. Conventional wisdom also became that street users need their own designated, clearly delineated zones in order to be safe—vehicular movement must be segregated from pedestrians and social activities.

In reality, many urban streets in the United States are unsafe and uncomfortable for pedestrians and cyclists. In 2013, 4,735 pedestrians and 743 cyclists were killed in collisions with motor vehicles in the U.S., and there were 66,000 reported injuries (Pedestrian and Bicycle Information Center 2015). Conventional traffic engineering mechanisms, such as curbs, stop signs, traffic signals, road surface markings, and signage, were created with the intent of making streets safer, but they have not delivered the safety benefits anticipated (Hamilton-Baillie 2008, Towards Shared Space).
America needs to redefine the purpose of its streets. Streets should, first and foremost, be designed and operated to ensure safe and comfortable use for all users, including pedestrians, cyclists, motorists, and transit riders. Further, streets should once again function as places in their own right that enable social, cultural, and economic interactions (PPS 2015). To achieve this goal, it is critical to slow down the speed of motor vehicles on local and collector roads, and potentially on targeted arterial roads. Numerous studies have proven that higher motor vehicle speeds lead to more pedestrian crashes, serious injuries, and fatalities (U.S. Department of Transportation 1999). “Shared streets” are one approach for achieving the goal of reduced motor vehicle speeds and place-based complete streets. While shared streets are still a fairly novel concept in the United States with limited application, they are more widely utilized in other countries like Denmark, the Netherlands, New Zealand, Sweden, and England.

This paper begins with a brief overview of the research motivation and methods. Chapter 2 provides background on what shared streets are, their history, design techniques for reducing motor vehicular speed, and a clarification of terminology. Chapter 3 explores some of the benefits of shared streets, including safety, livability and sense of community, and economics. Chapter 4 looks at best practices that emerged from this research. Chapter 5 outlines different street types on which shared streets can be applied, such as commercial streets with lots of pedestrian activity, alleyways, residential streets, and street intersections (to name a few), and explores three case studies. This paper concludes with challenges for implementation in America, such as adequately accommodating pedestrians with disabilities and adhering to the Americans with Disabilities Act, and final conclusions.

**Research Motivation**

This paper shows how shared streets can be applied more broadly in America and what best practices are when designing them. This research is intended to help practitioners, decision-makers, and members of the public determine if it makes sense to build a shared street in their community or advocate for including shared streets in a complete streets plan. In order to do so, this research outlines the nuts and bolts of how shared streets work, the benefits and challenges associated with them, and what regulations (if any) have to change to make them possible.

**Methodology**

To address the research questions, an extensive literature review and interviews with 11 professionals were conducted. These professionals were selected given their extensive knowledge of shared streets, experience working on shared street projects, and/or understanding of factors influencing the implementation of shared streets. They were also selected to provide a wide range of perspectives, as these individuals are from the public, private, and nonprofit sectors and include urban designers, architects, engineers, planners, and policy professionals. The interviews addressed shared street best practices, successful design techniques, American regulations that impact the implementation of shared streets, incorporation of transit on shared streets, case studies, project evaluation, and general lessons learned from prior experience.
Chapter 2: BACKGROUND ON SHARED STREETS

Shared space is a theoretical way of thinking about streets that is widely discussed in the related literature. This paper intentionally uses the term “shared streets” when talking about the application of shared space to make the concept more accessible to the general public. Additionally, it is important to note early on that there is no clear, universal definition in the literature for what constitutes a shared space. This paper’s definition reflects the author’s interpretation of the concept, which is based on a comprehensive literature review and interviews with professionals in the field.

What is a shared space street?

Shared space is a concept coined by the late Dutch traffic engineer, Hans Monderman, which refers to a “design approach that seeks to change the way streets operate by reducing the dominance of motor vehicles, primarily through lower speeds and encouraging drivers to behave more accommodatingly towards pedestrians” (UK Department for Transport 2011). Shared space streets lack conventional engineering mechanisms, such as curbs, stop signs, traffic signals, crosswalks, road surface markings, and signage. Motorists, pedestrians, and cyclists are all considered equal in the street, and no one type of user is given priority. Conflicts between modes are reduced because the atypical street design makes drivers travel more slowly and forces all street users to rely on eye contact, body language, and cues like hand gestures in order to safely navigate the space.

Conventional transportation engineering features signal to motorists that the street is their space. Ian Lockwood, a Transportation Engineer at Toole Design Group, articulately described this phenomenon: “If you paint yellow lines down the road, it starts to look like a highway. Crosswalks indicate that is the only place pedestrians can be, and they are at fault if they are anywhere else. Bit by bit, you create a space in which the
motorists feel dominant. When you don’t have a yellow line, a lane, or a step down into someone else’s territory, there is ambiguity, and ambiguity creates caution and greater equity.”

Shared streets lack a formal demarcation of different travel modes, such as where motorists drive and pedestrians walk. While the street design offers subtle cues for how people are intended to use the space, which will be discussed in more detail in Chapter 4, shared spaces lack the formal separation found in conventionally-designed streets, blurring the line between the space intended for pedestrians and for cars. The right-of-way is intended to be flexible, enabling cyclists and pedestrians to use the entire street rather than just the sidewalk or bicycle lane, as shown in Figure 2 and Figure 3.

There is no standard for how automobile parking should be addressed. Some shared streets retain on-street parking, some remove it entirely, and some reconfigure on-street parking to better fit the new street environment, such as switching from parallel parking to angle parking. The approach to parking needs to be determined by the unique circumstances on a given street and the shared values within a given community.

Shared streets are not appropriate on every street. The concept should only be applied in the right contexts. The philosophy acknowledges that cities need a larger-grain, faster network of framework streets to support the fine-grained slow network (Toth 2009). Therefore, higher-speed, arterial streets are not an appropriate context for shared streets. “The key point is that on the slow network, motor traffic is welcomed as a guest [and] has to adapt to certain social norms of behavior. The layout of the road must make this clear” (Toth 2009). Transport for London, a local government agency in London, England, recently developed a classification system for city street types. Their street type classifications do not perfectly compare to street types in the United States, but their system helps demonstrate the range of street types that exists in cities. Figure 4 shows which general street types are appropriate for shared streets.

Figure 3: Market Square in Pittsburgh, PA

Figure 4: General street types appropriate for shared streets, outlined in red (based on Transport for London’s graphic)
History
The concept of shared streets is not new. Shared streets have existed around the world for centuries and were the norm in cities in the late nineteenth and early twentieth centuries before the rise of modernism and the automobile, even though they were not thought of as such at the time. (See Figure 1.) “Visit any Mediterranean hill town or market square, and one can observe the informal sharing of street space by vehicles and other users, and such arrangements remain commonplace throughout the world” (Hamilton-Baillie 2008, Shared Space). In England, longstanding village squares, mew courts, car parks, camp sites, rural lanes, and other spaces also frequently have shared space characteristics (Hamilton-Baillie 2008, Shared Space). In the early 1900s, Market Street in San Francisco (shown in Figure 5) was a typical American city street, and it functioned as a shared street. “Travel modes lack[ed] a dedicated right of way, and yet passage through Market Street [was] not only possible, but [was] cogent and clear” (PPS 2015). In spite of the long history of streets serving as shared streets, it is only recently that this concept has been formalized in how we think and talk about streets.

The “conscious application of shared space and the deliberate integration of traffic into social space” date back to the late 1960s and early 1970s (Hamilton-Baillie 2008, Shared Space). Joost Vàhl, Hans Monderman, and others in the Netherlands experimented with removing road signage, pavement markings, and curbs on quieter, residential streets in an attempt to make streets safer for children (to remedy rising child fatalities on conventionally designed streets) and to minimize traffic’s impact on the quality of social space (Hamilton-Baillie 2008, Shared Space). These interventions, coined woonerfs or woonerven, resulted in slower motor vehicle speeds and fewer fatalities, making them quite popular (PPS 2015). In 1976, the Dutch government formally recognized the woonerf by establishing specific guidelines and regulations, such as restricting vehicle speed in a woonerf to walking pace (approximately 3 mph); other European countries followed suit shortly thereafter (Ben-Joseph 1995). Woonerfs are different than shared streets because pedestrians are given priority over cars on woonerfs (see Table 1), but the movement towards woonerfs in Europe set the stage for the implementation of shared streets. Shared streets have been applied in the United States in only a handful of cities and suburbs, though knowledge and interest in shared streets has been steadily increasing.

Figure 5: San Francisco’s Market Street in 1906. Source: Miles Brothers
Design Techniques for Reducing Speed

One might ask, “Aren’t shared streets dangerous?” or “How do street users know how to behave in such an unconventional space?” Ben Hamilton-Baillie, the leading international expert on shared streets, explains, “In the absence of rules, predictability, and certainty, drivers have to rely on cultural signals and informal social protocols. Speeds reduce, eye contact becomes the norm, and the driver becomes a part of her or his social surroundings and context” (Hamilton-Baillie 2008, *Towards Shared Space*).

Hamilton-Baillie is known for comparing a shared street to an ice skating rink. On an ice skating rink, there are no rules, and skaters glide around on slippery ice in unpredictable patterns in a limited space with sharp, steel blades on their feet. To someone unfamiliar with skating rinks, it sounds chaotic and dangerous! But in reality, “skating rinks work with few rules and no overseeing regulator. Informal social protocols serve to keep skaters moving in a roughly consistent direction, with beginners on the outside and faster skaters on the inside” (Hamilton-Baillie 2008, *Shared Space*). Hamilton-Baillie argues that what makes skating fun is the uncertainty and fluid interaction with others, so to regulate the activity with rules would destroy the experience. Humans are capable of navigating this uncertainty on an ice skating rink, and they are capable of navigating uncertainty on our streets as well. That said, shared streets arguably require a bit more regulation than ice skating rinks, such as speed limits, because cars are capable of more destruction than someone on skates.

In addition to a formal speed limit, different street design features can be used to slow cars down and make the ambiguous street easier for all users to navigate. These design features naturally influence how fast vehicles drive. The result is what Ian Lockwood calls, “self-enforcing street designs.”

First, shared streets typically utilize different materials than those used on a conventional street. For example, a combination of stone, granite, brick, and concrete pavers are often used instead of asphalt, as shown in Figure 6. The variety of textures and colors creates visual interest and intuitively signals to drivers that something is different about this section of street, so they should slow down. It also creates an uneven surface that helps slow down motorists. This type of paving has been shown to reduce traffic speeds by 2.5–4.5 mph, compared with speeds on asphalt surfaces (York et al 2007). Incorporating these features a few blocks before the shared street begins helps to signal the upcoming change in the street, as can features such as archways, sculptures, or bulb outs (PPS 2015).

Figure 6: Market Square street materials in Pittsburgh
Additionally, it is important to create “edge friction” as one interviewee called it. The more activities and areas of interest happening in the peripheral vision of a driver, the more they slow down to absorb that information. And the closer you bring those activities to the motorists, the more successful the space will be (Hamilton-Baillie, interview #6). This could include benches, trees, bicycle racks, bollards, and public art. One of the most famous shared streets is in the village of Poynton, England. A lot of effort went into placing lights in the center of the street to create friction, as shown in Figure 7.

Similarly, there are tricks and techniques a street designer can use to make the street look even narrower than it is, called visual narrowing, which narrows the perceived space that vehicles can drive in and makes motorists intuitively drive more slowly (Hamilton-Baillie, interview #6). For example, if there is parking on the street, it should not look like it is part of the roadway. Some techniques for achieving visual narrowing include slight grade changes, use of different surface materials (e.g. colors and textures), valley gutters between the on-street parking and travel surface, and use of lighting to define different zones. Bell Street in Seattle successfully incorporates several of these features, as shown in Figure 8.

Lastly, there is a direct relationship between the size of the street corner radius and the speed of turning motor vehicles. Small corner radii slow down motorists as they turn onto or off a street, and they also make pedestrians more visible to motorists. It is essential to minimize the size of corner radii on shared streets for the safety of pedestrians and cyclists. There is no consensus on the most appropriate corner radius for shared streets, but there is literature on the best radii for city streets. According to NACTO’s Urban Street Design Guide, standard corner radii are 10–15 feet, but many cities use corner radii as small...
as 2 feet (NACTO 2013). The Guide also states that in urban settings, corner radii exceeding 15 feet should be the exception. Another approach, which was used on Bell Street in Seattle, is to use a city’s standard driveway apron instead of having a corner radius, as shown in Figure 9. This signals that motorists are leaving the conventional street realm and entering a pedestrian-friendly realm.

**Terminology Clarification**

It is important to note that there is a lot of variation in how the following terminology is applied in the literature. Some people use shared spaces, shared streets, woonerfs, and other terms interchangeably. Obviously, this leads to miscommunications; clarity on how different words are defined would help everyone communicate more effectively. Based on the literature and interviews conducted, this paper argues that shared space is more of a theory—a way of thinking about streets. There are some streets that are designed and function as Hans Monderman envisioned. However, in reality, shared space operates more as a spectrum, with a conventional street on one end of the spectrum and shared space on the other end, as shown in Figure 10.

More often than not, shared streets include some, but not all elements of a shared space. For example, Palmer Street in Cambridge, MA has no curbs and high levels of interaction between modes, but some signage (see Figure 11). This is okay! As Gary Toth from Project for Public Space said, “Don’t get hung up on the terminology. Rather, focus on what we are trying to accomplish.” At the end of the day, it should not matter if a street is a “pure” shared space as envisioned by Monderman. What matters is whether a street is functioning in a way that inspires people to linger and use the street as a public space; what matters is whether the environment has been altered such that people intermix comfortably and negotiate the space more civilly, using eye contact to navigate the street. For these reasons, the author prefers the term “shared streets” when talking about the application of the shared space concept.

You might be thinking: this sounds a lot like a woonerf! How is a shared street different? Woonerfs look very similar to shared streets, as shown in Figure 12, but they are different. Pedestrians are given priority over cars on woonerfs, whereas in shared streets, all street users are considered equal. One might also confl ate shared streets with mews. Mews are arguably one type of shared street. They are narrow alleyways that residential dwellings

![Figure 10: Demarcation and sharing. Source: UK Department for Transport](image)

![Figure 11: Signage on Palmer Street in Cambridge, MA. Source: Google Street View 2014](image)
and/or garages front onto, as shown in Figure 13. They often do not have curbs and emphasize the importance of pedestrians and motorists sharing the street.

It is also important to clarify the relationship between traffic-calmed streets and shared streets. All shared streets are traffic-calmed streets, but not all traffic-calmed streets are shared streets. In other words, shared streets are a type of traffic-calmed street. Traffic-calmed streets are streets that are designed to intentionally slow down motorists and indirectly reduce through traffic. Examples of traffic-calming measures include bulbouts, speed humps, chicanes, medians, narrow lanes, sense of enclosure through street tree plantings and on-street parking, changes in pavement color and texture, or some combination of these.

There are a few distinctions between traffic-calmed streets and shared streets. First, on traffic-calmed streets, every use and user group has its own territory. For example, pedestrians are supposed to stay on the sidewalk. The purist form of a shared street makes no distinctions between any of the territories of the various uses and user groups. Less pure forms of shared streets introduce subtle cues for how people are intended to use the space through street design, as will be discussed in Chapter 4. At some point, as one moves further from the pure shared street, one approaches a blurry line between what would be considered a shared street versus a regular traffic-calmed street. Where the line is drawn is a matter of judgment. The boundary occurs approximately when crosswalks or similar design features are introduced. Once cyclists and pedestrians are guided as to where they travel, cross, or otherwise use the street, then the line is beginning to be crossed between a shared street and a traffic-calmed street.

A second distinction is that shared streets are intended to encourage a shift in societal mindsets, whereas traffic-calmed streets are not. Shared streets stimulate people to act more responsibly toward one another, using eye contact to navigate the street. Shared streets are intended to inspire people to linger, interact with one another, and use the street as a public space—either in a formal way, such as through a temporary street festival, or an informal way, such as simply walking or having coffee with a friend on the street. The street design elements discussed in this chapter help make this possible.
Chapter 2: Background on Shared Streets

**Concept** | **Definition**
---|---
**Complete Streets** | Streets for all. Streets are designed and operated to enable comfortable and safe access for all users, including pedestrians, cyclists, motorists (cars and trucks), and transit riders of all ages and abilities. There is no universal design for a complete street, and they look very different in a rural versus urban context.

Potential design features: sidewalks, bike lanes (or wide paved shoulders), special bus lanes, comfortable and accessible public transportation stops, frequent and safe crossing opportunities, median islands, accessible pedestrian signals, curb extensions, narrower travel lanes, roundabouts, etc.

**Home Zones** | England’s version of woonerfs, though the motor vehicular speed limit is higher at 10-20 mph. See definition of woonerfs.

**Mews** | Narrow alleyways that residential dwellings and/or garages front onto, and many were formerly stables. Some have restricted access to the public. Many mews are arguably one type of shared street. They often do not have curbs and emphasize the importance of pedestrians and motorists sharing the street.

**Shared Streets** | Streets that allow all travel modes and incorporate design measures for reducing or slowing motorists, though no one type of user is given priority. Users must use caution to navigate the street. Streets lack conventional engineering mechanisms, such as curbs, stop signs, traffic signals, crosswalks, road surface markings, and signage. Shared street designs can be used on a variety of street types.

**Specialized Streets** | Streets that cater primarily to one type of street user. For example, highways and interstates cater to high-speed motoring. Residential streets mainly cater to residents by limiting access to through traffic.

**Traffic-Calmed Streets** | Streets that are designed to slow down motorists and indirectly reduce through traffic (through regulatory action, physical design, or both), but do not restrict travel modes. Techniques for slowing down motorists are listed under “Traffic Calming Measures.” Examples include: mews, shared streets, woonerfs

**Traffic-Calming Measures** | Physical changes in the street design to slow down motorists and advantage pedestrians, cyclists, and the ambiance along the street. Examples include: bulbouts, speed humps, chicanes, medians, diagonal parking, street tree plantings, rumble strips, changes in pavement color and texture, or some combination of these

**Vehicle Restricted Zones** | Streets or portions of streets that have restricted travel modes via regulatory and physical actions. Examples include: pedestrian malls, transit malls, bikeways/bike boulevards/bike routes, truck routes, etc.

**Woonerfs (i.e. Living Streets)** | Streets that allow all travel modes and incorporate design changes for slowing the speed of motorists, though unlike shared streets, pedestrians are given priority over cars. Streets lack curbs, stop signs, traffic signals, crosswalks, and road surface markings. Woonerfs are usually located on residential streets. Vehicular speeds are restricted to “walking speed” (~ 3 mph). Originated in the Netherlands.
Chapter 3: SHARED STREET BENEFITS

Numerous authors and organizations have written about the benefits of shared streets, including Ben Hamilton-Baillie, the Project for Public Spaces, Michael Southworth, Eran Ben-Joseph, the UK Department for Transport, and Alta Planning and Design, among others. This paper explores three key benefits: safety, livability, and economic impacts.

Safety and Slowness

Streets are safer when motorists drive more slowly. Lower motor vehicle speeds are proven to help reduce injuries that result from collisions. A National Highway Traffic Safety Administration study found that “higher vehicle speeds are strongly associated with both a greater likelihood of pedestrian crash occurrence and more serious resulting pedestrian injury” (U.S. Department of Transportation 1999). It is estimated that only 5 percent of pedestrians die when struck by a vehicle traveling at 20 miles per hour or less; this compares with fatality rates of 45, 85, and nearly 100 percent for striking speeds of 30, 40, and 50+ miles per hour respectively (U.S. Department of Transportation 1999). (See Figure 14 and Figure 15.) Numerous other studies have reached similar conclusions.

While limited research has been done on the safety impacts of shared streets specifically, initial research has shown that shared streets make vehicles travel more slowly and reduce traffic volumes. An evaluation of the Fort Street area in Auckland, New Zealand found that the implementation of multiple shared streets in the Central Business District resulted in speeds dropping by 25 percent in Jean Batten Place, 29 percent on Fort Street, and 15 percent on Elliott Street (Auckland City Council 2012). It also resulted in a 30 percent reduction in the number of collisions.
of cars traveling on Jean Batten Place per day, a 14 percent reduction on Fort Street, and a 47 percent reduction on Elliott Street (Auckland City Council 2012). That said, it should be noted that a high volume of cars is not that objectionable when they are going slowly, compared to when they are going quickly (Lockwood, interview #8).

Even with the reduced traffic volumes, travel time increases for motorists were not long (averages of 6 and 11 seconds on different streets), and 72 percent of motorists thought their journey through the area took the same amount of time, or less time, as before (Auckland City Council 2012). A recent study found that shared streets have lower travel times for motorists compared to comparable streets using conventional traffic control systems, and this difference is attributed to slow but steady speeds for motorists (Wargo and Garrick 2016).

Research has also shown that shared streets sometimes reduce the number of collisions or result in no change in collision rates. Studies in Germany, Denmark, Japan, and Israel show that there are more than 20 percent fewer collisions in residential shared streets and more than 50 percent fewer severe collisions compared with conventional residential streets (Southworth and Ben-Joseph 2003). Traffic conflicts on Exhibition Road in London slightly decreased in both frequency and severity after its conversion to a shared street (Dong 2012). Researchers found a drastic reduction in collisions in the Laweiplein, a Dutch intersection that was converted into a famous shared space, though the long-term impacts of the design are inconclusive since the study was only conducted in the two years following the redesign (NHL 2007; Wargo and Garrick 2016). “...To the knowledge of this paper’s authors, no research has shown that shared space is more dangerous than conventionally designed intersections” (Wargo and Garrick 2016). However, further study is needed to provide more definitive conclusions about collision rates and severity—existing collision data would be strengthened if reported as a function of exposure (such as traffic volumes or Vehicle Miles Traveled) and if collected over longer periods of time.

People that are skeptical of shared streets might argue that conventional streets are safer than shared streets. However, there is no evidence to suggest that conventional transportation engineering mechanisms make streets safer. Gary Toth said,

If you put stripes on the roadway, speed limit signs, stop signs, crosswalks, and tell everybody what to do, then you’ve removed the responsibility from the human beings who are moving around that space; they have no responsibility for their actions anymore...The light turns green, I go. The sign says I go 25, I go 25. The crosswalk says I walk here (Badger 2011).

Toth argues that shared streets take some of the responsibility for making streets safe away from the government and put that responsibility back on citizens (Badger 2011).

While safety statistics are important, people generally do not base their behavior on statistics—they base it on the feeling of safety, or in other words, their level of comfort on the street. Ben Hamilton-Baillie argues that reducing traffic speed is the single most important measure to make pedestrians comfortable using the street. “Numerous studies of the relationship between traffic speed and pedestrians suggest a qualitative change occurs somewhere around 20 mph” (Hamilton-Baillie 2008, Towards Shared Space), making streets more attractive to pedestrians. Auckland City Council researched this after implementing its shared streets and

1. Average number of vehicles per day over 7 day period
found that, not only did motor vehicle speeds decrease, as shown in Table 2, perceptions of safety from cars and other traffic improved slightly after the upgrade as well. 44 percent of surveyed respondents rated pedestrian safety from cars and other traffic as very good or excellent – up from 35% prior to the project; however, the percentage of respondents rating pedestrian safety as poor remained roughly the same (10% post-project and 11% pre-project) (Auckland City Council 2012).

### Livability and Sense of Community

Our streets have so much untapped potential. “Streets typically represent the largest area of public space a community has – for example, Chicago’s streets and sidewalks represent 24 percent of the City’s land area and over 70 percent of City-owned public open space” (PPS 2015, *Streets as Places*). Therefore, poor streetscape quality has huge impacts on our communities and lifestyles (Hamilton-Baillie 2008, *Towards Shared Space*).

Shared streets help communities reclaim their streets as public places for social gathering. A well-designed street can become a place

### Table 2: Average vehicle speeds in Auckland’s CBD shared spaces before and after upgrade

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
<th>Tube position</th>
<th>Monitoring speed</th>
<th>Mean Speed (mi/hr)</th>
<th>85th Percentile Speed (mi/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lorne Street</td>
<td>Aug-09</td>
<td>*</td>
<td>North of Rutland St</td>
<td>12.4</td>
<td>16.2</td>
</tr>
<tr>
<td></td>
<td>Oct-11</td>
<td>% change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elliott Street</td>
<td>Oct-09</td>
<td>Strand Arcade</td>
<td></td>
<td>12.4</td>
<td>16.2</td>
</tr>
<tr>
<td></td>
<td>Oct-11</td>
<td>North of Wellesley St</td>
<td></td>
<td>10.6</td>
<td>14.2</td>
</tr>
<tr>
<td>Darby Street</td>
<td>Oct-09</td>
<td>10m east of Elliott St</td>
<td></td>
<td>7.8</td>
<td>10.4</td>
</tr>
<tr>
<td></td>
<td>Oct-11</td>
<td>mid block</td>
<td></td>
<td>8.9</td>
<td>11.4</td>
</tr>
<tr>
<td>Fort Street</td>
<td>Apr-09</td>
<td>West of Commerce St</td>
<td></td>
<td>13.7</td>
<td>18.1</td>
</tr>
<tr>
<td></td>
<td>Sep-11</td>
<td>East of Jean Batten Pl</td>
<td></td>
<td>9.8</td>
<td>13</td>
</tr>
<tr>
<td>Jean Batten Place</td>
<td>Oct-09</td>
<td>South of Fort St</td>
<td></td>
<td>13.4</td>
<td>16.8</td>
</tr>
<tr>
<td></td>
<td>Sep-11</td>
<td>South of Fort St</td>
<td></td>
<td>10</td>
<td>13.5</td>
</tr>
</tbody>
</table>

**Notes:**

* No data available

This table was originally published in kilometers per hour. This report converted kph to mph.

Darby Street comparison for speed measurements not a direct comparison, as the October 2009 location was only 10 meters from the Elliott Street intersection, whereas the October 2011 measurement was taken in a midblock location.

(Source: Auckland City Council 2012)
where people are inspired to spend their time, be it reading outside on a bench or playing a game of chess with a friend (re:Streets 2016). By designing our streets as vibrant centers of activity that are destinations in their own right, where vehicles are treated as welcome guests, cities can start to stitch communities back together and renew a sense of place (PPS 2015).

Streets designed to be social hubs build trust in the community by creating opportunities to know one’s neighbors. The street becomes the place to meet old friends, make new ones and to participate in the drama that is life. Creating streets that convey a sense of belonging and inclusion can encourage social cohesion and discourage isolation. Being connected to the community in small and big ways has a positive influence on the mental well being of its users (re:Streets 2016).

Shared streets can also reflect the unique identity of its residents, businesses, historical occupants, and visitors, and these actors should be involved in the design process for this reason (re:Streets 2016).

The best way of gauging livability and sense of community on shared streets is assessing shifts in both public perception and street use. Unfortunately, limited formal research has been conducted on public perception of shared streets and how the implementation of shared streets affects usage. The studies that have been undertaken indicate a positive response from the community, though some people with disabilities have expressed major concerns with shared streets, which will be discussed in greater detail in Chapters 4 and 6. The following paragraphs discuss the findings of studies conducted on public perception and street use.

“First and foremost, a great street should help make a community: should facilitate people acting and interacting to achieve in concert what they might not achieve alone. Accordingly, streets that are accessible to all, easy to find and easy to get to, would be better than those that are not. The best streets will be those where it is possible to see other people and to meet them; all kinds of people, not just of one class or color or age … The best streets encourage participation. People stop to talk or maybe they sit and watch, as passive participants, taking in what the street has to offer.”

—Allan Jacobs, Great Streets

In Auckland, New Zealand, 91 percent of stakeholders were highly complementary of the new shared streets, compared to 17 percent before (Auckland City Council 2012). Additionally, peak hour foot traffic increased 50 percent (Auckland City Council 2012).

Poynton saw a 180 percent increase in foot traffic one year after the renovation (Hamilton-Baillie, interview #6).² Several residents were interviewed about the redesign in the “Poynton Regenerated” video. Howard Murray said, “I’m delighted—there’s so much more vitality about the village center” (Cassini 2013). Elaine Fox said, “I was a little skeptical at first about it, when I heard that there were going to be no pavements or edges between the pavements in the road. But I think it’s working really well now” (Cassini 2013). A group of school children said, “It’s easier, it’s safer, it’s quicker. It’s quicker to cross the road because [cars] wait more” (Cassini 2013).

². This statistic is based on a study carried out by a firm called “The Shop Doctor” approximately 18 months after the project’s completion. This study compared the outcomes of Poynton’s shared street to Poynton Park Lane in 2009 to help draw conclusions.
In response to New Road’s shared street in England, 92.5% of interviewees said that they preferred the shared street to the previous conventional street. When asked why people spend time in New Road, “a majority (56.2%) of participants referred to experiential / social and emotional factors … such as convenience, atmosphere, people watching and buskers. The remaining responses referred to physical elements such as having a place to sit, amenities, proximity to the Pavilion Gardens, and the quality of New Road’s built environment” (Mayor and Coleman 2011).

Market Square in Pittsburgh was totally transformed by the shared street redesign in 2010. (See Case Study 3 for a full description of the redesign.) Between 2006 and 2012, the average number of people visiting Market Square per day more than doubled, and the number of pedestrians visiting Market Square now far exceeds pedestrian volumes at other popular downtown locations (Pittsburgh Downtown Partnership 2014). (See Figure 16.) The redesign has also impacted how the public uses the square. Prior to the redesign, the square was characterized by high rates of homeless populations, daytime drug deals, and vehicular traffic (IDA 2011). Many perceived the square as unsafe before the redesign, which was largely due to the fact that it had marginal uses throughout the day and even more so after 5 pm (PPS 2015, *Pittsburgh Market Square*). Now, the square serves a variety of different uses and is designed to be flexible. It features movable café seating, which is very popular with downtown professionals at lunchtime, and it hosts numerous events throughout the year, including a weekly farmers market, Yoga in the Square, Dancing in the Square, a night market, and more.

Finally, the redesign has influenced how the community perceives the public space. “Mostly negative perceptions have changed to mostly...
“I caught the tail end of the (one would say scary) old Market Square. I have to admit it was intimidating to walk around those dark, tree shadowed corners alone as a 17 year old in the big city…It (Market Square) is all good now though :) I often come here to enjoy my packed lunch when the weather is nice” -Chelsea S, 3/28/2014

“We just love going to market square! We always seem to find a good parking spot and it’s free after 6:00!! Great restaurants and there is a Starbucks too!!!” -Jenni H, 6/2/2015

A nice area right in the middle of the city to have some lunch or to sit outside at one of the many movable tables and chairs to enjoy the weather, scenery, and passersby…Ever since they remodeled the square a while back it is much better…I think it would be best with no cars are all, but this change was better than nothing.” -Nick F, 12/22/2013

“… the hustle and bustle of the place, the liveliness, and people-watching is what makes Market Square even more fun! Agreed that the place is lacking greenery but nonetheless a fun place to visit.” -Nish K, 3/18/2013

“There is shopping, dining, entertainment, and housing all within the general area. It’s clean and has plenty of room to handle the lunch and dinner rush. It’s a different atmosphere that makes people friendly and want to talk and interact. If you haven’t been there, go there.” -Dan H, 2/28/2014

Finally, one factor that is important to consider in the context of livability and sense of community is how a shared street will look and feel at different times of day and at different points in the week. Depending on individual circumstances, a shared street may or may not divert traffic to other routes. (This is something that traffic engineers and planners would want to study when considering whether or not to implement a shared street.) In the context of livability and sense of community, this is significant because the presence of vehicles creates “eyes on the street,” so diverted traffic (particularly in the evening) has the potential to create vacant streets. Further, in central business districts, people are primarily present during the day, so shared streets have the potential to work really well during the day with lots of pedestrian activity from nearby employment centers, yet feel empty at night. This should be avoided. While some communities in these situations may decide that shared streets are not the right solution for them and therefore choose alternative placemaking street design solutions, there is another option.

Shared streets can function as a shared space at some times and as a conventional street with free-flowing traffic, or a pedestrian-only space, at other times. In the case of a location that may become vacant at night, a shared street can function as a shared space during the day and transition to a more conventional street in the evening. A key benefit of shared streets is that they can serve as flexible spaces that meet a variety of community goals and needs. Shared streets can also house farmers markets, festivals, and other local celebrations on a short-term basis, which can go a long way in increasing livability and sense of community.
Economics

This section attempts to start the conversation on the economic impact of shared streets. It is difficult to prove that a given shared street caused economic outcomes rather than merely being correlated to those outcomes. Data availability was a major limitation in this analysis, so additional research is needed. To begin to prove causation, one would need to look at economic factors before and after the shared street intervention and compare that to economic factors before and after for (1) a place that already had a shared street and (2) a place that was not converted to a shared street. One would need to demonstrate that the economic gains seen on the new shared street exceeded those in the other two scenarios. Unfortunately, this data does not exist. Very few shared street projects collect any before/after data, not to mention control data. Therefore, this section only compares economic factors before and after shared street interventions. One cannot conclude from this analysis that economic shifts were caused by the shared space, as economic changes might have been due to a whole host of factors, but the author hopes this compilation of existing economic data can serve as the basis for further research.

In Auckland, New Zealand, total consumer spending in the Fort Street area between the months of January and June increased from $4,211,304 in 2009 (pre-shared space) to $6,988,452 in 2012 (post-shared space), an increase of 65% (Auckland City Council 2012). Further, 75 percent of property owners determined that it was valuable being sited near or adjacent to a shared space, and almost half of those surveyed (49%) would visit the area more often as a destination in its own right (Auckland City Council 2012).

In Brighton, England, 80% of businesses felt that the improvements to New Road had been good for their business (Mayor and Coleman 2011). “Interestingly, a majority of respondents referred to social and emotional benefits rather than financial gains when asked to explain the impact on their business” (Mayor and Coleman 2011). The Mash Tun pub estimated that since New Road was redesigned, average takings had increased by 200% and closer to 300% at the height of the summer (Mayor and Coleman 2011). The Colonnade Bar thought that overall business had increased by approximately 33% (Mayor and Coleman 2011).

In Pittsburgh, the area surrounding Market Square has witnessed a huge amount of development since the project’s completion. “Reactivating the Square has released pent-up demand for private investment. Within a two-block radius of Market Square, there is over half a billion [dollars] of private funds committed. These funds represent a mix of large property owners, small local developers, a transit project, a university expansion, historic renovations, and new construction” (IDA 2011). In conjunction with this project, 24 new restaurants and 387+ new residential units were built or under construction in and around Market Square, 12 buildings were rehabbed, 16 buildings received façade improvements, 6 infrastructure improvement projects were undertaken, and 4 new office buildings were under construction as of 2011 (PDP 2015, Downtown Pittsburgh Investment Map). Some of this development is still underway.

There is limited data available on changes in Market Square’s businesses over time. Using a combination of Google Maps and Yelp, the author determined that there are approximately 28 retail establishments on Market Square, 25 of which are restaurants and cafes. Of those 25,
only 7 were established before the Market Street redesign was completed in 2010. This means that Market Square experienced high turnover of retail establishments and/or filled vacant spaces. *Table 3* explores visitors’ perceptions of the shared street and plaza, highlighting Yelp reviews from before and after the redesign. Arguably, if customers liked the public space better after the redesign, this would positively affect business, though specific economic effects cannot be determined from this analysis.

It would be valuable to conduct further research on the economic impacts of shared streets, as this data is virtually non-existent in the literature.

Table 3: Opinions of the Market Square area from Yelp reviews

<table>
<thead>
<tr>
<th>Pre-Renovation Comments</th>
<th>Post-Renovation Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>• “My only complaint about this particular Primanti Bros in market square is the people that it generates. Anywhere from hookers to crackheads. I have been in there several times, and at least 4 or 5 times I watched someone get kicked out for doing something illegal. My advice is, if you can, go to this Primantis during the day for lunch - don’t go at night.” -Tia H. Oct 2009</td>
<td>• “Awesome place … within steps of a seriously nice plaza lined with food stores, the Primantis store, and several others.” -Louis B. Oct 2011</td>
</tr>
<tr>
<td>• “The location is nice. Market Square is a nice area. Brick inlaid street.” -Mark A P. Sept 2007</td>
<td>• “Tip: Go on Thursday afternoons when Market Square has their farmer’s market and pick up some fresh produce and pierogies...” -Kerry H. Aug 2011</td>
</tr>
<tr>
<td>• “Outdoor seating on the square is also nice.” -David T. June 2009</td>
<td>• “I think the only drawback to this restaurant is its location … I usually have to circle around the block a couple of times to find parking.” -Renascent C. Mar 2012</td>
</tr>
</tbody>
</table>

3. These 7 retail establishments were: Original Oyster House (established 1916), Nicholas Coffee (established 1919), La Gondola Pizzeria (established 1978), Primanti Bros (established ~2006), Starbucks (established ~2009), Moe’s Southwest Grill (established ~2009), and Las Velas (established 2009).
Chapter 4: BEST PRACTICES

It is important to note that there is no formula for what a shared street should look like. Each street is unique and each community has unique needs and desires, so there should not be a cookie cutter approach to shared streets. That said, several best practices emerged from the literature review and interviews that seem broadly applicable. These criteria are used to analyze the case studies explored in Chapter 5.

Land Use and Density of Pedestrians

One of the most important elements necessary for shared streets to be successful is an appropriate level of activities on the street edges. Pedestrians are drawn to shops, cafes, restaurants, museums, parks, and other activities, so if a street lacks activities for pedestrians, they will not linger. (See Figures 17, 18, and 19.) Further, a steady stream of pedestrians is critical for getting motorists to slow down. What constitutes an “appropriate” level of pedestrian density is up for debate. Oliver Schulze, who worked on the design of New Road for Gehl Architects, uses a 4:1 ratio as a general rule of thumb (Schulze, interview #10). He believes that for a shared street to be successful, you need four pedestrians for every car and generally low levels of car traffic at all times of the day. This ratio may not be appropriate for every situation, but the basic takeaway is that a shared street needs to have significant pedestrian volumes (and Schulze argues, limited car volumes) to work successfully.

“[Monderman’s] ideas have sometimes been mistranslated across the Atlantic to suggest that he advocated removing all signage from every intersection everywhere. In reality, he believed the idea was only a good fit in the right contexts. Highways, obviously, are not the right context. But intersections that already resemble plazas or
village squares may be” (Badger 2011). Shared streets are not appropriate everywhere.

It should also be noted that the surrounding buildings themselves should influence the design of a shared street. A shared street that serves a school would be different than one that serves a park or pub (Hamilton-Baillie, interview #6). It is also important to look at pedestrian desire lines and how people are getting across the street, which is something that conventional traffic engineering often overlooks (Hamilton-Baillie, interview #6). The street design must reflect what is happening in the surrounding environment.

**Robust Public Participation Process**

It is essential for decision-makers and designers to involve the public at the very beginning of a street design project to think through how to redesign a street and if a shared street makes sense for the community. Those who are affected by a decision have a right to be involved in the decision-making process (“IAP2 Core Values” 2014). Shared streets are not right for every community, so it is best to initially have a broader, robust conversation with a community on what their goals are for a given street and how they envision the space (Toth, interview #11). Bringing the public into the process early goes a long way in building trust with the community and getting buy-in for the final decision.

It is also critical to involve the full range of stakeholders affected by a project in the process. Shop owners, nearby residents, and individuals with disabilities should be involved, as should the “unusual suspects” that are typically excluded from decision-making processes, such as the single mother working multiple jobs and non-English speakers. Shared streets might be one of many solutions discussed, but shared streets will only work if residents and land owners are involved and buy into that solution. Public participation processes, if designed well and carried out effectively, help produce sustainable, enduring solutions.

Citizens will be skeptical and probably opposed to shared streets at first since it is such a novel concept in America with very few examples. This is okay, and urban designers will likely have to tweak some aspects of their designs to accommodate public desires and alleviate public fears, even if it means implementing a design that is not ideal in the minds of the designers. In Haren, Germany, the Mayor was initially disappointed that he had to compromise his vision for a “pure shared space” in order to get citizens to buy in (Toth 2009). For example, the city included crosswalks because seniors were concerned about crossing the road safely, and it relocated bicycle parking to address shopowners’ fear of cars parking too close to their shops (Toth 2009). “[The Mayor] decided that he would need to settle for a very good Shared Space that he could build during his term, rather than continue to fight for a perfect Shared Space that might only exist in his imagination if he didn’t yield” (Toth 2009).

Further, even if shared streets are not received with open arms at first in American cities, it is important to begin to have that dialogue with the public and through the press. Ben Hamilton-Baillie argues, “no publicity is bad publicity.” A local television presenter wrote a two-page rant in a local newspaper against the Ashford shared street stating, “This is madness, millions will die!” Yet, Hamilton-Baillie said, “it was great because what he articulated there was exactly the underlying skepticism of the public. It allowed us to really open the debate about safety, and two years later say, ‘What was the problem?’ … Once you’ve got one scheme that feels right, the second and third are really much easier” (Architecture Norway 2011).
Delineation of Zones

While shared streets lack the formal demarcation of different uses found in conventional streets, such as road striping and curbs, in order to blur the line between the public realm and the space for cars, it is helpful to offer subtle cues for how people are intended to use the space through street design. For example, where designers place lamp posts, benches, trees, and trash cans provide intuitive cues for where people should and should not drive or sit. Changes in street material texture and color can also have the same effect. For example, New Road uses long, light grey stones to mark the car-free zone, as shown in Figure 20. Informal delineation of zones is also critical for accommodating Americans who have disabilities.

Americans with Disabilities Act

Shared streets must be designed to comfortably accommodate Americans with disabilities and meet Americans with Disabilities Act (ADA) requirements. Shared streets are beneficial to pedestrians in wheelchairs because the street is flush, making wheelchair ramps unnecessary. “Disabled parking spaces should be marked and positioned away from obstacles so they do not impede the use of an automatic lift or wheelchair” (Witte and Meisel 2011).

However, shared streets can be more challenging for the blind given the lack of curbs, so informal delineation of zones is critical for these users. (Chapter 6 discusses these challenges in more detail.) In order for blind pedestrians to be
confident using a shared street, the space for vehicular traffic must be distinct enough from the rest of the street. “It may be necessary to develop a pedestrian through route that is clear of obstacles and free of motor vehicles. This can be accomplished through careful placement of street furniture or planters and the use of textured [materials] demarcating the preferred path” (Witte and Meisel 2011).

A variety of different techniques can be used instead of curbs to signal to blind users the preferred path and where the transition between zones happens. New Road in Brighton, England used linear drainage channels. (See Figure 21.) Exhibition Road in London used linear drainage channels and “corduroy” tactile strips. (See Figure 22.) The project team conducted trials on the suitability of corduroy paving. “The trials demonstrated that an 800 mm wide strip of corduroy tactile paving could be reliably detected by blind and partially sighted people. The trials also found it didn’t represent a barrier to mobility-impaired people” (UK Department for Transport 2011). Some streets use small, dark stone pavers to achieve the same effect. Others incorporate typical truncated domes (See Figure 23). Each shared street uses a slightly different approach. “For many partially sighted people, tonal contrast is especially useful in enabling them to perceive boundaries such as the edge of the carriageway or the comfort space. However, complicated surface patterns can be confusing and disorientating, and this needs to be taken into account when incorporating them into street designs” (UK Department for Transport 2011).

There is no recipe for making shared streets accessible for all users, and it is essential to work with local advocacy groups and individuals with disabilities to find solutions that will work for them. This comes back to the importance of involving the public early in the process. In Poynton, England, the project team involved
blind people that lived in the village from the project onset in designing and testing different materials, lighting, and fixtures (Hamilton-Baillie, interview #6). This engagement was extremely helpful, and the project team was able to make appropriate adjustments to the design to accommodate the needs of these individuals. Other shared streets projects have not been as successful in accommodating people with disabilities and significant obstacles remain, so there is still a lot to learn.

Transitions into Shared Street

It is important to incorporate a transition from a conventional asphalt street to a shared street that alerts drivers there is an upcoming change in the street. “Ideally, the feature would encourage drivers to slow down to the scheme’s design speed before entering the shared area” (UK Department for Transport 2011). Drivers need to feel like they are leaving the conventional street system and entering into a pedestrian environment in which they are guests (PPS 2015). Figure 24 shows an example of a transition into a shared street.

Some techniques for achieving this are grade changes, small corner radii, visual narrowing (e.g. trees on either side of the entry point), changes in surface texture and color, signage, narrowed road width, and gateway features that reduce the visual (or actual) height, such as an arch or sculpture (UK Department for Transport 2011). (See Figure 25.) Entrances are a great place to incorporate art and celebrate local culture (PPS 2015).

Placemaking

Placemaking is crucial when designing shared streets. The Project for Public Spaces describes placemaking as the following:

Placemaking is both a process and a philosophy. It is centered around
observing, listening to, and asking questions of the people who live, work, and play in a particular space in order to understand their needs and aspirations for that space and for their community as a whole. With this knowledge, we can come together to create a common vision for that place ... Placemaking shows people just how powerful their collective vision can be. It helps them to re-imagine everyday spaces, and to see anew the potential of parks, downtowns, waterfronts, plazas, neighborhoods, streets, markets, campuses and public buildings ... It results in the creation of quality public spaces that contribute to people’s health, happiness, and well-being (PPS 2015, *What is Placemaking?*).

Ultimately, placemaking is about creating lively, welcoming public places where people want to hang out (Badger 2013). Placemaking is a buzzword that is overused and thus often disliked by planners. But it still plays a vital role in urban planning and design. (See Figures 26 and 27.)

In order to be successful, a shared street design needs to speak to the uniqueness and history of the location – art, culture, and heritage should be built into the design (Lockwood, interview #8). This serves a dual purpose. First, it serves to create a space that the community relates to, is proud of, and wants to spend time in. Second, it serves to create an engaging environment that captures motorists’ attention and slows them down. Ben Hamilton-Baillie said, “You’re trying to change the expectations of the driver. And to do that, ... you try to downplay the linear perspective you get on a freeway and emphasize the spatial qualities of a place. [You emphasize] placemaking over linearity” (Hamilton-Baillie, interview #6). Jan Gehl espouses techniques for achieving this goal, including human scale design rather than car scale design, architecture with soft edges and varied facades, and a sense of enclosure.

Figure 27: Example of placemaking. Source: Herald Halifax
Chapter 5: CASE STUDIES

Shared streets can be applied to many different types of streets—commercial streets with lots of pedestrian activity, narrow streets or alleyways, high traffic volume streets, squares and street intersections-only, low traffic volume residential streets, and streets acting as linear parks, to name a few. This section of the report highlights existing examples in three types of streets common in urban areas—New Road in Brighton, England as an example of a Commercial Street with Lots of Pedestrian Activity, Exhibition Road in London, England as an example of a High Traffic Volume Street, and Market Square in Pittsburgh, Pennsylvania as an example of a Square and Intersection.

The main criterion used for selecting these case studies were that the designs were inspiring, the street type was common in American cities, and it had design elements that could be applied elsewhere. The author originally wanted to exclusively explore American case studies, but there was either not an American example for a given street type or international examples were clearly superior. While these case studies are unique to their specific location and arguably could not be replicated successfully in their entirety, it is still helpful to look at success stories and extract aspects of the designs that could be successful in other locations as well.

Figure 28: Cady’s Alley in Washington, DC
Commercial Street with Lots of Pedestrian Activity

A common street type in America is a small- to medium-volume commercial street characterized by shops and restaurants that has high volumes of pedestrians. Shared streets can be very successful in this environment because there is enough density of activities to support the space. There are some examples of shared streets that fall in this category in America. Pike Place Market in Seattle was not designed as a shared street and has curbs, but in many ways, it functions as a shared street. Palmer Street in Cambridge, MA and Wall Street in Ashville, SC are examples of narrow streets and alleyways that are also shared shopping streets. However, the example that is most inspiring is New Road in Brighton, England.

High Traffic Volume Street

Another common street type in America is a high traffic volume street that may include public transportation, such as buses and streetcars. *Shared streets are not appropriate on many high traffic volume streets*, but they could be successful in locations that have enough density of activities to support the space. There is not a precedent for this type of shared street in America, but there are a few examples in Europe. Poynton in Cheshire, England is a shared street intersection, which will be discussed more under that classification, but it also arguably fits under this category as well because it experiences high vehicular volumes that include buses and trucks. Exhibition Road in London is another commonly cited example.

Squares and Intersections

Shared streets can also be applied to street-intersections and squares, extending slightly onto surrounding streets to serve as the gateway into the shared street. Conventional intersections often end up serving as a thoroughfare, with speeding drivers anxious to make it through the green light. As a result, intersections can be particularly hostile to pedestrians. Yet, there is a lot of potential for placemaking in squares and intersections. Poynton in England is the most famous example of a shared street intersection. This intersection experiences high vehicular volumes, as it is the main junction of Park Lane, the A523 London Road, and the A5149 Chester Road. While this intersection previously bisected the village in two, the conversion to a shared street unified and revitalized the village center without negatively impacting traffic. The author is only aware of two examples of shared streets that fall in this category in America—the intersection of Broadway & Willamette Street in Eugene, Oregon and Market Square in Pittsburgh, Pennsylvania.
NEW ROAD: BRIGHTON, ENGLAND

Designer: Gehl Architects
Constructed: 2007
Right of Way: ~47 feet
Cost: $2.49 million (£1.75 m)

Overview

New Road is one of England’s first shared streets. Gehl Architects redesigned this main street in central Brighton as a flush street that permits all modes of transportation, but is primarily intended for, and used by, pedestrians (Community Design + Architecture 2013). Brighton’s Royal Pavilion and its Gardens bound the street on the eastern side, and the western side has numerous shops, restaurants with outdoor seating, a theater, a few offices, and a church.

Key features

New Road successfully utilizes different paving materials and furniture placement to delineate informal zones. As discussed earlier, the linear drainage system marks the zone for sitting; long grey stones intermixed with multicolored pavers mark the zone for pedestrians to walk on the eastern side; linear black and white stones mark the transition to the pedestrian zone on the western side; and light grey pavers mark the zone for café seating and for pedestrians to walk on the western side.

New Road also offers beautiful, unique, custom-made wooden benches that create a distinct sense of place and invite people to linger on the street. They are so successful because the design speaks to how people use the street and to the adjacent land use. The benches also inherently encourage everyday citizens to take ownership of the street by putting more “eyes on the street” (PPS 2015, What is Placemaking?) It is arguably one of the best placemaking initiatives in a shared street to date.

Before

![Before](image)

After

![After](image)

Source: Mayor and Coleman 2011

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Scale: 1” = 10’
Takeaways

• **Data collection helps bolster the case for shared streets.**

New Road is one of few shared street schemes that conducted before and after analyses. While many of the benefits of shared streets may seem intuitive to project consultants or even cities, this type of data collection can be important to making the case for implementing shared streets elsewhere. Since its opening, vehicular “traffic levels have dropped by 93%, the number of pedestrians has increased by 62%, and there has been a massive 600% increase in lingering activities...Today 86% would like to see more areas like New Road in their city” (Gehl Architects 2015).

The consultants conducted 183 post-project interviews/surveys with various street users: people spending time in the street, people moving through the street, homeless people and street drinkers, and businesses (Mayor and Coleman 2011). The research analyzed what users like and do not like about the street design before and after, why they spend time there, what emotional impact the street has on them, how businesses have been impacted, impact on perceived priority of street users, impact on how people behave in the street, and more.

• **Robust public involvement is key to winning over skeptics.**

A variety of workshops and meetings were held with local residents, stakeholders, public officials, and businesses to discuss their vision for the space, share design ideas, and work through areas that may have been overlooked. Gehl Architects used the local context as a basis for finding solutions. “How people use spaces helps us design places” (Gehl Architects 2015). Through a survey and observation, they gained an understanding of who used the street, how they moved, and what physical features existed (Gehl Architects 2015). They spent a lot of time talking to people so they would know how to respond to their needs and help them improve the environment they live in (Gehl Architects 2015). This type of data analysis proved to be helpful in diffusing tension and alleviating fear of change (Gehl Architects 2015).

• **High quality materials can go a long way in the right environment.**

In an interview with the author, urban design consultant, Oliver Schulze, described that there is a spectrum of successful shared streets: on one end, you can have a street that uses expensive, natural stone paving, custom-made furniture using timber, and lighting integrated into furniture—all the treatments you would use for an exclusive plaza design. These features can go a long way in giving the street a sense of place. This worked well on New Road because high pedestrian volumes are attracted to the historic museums and restaurants nearby. However, such a fancy design would be out of place in a residential area and not a wise use of money. On the other end of the spectrum, you can have a much cheaper design—an asphalt street without signage and curbs. This might work well in a residential area. Sometimes asphalt is just as good—it can be a great surface for playing on. Shared streets can work at all levels of the spectrum (Schulze, interview #10).
EXHIBITION ROAD: LONDON, ENGLAND

Designer: Dixon Jones
Constructed: 2011
Right of Way: ~78 feet
Cost: $41.3 million (£29 m)

Overview
Exhibition Road is a main street in central London that is lined with popular museums, such as the Natural History Museum and the Victoria and Albert Museum, shops, restaurants, and offices. The street attracts roughly eleven million visitors each year (CCCB 2016). A half-mile section of the street was redesigned in 2011 because it was difficult for pedestrians to cross the busy street, as there were few crosswalks, and many felt the street’s appearance was “cluttered, unattractive and not very worthy of its prestigious institutions” (CCCB 2016). Today, Exhibition Road is a shared street, though it continues to serve as a through route with a 20 mph speed limit for transit and two-way car traffic (CD+A 2013). Some segments carry up to 1,000 vehicles per hour (CD+A 2013).

Key features
Even though Exhibition Road is a busy street, it still delineates zones. In the busiest section of the redesigned corridor, there are four meter wide pedestrian zones on either side of the street, and in the center, there are two lanes for traffic and an eight meter wide “transition zone” (RBKC 2016).

Exhibition Road’s striking black and white paving speaks to the nature of the adjacent museums by serving as a piece of art in its own right and a bridge between the museums. Unlike other shared streets, the paving is uniform from edge to edge and does not change from one zone to the next. (See Figure 17.)

The street also features vertical, black drains and ribbed (“corduroy”) paving to alert blind users that they are reaching the edge of the pedestrian-only zone. (See Figure 22.)
**Takeaways**

- **The outcomes are a mixed bag.**

On one hand, many feel the environment for pedestrians and cyclists is significantly improved. Some pedestrians appear to use the full extent of the road, as intended. On the other hand, some argue that the benefits do not outweigh the high cost of this project.

Many pedestrians appear to only utilize the pedestrian zone on the outer edge of the street, as shown in Figure 32, and this might be correlated with the fact that Exhibition Road is a busier street. Further, the street design has not adequately slowed vehicles down at all times of day or on all sections. One interviewee who has visited Exhibition Road noted that the southern portion of the corridor functions better than the northern portion (between Kensington Road and Prince Consort Road), where speeds are often higher. While vehicles roughly adhered to the speed limit during peak pedestrian and vehicle flow times (10:00 to 4:00), the hourly 85th percentile speed, or the speed most motorists adopt, exceeded the speed limit when averaged across a 24-hour period (RBKC 2012, PPS 2015).

The author argues that fluctuating speeds at different times of days is not inherently bad. As noted in Chapter 3, it can be detrimental for a street to empty out at night (as might be the case on Exhibition Road when museums close). Vehicular traffic creates “eyes on the street” when there are fewer pedestrians. So it is possible for a street to function well as a shared street at certain times of day and act as a more conventional street with free-flowing traffic in the evenings, though this may or may not be the case on Exhibition Road.

- **Public transportation can be successful on shared streets.**

Exhibition Road demonstrates that public transportation can successfully be integrated into shared streets. It is helpful for the design team to start a conversation with the transit agency(ies) at the beginning of the project. It is also crucial that transit drivers go through a training program to learn about appropriate speeds and responses on shared streets (Hamilton-Baillie, interview #6).

- **There are significant safety concerns for blind and deaf users on high traffic volume streets.**

Despite the project team’s commitment to working with the blind community and incorporating their feedback into the design, many feel Exhibition Road did not get the design quite right. High traffic volume streets with transit have the potential to be more dangerous than low volume streets, and more research is needed to determine best practices. That said, designing shared streets that are safe for blind and deaf users is not impossible. The best design solutions will undoubtedly vary from community to community, so it remains crucial to work with the disabled community at the onset of a shared street project and, for the sake of other communities considering shared streets, share the design and results.

- **Shared streets are not appropriate on many high traffic volume streets.**

Exhibition Road is an interesting case study because it is one of the few examples of its kind, but this model won’t work everywhere.
MARKET SQUARE: PITTSBURGH, PA

Designer: Klavon Design
Constructed: 2010
Right of Way: ~48 feet
Cost: $5 million

Overview

Market Square is one of the first and most well known shared streets in the United States. Vehicles and buses are no longer permitted to drive through the square; buses were redirected onto other streets, and automobiles from Forbes Avenue and Market Street are only permitted to travel counter-clockwise around the perimeter of the square. The perimeter road is a shared street, so there are no curbs or road surface markings (i.e. striping), and there is minimal signage. Motorists around the square drive slowly, and motorists and pedestrians navigate the space via eye contact. There are numerous cafes and restaurants around the perimeter of the square.

Key features

Like other successful shared streets, Market Square utilizes different paving materials and furniture placement to delineate informal zones. (See Figure 3 and Figure 6.) The street reconfiguration also preserved the square itself for pedestrians. The square is designed to be flexible and serve a variety of different uses. The square features movable café seating, which is very popular with downtown professionals at lunchtime, and it hosts numerous events throughout the year, including a weekly farmers market, Yoga in the Square, Dancing in the Square, a night market, and more. (See Figure 31.)
Takeaways

• **Success is largely determined by adjacent land uses.**

Market Square is arguably so successful because it is in the heart of downtown and is lined with cafes and restaurants, attracting tourists and business workers alike. Pedestrians are drawn to shops, cafes, restaurants, museums, parks, and other activities, so if a street lacks activities for pedestrians, they will not linger.

• **Programming can help activate squares and intersections.**

The Pittsburgh Downtown Partnership, Market Square Merchants Association, and the City of Pittsburgh have done a phenomenal job hosting a variety of activities and events that cater to a variety of different audiences. In addition to these official events, Market Square also hosts individual, one-off events like private weddings, non-profit fundraisers, and flash mobs.

• **It may be necessary to compromise on your design.**

Unlike some shared streets, Market Square has crosswalks with truncated domes. Although the literature does not explicitly explain the rationale behind this design decision, this deviation from conventional shared streets was likely a result of community engagement and concerns from the Americans with Disabilities (ADA) community. A key takeaway is that it may be necessary to deviate from a designer’s perceived “ideal” aesthetic design in order to achieve community support. Again, it should not matter if a street is a “pure” shared space as envisioned by Monderman. What matters is whether a street is functioning in a way that enables all users to intermix comfortably and that the environment has been altered in a way that people negotiate the space more civilly, using eye contact to navigate the street. Market Street accomplishes this goal, as pedestrians are found crossing the square’s streets at all angles and locations, as intended.
Shared Streets in the United States

Note: The following is a list of all known shared streets in the United States. Other less-publicized examples may exist.

<table>
<thead>
<tr>
<th>Commercial Streets with Pedestrian Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Kalamazoo Outdoor Pedestrian Mall, Kalamazoo, MI</td>
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<tr>
<td>• Church Street, Orlando, FL</td>
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<tr>
<td>• Court Street and Washington Street, Binghamton, NY</td>
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<tr>
<td>• First Street, Jacksonville Beach, FL</td>
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<tr>
<td>• College Street, Jefferson Street, Gilmer Street, and Oak Avenue, Sulphur Springs, TX</td>
</tr>
<tr>
<td>• Argyle Street, Chicago, IL (under construction)</td>
</tr>
<tr>
<td>• Allen Street, Buffalo, NY (in planning phase/under construction)</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Urban Side Streets</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Festival Streets (NW Flanders and NW Davis), Portland, OR</td>
</tr>
<tr>
<td>• Rosemary Street, West Palm Beach, FL</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Narrow Streets and Alleyways</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cady’s Alley, Washington, DC</td>
</tr>
<tr>
<td>• Wall Street, Asheville, NC</td>
</tr>
<tr>
<td>• Palmer Street, Cambridge, MA</td>
</tr>
<tr>
<td>• Winthrop Street, Cambridge, MA (no cars at certain times)</td>
</tr>
<tr>
<td>• Linden Alley, San Francisco, CA</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Squares and Intersections</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Market Square, Pittsburgh, PA</td>
</tr>
<tr>
<td>• Broadway &amp; Willamette, Eugene, OR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Green Streets and Linear Parks</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bell Street, Seattle, WA</td>
</tr>
</tbody>
</table>
### Residential
- Longfellow Street, Santa Monica, CA
- SW Pennoyer and SW Lane in Portland, OR

### Quasi-Shared Streets / Not Designed as Shared Street, but Functions as One
- Terry Street, Seattle, WA
- Pikes Place Market, Seattle, WA

### Shared Streets Under Consideration / Study
- Preston Street, Mount Pleasant/Central Michigan University, MI
- San Pablo Avenue, Oakland, CA
- Penn Avenue, Stanwix Street, and Liberty Avenue, Pittsburgh, PA
- Michigan Street and Saint Joseph Street, South Bend, IN
- King Street, Alexandria, VA
- Downtown Alley/Garage Access Road, Fairhope, AL
- Adamson Square, Carrollton, GA
Chapter 6: CHALLENGES AND CONCLUSIONS

This chapter will first discuss several challenges to implementing shared streets in America that practitioners should be aware of. It will then briefly outline a strategy for encouraging cities to implement shared streets. This chapter concludes with conclusions and key takeaways on the application of shared streets in America.

Challenges to American Implementation
Policy, Legal, and Cultural Challenges

Shared streets face several policy, legal, and cultural challenges in the American context. First, blind and deaf individuals have significant concerns about shared streets, and shared streets in the U.S. must adhere to the Americans with Disabilities Act (ADA). One concern is that shared streets provide an unfamiliar landscape that blind and deaf individuals would need to learn to navigate. Curbs play a large role in how guide dogs are trained, so the lack of curbs on shared streets can be problematic.

Figure 32: Pedestrians only utilizing the outer edge of Exhibition Road. Source: aseasyasridingabike.wordpress.com

One option depending on how many blind individuals live in, work in, or visit the area is for the city to pay for retraining the guide dogs. This has been discussed in other shared street schemes. Another concern is that a lack of crosswalks could be dangerous for those who cannot see or hear oncoming cars (PPS 2015). This is the reason some shared street schemes, such as Market Square, are not “pure” shared spaces as Hans Monderman envisioned. The best way of addressing these concerns is to engage disability groups at the very beginning of the planning process to ensure that the street design accommodates the needs of those with disabilities (PPS 2015). Poynton appears to have done this successfully.

Second, it is important to acknowledge legal differences between the United States and European countries. When a collision occurs between a motor vehicle and a pedestrian in many European countries, the motorist is
automatically at fault (Hugh 2015). An extra responsibility is placed on drivers to watch out for pedestrians and cyclists. In America, this is not the case. A 2002 study of pedestrian-vehicle crashes in Washington, D.C. and Baltimore found that pedestrians were more likely than motorists to be at fault (50 percent versus 39 percent) (Preusser et al 2002). This is true in many other parts of the country as well. Therefore, motorists are more likely to be reckless, and pedestrians are more likely to be cautious in the street. This is a challenge for shared streets. This is not to say that shared streets cannot be successful in America. It may just take a little more time and convincing to make Americans comfortable with the idea of a sharing the street.

In a similar vein, public perception is a challenge. Shared streets are radically different than conventional American streets, and people are often resistant to change. Many people oppose complete streets projects because they don’t want to give up parking and are concerned about slower speeds for motorists, and these will be challenges for shared streets as well. It will be important for cities and consultants to gather examples of successful shared streets in other places (particularly in the United States) as well as data to ease fears and skepticism. Some communities may never get on board with the idea of shared streets, and they are not the right solution for every community.

Additionally, even though shared streets are fairly common in Europe, minimal before and after research has been conducted on factors such as public opinion, travel time, pedestrian volumes, collisions, etc. While data is not necessarily essential and many people intuitively prefer shared street outcomes over the conventional design (as Yelp data in Pittsburgh showed), data would help make the case to politicians and community members that are trying to decide if a shared street is right for them.

Finally, strong political will and leadership is needed to overcome some of these challenges, and this does not exist in all cities and towns. Not everyone buys into the importance of complete streets and the mutual benefits associated with sharing the public street space. Without some champions in the public sector (or the community), it will be difficult to implement shared streets in a given community.

**Regulatory Challenges**

Many people have the perception that shared streets face considerable regulatory challenges, making them difficult to implement in the United States. This section explores if that perception is accurate. The AASHTO “Green Book” provides guidance to American engineers, planners, and designers on how to design the physical geometry (e.g. lane widths, corner/turning radii, etc.) of our highways, and many states and local agencies have adopted the Green Book as their geometric design standards or design manual. The Federal Highway Administration’s (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) serves as the national standard for all traffic control devices installed on any street, highway, bikeway, or private road open to public travel. This includes signs, traffic lights, and road markings, such as sharrows and other surface paint. The Green Book and MUTCD are both backed by the force of the law, as they are authorized under Title 23, United States Code and Title 23, Code of Federal Regulations. Fortunately, neither of these documents would prevent a city from implementing a shared street.

The Green Book is intended to serve as guidance, and cities are not obligated to adhere to it under all circumstances, as
The intent of this policy is to provide guidance to the designer by referencing a recommended range of values for critical dimensions. Good highway design involves balancing safety, mobility, and preservation of scenic, aesthetic, historic, cultural, and environmental resources. This policy is therefore not intended to be a detailed design manual that could supersede the need for the application of sound principles by the knowledgeable design professional. Sufficient flexibility is permitted to encourage independent designs tailored to particular situations. Minimum values are either given or implied by the lower value in a given range of values. The larger values within the ranges may be used where social, economic, and environmental impacts are not critical. Engineering judgment is exercised by highway agencies to select appropriate design values (AASHTO 2011, page xli).

The MUTCD is stricter, as the document is intended to serve as a standard. However, jurisdictions are able to apply to the FHWA for an exception, which is called an “experiment.” The FHWA MUTCD website states, “If you have an idea for a new traffic control device or a different application of an existing device that will improve road user safety or operation, but the device or application is not compliant with or not included in the MUTCD, it is possible to experiment with the device or its use.” Bike boxes, green paint, and other design treatments that are now fairly standard were all experiments. The advantage of conducting a formal experiment is that jurisdictions start building a case for changing the MUTCD standards. In sum, shared streets are feasible under both these regulations.

Another challenge is that cities regulate street dimensions, such as street width, property buffers, and corner radii, in order to adequately accommodate emergency vehicles and underground utilities. The minimum clear street width for emergency vehicles is commonly 20 to 26 feet without parking. It may be necessary to compromise on an ideal street design in order to meet these fire code regulations. For example, it may not be possible to have the optimal corner radius to slow down cars, and lanes may need to be wider, decreasing the sense of enclosure.

### Strategies for Implementation

Cities may want to pass ordinances to support the design and construction of shared streets (Lockwood, interview #8). A few cities around the country, such as Seattle, WA, Cambridge, MA, and Gresham, OR, have already introduced legal codes recognizing shared streets. Ordinances should give engineers, planners, and designers increased legal protection, encourage more experimentation, advocate for documenting assumptions and reasons for various design decisions, and encourage periodic monitoring (Lockwood, interview #8). Ordinances would help give cities and consultants more confidence moving forward with shared streets. However, ordinances should not be overly prescriptive about the location of shared streets, design techniques, and other factors because shared streets are still an evolving concept (Lockwood, interview #8).
Conclusions

There is so much untapped potential in American streets. Streets are essential for the efficient and effective mobility of pedestrians, cyclists, motorists, and transit users. Cities need a larger-grain, faster network of framework streets to support the fine-grained slower network (Toth 2009). However, the time has come to stop prioritizing motorists ahead of other street users.

Our streets should, first and foremost, be designed and operated to ensure safe and comfortable use for all users, including pedestrians, cyclists, motorists, and transit riders. “Streets typically represent the largest area of public space a community has,” and shared streets have the potential to help communities reclaim key streets as places for rich social, cultural, and economic interactions in addition to transportation (PPS 2015).

Shared streets is “an approach that is still in its infancy, and there remain many barriers to overcome, observations to be made, evaluations to be conducted, and experience to be gained” (Hamilton-Baillie 2008, Shared Space). However, momentum is building across the country for complete streets and placemaking solutions, and shared streets are one approach that can work well under the right circumstances. The author hopes this research will help advance our understanding of how shared streets could be applied more broadly in America.
REFERENCES


Interviewees

1. Will Britnell, Connecticut Department of Transportation
2. Brian Byrd, City of Las Cruces
3. Darren Flusche, Toole Design Group
4. Norman Garrick, University of Connecticut
5. Sam Goater, Project for Public Spaces
7. Pete Lagerwey, Toole Design Group
8. Ian Lockwood, Toole Design Group
9. Jeff Rosenblum, LivableStreets Alliance
10. Oliver Schulze, Schulze + Grassov
11. Gary Toth, Project for Public Spaces